6560-50-P

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 63

[EPA-HQ-OAR-2016-0442; FRL-]

RIN 2060-AS92

National Emission Standards for Hazardous Air Pollutants From the Portland Cement Manufacturing Industry Residual Risk and Technology Review

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule.

SUMMARY: The Environmental Protection Agency (EPA) is proposing amendments to the National Emission Standards for Hazardous Air Pollutants (NESHAP) From the Portland Cement Manufacturing Industry to address the results of the residual risk and technology review (RTR) the EPA is required to conduct in accordance with section 112 of the Clean Air Act (CAA). We found risks due to emissions of air toxics to be acceptable from this source category with an ample margin of safety, and we identified no new cost-effective controls under the technology review to achieve further emissions reductions. Therefore, we are proposing no revisions to the numerical emission limits based on these analyses. However, the EPA is proposing amendments to correct and clarify rule requirements and provisions. While the proposed amendments would not result in reductions in emissions of hazardous air pollutants (HAP), this action, if finalized, would result in improved monitoring, compliance, and implementation of the rule.

DATES: *Comments*. Comments must be received on or before **[INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

Public Hearing. If a public hearing is requested by **[INSERT DATE 5 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, the EPA will hold a public hearing on **[INSERT DATE 15 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].** The last day to pre-register in advance to speak at the public hearing will be **[INSERT DATE 13 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

ADDRESSES: *Comments*. Submit your comments, identified by Docket ID No. EPA-HQ-OAR-2016-0442, *at http://www.regulations.gov*. Follow the online instructions for submitting comments. Once submitted, comments cannot be edited or removed from Regulations.gov. The EPA may publish any comment received to its public docket. Do not submit electronically any information you consider to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. 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 *http://www2.epa.gov/dockets/commenting-epa-dockets*.

Public Hearing. If a hearing is requested, it will be held at the EPA WJC East Building, 1201 Constitution Avenue, NW, Washington, DC 20004. If a public hearing is requested, then we will provide details about the public hearing on our Web site at *https://www.epa.gov/stationary-sources-air-pollution/portland-cement-manufacturing-industry-national-emission-standards*. The EPA does not intend to publish any future notices in the **Federal Register** announcing any updates on the request for public hearing. Please contact Aimee St. Clair at (919) 541-1063 or by email at *stclair.aimee@epa.gov* to request a public hearing, to register to speak at the public hearing, or to inquire as to whether a public hearing will be held.

FOR FURTHER INFORMATION CONTACT: For questions about this proposed action, contact Mr. Brian Storey, Sector Policies and Programs Division (D243-04), Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711; telephone number: (919) 541-1103; fax number: (919) 541-5450; and email address: *storey.brian@epa.gov*. For specific information regarding the risk modeling methodology, contact Mr. 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*. For information about the applicability of the NESHAP to a particular entity, contact Ms. Sara Ayres, Office of Enforcement and Compliance Assurance, U.S. Environmental Protection Agency, U.S. EPA Region 5 (E-19J), 77 West Jackson Boulevard, Chicago, IL 60604; telephone number: (312) 353-6266; email address: *ayres.sara@epa.gov*.

SUPPLEMENTARY INFORMATION: *Docket*. The EPA has established a docket for this rulemaking under Docket ID No. EPA-HQ-OAR-2016-0442. All documents in the docket are listed in the Regulations.gov index. Although listed in the index, some information is not publicly available, *e.g.*, 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. Publicly available docket materials are available either electronically in Regulations.gov or in hard copy at the EPA Docket Center, Room 3334, EPA WJC West Building, 1301 Constitution Avenue, NW, Washington, DC. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566-1744, and the telephone number for the EPA Docket Center is (202) 566-1742.

Instructions. Direct your comments to Docket ID No. EPA-HQ-OAR-2016-0442. 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 *http://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 information that you consider to be CBI or otherwise protected through *http://www.regulations.gov* or email. The *http://www.regulations.gov* Web site is an "anonymous access" system, 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 *http://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 disk or CD-ROM 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 *http://www.epa.gov/dockets*.

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:

ACI	activated carbon injection
AEGL	acute exposure guideline levels
AERMOD	air dispersion model used by the HEM-3 model
CAA	Clean Air Act
CalEPA	California EPA
CBI	Confidential Business Information
CDX	Central Data Exchange
CEDRI	Compliance and Emissions Data Reporting Interface
CFR	Code of Federal Regulations
CISWI	commercial and industrial solid waste incinerators
CO	carbon monoxide
D/F	dioxins and furans
EPA	Environmental Protection Agency
ERP	Emergency Response Planning
ERPG	Emergency Response Planning Guidelines
ERT	Electronic Reporting Tool
ESP	electrostatic precipitators
FR	Federal Register
GHGRP	Greenhouse Gas Reporting Program
HAP	hazardous air pollutants
HCl	hydrochloric acid
HEM-3	Human Exposure Model
HF	hydrogen fluoride
HI	hazard index
HQ	hazard quotient
IRIS	Integrated Risk Information System
km	kilometer
lb/hr	pounds per hour

lb/ton	pounds per ton
LOAEL	lowest-observed-adverse-effect level
MACT	maximum achievable control technology
mg/kg-day	milligrams per kilogram per day
mg/m^3	milligrams per cubic meter
mg/Nm^3	milligrams per normal cubic meter
MIR	maximum individual risk
NAAQS	National Ambient Air Quality Standards
NAC	National Advisory Committee
NAICS	North American Industry Classification System
NAS	National Academy of Sciences
NATA	National Air Toxics Assessment
NEI	National Emissions Inventory
NESHAP	national emission standards for hazardous air pollutants
NO_x	nitrogen oxides
NOAA	National Oceanic and Atmospheric Administration
NOAEL	no-observed-adverse-effect level
NRC	National Research Council
NRDC	Natural Resources Defense Council
NSPS	new source performance standards
NTTAA	National Technology Transfer and Advancement Act
OAQPS	Office of Air Quality Planning and Standards
OMB	Office of Management and Budget
PB-HAP	hazardous air pollutants known to be persistent and bio-accumulative in the environment
PCA	Portland Cement Association
PEL	probable effect level
PM	particulate matter
POM	polycyclic organic matter
ppm	parts per million
ppmvd	parts per million by volume, dry basis
PRA	Paperwork Reduction Act
REL	reference exposure level
RFA	Regulatory Flexibility Act
RfC	reference concentration
RfD	reference dose
RTO	regenerative thermal oxidizers
RTR	residual risk and technology review
SAB	Science Advisory Board

SCR	selective catalytic reduction
SO_2	sulfur dioxide
TEF	toxicity equivalence factors
TEQ	toxic equivalents
THC	total hydrocarbons
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
UISIS	Universal Industrial Sectors Integrated Solutions
UMRA	Unfunded Mandates Reform Act
URE	unit risk estimate
U.S.C.	United States Code
WebFIRE	Web Factor Information Retrieval System

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

I. General Information

A. Does this action apply to me?

Table 1 of this preamble lists the NESHAP and associated regulated industrial source category that is the subject of this proposal. Table 1 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), the Portland Cement Manufacturing Industry source category is any facility engaged in manufacturing Portland cement by either the wet or dry process. The category includes, but is not limited to, the following process units: kiln, clinker cooler, raw mill system, finish mill system, raw mill dryer, raw material storage, clinker storage, finished product storage, conveyor transfer points, bagging, and bulk loading and unloading systems.

Table 1. NESHAP and Industrial Source Categories Affected by This Proposed Action

Source Category	NESHAP	NAICS code[1]
Portland cement manufacturing facilities	40 CFR part 63 subpart LLL	327310

[1] North American Industry Classification System.

The source category does not include those kilns that burn hazardous waste and are subject to and regulated under 40 CFR part 63, subpart EEE, or kilns that burn solid waste and are subject to the Commercial and Industrial Solid Waste Incinerator (CISWI) rule under 40 CFR part 60, subparts CCCC and DDDD.

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://www3.epa.gov/airquality/cement/actions.html*. Following publication in the **Federal Register**, the EPA will post the **Federal Register** version of the proposal and key technical documents at this same Web site. Information on the overall RTR program is available at *https://www3.epa.gov/ttn/atw/rrisk/rtrpg.html*.

C. What should I consider as I prepare my comments for the EPA?

Submitting CBI. Do not submit information containing CBI to the EPA through *http://www.regulations.gov* or email. Clearly mark the part or all of the information that you claim to be CBI. For CBI information on a disk or CD-ROM that you mail to the EPA, mark the outside of the disk or CD-ROM as CBI and then identify electronically within the disk or CD-ROM 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 for inclusion in the public docket. If you submit a CD-ROM or disk that does not contain CBI, mark the outside of the disk or CD-ROM 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-2016-0442.

II. Background

A. What is the statutory authority for this action?

Section 112 of the CAA establishes a two-stage regulatory process to address emissions of HAP from stationary sources. In the first stage, after the EPA has identified categories of sources emitting one or more of the HAP listed in CAA section 112(b), CAA section 112(d) requires us to promulgate technology-based NESHAP for those sources. "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. For major sources, 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) and are commonly referred to as maximum achievable control technology (MACT) standards.

MACT standards must reflect the maximum degree of emissions reduction achievable through the application of measures, processes, methods, systems, or techniques, including, but not limited to, measures that: (1) reduce the volume of or eliminate pollutants through process changes, substitution of materials, or other modifications; (2) enclose systems or processes to eliminate emissions; (3) capture or treat pollutants when released from a process, stack, storage, or fugitive emissions point; (4) are design, equipment, work practice, or operational standards (including requirements for operator training or certification); or (5) are a combination of the above. CAA section 112(d)(2)(A)-(E). The MACT standards may take the form of design, equipment, work practice, or operational standards where the EPA first determines either that: (1) a pollutant cannot be emitted through a conveyance designed and constructed to emit or capture the pollutant, or that any requirement for, or use of, such a conveyance would be inconsistent with law; or (2) the application of measurement methodology to a particular class of sources is not practicable due to technological and economic limitations. CAA section 112(h)(1)-(2).

The MACT "floor" is the minimum control level allowed for MACT standards promulgated under CAA section 112(d)(3) and may not be based on cost considerations. For new sources, the MACT floor cannot be less stringent than the emissions control that is achieved in practice by the best-controlled similar source. The MACT floor for existing sources can be less stringent than floors for new sources, but not less stringent than the average emissions limitation achieved by the best-performing 12 percent of existing sources in the category or subcategory (or the best-performing five sources for categories or subcategories with fewer than 30 sources). In developing MACT standards, the EPA must also consider control options that are more stringent than the floor. We may establish standards more stringent than the floor based on considerations of the cost of achieving the emission reductions, any non-air quality health and environmental impacts, and energy requirements.

The EPA is then required to review these technology-based standards and revise them "as necessary (taking into account developments in practices, processes, and control technologies)" no less frequently than every 8 years. CAA section 112(d)(6). In conducting this 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 second stage in standard-setting focuses on reducing any remaining (*i.e.*, "residual") risk according to CAA section 112(f). Section 112(f)(1) of the CAA required that the EPA prepare a report to Congress discussing (among other things) methods of calculating the risks posed (or potentially posed) by sources after implementation of the MACT standards, the public health significance of those risks, and the EPA's recommendations as to legislation regarding such remaining risk. The EPA prepared and submitted the *Residual Risk Report to Congress*, EPA–453/R–99–001 (*Risk Report*) in March 1999. Section 112(f)(2) of the CAA then provides that if Congress does not act on any recommendation in the *Risk Report*, the EPA must analyze and address residual risk for each category or subcategory of sources 8 years after promulgation of such standards pursuant to CAA section 112(d).

Section 112(f)(2) of the CAA requires the EPA to determine for source categories subject to MACT standards whether promulgation of additional standards is needed to provide an ample margin of safety to protect public health. Section 112(f)(2)(B) of the CAA expressly preserves the EPA's use of the two-step process 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 *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 in a challenge to the risk review for the Synthetic Organic Chemical Manufacturing source category, the United States Court of Appeals for the District of Columbia Circuit (the Court) upheld as reasonable 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) ("[S]ubsection 112(f)(2)(B) expressly incorporates the EPA's interpretation of the Clean Air Act from the Benzene standard, complete with a citation to the **Federal Register**."); see also, *A Legislative History of the Clean Air Act Amendments of 1990*, vol. 1, p. 877 (Senate debate on Conference Report).

The first step in the process of evaluating residual risk is the determination of acceptable risk. If risks are unacceptable, the EPA cannot consider cost in identifying the emissions standards necessary to bring risks to an acceptable level. The second step is the determination of whether standards must be further revised in order to provide an ample margin of safety to protect public health. The ample margin of safety is the level at which the standards must be set, unless an even more stringent standard is necessary to prevent, taking into consideration costs, energy, safety, and other relevant factors, an adverse environmental effect.

1. Step 1-Determination of Acceptability

The Agency in the Benzene NESHAP concluded that "the acceptability of risk under section 112 is best judged on the basis of a broad set of health risk measures and information" and that the "judgment on acceptability cannot be reduced to any single factor." Benzene

NESHAP at 38046. The determination of what represents an “acceptable” risk is based on a judgment of “what risks are acceptable in the world in which we live” (*Risk Report* at 178, quoting *NRDC v. EPA*, 824 F. 2d 1146, 1165 (D.C. Cir. 1987) (*en banc*) (“Vinyl Chloride”), recognizing that our world is not risk-free.

In the Benzene NESHAP, we stated that “EPA will generally presume that if the risk to [the maximum exposed] individual is no higher than approximately one in 10 thousand, that risk level is considered acceptable.” 54 FR at 38045, September 14, 1989. We discussed the maximum individual lifetime cancer risk (or maximum individual risk (MIR)) as being “the estimated risk that a person living near a plant would have if he or she were exposed to the maximum pollutant concentrations for 70 years.” *Id.* We explained that this measure of risk “is an estimate of the upper bound of risk based on conservative assumptions, such as continuous exposure for 24 hours per day for 70 years.” *Id.* We acknowledged that maximum individual lifetime cancer risk “does not necessarily reflect the true risk, but displays a conservative risk level which is an upper-bound that is unlikely to be exceeded.” *Id.*

Understanding that there are both benefits and limitations to using the MIR as a metric for determining acceptability, we acknowledged in the Benzene NESHAP that “consideration of maximum individual risk * * * must take into account the strengths and weaknesses of this measure of risk.” *Id.* Consequently, the presumptive risk level of 100-in-1 million (1-in-10 thousand) provides a benchmark for judging the acceptability of maximum individual lifetime cancer risk, but does not constitute a rigid line for making that determination. Further, in the Benzene NESHAP, we noted that:

> “[p]articular attention will also be accorded to the weight of evidence presented in the risk assessment of potential carcinogenicity or other health effects of a pollutant. While the same numerical risk may be estimated for an exposure to a pollutant judged to be a known human carcinogen, and to a pollutant considered a possible human carcinogen

> based on limited animal test data, the same weight cannot be accorded to both estimates. In considering the potential public health effects of the two pollutants, the Agency's judgment on acceptability, including the MIR, will be influenced by the greater weight of evidence for the known human carcinogen."

Id. at 38046. The Agency also explained in the Benzene NESHAP that:

> "[i]n establishing a presumption for MIR, rather than a rigid line for acceptability, the Agency intends to weigh it with a series of other health measures and factors. These include the overall incidence of cancer or other serious health effects within the exposed population, the numbers of persons exposed within each individual lifetime risk range and associated incidence within, typically, a 50 km exposure radius around facilities, the science policy assumptions and estimation uncertainties associated with the risk measures, weight of the scientific evidence for human health effects, other quantified or unquantified health effects, effects due to co-location of facilities, and co-emission of pollutants."

Id. at 38045. In some cases, these health measures and factors taken together may provide a more realistic description of the magnitude of risk in the exposed population than that provided by maximum individual lifetime cancer risk alone.

As noted earlier, in *NRDC v. EPA*, the Court held that CAA section 112(f)(2) "incorporates the EPA's interpretation of the Clean Air Act from the Benzene Standard." The Court further held that Congress' incorporation of the Benzene standard applies equally to carcinogens and non-carcinogens. 529 F.3d at 1081-82. Accordingly, we also consider non-cancer risk metrics in our determination of risk acceptability and ample margin of safety.

2. Step 2-Determination of Ample Margin of Safety

Section 112(f)(2) of the CAA requires the EPA to determine, for source categories subject to MACT standards, whether those standards provide an ample margin of safety to protect public health. As explained in the Benzene NESHAP, "the second step of the inquiry, determining an 'ample margin of safety,' again includes consideration of all of the health factors, and whether to reduce the risks even further.... Beyond that information, additional factors relating to the appropriate level of control will also be considered, including costs and economic impacts of controls, technological feasibility, uncertainties, and any other relevant factors. Considering all of these factors, the agency will establish the standard at a level that provides an ample margin of safety to protect the public health, as required by section 112." 54 FR 38046, September 14, 1989.

According to CAA section 112(f)(2)(A), if the MACT standards for HAP "classified as a known, probable, or possible human carcinogen do not reduce lifetime excess cancer risks to the individual most exposed to emissions from a source in the category or subcategory to less than one in one million," the EPA must promulgate residual risk standards for the source category (or subcategory), as necessary to provide an ample margin of safety to protect public health. In doing so, the EPA may adopt standards equal to existing MACT standards if the EPA determines that the existing standards (*i.e.*, the MACT standards) are sufficiently protective. *NRDC v. EPA*, 529 F.3d 1077, 1083 (D.C. Cir. 2008) ("If EPA determines that the existing technology-based standards provide an 'ample margin of safety,' then the Agency is free to readopt those standards during the residual risk rulemaking.") The EPA must also adopt more stringent standards, if necessary, to prevent an adverse environmental effect,[1] but must consider cost, energy, safety, and other relevant factors in doing so.

The CAA does not specifically define the terms "individual most exposed," "acceptable level," and "ample margin of safety." In the Benzene NESHAP, 54 FR at 38044-38045, September 14, 1989, we stated as an overall objective:

> "In protecting public health with an ample margin of safety under section 112, EPA strives to provide maximum feasible protection against risks to health from hazardous air pollutants by (1) protecting the greatest number of persons possible to an individual lifetime risk level no higher than approximately 1-in-1 million and (2) limiting to no

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[1] "Adverse environmental effect" is defined as any significant and widespread adverse effect, which may be reasonably anticipated to wildlife, aquatic life, or natural resources, including adverse impacts on populations of endangered or threatened species or significant degradation of environmental qualities over broad areas. CAA section 112(a)(7).

> higher than approximately 1-in-10 thousand [*i.e.*, 100-in-1 million] the estimated risk that a person living near a plant would have if he or she were exposed to the maximum pollutant concentrations for 70 years."

The Agency further stated that "[t]he EPA also considers incidence (the number of persons estimated to suffer cancer or other serious health effects as a result of exposure to a pollutant) to be an important measure of the health risk to the exposed population. Incidence measures the extent of health risks to the exposed population as a whole, by providing an estimate of the occurrence of cancer or other serious health effects in the exposed population." *Id.* at 38045.

In the ample margin of safety decision process, the Agency again considers all of the health risks and other health information considered in the first step, including the incremental risk reduction associated with standards more stringent than the MACT standard or a more stringent standard that the EPA has determined is necessary to ensure risk is acceptable. In the ample margin of safety analysis, the Agency considers additional factors, including costs and economic impacts of controls, technological feasibility, uncertainties, and any other relevant factors. Considering all of these factors, the Agency will establish the standard at a level that provides an ample margin of safety to protect the public health, as required by CAA section 112(f). 54 FR 38046, September 14, 1989.

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

The EPA initially promulgated the Portland Cement Manufacturing Industry NESHAP on June 14, 1999 (64 FR 31898), under title 40, part 63, subpart LLL of the CFR (40 CFR part 63, subpart LLL). The rule was amended on April 5, 2002 (67 FR 16614); July 5, 2002 (67 FR 44766); December 6, 2002 (67 FR 72580); December 20, 2006 (71 FR 76518); September 9, 2010 (75 FR 54970); January 18, 2011 (76 FR 2832); February 12, 2013 (78 FR 10006); July 27, 2015 (80 FR 44772); September 11, 2015 (80 FR 54728); and July 25, 2016 (81 FR 48356). The amendments further defined affected cement kilns as those used to manufacture Portland cement, except for kilns that burn hazardous waste, and are subject to and regulated under 40 CFR part 63, subpart EEE, and kilns that burn solid waste, which are subject to the CISWI rule under 40 CFR part 60, subparts CCCC and DDDD. Additionally, onsite sources that are subject to standards for nonmetallic mineral processing plants in 40 CFR part 60, subpart OOO are not subject to 40 CFR part 63, subpart LLL. Crushers are not covered by 40 CFR part 63, subpart LLL regardless of their location. Subpart LLL NESHAP regulates HAP emissions from new and existing Portland cement production facilities that are major or area sources of HAP, with one exception. Kilns located at facilities that are area sources, are not regulated for hydrochloric acid (HCl) emissions.

Portland cement manufacturing is an energy-intensive process in which cement is made by grinding and heating a mixture of raw materials such as limestone, clay, sand, and iron ore in a rotary kiln. The kiln is a large furnace that is fueled by coal, oil, gas, coke, and/or various waste materials. The product (known as clinker) from the kiln is cooled, ground, and then mixed with a small amount of gypsum to produce Portland cement.

The main source of air toxics emissions from a Portland cement plant is the kiln. Emissions originate from the burning of fuels and heating of feed materials. Air toxics are also emitted from the grinding, cooling, and materials handling steps in the manufacturing process. Pollutants regulated under the subpart LLL NESHAP are particulate matter (PM) as a surrogate for non-mercury HAP metals, total hydrocarbons (THC) as a surrogate for organic HAP other than dioxins and furans (D/F), organic HAP as an alternative to the limit for THC, mercury, HCl (from major sources only), and D/F expressed as toxic equivalents (TEQ). The kiln is regulated for all HAP and raw material dryers are regulated for THC or the alternative organic HAP.

Clinker coolers are regulated for PM. Finish mills and raw mills are regulated for opacity. During periods of startup and shutdown, the kiln, clinker cooler, and raw material dryer are regulated by work practices. Open clinker storage piles are regulated by work practices. The emission standards for the affected sources are summarized in Table 2.

Table 2. Emission Limits for Kilns, Clinker Coolers, Raw Material Dryers, Raw and Finish Mills

If your source is a (an):	And the operating mode is:	And it is located at a:	Your emissions limits are:	And the units of the emissions limit are:	The oxygen correction factor is:
1. Existing kiln	Normal operation	Major or area source	PM[1] 0.07	Pounds (lb)/ ton clinker	NA.
			D/F[2] 0.2	Nanograms/dry standard cubic meters (ng/dscm) (TEQ)	7 percent.
			Mercury 55	lb/million (MM) tons clinker	NA.
			THC[3,4] 24	Parts per million, volumetric dry (ppmvd)	7 percent.
2. Existing kiln	Normal operation	Major source	HCl 3	ppmvd	7 percent.
3. Existing kiln	Startup and shutdown	Major or area source	Work practices (63.1346(g))	NA	NA.
4. New kiln	Normal operation	Major or area source	PM[1] 0.02	lb/ton clinker	NA.
			D/F[2] 0.2	ng/dscm (TEQ)	7 percent.
			Mercury 21	lb/MM tons clinker	NA.
			THC[3,4] 24	ppmvd	7 percent.
5. New kiln	Normal operation	Major source	HCl 3	ppmvd	7 percent.
6. New kiln	Startup and shutdown	Major or area source	Work practices (63.1346(g))	NA	NA.

If your source is a (an):	**And the operating mode is:**	**And it is located at a:**	**Your emissions limits are:**	**And the units of the emissions limit are:**	**The oxygen correction factor is:**
7. Existing clinker cooler	Normal operation	Major or area source	PM 0.07	lb/ton clinker	NA.
8. Existing clinker cooler	Startup and shutdown	Major or area source	Work practices (63.1348(b)(9))	NA	NA.
9. New clinker cooler	Normal operation	Major or area source	PM 0.02	lb/ton clinker	NA.
10. New clinker cooler	Startup and shutdown	Major or area source	Work practices (63.1348(b)(9))	NA	NA.
11. Existing or new raw material dryer	Normal operation	Major or area source	THC[3,4] 24	ppmvd	NA.
12. Existing or new raw material dryer	Startup and shutdown	Major or area source	Work practices (63.1348(b)(9))	NA	NA.
13. Existing or new raw or finish mill	All operating modes	Major source	Opacity 10	percent	NA.

[1] The initial and subsequent PM performance tests are performed using Method 5 or 5I and consist of three test runs.

[2] If the average temperature at the inlet to the first PM control device (fabric filter or electrostatic precipitator) during the D/F performance test is 400 °F or less, this limit is changed to 0.40 ng/dscm (TEQ).

[3] Measured as propane.

[4] Any source subject to the 24 ppmvd THC limit may elect to meet an alternative limit of 12 ppmvd for total organic HAP.

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

For the Portland Cement Manufacturing Industry source category, we did not submit data collection requests to the industry or request emissions testing by the industry for the information used in this analysis. The data and data sources used to support this action are described in section II.D below.

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

For the Portland Cement Manufacturing Industry source category, a comprehensive list of facilities and kilns was compiled using information from the EPA's Greenhouse Gas Reporting Program (GHGRP) (*https://www.epa.gov/ghgreporting*). All manufacturers of Portland cement are required to report annually their greenhouse gas emissions to the EPA (40 CFR part 98, subpart H). In reporting year 2015, 95 Portland cement facilities reported under the GHGRP. As explained above in section II.B, kilns that are fueled by hazardous waste are subject to the hazardous waste regulations in 40 CFR part 63, subpart EEE and, therefore, are not subject to 40 CFR part 63, subpart LLL. Kilns that are fueled by solid waste are subject to regulations in 40 CFR part 60, subpart CCCC or DDDD and are also not subject to subpart LLL. To assist in the identification of which sources are subject to subpart LLL, the comprehensive list of Portland cement manufacturing facilities was submitted to the Portland Cement Association (PCA) for review. The PCA is an organization that represents the manufacturers of cement. The PCA provided information on the status of each kiln and clinker cooler, whether or not they were subject to subpart LLL regulations, and identified other sources at facilities, such as raw material dryers, that were also subject to subpart LLL.

The risk modeling dataset was developed in a two-step process. Initially, a draft dataset was developed using available information on emissions, stack parameters, and emission source locations. In step two, the draft dataset for each Portland cement manufacturing facility was submitted to the facility or its parent company to review for accuracy. Based on the review by each company and the submittal of documentation supporting the changes, the risk modeling dataset was revised. Copies of the datasets sent to the companies for review and the revised datasets and supporting documentation submitted by each company are contained in the docket to this rulemaking (Docket ID No. EPA-HQ-OAR-2016-0442).

The initial draft dataset was developed using emission test data to the extent possible. Under 40 CFR part 63, subpart LLL, the EPA requires that performance test results be submitted to the EPA via the Compliance and Emissions Data Reporting Interface (CEDRI), which can be accessed through the EPA’s Central Data Exchange (CDX). Emissions data are publicly available through the EPA’s Web Factor Information Retrieval System (WebFIRE) using the EPA’s electronic reporting tool (ERT) as listed on the EPA’s ERT Web site (*https://www.epa.gov/electronic-reporting-air-emissions/electronic-reporting-tool-ert*). To estimate actual emissions, available emissions data were extracted from each facility’s submitted ERT file. When emissions data were not available in ERT, the subpart LLL emissions limit was substituted as a placeholder for actual emissions until the data set could be reviewed and revised by industry.

III. Analytical Procedures

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 did we estimate post-MACT risks posed by the source category?

The EPA conducted a risk assessment that provides estimates of the MIR posed by the HAP emissions from each source in the source category, the hazard index (HI) for chronic exposures to HAP with the potential to cause non-cancer health effects, and the hazard quotient (HQ) for acute exposures to HAP with the potential to cause non-cancer health effects. The assessment also provides estimates of the distribution of cancer risks within the exposed populations, cancer incidence, and an evaluation of the potential for adverse environmental effects. The eight 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 Portland Cement Manufacturing Industry Source Category in Support of the Risk and Technology Review September, 2017 Proposed Rule*. The methods used to assess risks (as described in the eight primary steps below) are consistent with those peer-reviewed by a panel of the EPA's Science Advisory Board (SAB) in 2009 and described in their peer review report issued in 2010;[2] 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 pollutants regulated under 40 CFR part 63, subpart LLL are PM, HCl, THC, mercury, and D/F. The emission standards apply to Portland cement plants that are major or area sources, with one exception. Kilns that are located at a facility that is an area source are not subject to the emission limits for HCl. Sources subject to the emissions limit for THC may elect to meet an alternative limit for total organic HAP. For purposes of subpart LLL, total organic HAP is the sum of the concentrations of compounds of formaldehyde, benzene, toluene, styrene, m-xylene, p-xylene, o-xylene, acetaldehyde, and naphthalene as measured by EPA Test Method 320 or Method 18 of appendix A to 40 CFR part 63 or ASTM D6348-03 or a combination of these methods, as appropriate. The affected sources at Portland cement plants that were accounted for in the risk modeling dataset include the kiln, as well as any alkali bypass or inline

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[2] U.S. EPA SAB. *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*, May 2010.

raw mill or inline coal mill, clinker coolers, and raw material dryers. Kilns fueled with hazardous waste or solid waste and not subject to subpart LLL were excluded from the dataset. All affected sources in the risk modeling dataset emit through stacks. As mentioned in section II.D above, the risk modeling dataset used for estimating actual emissions was developed in a two-step process. Initially, the dataset was developed using available information and is described below. The dataset for each Portland cement manufacturing facility was then submitted to the facility, or its parent company, to review for accuracy. Based on the review by each company, and the submittal of documentation supporting the changes, the risk modeling dataset was then revised. Copies of the datasets sent to the companies for review and the revised datasets submitted by each company are contained in the docket to this rulemaking (Docket ID No. EPA-HQ-OAR-2016-0442).

As described in section II.D above, available emissions data were extracted from each facility's submitted ERT file. To ensure that the emissions data reflect process and control device changes made at each Portland cement plant to comply with the 2013 final amendments to 40 CFR part 63, subpart LLL (February 12, 2013, 78 FR 10006), emissions data from mid-2015 and later were used as inputs into the emissions modeling file.

Emissions data are reported in ERT in units of pounds per hour (lb/hr), which were multiplied by a facility's reported annual hours of operation to calculate emissions in tpy. If hours of operation were not reported, the default of 8,760 hours per year was used. When emissions data were not available in ERT, the 40 CFR part 63, subpart LLL emissions limit was substituted as a placeholder for actual emissions until the data set could be reviewed and revised by industry.

Subpart LLL of 40 CFR part 63 uses PM as a surrogate for non-mercury metallic HAP and THC as a surrogate for organic HAP. The specific non-mercury metallic HAP that went into the modeling file are antimony, arsenic, beryllium, cadmium, chromium, cobalt, lead, manganese, mercury, nickel, and selenium. As an alternative to measuring THC, subpart LLL allows sources to measure directly their emissions of the nine organic HAP listed in subpart LLL. The specific organic HAP that went into the modeling file are acetaldehyde, formaldehyde, naphthalene, styrene, toluene, m-xylene, o-xylene, p-xylene, and benzene. Because subpart LLL compliance testing is typically performed for the surrogates PM and THC, there are limited test data available for compound-specific non-mercury metallic and organic HAP emissions. To generate compound-specific metallic HAP and organic HAP emissions estimates, recent emissions tests were identified in which testing was done for compound-specific metallic and organic HAP emissions. To account for recent changes in emission controls and production processes that have been implemented by facilities to comply with the subpart LLL MACT standards, emissions testing that occurred in 2015 and later were used to develop compound-specific estimates for metallic HAP and organic HAP emissions. In the case of D/F, the subpart LLL emission limits for D/F were unchanged in the 2013 final rule. Thus, older D/F test data could be used along with more recent test data.

The approach used to develop the final risk modeling dataset assures the quality of the data at various steps in the process of developing the dataset. The initial step in developing the dataset was to compile a list of affected facilities. A comprehensive list of cement manufacturing facilities and kilns was derived from the EPA’s GHGRP, which requires reporting by all cement manufacturing facilities. Not all Portland cement kilns are subject to 40 CFR part 63, subpart LLL. Kilns that burn commercial and industrial solid waste are subject to 40 CFR part 60, subpart CCCC and DDDD. Kilns that burn hazardous waste are subject to 40 CFR part 63, subpart EEE. To help identify the cement kilns that are subject to subpart LLL regulations, the list of facilities and kilns was submitted to the PCA for review. In their review, they provided useful information on which cement manufacturing facilities were or were not subject to subpart LLL, whether kilns and clinker coolers used separate or combined stacks, the presence of additional affected sources not on the initial list, and the presence of kilns that were not currently operating. For those kilns identified as not currently operating, the appropriate state permitting agency was contacted to determine whether the kiln was currently permitted to operate. If the kiln was not operating, but retained their title V permit, they were kept in the dataset. In other instances, company representatives were contacted to verify that kilns at their facilities were or were not subject to subpart LLL regulations. In developing the emissions data, operating hours, stack parameters (*i.e.*, stack height, temperature, diameter, velocity, and flowrate), and stack locations (*i.e.*, latitude and longitude), the use of the EPA’s ERT provides a single source of electronic test data and replaces the manual collection and evaluation of test data. The regulated facility owner or operator submits their summary report semiannually to the EPA via the CEDRI, which is accessed through the EPA's CDX (*www.epa.gov/cdx*). This electronic submission of data helps to ensure that information and procedures required by test methods are documented, provides consistent criteria to quantitatively characterize the quality of the data collected during the emissions test, and standardizes the reporting of results. Information on stack parameters and stack locations were also derived from ERT. For facilities that had not yet submitted their test information to ERT, the emission limits were used as placeholders until industry could review the information. When operating hours were not in ERT, a placeholder of 8,760 hours was used until industry could review the information. When stack parameters and stack locations were not in ERT, other sources of information such as the 2013 Universal Industrial Sectors Integrated Solutions (UISIS) modeling file created by the EPA and the 2011 National Emissions Inventory (NEI) were used. As a check on the emissions data, operating hours, stack parameters, and stack locations compiled for each facility, a draft of the dataset consisting of the data for all the facilities under a single company was sent to a representative at the appropriate company for review. Instructions for reviewing and making changes to the dataset required that any revisions be supported with appropriate documentation. In addition, example calculations for emissions estimates and default stack parameters were provided. Revisions made to the data for each facility were incorporated into a master final dataset. The master final dataset was subjected to further quality evaluation. For example, exhaust gas flowrates were checked using information on stack diameters and gas velocities. Stack diameters and stack velocities are checked for outliers. Stack locations were also checked using Google Earth® to ensure that stack locations were correctly located at the cement manufacturing facility.

The derivation of actual emission estimates is discussed in more detail in the document, *Development of the RTR Risk Modeling Dataset for the Portland Cement Manufacturing Industry Source Category*, which is available in the docket for this proposed rulemaking.

2. How did we estimate MACT-allowable emissions?

The available emissions data in the RTR emissions dataset include estimates of the mass of HAP emitted during the specified annual time period. In some cases, these "actual" emission levels are lower than the emission levels required to comply with the current MACT standards. The emissions level allowed to be emitted by the MACT standards is referred to as the "MACT-allowable" emissions level. We discussed the use of both MACT-allowable and actual emissions in the final Coke Oven Batteries RTR (70 FR 19998–19999, April 15, 2005) and in the proposed and final Hazardous Organic NESHAP RTRs (71 FR 34428, June 14, 2006, and 71 FR 76609, December 21, 2006, respectively). In those actions, we noted that assessing the risks at the MACT-allowable level is inherently reasonable since these risks reflect 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, September 14, 1989).

Allowable emissions are calculated using the emission limits in the rule for existing sources along with the emission factors for metallic HAP, organic HAP, and D/F congeners, the annual production capacity, and, when the emission limit is a concentration-based limit, the annual hours of operation reported by each source. We note that these are conservative estimates of allowable emissions. It is unlikely that emissions would be at the maximum limit at all times because sources cannot emit HAP at a level that is exactly equal to the limit and remain in compliance with the standard due to day-to-day variability in process operations and emissions. On average, facilities must emit at some level below the MACT limit to ensure that they are always in compliance. The derivation of allowable emissions is discussed in more detail in the document, *Development of the RTR Risk Modeling Dataset for the Portland Cement Manufacturing Industry Source Category*, which is available in the docket for this proposed rulemaking.

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

Both long-term and short-term inhalation exposure concentrations and health risks from the source category addressed in this proposal were estimated using the Human Exposure Model

(Community and Sector HEM-3). 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,[3] and (3) estimating individual and population-level inhalation risks using the exposure estimates and quantitative dose-response information.

The air dispersion model used by the HEM-3 model (AERMOD) is one of the EPA's preferred models for assessing pollutant concentrations from industrial facilities.[4] 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 for more than 800 meteorological stations, selected to provide coverage of the U.S. and Puerto Rico. A second library of U.S. Census Bureau census block[5] internal point locations and 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 unit risk factors and other health benchmarks is used to estimate health risks. These risk factors and health benchmarks are the latest values recommended by the EPA for HAP and other toxic air pollutants. These values are available at *https://www.epa.gov/fera/dose-response-assessment-assessing-health-risks-associated-exposure-hazardous-air-pollutants* and are discussed in more detail later in this section.

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[3] This metric comes from the Benzene NESHAP. See 54 FR 38046, September 14, 1989.

[4] 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).

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

In developing the risk assessment for chronic exposures, we used the estimated annual average ambient air concentrations of each HAP emitted by each source for which we have emissions data in the source category. The air concentrations at each nearby census block centroid were used as a surrogate for the chronic inhalation exposure concentration for all the people who reside in that census block. We calculated the MIR for each facility as the cancer risk associated with a continuous lifetime (24 hours per day, 7 days per week, and 52 weeks per year for a 70-year period) exposure to the maximum concentration at the centroid of inhabited census blocks. Individual cancer risks were calculated by multiplying the estimated lifetime exposure to the ambient concentration of each of the 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 probability 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 URE values 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) URE values, where available. In cases where new, scientifically credible dose response values have been developed in a manner consistent with the 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 EPA estimated incremental individual lifetime cancer risks associated with emissions from the facilities in the source category as the sum of the risks for each of the carcinogenic HAP (including those classified as carcinogenic to humans, likely to be carcinogenic to humans, and suggestive evidence of carcinogenic potential[6]) emitted by the modeled sources. Cancer incidence and the distribution of individual cancer risks for the population within 50 km of the sources were also estimated for the source category as part of this assessment by summing individual risks. A distance of 50 km is consistent with both the analysis supporting the 1989 Benzene NESHAP (54 FR 38044, September 14, 1989) and the limitations of Gaussian dispersion models, including AERMOD.

To assess the risk of non-cancer health effects from chronic exposures, we summed the HQ for each of the HAP that affects a common target organ system to obtain the HI for that target organ system (or target organ-specific HI, TOSHI). The HQ is the estimated exposure divided by the chronic reference value, which is a value selected from one of several sources. First, the chronic reference level can be the EPA reference concentration (RfC) (*https://iaspub.epa.gov/sor_internet/registry/termreg/searchandretrieve/glossariesandkeywordlists/search.do?details=&vocabName=IRIS%20Glossary*), 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.” Alternatively, in cases where an RfC from the EPA’s IRIS database is not available or where the EPA determines that using a value other than the RfC is appropriate, the chronic reference level can be a value from the following prioritized sources:

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[6] These classifications also coincide with the terms "known carcinogen, probable carcinogen, and possible carcinogen," respectively, which are the terms advocated in the EPA's previous *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 risks of these individual compounds to obtain the cumulative cancer risks 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 *http://yosemite.epa.gov/sab/sabproduct.nsf/214C6E915BB04E14852570CA007A682C/$File/ecadv02001.pdf*.

(1) The Agency for Toxic Substances and Disease Registry (ATSDR) Minimal Risk Level (MRL) (*http://www.atsdr.cdc.gov/mrls/index.asp*), which is defined as "an estimate of daily human exposure to a hazardous substance that is likely to be without an appreciable risk of adverse non-cancer health effects (other than cancer) over a specified duration of exposure"; (2) the CalEPA Chronic Reference Exposure Level (REL) (*http://oehha.ca.gov/air/crnr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0*), which is defined as "the concentration level (that is expressed in units of $\mu g/m^3$ for inhalation exposure and in a dose expressed in units of milligram per kilogram-day (mg/kg-day) for oral exposures), at or below which no adverse health effects are anticipated for a specified exposure duration"; 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, in place of or in concert with other values.

As mentioned above, in order to characterize non-cancer chronic effects, and in response to key recommendations from the SAB, the EPA selects dose-response values that reflect the best available science for all HAP included in RTR risk assessments.[7] More specifically, for a given HAP, the EPA examines the availability of inhalation reference values from the sources included in our tiered approach (*e.g.*, IRIS first, ATSDR second, CalEPA third) and determines which inhalation reference value represents the best available science. Thus, as new inhalation reference values become available, the EPA will typically evaluate them and determine whether they should be given preference over those currently being used in RTR risk assessments.

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[7] Recommendations from the SAB's review of RTR Risk Assessment Methodologies and the review materials are available at *http://yosemite.epa.gov/sab/sabproduct.nsf/4AB3966E263D943A8525771F00668381/$File/EPA-SAB-10-007-unsigned.pdf* and at *https://cfpub.epa.gov/si/si_public_record_report.cfm?dirEntryID=238928*, respectively.

The EPA also evaluated screening estimates of acute exposures and risks for each of the HAP (for which appropriate acute dose-response values are available) at the point of highest potential off-site exposure for each facility. To do this, the EPA estimated the risks when both the peak hourly emissions rate and worst-case dispersion conditions occur. We also assume that a person is located at the point of highest impact during that same time. In accordance with our mandate in section 112 of the CAA, we use the point of highest off-site exposure to assess the potential risk to the maximally exposed individual. The acute HQ is the estimated acute exposure divided by the acute dose-response value. In each case, the EPA calculated acute HQ values using best available, short-term dose-response values. These acute dose-response values, which are described below, include the acute REL, acute exposure guideline levels (AEGL) and Emergency Response Planning Guidelines (ERPG) for 1-hour exposure durations. As discussed below, we used conservative assumptions for emissions rates, meteorology, and exposure location.

As described in the CalEPA's *Air Toxics Hot Spots Program Risk Assessment Guidelines, Part I, The Determination of Acute Reference Exposure Levels for Airborne Toxicants*, an acute REL value (*http://oehha.ca.gov/air/general-info/oehha-acute-8-hour-and-chronic-reference-exposure-level-rel-summary*) is defined as "the concentration level at or below which no adverse health effects are anticipated for a specified exposure duration." *Id.* at page 2. Acute REL values are based on the most sensitive, relevant, adverse health effect reported in the peer-reviewed medical and toxicological literature. Acute REL values 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.

AEGL values were derived in response to recommendations from the National Research Council (NRC). The National Advisory Committee (NAC) for the Development of Acute Exposure Guideline Levels for Hazardous Substances, usually referred to as the AEGL Committee or the NAC/AEGL committee, developed AEGL values for at least 273 of the 329 chemicals on the AEGL priority chemical list. The last meeting of the NAC/AEGL Committee was in April 2010, and its charter expired in October 2011. The NAC/AEGL Committee 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*).

As described in *Standing Operating Procedures (SOP) of the National Advisory Committee on Acute Exposure Guideline Levels for Hazardous Chemicals* (*https://www.epa.gov/sites/production/files/2015-09/documents/sop_final_standing_operating_procedures_2001.pdf*),[8] "the NRC's previous name for acute exposure levels – community emergency exposure levels – was replaced by the term AEGL to reflect the broad application of these values to planning, response, and prevention in the community, the workplace, transportation, the military, and the remediation of Superfund sites." *Id.* at 2. This document also states that AEGL values "represent threshold exposure limits for the general public and are applicable to emergency exposures ranging from 10 minutes to eight hours." *Id.* at 2.

The document lays out the purpose and objectives of AEGL by stating that "the primary purpose of the AEGL program and the National Advisory Committee for Acute Exposure Guideline Levels for Hazardous Substances is to develop guideline levels for once-in-a-lifetime, short-term exposures to airborne concentrations of acutely toxic, high-priority chemicals." *Id.* at

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[8] National Academy of Sciences (NAS), 2001. *Standing Operating Procedures for Developing Acute Exposure Levels for Hazardous Chemicals*, page 2.

21. In detailing the intended application of AEGL values, the document states that “[i]t is anticipated that the AEGL values will be used for regulatory and nonregulatory purposes by U.S. Federal and state agencies and possibly the international community in conjunction with chemical emergency response, planning, and prevention programs. More specifically, the AEGL values will be used for conducting various risk assessments to aid in the development of emergency preparedness and prevention plans, as well as real-time emergency response actions, for accidental chemical releases at fixed facilities and from transport carriers.” *Id.* at 31.

The AEGL–1 value is then 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.” *Id.* at 3. 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.* Similarly, the document defines AEGL–2 values 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.*

ERPG values are derived for use in emergency response, as described in the American Industrial Hygiene Association’s Emergency Response Planning (ERP) Committee document titled, *ERPGS Procedures and Responsibilities (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), which states that, "Emergency Response Planning Guidelines were developed for emergency planning and are intended as health based guideline concentrations for single exposures to chemicals."[9] *Id.* at 1. The ERPG–1 value 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 value 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.

As can be seen from the definitions above, the AEGL and ERPG values include the similarly-defined severity levels 1 and 2. For many chemicals, a severity level 1 value AEGL or ERPG has not been developed because the types of effects for these chemicals are not consistent with the AEGL-1/ERPG-1 definitions; in these instances, we compare higher severity level AEGL–2 or ERPG–2 values to our modeled exposure levels to screen for potential acute concerns. When AEGL-1/ERPG-1 values are available, they are used in our acute risk assessments.

Acute REL values for 1-hour exposure durations are typically lower than their corresponding AEGL–1 and ERPG–1 values. Even though their definitions are slightly different, AEGL–1 values are often the same as the corresponding ERPG–1 values, and AEGL–2 values are often equal to ERPG–2 values. Maximum HQ values from our acute screening risk

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[9] *ERP Committee Procedures and Responsibilities*. March 2014. American Industrial Hygiene Association.

assessments typically result when basing them on the acute REL value for a particular pollutant. In cases where our maximum acute HQ value exceeds 1, we also report the HQ value based on the next highest acute dose-response value (usually the AEGL–1 and/or the ERPG–1 value).

To develop screening estimates of acute exposures in the absence of hourly emissions data, generally we first develop estimates of maximum hourly emissions rates by multiplying the average actual annual hourly emissions rates by a default factor to cover routinely variable emissions. We choose the factor to use partially based on process knowledge and engineering judgment. The factor chosen also reflects a Texas study of short-term emissions variability, which showed that most peak emission events in a heavily-industrialized four-county area (Harris, Galveston, Chambers, and Brazoria Counties, Texas) were less than twice the annual average hourly emissions rate. The highest peak emissions event was 74 times the annual average hourly emissions rate, and the 99th percentile ratio of peak hourly emissions rate to the annual average hourly emissions rate was 9.[10] Considering this analysis, to account for more than 99 percent of the peak hourly emissions, we apply a conservative screening multiplication factor of 10 to the average annual hourly emissions rate in our acute exposure screening assessments as our default approach. A further discussion of why this factor was chosen can be found in the memorandum, *Emissions Data and Acute Risk Factor Used in Residual Risk Modeling: Portland Cement Manufacturing Industry*, available in the docket for this rulemaking.

As part of our acute risk assessment process, for cases where acute HQ values from the screening step are less than or equal to 1 (even under the conservative assumptions of the screening analysis), acute impacts are deemed negligible and no further analysis is performed for

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[10] Allen, *et al.*, 2004. *Variable Industrial VOC Emissions and their impact on ozone formation in the Houston Galveston Area*. Texas Environmental Research Consortium. *https://www.researchgate.net/publication/237593060_Variable_Industrial_VOC_Emissions and_their_Impact_on_Ozone_Formation_in_the_Houston_Galveston_Area*.

these HAP. In cases where an acute HQ from the screening step is greater than 1, additional site-specific data are considered to develop a more refined estimate of the potential for acute impacts of concern. For this source category, since no HQ was greater than 1, no further analysis was performed.

Ideally, we would prefer to have continuous measurements over time to see how the emissions vary by each hour over an entire year. Having a frequency distribution of hourly emissions rates over a year would allow us to perform a probabilistic analysis to estimate potential threshold exceedances and their frequency of occurrence. Such an evaluation could include a more complete statistical treatment of the key parameters and elements adopted in this screening analysis. Recognizing that this level of data is rarely available, we instead rely on the multiplier approach.

To better characterize the potential health risks associated with estimated acute exposures to HAP, and in response to a key recommendation from the SAB's 2010 peer review of the EPA's RTR risk assessment methodologies,[11] we generally examine a wider range of available acute health metrics (*e.g.*, RELs, AEGLs) than we do for our chronic risk assessments. This is in response to the SAB's acknowledgement that there are generally more data gaps and inconsistencies in acute reference values than there are in chronic reference values. In some cases, when Reference Value Arrays[12] for HAP have been developed, we consider additional

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[11] The SAB peer review of RTR Risk Assessment Methodologies is available at *http://yosemite.epa.gov/sab/sabproduct.nsf/4AB3966E263D943A8525771F00668381/$File/EPA-SAB-10-007-unsigned.pdf*.

[12] U.S. EPA. Chapter 2.9, *Chemical Specific Reference Values for Formaldehyde in Graphical Arrays of Chemical-Specific Health Effect Reference Values for Inhalation Exposures* (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-09/061, 2009, and available online at *http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=211003*.

acute values (*i.e.*, occupational and international values) to provide a more complete risk characterization.

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

The EPA conducted a screening analysis examining the potential for significant human health risks due to exposures via routes other than inhalation (*i.e.*, ingestion). We first determined whether any sources in the source category emitted any HAP known to be persistent and bioaccumulative in the environment (PB-HAP). The PB-HAP compounds or compound classes are identified for the screening from the EPA's Air Toxics Risk Assessment Library (available at *http://www2.epa.gov/fera/risk-assessment-and-modeling-air-toxics-risk-assessment-reference-library*).

For the Portland Cement Manufacturing Industry source category, we identified emissions of lead compounds, cadmium compounds, mercury compounds, arsenic compounds, and D/F. Because one or more of these PB-HAP are emitted by at least one facility in the Portland Cement Manufacturing Industry source category, we proceeded to the next step of the evaluation. In this step, we determined whether the facility-specific emission rates of the emitted PB-HAP were large enough to create the potential for significant non-inhalation human health risks under reasonable worst-case conditions. To facilitate this step, we developed screening threshold emission rates for several PB-HAP using 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: cadmium compounds, mercury compounds, arsenic compounds, and D/F and polycyclic organic matter (POM). We conducted a sensitivity analysis on the screening scenario to ensure that its key design parameters would represent the upper end of the range of possible values, such that it would represent a conservative, but not impossible scenario. The facility-specific PB-HAP emission rates were compared to their respective screening threshold emission rate to assess the potential for significant human health risks via non-inhalation pathways. We call this application of the TRIM.FaTE model the Tier 1 TRIM-screen or Tier 1 screen.

For the purpose of developing emission rates for the Tier 1 TRIM-screen, we derived emission levels for these PB-HAP (other than lead compounds) at which the maximum excess lifetime cancer risk would be 1-in-1 million (*i.e.*, D/F, arsenic compounds, and POM) or, for HAP that cause non-cancer health effects (*i.e.*, cadmium compounds and mercury compounds), the maximum HQ would be 1. If the emission rate of any PB-HAP included in the Tier 1 screen exceeds the Tier 1 screening threshold emission rates for any facility, we conduct a second screen, which we call the Tier 2 TRIM-screen or Tier 2 screen.

In the Tier 2 screen, the location of each facility that exceeds the Tier 1 screening threshold emission rates is used to refine the assumptions associated with the environmental scenario while maintaining the exposure scenario assumptions. A key assumption that is part of the Tier 1 screen is that a lake is located near the facility; we confirm the existence of lakes near the facility as part of the Tier 2 screen. We also examine the differences between local meteorology near the facility and the meteorology used in the Tier 1 screen. We then adjust the risk-based 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 meteorology and environmental assumptions. PB-HAP emissions that do not exceed these new Tier 2 screening threshold emission rates are considered to be below a level of concern. If the PB-HAP emissions for a facility exceed the Tier 2 screening threshold emission rates and data are available, we may decide to conduct a more refined Tier 3 multipathway assessment or proceed to a site-specific assessment. There are several analyses that can be included in a Tier 3 screen depending upon the extent of refinement warranted, including validating that the lakes are fishable, 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. For this source category a Tier 3 screen was conducted for 1 facility that had dioxin emissions exceeding the Tier 2 threshold emission rates up to a value of 100-in-1 million. If the Tier 3 screen is exceeded, the EPA may conduct a refined site-specific assessment.

When tiered screening values for any facility indicate a potential health risk to the public, we may conduct a more refined multipathway assessment. A refined assessment was conducted for mercury in lieu of conducting a Tier 3 screen. To select the candidate facilities for the site-specific assessment, we analyzed the facilities with the maximum exceedances of the Tier 2 screening values as well as the combined effect from multiple facilities on lakes within the same watershed. In addition to looking at the Tier 2 screen value for each lake, the location and number of lakes or farms impacted for each watershed was evaluated to assess elevation/topography influences. A review of the source category identified 3 facilities located in Midlothian, Texas, as the best candidates for mercury impacts. These candidate sites were selected because of their exceedances of the Tier 2 mercury screening value and based upon the above considerations.

In evaluating the potential multipathway risk from emissions of lead compounds, rather than developing a screening threshold emission rate for them, we compared maximum estimated

1-hour acute inhalation exposures with the level of the current National Ambient Air Quality Standard (NAAQS) for lead.[13] Values below the level of the Primary (health-based) Lead NAAQS were considered to have a low potential for multipathway risk.

For further information on the multipathway analysis approach, see the *Residual Risk Assessment for the Portland Cement Manufacturing Industry Source Category in Support of the Risk and Technology Review September 2017 Proposed Rule*, which is available in the docket for this action.

5. How did we assess risks considering emissions control options?

In addition to assessing baseline inhalation risks and screening for potential multipathway risks, we also estimated risks considering the potential emission reductions that would be achieved by the control options under consideration. In these cases, the expected emission reductions were applied to the specific HAP and emission points in the RTR emissions dataset to develop corresponding estimates of risk and incremental risk reductions.

6. How did we conduct the environmental risk screening assessment?

a. Adverse Environmental Effect

The EPA conducts a screening assessment to examine the potential for adverse environmental effects 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,

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[13] 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"). 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 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.

including adverse impacts on populations of endangered or threatened species or significant degradation of environmental quality over broad areas."

b. Environmental HAP

The EPA focuses on eight HAP, which we refer to as "environmental HAP," in its screening analysis: six PB-HAP and two acid gases. The six PB-HAP are cadmium compounds, D/F, arsenic compounds, POM, mercury compounds (both inorganic mercury and methyl mercury), and lead compounds. The two acid gases are HCl and hydrogen fluoride (HF). The rationale for including these eight HAP in the environmental risk screening analysis is presented below.

HAP that persist and bioaccumulate are of particular environmental concern because they accumulate in the soil, sediment, and water. The PB-HAP are taken up, through sediment, soil, water, and/or ingestion of other organisms, by plants or animals (*e.g.*, small fish) at the bottom of the food chain. As larger and larger predators consume these organisms, concentrations of the PB-HAP in the animal tissues increases as does the potential for adverse effects. The six PB-HAP we evaluate as part of our screening analysis account for 99.8 percent of all PB-HAP emissions nationally from stationary sources (on a mass basis from the 2005 EPA NEI).

In addition to accounting for almost all of the mass of PB-HAP emitted, we note that the TRIM.FaTE model that we use to evaluate multipathway risk allows us to estimate concentrations of cadmium compounds, D/F, arsenic compounds, POM, and mercury compounds in soil, sediment, and water. For lead compounds, we currently do not have the ability to calculate these concentrations using the TRIM.FaTE model. Therefore, to evaluate the potential for adverse environmental effects from lead compounds, we compare the estimated HEM-modeled exposures from the source category emissions of lead with the level of the

Secondary Lead NAAQS.[14] We consider values below the level of the Secondary Lead NAAQS to be unlikely to cause adverse environmental effects.

Due to their well-documented potential to cause direct damage to terrestrial plants, we include two acid gases, HCl and HF, in the environmental screening analysis. According to the 2005 NEI, HCl and HF account for about 99 percent (on a mass basis) of the total acid gas HAP emitted by stationary sources in the U.S. In addition to the potential to cause direct damage to plants, high concentrations of HF in the air have been linked to fluorosis in livestock. Air concentrations of these HAP are already calculated as part of the human multipathway exposure and risk screening analysis using the HEM3-AERMOD air dispersion model, and we are able to use the air dispersion modeling results to estimate the potential for an adverse environmental effect.

The EPA acknowledges that other HAP beyond the eight HAP discussed above may have the potential to cause adverse environmental effects. Therefore, the EPA may include other relevant HAP in its environmental risk screening in the future, as modeling science and resources allow. The EPA invites comment on the extent to which other HAP emitted by the source category may cause adverse environmental effects. Such information should include references to peer-reviewed ecological effects benchmarks that are of sufficient quality for making regulatory decisions, as well as information on the presence of organisms located near facilities within the source category that such benchmarks indicate could be adversely affected.

c. Ecological Assessment Endpoints and Benchmarks for PB-HAP

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[14] The Secondary Lead NAAQS is a reasonable measure of determining whether there is an adverse environmental effect since it was established considering “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.”

An important consideration in the development of the EPA's screening methodology is the selection of ecological assessment endpoints and benchmarks. Ecological assessment endpoints are defined by the ecological entity (*e.g.*, aquatic communities, including fish and plankton) and its attributes (*e.g.*, frequency of mortality). Ecological assessment endpoints can be established for organisms, populations, communities or assemblages, and ecosystems.

For PB-HAP (other than lead compounds), we evaluated the following community-level ecological assessment endpoints to screen for organisms directly exposed to HAP in soils, sediment, and water:

- Local terrestrial communities (*i.e.*, soil invertebrates, plants) and populations of small birds and mammals that consume soil invertebrates exposed to PB-HAP in the surface soil;
- Local benthic (*i.e.*, bottom sediment dwelling insects, amphipods, isopods, and crayfish) communities exposed to PB-HAP in sediment in nearby water bodies; and
- Local aquatic (water-column) communities (including fish and plankton) exposed to PB-HAP in nearby surface waters.

For PB-HAP (other than lead compounds), we also evaluated the following population-level ecological assessment endpoint to screen for indirect HAP exposures of top consumers via the bioaccumulation of HAP in food chains:

- Piscivorous (*i.e.*, fish-eating) wildlife consuming PB-HAP-contaminated fish from nearby water bodies.

For cadmium compounds, D/F, arsenic compounds, POM, and mercury compounds, we identified the available ecological benchmarks for each assessment endpoint. An ecological benchmark represents a concentration of HAP (*e.g.*, 0.77 µg of HAP per liter of water) that has been linked to a particular environmental effect level through scientific study. For PB-HAP we identified, where possible, ecological benchmarks at the following effect levels:

- **Probable effect levels (PEL)**: Level above which adverse effects are expected to occur frequently;
- **Lowest-observed-adverse-effect level (LOAEL):** The lowest exposure level tested at which there are biologically significant increases in frequency or severity of adverse effects; and
- **No-observed-adverse-effect levels (NOAEL):** The highest exposure level tested at which there are no biologically significant increases in the frequency or severity of adverse effect.

We established a hierarchy of preferred benchmark sources to allow selection of benchmarks for each environmental HAP at each ecological assessment endpoint. In general, the EPA sources that are used at a programmatic level (*e.g.*, Office of Water, Superfund Program) were used in the analysis, if available. If not, the EPA benchmarks used in Regional programs (*e.g.*, Superfund) were used. If benchmarks were not available at a programmatic or Regional level, we used benchmarks developed by other federal agencies (*e.g.*, National Oceanic and Atmospheric Administration (NOAA)) or state agencies.

Benchmarks for all effect levels are not available for all PB-HAP and assessment endpoints. 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.

d. Ecological Assessment Endpoints and Benchmarks for Acid Gases

The environmental screening analysis also evaluated potential damage and reduced productivity of plants due to direct exposure to acid gases in the air. For acid gases, we evaluated the following ecological assessment endpoint:

- Local terrestrial plant communities with foliage exposed to acidic gaseous HAP in the air.

The selection of ecological benchmarks for the effects of acid gases on plants followed the same approach as for PB-HAP (*i.e.*, we examine all of the available chronic benchmarks). For HCl, the EPA identified chronic benchmark concentrations. We note that the benchmark for chronic HCl exposure to plants is greater than the reference concentration for chronic inhalation exposure for human health. This means that where the EPA includes regulatory requirements to prevent an exceedance of the reference concentration for human health, additional analyses for adverse environmental effects of HCl would not be necessary.

For HF, the EPA identified chronic benchmark concentrations for plants and evaluated chronic exposures to plants in the screening analysis. High concentrations of HF in the air have also been linked to fluorosis in livestock. However, the HF concentrations at which fluorosis in livestock occur are higher than those at which plant damage begins. Therefore, the benchmarks for plants are protective of both plants and livestock.

e. Screening Methodology

For the environmental risk screening analysis, the EPA first determined whether any facilities in the Portland Cement Manufacturing Industry sources emitted any of the eight environmental HAP. For the Portland Cement Manufacturing Industry source category, we identified emissions of lead compounds, cadmium compounds, mercury compounds, arsenic compounds, D/F, and HCl.

Because one or more of the eight environmental HAP evaluated are emitted by at least one facility in the source category, we proceeded to the second step of the evaluation.

f. PB-HAP Methodology

For cadmium compounds, arsenic compounds, mercury compounds, POM, and D/F, the environmental screening analysis consists of two tiers, while lead compounds are analyzed differently as discussed earlier. In the first tier, we determined whether the maximum facility-specific emission rates of each of the emitted environmental HAP were large enough to create the potential for adverse environmental effects under reasonable worst-case environmental conditions. These are the same environmental conditions used in the human multipathway exposure and risk screening analysis.

To facilitate this step, TRIM.FaTE was run for each PB-HAP under hypothetical environmental conditions designed to provide conservatively high HAP concentrations. The model was set to maximize runoff from terrestrial parcels into the modeled lake, which in turn, maximized the chemical concentrations in the water, the sediments, and the fish. The resulting media concentrations were then used to back-calculate a screening level emission rate that corresponded to the relevant exposure benchmark concentration value for each assessment endpoint. To assess emissions from a facility, the reported emission rate for each PB-HAP was compared to the screening level emission rate for that PB-HAP for each assessment endpoint. If emissions from a facility do not exceed the Tier 1 screening level, the facility "passes" the screen, and, therefore, is not evaluated further under the screening approach. If emissions from a facility exceed the Tier 1 screening level, we evaluate the facility further in Tier 2.

In Tier 2 of the environmental screening analysis, the emission rate screening levels 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 screen. The modeling domain for each facility in the Tier 2 analysis consists of 8 octants. Each octant contains 5 modeled soil concentrations at various distances from the facility (5 soil concentrations x 8 octants = total of 40 soil concentrations per facility) and one lake with modeled concentrations for water, sediment, and fish tissue. In the Tier 2 environmental risk screening analysis, the 40 soil concentration points are averaged to obtain an average soil concentration for each facility for each 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 level, the facility passes the screen, and typically is not evaluated further. If emissions from a facility exceed the Tier 2 screening level, the facility does not pass the screen and, therefore, may have the potential to cause adverse environmental effects. Such facilities are evaluated further to investigate factors such as the magnitude and characteristics of the area of exceedance.

g. Acid Gas Methodology

The environmental screening analysis evaluates the potential phytotoxicity and reduced productivity of plants due to chronic exposure to acid gases. The environmental risk screening methodology for acid gases is a single-tier screen that compares the average off-site ambient air concentration over the modeling domain to ecological benchmarks for each of the acid gases. Because air concentrations are compared directly to the ecological benchmarks, emission-based screening levels are not calculated for acid gases.

For purposes of ecological risk screening, the EPA identifies a potential for adverse environmental effects to plant communities from exposure to acid gases when the average concentration of the HAP around a facility exceeds the LOAEL ecological benchmark. In such cases, we further investigate factors such as the magnitude and characteristics of the area of exceedance (*e.g.*, land use of exceedance area, size of exceedance area) to determine if there is an adverse environmental effect.

For further information on the environmental screening analysis approach, see the *Residual Risk Assessment for the Portland Cement Manufacturing Industry Source Category in Support of the Risk and Technology Review September 2017 Proposed Rule*, which is available in the docket for this action.

7. How did 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 the 2014 NEI. 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, the modeled source category 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 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 Portland Cement Manufacturing Industry Source Category in Support of the Risk and Technology Review September 2017 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.

8. How did we consider uncertainties in risk assessment?

In the Benzene NESHAP, we concluded that risk estimation uncertainty should be considered in our decision-making under the ample margin of safety framework. 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 protective 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. A more thorough discussion of these uncertainties is included in the *Residual Risk Assessment for the Portland Cement Manufacturing Industry Source Category in Support of the Risk and Technology Review September 2017 Proposed Rule*, which is available in the docket for this action.

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.

c. Uncertainties in Inhalation Exposure

The EPA did not include the effects of human mobility on exposures in the assessment. Specifically, short-term mobility and long-term mobility between census blocks in the modeling domain were not considered.[15] The approach of not considering short or long-term population mobility does not bias the estimate of the theoretical MIR (by definition), nor does it affect the estimate of cancer incidence because the total population number remains the same. It does, however, affect the shape of the distribution of individual risks across the affected population,

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[15] Short-term mobility is movement from one micro-environment to another over the course of hours or days. Long-term mobility is movement from one residence to another over the course of a lifetime.

shifting it toward higher estimated individual risks at the upper end and reducing the number of people estimated to be at lower risks, thereby increasing the estimated number of people at specific high risk levels (*e.g.*, 1-in-10 thousand or 1-in-1 million).

In addition, the assessment predicted the chronic exposures at the centroid of each populated census block as surrogates for the exposure concentrations for all people living in that block. Using the census block centroid to predict chronic exposures tends to over-predict exposures for people in the census block who live farther from the facility and under-predict exposures for people in the census block who live closer to the facility. Thus, using the census block centroid to predict chronic exposures may lead to a potential understatement or overstatement of the true maximum impact, but is an unbiased estimate of average risk and incidence. We reduce this uncertainty by analyzing large census blocks near facilities using aerial imagery and adjusting the location of the block centroid to better represent the population in the block, as well as adding additional receptor locations where the block population is not well represented by a single location.

The assessment evaluates the cancer inhalation risks associated with pollutant exposures over a 70-year period, which is the assumed lifetime of an individual. In reality, both the length of time that modeled emission sources at facilities actually operate (*i.e.*, more or less than 70 years) and the domestic growth or decline of the modeled industry (*i.e.*, the increase or decrease in the number or size of domestic facilities) will influence the future risks posed by a given source or source category. Depending on the characteristics of the industry, these factors will, in most cases, result in an overestimate both in individual risk levels and in the total estimated number of cancer cases. However, in the unlikely scenario where a facility maintains, or even increases, its emissions levels over a period of more than 70 years, residents live beyond 70 years at the same location, and the residents spend most of their days at that location, then the cancer inhalation risks could potentially be underestimated. However, annual cancer incidence estimates from exposures to emissions from these sources would not be affected by the length of time an emissions source operates.

The exposure estimates used in these analyses assume chronic exposures to ambient (outdoor) levels of pollutants. Because most people spend the majority of their time indoors, actual exposures may not be as high, depending on the characteristics of the pollutants modeled. For many of the HAP, indoor levels are roughly equivalent to ambient levels, but for very reactive pollutants or larger particles, indoor levels are typically lower. This factor has the potential to result in an overestimate of 25 to 30 percent of exposures.[16]

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 that should be highlighted. 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 humans at the location of the maximum concentration. In the acute screening assessment that we conduct under the RTR program, we assume that peak emissions from the source category and worst-case meteorological conditions co-occur, thus, resulting in maximum ambient concentrations. These two events are unlikely to occur at the same time, making these assumptions conservative. We then include the additional assumption that a person is located at this point during this same time period. For this source category, these assumptions would tend to be worst-case actual exposures as it is unlikely that a

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[16] U.S. EPA. *National-Scale Air Toxics Assessment for 1996*. (EPA 453/R–01–003; January 2001; page 85.)

person would be located at the point of maximum exposure during the time when peak emissions and worst-case meteorological conditions occur simultaneously.

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 non-cancer effects from both chronic and acute exposures. Some uncertainties may be considered quantitatively, and others generally are expressed in qualitative terms. We note as a preface to this discussion a point on dose-response uncertainty that is brought out in the EPA’s *2005 Cancer Guidelines*; 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” (EPA's *2005 Cancer Guidelines*, pages 1–7). This is the approach followed here as summarized in the next several paragraphs. A complete detailed discussion of uncertainties and variability in dose-response relationships is given in the *Residual Risk Assessment for the Portland Cement Manufacturing Industry Source Category in Support of the Risk and Technology Review September 2017 Proposed Rule*, which is available in the docket for this action.

Cancer URE values used in our risk assessments are those that have been developed to generally provide an upper bound estimate of risk. 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).[17] In some circumstances, the true risk could be as low as zero; however, in other circumstances,

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

the risk could be greater.[18] When developing an upper bound estimate of risk and to provide risk values that do not underestimate risk, health-protective default approaches are generally used. To err on the side of ensuring adequate health protection, the EPA typically uses the upper bound estimates rather than lower bound or central tendency estimates in our risk assessments, an approach that may have limitations for other uses (*e.g.*, priority-setting or expected benefits analysis).

Chronic non-cancer RfC and reference dose (RfD) values represent chronic exposure levels that are intended to be health-protective levels. Specifically, these values provide an estimate (with uncertainty spanning perhaps an order of magnitude) of a continuous inhalation exposure (RfC) or a daily oral exposure (RfD) to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. To derive values that are intended to be "without appreciable risk," the methodology relies upon an uncertainty factor (UF) approach (U.S. EPA, 1993 and 1994) which considers uncertainty, variability, and gaps in the available data. The UF are applied to derive reference values that are intended to protect against appreciable risk of deleterious effects. The UF are commonly default values,[19] (*e.g.*, factors of 10 or 3), used in the absence of compound-specific data; where data are

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[18] 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.

[19] According to the NRC report, *Science and Judgment in Risk Assessment* (NRC, 1994) "[Default] options are generic approaches, based on general scientific knowledge and policy judgment, that are applied to various elements of the risk assessment process when the correct scientific model is unknown or uncertain." The 1983 NRC report, *Risk Assessment in the Federal Government: Managing the Process*, defined default option as "the option chosen on the basis of risk assessment policy that appears to be the best choice in the absence of data to the contrary" (NRC, 1983a, p. 63). Therefore, default options are not rules that bind the Agency; rather, the Agency may depart from them in evaluating the risks posed by a specific substance when it believes this to be appropriate. In keeping with the EPA's goal of protecting public health and the environment, default assumptions are used to ensure that risk to chemicals is not underestimated (although defaults are not intended to overtly overestimate risk). See EPA, *An Examination of EPA Risk Assessment Principles and Practices*, EPA/100/B–04/001, 2004, available at *https://nctc.fws.gov/resources/course-resources/pesticides/Risk%20Assessment/Risk%20Assessment%20Principles%20and%20Practices.pdf*.

available, a UF may also be developed using compound-specific information. When data are limited, more assumptions are needed and more UF are used. Thus, there may be a greater tendency to overestimate risk in the sense that further study might support development of reference values that are higher (*i.e.*, less potent) because fewer default assumptions are needed. However, for some pollutants, it is possible that risks may be underestimated.

While collectively termed “UF,” these factors account for a number of different quantitative considerations when using observed animal (usually rodent) or human toxicity data in the development of the RfC. The UF are intended to account for: (1) variation in susceptibility among the members of the human population (*i.e.*, inter-individual variability); (2) uncertainty in extrapolating from experimental animal data to humans (*i.e.*, interspecies differences); (3) uncertainty in extrapolating from data obtained in a study with less-than-lifetime exposure (*i.e.*, extrapolating from sub-chronic to chronic exposure); (4) uncertainty in extrapolating the observed data to obtain an estimate of the exposure associated with no adverse effects; and (5) uncertainty when the database is incomplete or there are problems with the applicability of available studies.

Many of the UF used to account for variability and uncertainty in the development of acute reference values are quite similar to those developed for chronic durations, but they more often use individual UF values that may be less than 10. The UF are applied based on chemical-specific or health effect-specific information (*e.g.*, simple irritation effects do not vary appreciably between human individuals, hence a value of 3 is typically used), or based on the purpose for the reference value (see the following paragraph). The UF applied in acute reference value derivation include: (1) heterogeneity among humans; (2) uncertainty in extrapolating from animals to humans; (3) uncertainty in lowest observed adverse effect (exposure) level to no observed adverse effect (exposure) level adjustments; and (4) uncertainty in accounting for an incomplete database on toxic effects of potential concern. 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 reference value at another exposure duration (*e.g.*, 1 hour).

Not all acute reference 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 reference value or values being exceeded. Where relevant to the estimated exposures, the lack of short-term dose-response values at different levels of severity should be factored into the risk characterization as potential uncertainties.

Although every effort is made to identify appropriate human health effect dose-response assessment values for all pollutants emitted by the sources in this risk assessment, some HAP emitted by this source category are lacking dose-response assessments. Accordingly, these pollutants cannot be included in the quantitative risk assessment, which could result in quantitative estimates understating HAP risk. To help to alleviate this potential underestimate, where we conclude similarity with a HAP for which a dose-response assessment value is available, we use that value as a surrogate for the assessment of the HAP for which no value is available. To the extent use of surrogates indicates appreciable risk, we may identify a need to increase priority for new IRIS assessment of that substance. We additionally note that, generally speaking, HAP of greatest concern due to environmental exposures and hazard are those for which dose-response assessments have been performed, reducing the likelihood of understating risk. Further, HAP not included in the quantitative assessment are assessed qualitatively and considered in the risk characterization that informs the risk management decisions, including with regard to consideration of HAP reductions achieved by various control options.

For a group of compounds that are unspeciated (*e.g.*, glycol ethers), we conservatively use the most protective reference 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 reference value, we also apply the most protective reference value from the other compounds in the group to estimate risk.

e. Uncertainties in the Multipathway Assessment

For each source category, we generally rely on site-specific levels of PB-HAP emissions to determine whether a refined assessment of the impacts from multipathway exposures is necessary. This determination is based on the results of a three-tiered screening analysis that relies on the outputs from models that estimate environmental pollutant concentrations and human exposures for five PB-HAP. 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.[20]

Model uncertainty concerns whether the selected models are appropriate for the assessment being conducted and whether they adequately represent the actual processes that might occur for that situation. An example of model uncertainty is the question of whether the model adequately describes 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 screen are appropriate and state-of-the-art for the multipathway risk assessments conducted in support of RTR.

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[20] 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.

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 screen, 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 and 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 assessment, 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 screen. The assumptions and the associated uncertainties regarding the selected ingestion exposure scenario are the same for Tier 1 and Tier 2.

For both Tiers 1 and 2 of the multipathway assessment, 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 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 not screen out, it does not mean that multipathway impacts are significant, only that we cannot rule out that possibility and that a refined multipathway analysis for the site might be necessary to obtain a more accurate risk characterization for the source category. The site-specific multipathway assessment improves upon the screens by utilizing AERMOD to estimate dispersion and deposition impacts upon delineated watersheds and farms. This refinement also provides improved soil and water run-off calculations for effected watershed(s) and adjacent parcels in estimating media concentrations for each PB-HAP modeled.

For further information on uncertainties and the Tier 1 and 2 screening methods, refer to Appendix 5 of the risk report, "*Technical Support Document for TRIM-Based Multipathway Tiered Screening Methodology for RTR: Summary of Approach and Evaluation*."

f. Uncertainties in the Environmental Risk Screening Assessment

For each source category, we generally rely on site-specific levels of environmental HAP emissions to perform an environmental screening assessment. The environmental screening assessment is based on the outputs from models that estimate environmental HAP concentrations. The TRIM.FaTE multipathway model and the AERMOD air dispersion model, are used to estimate environmental HAP concentrations for the environmental screening analysis. The human multipathway screening analysis are based upon the TRIM.FaTE model, while the site-specific assessments incorporate AERMOD model runs into the TRIM.FaTE model runs. Therefore, both screening assessments have similar modeling uncertainties.

Two important types of uncertainty associated with the use of these models in RTR environmental screening assessments (and inherent to any assessment that relies on environmental modeling) are model uncertainty and input uncertainty.[21]

Model uncertainty concerns whether the selected models are appropriate for the assessment being conducted and whether they adequately represent the movement and accumulation of environmental HAP emissions 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 screen are appropriate and state-of-the-art for the environmental risk assessments conducted in support of our RTR analyses.

Input uncertainty is concerned with how accurately the models have been configured and parameterized for the assessment at hand. For Tier 1 of the environmental screen for PB-HAP, we configured the models to avoid underestimating exposure and risk to reduce the likelihood that the results indicate the risks are lower than they actually are. 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, the location and size of any bodies of water, meteorology, surface water and soil characteristics, and structure of the aquatic food web. In Tier 1, we used the maximum facility-specific emissions for the PB-HAP (other than lead compounds, which were evaluated by comparison to the Secondary Lead NAAQS) that were included in the environmental screening assessment and each of the media when comparing to ecological benchmarks. This is consistent

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[21] In the context of this discussion, the term "uncertainty," as it pertains to exposure and risk assessment, 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.

with the conservative design of Tier 1 of the screen. In Tier 2 of the environmental screening analysis for PB-HAP, 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 locations of water bodies near the facility location. 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 screen. To better represent widespread impacts, the modeled soil concentrations are averaged in Tier 2 to obtain one average soil concentration value for each facility and for each PB-HAP. For PB-HAP concentrations in water, sediment, and fish tissue, the highest value for each facility for each pollutant is used.

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 both Tiers 1 and 2 of the environmental screening assessment, 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 potential risks for adverse environmental impacts.

Uncertainty also exists in the ecological benchmarks for the environmental risk screening analysis. We established a hierarchy of preferred benchmark sources to allow selection of benchmarks for each environmental HAP at each ecological assessment endpoint. In general, EPA benchmarks used at a programmatic level (*e.g.*, Office of Water, Superfund Program) were used if available. If not, we used EPA benchmarks used in regional programs (*e.g.*, Superfund Program). If benchmarks were not available at a programmatic or regional level, we used benchmarks developed by other agencies (*e.g.*, NOAA) or by state agencies.

In all cases (except for lead compounds, which were evaluated through a comparison to the NAAQS), we searched for benchmarks at the following three effect levels, as described in section III.A.6 of this preamble:

1. A no-effect level (*i.e.*, NOAEL).
2. Threshold-effect level (*i.e.*, LOAEL).
3. Probable effect level (*i.e.*, PEL).

For some ecological assessment endpoint/environmental HAP combinations, we could identify benchmarks for all three effect levels, but for most, we could not. In one case, where different agencies derived significantly different numbers to represent a threshold for effect, we included both. In several cases, only a single benchmark was available. In cases where multiple effect levels were available for a particular PB-HAP and assessment endpoint, we used all of the available effect levels to help us to determine whether risk exists and if the risks could be considered significant and widespread.

The EPA evaluates the following eight HAP in the environmental risk screening assessment: cadmium compounds, D/F, arsenic compounds, POM, mercury compounds (both inorganic mercury and methyl mercury), lead compounds, HCl, and HF, where applicable. These eight HAP represent pollutants that can cause adverse impacts for plants and animals either through direct exposure to HAP in the air or through exposure to HAP that is deposited from the air onto soils and surface waters. These eight HAP also represent those HAP for which we can conduct a meaningful environmental risk screening assessment. For other HAP not included in our screening assessment, 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 the eight HAP that we are evaluating may have the potential to cause adverse environmental effects and, therefore, the EPA may evaluate other relevant HAP in the future, as modeling science and resources allow.

Further information on uncertainties and the Tier 1 and 2 environmental screening methods is provided in Appendix 5 of the document, *Technical Support Document for TRIM-Based Multipathway Tiered Screening Methodology for RTR: Summary of Approach and Evaluation*. Also, see the *Residual Risk Assessment for Portland Cement Manufacturing Industry Source Category in Support of the Risk and Technology Review September 2017 Proposed Rule*, available in the docket for this action.

B. How did we consider the risk results in making decisions for this proposal?

As discussed in section II.A of this preamble, in evaluating and developing standards under CAA section 112(f)(2), we apply a two-step process to address residual risk. 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)[22] of approximately [1-in-10 thousand] [*i.e.*, 100-in-1 million]." 54 FR 38045, September 14, 1989. If risks are unacceptable, the EPA must determine the emission standards necessary to bring risks to an acceptable level without considering costs. In the second step of the process, the EPA considers whether the emissions standards provide an ample margin of safety "in consideration of all health information,

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

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 margin of safety. 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.

In past residual risk actions, the EPA considered a number of human health risk metrics associated with emissions from the categories under review, including the MIR, the number of persons in various risk ranges, cancer incidence, the maximum non-cancer HI and the maximum acute non-cancer hazard. See, *e.g.*, 72 FR 25138, May 3, 2007; and 71 FR 42724, July 27, 2006. The EPA considered this health information for both actual and allowable emissions. See, *e.g.*, 75 FR 65068, October 21, 2010; 75 FR 80220, December 21, 2010; 76 FR 29032, May 19, 2011. The EPA also discussed risk estimation uncertainties and considered the uncertainties in the determination of acceptable risk and ample margin of safety in these past actions. The EPA considered this same type of information in support of this action.

The Agency is considering these various measures of health information to inform our determinations of risk acceptability and ample margin of safety under CAA section 112(f). 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 [previous] section 112 is best judged on the basis of a broad set of health risk measures and information.” 54 FR 38046, September 14, 1989. 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. In responding to comment on our policy under the Benzene NESHAP, the EPA explained that:

> "[t]he 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 [her] 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 [her] judgment, believes are appropriate to determining what will 'protect the public health'."

See 54 FR at 38057, September 14, 1989. Thus, the level of the MIR is only one factor to be weighed in determining acceptability of risks. 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 MIR less than the presumptively acceptable level is unacceptable in the light of other health risk factors." *Id.* at 38045. 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 those HAP risks that may be associated with emissions from other facilities that do not include the source categories in question, mobile source emissions, natural source emissions, persistent environmental pollution, or atmospheric transformation in the vicinity of the sources in these categories.

The Agency 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 non-cancer risks, where pollutant-specific exposure health reference levels (*e.g.*, RfCs) are based on the assumption that thresholds exist for adverse health effects. For example, the Agency recognizes that, although exposures attributable to emissions from a source category or facility alone may not indicate the potential for increased risk of adverse non-cancer 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 increased risk of adverse non-cancer health effects. In May 2010, the 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."[23]

In response to the SAB recommendations, the EPA is incorporating cumulative risk analyses into its RTR risk assessments, including those reflected in this proposal. The Agency is: (1) conducting facility-wide assessments, which include source category emission points, as well as other emission points within the facilities; (2) considering sources in the same category whose emissions result in exposures to the same individuals; and (3) for some persistent and bioaccumulative pollutants, analyzing the ingestion route of exposure. In addition, the RTR risk assessments have always considered aggregate cancer risk from all carcinogens and aggregate non-cancer HI from all non-carcinogens affecting the same target organ system.

Although we are interested in placing source category and facility-wide HAP risks in the context of *total* HAP risks from all sources combined in the vicinity of each source, we are concerned about the uncertainties of doing so. Because of the contribution to total HAP risk from emission sources other than those that we have studied in depth during this RTR review, such estimates of total HAP risks would have significantly greater associated uncertainties than the source category or facility-wide estimates. Such aggregate or cumulative assessments would compound those uncertainties, making the assessments too unreliable.

C. How did we perform the technology review?

Our technology review focused on the identification and evaluation of developments in practices, processes, and control technologies that have occurred since the MACT standards were

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[23] The EPA's responses to this and all other key recommendations of the SAB's advisory on RTR risk assessment methodologies (which is available at: *http://yosemite.epa.gov/sab/sabproduct.nsf/4AB3966E263D943A8525771F00668381/$File/EPA-SAB-10-007-unsigned.pdf*) are outlined in a memorandum to this rulemaking docket from David Guinnup titled, *EPA's Actions in Response to the Key Recommendations of the SAB Review of RTR Risk Assessment Methodologies*.

promulgated. Where we identified such developments, in order to inform our decision of whether it is “necessary” to revise the emissions standards, we analyzed the technical feasibility of applying these developments and the estimated costs, energy implications, non-air environmental impacts, as well as considering the emission reductions. We also considered the appropriateness of applying controls to new sources versus retrofitting existing sources.

Based on our analyses of the available data and information, we identified potential developments in practices, processes, and control technologies. For this exercise, we considered 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 reviewed a variety of data sources in our investigation of potential practices, processes, or controls to consider. Among the sources we reviewed were the NESHAP for various industries that were promulgated since the MACT standards being reviewed in this action. We reviewed the regulatory requirements and/or technical analyses associated with these regulatory actions to identify any practices, processes, and control technologies considered in these efforts that could be applied to emission sources in the Portland Cement Manufacturing Industry source category, as well as the costs, non-air impacts, and energy implications associated with the use of these technologies. Finally, we reviewed information from other sources, such as state and/or local permitting agency databases and industry-supported databases.

IV. Analytical Results and Proposed Decisions

A. What are the results of the risk assessment and analyses?

1. Inhalation Risk Assessment Results

Table 3 of this preamble provides an overall summary of the inhalation risk results. The results of the chronic baseline inhalation cancer risk assessment indicate that, based on estimates of current actual and allowable emissions, the MIR posed by the Portland Cement Manufacturing Industry source category was estimated to be 1-in-1 million and 4-in-1 million, respectively, from volatile HAP being emitted from the kilns. The total estimated cancer incidence from Portland cement manufacturing industry emission sources based on actual emission levels is 0.01 excess cancer cases per year, or one case in every 100 years. The total estimated cancer incidence from Portland Cement Manufacturing Industry emission sources based on allowable emission levels is 0.03 excess cancer cases per year, or one case in every 33 years. Emissions of formaldehyde, benzene, naphthalene, and acetaldehyde contributed 91 percent to this cancer incidence. The population exposed to cancer risks greater than or equal to 1-in-1 million considering actual emissions was estimated to be approximately 130; for allowable emissions, approximately 2,300 people were estimated to be exposed to cancer risks greater than or equal to 1-in-1 million.

Table 3: Inhalation Risk Assessment Summary for Portland Cement Manufacturing Industry Source Category

	Cancer MIR (in-1 million)	Cancer Incidence	Population with risk	Population with risk of	Max Chronic Noncancer HI

	Based on Actual Emissions	Based on Allowable Emissions	(cases per year)[1]	of 1-in-1 million or greater[1]	10-in-1 million or greater[1]	--
Source Category	1 (formaldehyde, benzene)	4 (formaldehyde, benzene)	0.01	130	0	HI < 1 (Actuals and Allowables)
Whole Facility	70 (arsenic and chromium VI)	--	0.02	20,000	690	HI = 1 (Actuals)

[1] Cancer incidence and populations exposed are based upon actual emissions.

The maximum chronic noncancer HI (TOSHI) values for the source category, based on actual and allowable emissions, were estimated to be 0.02 and 0.06, respectively, with formaldehyde, acetaldehyde, and hydrochloric acid driving the TOSHI value.

2. Acute Risk Results

Worst-case acute HQs were calculated for every HAP for which there is an acute health benchmark using actual emissions. The maximum acute noncancer HQ value for the source category was less than 1. Acute HQs are based upon actual emissions.

3. Multipathway Risk Screening Results

Results of the worst-case Tier 1 screening analysis indicate that PB-HAP emissions (based on estimates of actual emissions) from 70 of the 91 facilities in the source category exceed the screening values for the carcinogenic PB-HAP (D/F and arsenic) and that PB-HAP emissions from 68 of the 91 facilities exceed the screening values for mercury, a noncarcinogenic PB-HAP. Cadmium emissions were below the Tier 1 emission noncancer screening level for each facility based upon the combined Farmer and Fisher scenarios. For the PB-HAP and facilities that did not screen out at Tier 1, we conducted a Tier 2 screening analysis.

The Tier 2 screen replaces some of the assumptions used in Tier 1 with site-specific data, the location of fishable lakes, and local wind direction and speed. The Tier 2 screen continues to rely on high-end assumptions about consumption of local fish and locally grown or raised foods (adult female angler at 99th percentile consumption for fish[24] for the Fisher Scenario and 90th percentile for consumption of locally grown or raised foods[25]) for the Farmer Scenario and uses an assumption that the same individual consumes each of these foods in high end quantities (*i.e.*, that an individual has high end ingestion rates for each food). The result of this analysis was the development of site-specific concentrations of D/F, arsenic compounds, and mercury compounds. It is important to note that, even with the inclusion of some site-specific information in the Tier 2 analysis, the multipathway screening analysis is still a very conservative, health-protective assessment (*e.g.*, upper-bound consumption of local fish, locally grown, and/or raised foods) and in all likelihood will yield results that serve as an upper-bound multipathway risk associated with a facility.

Based on the Tier 2 screening analysis, 45 facilities emit D/F and arsenic that exceed the Tier 2 cancer screening value. D/F emissions exceeded the screening value by a factor of as much as 100 for the fisher scenario and by as much as 30 for the farmer scenario. For arsenic, the facility with the largest exceedance of the cancer screening value had an exceedance of 10 times the Tier 1 emission rate level resulting in a Tier 2 screening value less than 1 for both the Fisher and Farmer scenarios. For mercury, 24 facilities emit mercury emissions above the noncancer screening value, with at least one facility exceeding the screening value by a factor of 30 for the

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[24] Burger, J. 2002. *Daily Consumption of Wild Fish and Game: Exposures of High End Recreationists*. *International Journal of Environmental Health Research*, 12:343–354.

[25] U.S. EPA. *Exposure Factors Handbook*, 2011 Edition (Final). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R–09/052F, 2011.

Fisher scenario. When we considered the effect multiple facilities within the source category could have on common lake(s) in the modeling domain, mercury emissions exceeded the noncancer screening value by a factor of 40.

For D/F, we conducted a Tier 3 multipathway screen for the facility with the highest Tier 2 multipathway cancer screen (a value of 100) for the Fisher scenario. The next highest facility had a Tier 2 cancer screen value of 40. Tier 3 has three individual stages, and we progressed through each of those stages until either the facility's PB-HAP emissions did not exceed the screening value or all three stages had been completed. These stages included lake, plume rise, and time-series assessments. Based on this Tier 3 screening analysis, the MIR facility had D/F emissions that exceeded the screening value by a factor of 20 for the Fisher scenario. Further details on the Tier 3 screening analysis can be found in Appendix 11 of *Residual Risk Assessment for the Portland Cement Manufacturing Industry Source Category in Support of the Risk and Technology Review September 2017 Proposed Rule."*

An exceedance of a screening value in any of the tiers cannot be equated with a risk value or a HQ (or HI). Rather, it represents a high-end estimate of what the risk or hazard may be. For example, facility emissions exceeding the screening value by a factor 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 exceeding the screening value by a factor of 20 for a carcinogen means that we are confident that the risk is lower than 20-in-1 million. Our confidence comes from the health-protective assumptions that are in 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 that the exposed individual exhibits ingestion behavior that would lead to a high total exposure.

For mercury emissions, we conducted a site-specific assessment. Analysis of the facilities with the highest Tier 2 screen values helped identify the location for the site-specific assessment and the facilitie(s) to model with TRIM_FaTE. We also considered the effect multiple facilities within the source category could have on common lake(s) in the modeling domain. The selection of the facility(s) for the site-specific assessment also included evaluating the number and location of lakes impacted, watershed boundaries, and land-use features around the target lakes, (*i.e.*, elevation changes, topography, rivers).

The three facilities selected are located in Midlothian, Texas. One of the three facilities had the largest Tier 2 screen value, as well as the lake with the highest aggregated noncancer screen value for mercury with a lake size of over 6,600 acres. These sites were selected because of the Tier 2 mercury screening results and based on the feasibility, with respect to the modeling framework, of obtaining parameter values for the region surrounding the facilities. We expect that the exposure scenarios we assessed are among the highest that might be encountered for other facilities in this source category.

The refined site-specific multipathway assessment, as in the screening assessments, includes some hypothetical elements, namely the hypothetical human receptor (*e.g.*, the Fisher scenario which did not screen out in the screening assessments). We also included children in different age ranges and adults with lifetime cancer risks evaluated for carcinogens if they did not pass the screening, and noncancer hazards evaluated for different age groups for other chemicals that did not pass the screening. It is important to note that even though the multipathway assessment has been conducted, no data exist to verify the existence of the hypothetical human receptor.

The Fisher scenario involves an individual who regularly consumes fish caught in freshwater lakes in the vicinity of the source of interest over the course of a 70-year lifetime. Since the

Fisher scenario did not pass the screening, we evaluated risks and/or hazards from the one lake that was fished in the screening assessment, with the same adjustments to fish ingestion rates as used in the screening according to lake acreage and its assumed impact on fish productivity. The refined multipathway assessment produced an HQ of 0.6 for mercury for the three facilities assessed. This risk assessment represents the maximum hazard for mercury through fish consumption for the source category and, with an HQ less than 1, is below the level of concern for exposure to emissions from these sources.

In evaluating the potential for multipathway effects from emissions of lead, we compared modeled hourly lead concentrations to the secondary NAAQS for lead (0.15 $\mu g/m^3$). The highest hourly lead concentration, of 0.023 $\mu g/m^3$, is below the NAAQS for lead, indicating a low potential for multipathway impacts of concern due to lead.

4. Environmental Risk Screening Results

As described in section III.A of this preamble, we conducted an environmental risk screening assessment for the Portland Cement Manufacturing Industry source category for the following six pollutants: mercury (methyl mercury and mercuric chloride), arsenic, cadmium, lead, D/F, and HCl. In the Tier 1 screening analysis for PB-HAP (other than lead, which was evaluated differently), cadmium and arsenic emissions had no exceedances of any ecological benchmarks evaluated. D/F and methyl mercury emissions had Tier 1 exceedances for surface soil. Divalent mercury emissions had Tier 1 exceedances for sediment and surface soil. A Tier 2 screening analysis was performed for D/F, divalent mercury, and methyl mercury emissions. In the Tier 2 screening analysis, D/F emissions had no exceedances of any ecological benchmarks evaluated. Divalent mercury emissions from six facilities exceeded the Tier 2 screen for a threshold level sediment benchmark by a maximum screening value of 2. The divalent mercury probable-effects benchmark for sediment was not exceeded. Methyl mercury emissions from two facilities exceeded the Tier 2 screen for a NOAEL surface soil benchmark for avian ground insectivores (woodcock) by a maximum screening value of 2. Other surface soil benchmarks for methyl mercury were not exceeded. Given the low Tier 2 maximum screening values of 2 for divalent mercury and methyl mercury, and the fact that only the most protective benchmarks were exceeded, a Tier 3 environmental risk screen was not conducted for this source category. 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, each individual modeled concentration of HCl (*i.e.,* each off-site data point in the modeling domain) was below the ecological benchmarks for all facilities. 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

Results of the assessment of facility-wide emissions indicate that, of the 91 facilities, 16 facilities have a facility-wide cancer risk greater than or equal to 1-in-1 million (refer to Table 3). The maximum facility-wide cancer risk is 70-in-1 million, mainly driven by arsenic and chromium (VI) emissions from construction activities involving the hauling of sand and gravel from the stone quarrying process. The next highest facility-wide cancer risk is 8-in-1 million.

The total estimated cancer incidence from the whole facility is 0.02 excess cancer cases per year, or one case in every 50 years. Approximately 20,000 people are estimated to have cancer risks greater than or equal to 1-in-1 million from exposure to whole facility emissions from 16 facilities in the source category. Approximately 700 people are estimated to have cancer risk greater than 10-in-1 million from exposure to whole facility emissions from one facility in the source category.

The maximum facility-wide chronic non-cancer TOSHI is estimated to be equal to 1, mainly driven by emissions of HCl from a drying operation routed through the long kiln.

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 of the population close to the facilities. In this analysis, we evaluated the distribution of HAP-related cancer and non-cancer risks from the Portland Cement Manufacturing Industry source category across different demographic groups within the populations living near facilities identified as having the highest risks. The methodology and the results of the demographic analyses are included in a technical report, *Risk and Technology Review – Analysis of Demographic Factors for Populations Living Near Portland Cement Manufacturing Facilities*, available in the docket for this action.

The results of the demographic analysis are summarized in Table 4 below. These results, for various demographic groups, are based on the estimated risks from actual emission levels for the population living within 50 km of the facilities.

Table 4. Portland Cement Manufacturing Industry Source Category Demographic Risk Analysis Results

	Nationwide	Population with Cancer Risk at or Above 1-in-1 Million Due to Portland Cement Manufacturing	Population with Chronic Hazard Index Above 1 Due to Portland Cement Manufacturing
Total Population	317,746,049	134	0
Race by Percent			
White	62	71	0
All Other Races	38	29	0
Race by Percent			
White	62	94	0

	Nationwide	Population with Cancer Risk at or Above 1-in-1 Million Due to Portland Cement Manufacturing	Population with Chronic Hazard Index Above 1 Due to Portland Cement Manufacturing
African American	12	1	0
Native American	0.8	1.6	0
Other and Multiracial	7	3	0
Ethnicity by Percent			
Hispanic	18	24	0
Non-Hispanic	82	76	0
Income by Percent			
Below Poverty Level	14	10	0
Above Poverty Level	86	90	0
Education by Percent			
Over 25 and without High School Diploma	14	11	0
Over 25 and with a High School Diploma	86	89	0

The results of the Portland Cement Manufacturing Industry source category demographic analysis indicate that emissions from the source category expose approximately 130 people to a cancer risk at or above 1-in-1 million and no people to a chronic noncancer TOSHI greater than 1. The percentages of the at-risk population in each demographic group (except for White, Native American, and Hispanic) are similar to or lower than their respective nationwide percentages. The specific demographic results indicate that the percentage of the population potentially impacted by Portland cement emissions is greater than its corresponding nationwide percentage for the following demographics: Native American (1.6 percent compared to 0.8 percent nationally), Hispanic or Latino (24 percent compared to 18 percent nationally) and children aged 0 to 17 (32 percent compared to 23 percent nationally). The other demographic groups within the exposed population were the same or lower than the corresponding nationwide percentages.

B. What are our proposed decisions regarding risk acceptability, ample margin of safety, and adverse environmental effects?

1. Risk Acceptability

As noted in section II.A.1 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 lifetime [cancer] risk (MIR)[26] of approximately 1-in-10 thousand [*i.e.*, 100-in-1 million]." 54 FR 38045, September 14, 1989. In this proposal, we estimated risks based on actual and allowable emissions. As discussed earlier, we consider our analysis of risk from allowable emissions to be conservative and, as such, to represent an upper bound estimate of inhalation risk from emissions allowed under the NESHAP for the source category.

The inhalation cancer risk to the individual most exposed to emissions from sources in the Portland Cement Manufacturing Industry source category is 1-in-1 million based on actual emissions. The estimated incidence of cancer due to inhalation exposure is 0.01 excess cancer cases per year, or one case in every 100 years, based on actual emissions. Approximately 130 people are exposed to actual emissions resulting in an increased cancer risk greater than or equal to 1-in-1 million. We estimate that, for allowable emissions, the inhalation cancer risk to the individual most exposed to emissions from sources in this source category is up to 4-in-1 million. The estimated incidence of cancer due to inhalation exposure is 0.02 excess cancer cases per

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

year, or one case in every 50 years, based on allowable emissions. Based on allowable emissions, approximately 20,000 people could be exposed to emissions resulting in an increased cancer risk of up to 1-in-1 million, and about 690 people to an increased cancer risk of up to 10-in-1 million.

The Agency estimates that the maximum chronic noncancer TOSHI from inhalation exposure is less than 1 due to actual emissions, and up to 1 due to allowable emissions. The screening assessment of worst-case acute inhalation impacts from worst-case 1-hour emissions indicates that no HAP exceed an HQ value of 1.

Based on the results of the multipathway cancer screening analyses of arsenic and dioxin emissions, we conclude that the cancer risk from ingestion exposure to the individual most exposed is less than 1-in-1 million for arsenic and, based on a Tier 3 analysis, less than 20-in-1 million for dioxins. Based on the Tier 1 multipathway screening analysis of cadmium emissions and the refined site-specific multipathway analysis of mercury emissions, the maximum chronic noncancer TOSHI due to inhalation exposures is less than 1 for actual emissions.

In determining whether risk is acceptable, the EPA considered all available health information and risk estimation uncertainty, as described above. The results indicate that both the actual and allowable inhalation cancer risks to the individual most exposed are significantly less than 100-in-1 million, which is the presumptive limit of acceptability. The maximum chronic noncancer TOSHI due to inhalation exposures is less than 1 due to actual emissions and up to 1 due to allowable emissions, and our refined multipathway analysis indicates that noncancer ingestion risks also are less than 1. Finally, the evaluation of acute noncancer risks was very conservative and showed that acute risks are below a level of concern.

Taking into account this information, we propose that the risk remaining after implementation of the existing MACT standards for the Portland Cement Manufacturing Industry is acceptable.

2. Ample Margin of Safety Analysis

Although we are proposing that the risks from the Portland Cement Manufacturing Industry source category are acceptable, for allowable emissions, the inhalation cancer risk to the individual most exposed to emissions from sources in this source category is up to 4-in-1 million, with approximately 2,000 individuals estimated to be exposed to emissions resulting in an increased cancer risk of 1-in-1 million or greater. In addition, based on the Tier 3 multipathway screening analysis, dioxin emissions from the MIR facility could pose a risk of up to 20-in-1 million. Thus, we considered whether the existing MACT standards provide an ample margin of safety to protect public health. In addition to considering all of the health risks and other health information considered in the risk acceptability determination, in 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 in this source category to further reduce the risks due to emissions of HAP.

Our inhalation risk analysis indicates very low potential for risk from the facilities in the source category based upon actual emissions at 1-in-1 million, and just slightly higher risks based upon allowable emissions at 4-in-1 million. Therefore, very little reduction in inhalation risks could be realized regardless of the availability of control options. As directed by CAA section 112(f)(2), we conducted an analysis to determine if the standard provides an ample margin of safety to protect public health. The HAP risk drivers contributing to the inhalation MIR in excess of 1-in-1 million for 40 CFR part 63, subpart LLL facilities include primarily the gaseous organic HAP: formaldehyde, benzene, naphthalene, and acetaldehyde. More than 62 percent of the mass emissions of these compounds originate from kiln operations.

The following paragraphs provide our analyses of HAP-reducing measures that we considered in our ample margin of safety analysis. For each option, we considered feasibility, cost-effectiveness, and health information in determining whether to revise standards in order to provide an ample margin of safety.

The first technology we evaluated in our ample margin of safety analysis is a regenerative thermal oxidizer (RTO). To assess the costs associated with RTOs, we relied on our beyond-the-floor (BTF) analysis documented in the May 6, 2009, Portland Cement NESHAP proposal (74 FR 21136). In that proposal, we assessed the potential for further reductions in THC and organic HAP emissions beyond the reductions achieved by activated carbon injection (ACI) (controlling mercury and THC emissions), the typical kiln controls used in the industry. To achieve further reductions in THC, a kiln would likely require additional controls, such as RTO. It was expected that RTO would only offer an additional 50-percent removal efficiency, due to the reduced THC concentration leaving the ACI control device and entering the proposed RTO. The analysis indicates that addition of an RTO would reduce THC emissions by approximately 9 tpy, for a cost effectiveness of $411,000/ton. The HAP fraction would be approximately 24 percent of THC, so 2 tpy of organic HAP would be removed, at a cost effectiveness of $1.7 million/ton of organic HAP. The details of this analysis are included in 74 FR 21152-21153. Overall, we do not consider the use of an RTO to be cost effective for this industry, and given the small reduction in organic HAP emissions, the addition of an RTO would have little effect on the source category risks.

Exposure to dioxin emissions from the MIR facility were found to pose a non-inhalation MIR of less than 20-in-1 million, and possibly greater than 1-in-1 million. Technologies evaluated included the use of ACI with wet scrubbers to help control D/F emissions. For the March 24, 1998, proposal (63 FR 14182), we performed a BTF analysis that considered the MACT floor for D/F emissions controls to be a reduction of the kiln exhaust gas stream temperature at the PM control device inlet to 400 degrees Fahrenheit (63 FR 14200). An ACI system was considered as a potential BTF option. Total annual costs were estimated to be $426,000 to $3.3 million per kiln. The Agency determined that, based on the additional costs and the level of D/F emissions reduction achievable, the BTF costs were not justified (63 FR 14199-14201). We do not consider the use of ACI system to be cost effective for the industry to use to reduce D/F emissions, and would have little effect on the source category risks.

Our multipathway screening analysis results did not necessarily indicate any risks from mercury emissions, but we have also performed an evaluation of mercury emissions controls. In the May 6, 2009, BTF analysis, it was estimated for a typical 1.2 million tpy kiln, the addition of a halogenated carbon injection system would result in a 3.0 lb/year reduction in mercury at a cost of $1.25 million/year and a cost effectiveness of $420,000/lb of mercury removed. If the halogenated carbon injection system effectiveness is reduced due to a low level of mercury entering the system, 2.3 lb/year of mercury would be removed at a cost effectiveness of $540,000/lb of mercury removed (74 FR 21149). We do not consider the use of halogenated carbon injection system to be cost effective for the industry to use to reduce mercury emissions, and would have little effect on the low risks identified for this source category.

The cost-effectiveness values for further reduction of organic HAP, as referenced herein, are significantly higher than values in other NESHAP we have historically rejected for not being cost effective for organic HAP. As examples of determinations made historically, refer to the National Emission Standards for Hazardous Air Pollutants Residual Risk and Technology Review for Flexible Polyurethane Foam Production (August 15, 2014, 79 FR 48078), the National Emission Standards for Hazardous Air Pollutant Emissions: Group I Polymers and Resins (April 21, 2011, 77 FR 22579), and the National Emission Standards for Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry (December 21, 2006, 71 FR 76605). We also determined that further reduction of dioxin emissions would not be cost effective. Due to the low level of current risk, the minimal risk reductions that could be achieved with the various control options that we evaluated, and the substantial costs associated with additional control options, we are proposing that the current standards provide an ample margin of safety.

3. Adverse Environmental Effects

Based on the results of our environmental risk screening assessment, we conclude that there is not an adverse environmental effect from the Portland Cement Manufacturing Industry source category. We are 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.

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

Control devices typically used to minimize emissions at Portland cement manufacturing industry facilities include fabric filters and electrostatic precipitators (ESP) for control of PM from kilns; fabric filters for the control of PM from clinker coolers and raw material handling operations; wet scrubbers or dry lime injection for control of HCl, and ACI, wet scrubbers, or both for the control of mercury, D/F, and THC. At least one kiln has controlled THC using a wet scrubber followed by an RTO. Process changes used at some facilities to reduce HAP emissions include dust shuttling to reduce mercury emissions and raw material substitution to reduce organic HAP emissions. The add-on controls and process changes used by a facility to comply with the 40 CFR part 63, subpart LLL emission standards are highly site specific because of factors such as variations in the HAP content of raw materials and fuels, availability of alternative raw materials and fuels, and kiln characteristics (such as age and type of kiln). In addition, new or reconstructed kilns must also comply with the New Source Performance Standards (NSPS) for Cement Manufacturing (40 CFR part 60, subpart F). The NSPS sets limits for emissions of PM, nitrogen oxides (NOx) and sulfur dioxide (SO_2). The PM limits in the NSPS and the subpart LLL PM limits for new sources are the same. Measures taken at a facility to comply with the NOx and SO_2 limits must be considered in light of the subpart LLL emission standards. Due to the relatively recent finalization of the MACT rules for Portland cement manufacturing, there have been no new developments in practices, processes, or control technologies that have been implemented in this source category since promulgation of the current NESHAP. Nevertheless, we did review several technologies that have been available, or may be available soon, to the industry and provided additional options to the industry for reducing HAP emissions. Based on information available to the EPA, these technologies do not clearly reduce HAP emissions relative to technologies that were considered by the EPA when promulgating the Portland Cement Manufacturing Industry NESHAP in 2013.

Selective catalytic reduction (SCR) is the process of adding ammonia or urea in the presence of a catalyst to selectively reduce NOx emissions from exhaust gases. A benefit of SCR may be its ability to facilitate the removal of mercury and other HAP emissions from the Portland cement manufacturing process. The EPA considered SCR in proposing standards for

NOx in 2008, but did not propose SCR as best demonstrated technology for several reasons (73 FR 34072, June 16, 2008). At the time of the proposal, SCR was in use at just a few kilns in Europe, and no cement kilns in the U.S. used SCR. There were concerns over the plugging of the SCR catalyst in high-dust installations and, in low-dust installations where the catalyst is located downstream of the PM control device, the cost of reheating cooled exhaust was very high leading to uncertainties over what actual costs would be. Finally, SCR was anticipated to increase energy use due to the pressure drop across the catalyst and produce additional liquid and solid waste to be handled.

Since then, SCR has been installed on two cement kilns in the U.S. The two installations in the U.S. started operation in 2016 (Holcim in Midlothian, Texas) and 2013 (Lafarge in Joppa, Illinois). Holcim controls THC through addition of SCR to Kiln 1 and an RTO to Kiln 2. The SCR system at Lafarge controls NOx and operates with a long dry kiln with a hot ESP, and no reheat.

Beyond its ability to reduce NOx by 90 percent, multipollutant benefits have been reported. At kilns in Europe, reductions in THC of 50 to greater than 70 percent have been reported. Although D/F reductions have been observed for SCR in many industries and reductions in D/F have been reported for an SCR installation at a cement kiln in Italy, tests of D/F reduction across SCR catalyst in the Portland Cement Manufacturing Industry have not been conducted. SCR does not directly reduce mercury emissions. Instead, SCR results in the oxidation of mercury from its elemental form, and the oxidized form is more easily captured in scrubbers. The addition of an SCR as control is expected to have little impact on reducing mercury emissions from cement kilns without requiring the addition of a scrubber system.

Catalytic ceramic filter candles and catalytic filter bags are used to remove not only particulate, but may be used to remove other pollutants such as D/F, THC, non-D/F organic HAP, carbon monoxide (CO), and NOx. Catalytic ceramic filter candles are typically approximately 10 feet long. The length is limited to 10 feet by several considerations, including the weight of the candle and the fact that the candle cannot be flexed, limiting the height above the seal plate. In contrast, the length of catalytic filter bags can vary from 10 to 32 feet. Currently, filter bags at cement manufacturing facilities are much longer than 10 feet. Therefore, installing ceramic filter candles can only be done by replacing the baghouse housing (*i.e.*, ceramic filter candles are not a drop-in replacement for existing filter bags).

FLSmidth received the first contract for removal of THC with ceramic catalytic filters at a U.S. cement kiln. They noted that the removal of THC with their ceramic catalytic filter system depends on the speciation of THC components, but that removal efficiencies of greater than 90 percent have been seen in testing for HAP THC pollutants. Tri-Mer Corp., a technology company specializing in advanced industrial air pollution control systems, claims to have fully commercialized a ceramic filter technology that is highly effective for emissions from cement kilns and other processes facing NESHAP and MACT compliance issues. Although no studies were identified in the literature documenting the performance of Tri-Mer's ceramic filter system, the company states that their catalyst filter system is highly efficient at removing PM, SO_2, HCl, mercury, and heavy metals, while simultaneously destroying NOx, cement organic HAP and D/F. Tri-Mer reports NOx removal at up to 95 percent and D/F removal typically over 97 percent. The system can incorporate dry sorbent injection of hydrated lime, sodium bicarbonate, or trona for dry scrubbing of SO_2, HCI, HF, and other acid gases. With dry sorbent injection, typical SO_2 and HCl results show 90- to 98- percent removal. According to company information, the control of any combination of these pollutants is accomplished in a single, completely dry system that is suitable for all flow volumes.

Powdered activated carbon (PAC) for mercury control was first used in the U.S. for the incinerator (waste-to-energy) industry. Conventional PAC was expected to be used for mercury control for electrical power generation. However, conventional PAC mercury removal performance suffers in situations involving high-sulfur coal, which leads to high sulfur trioxide (SO_3) levels, or situations where SO_3 is injected to improve ESP performance. In addition, a September 2007 test conducted at the Ash Grove facility in Durkee, Oregon, suggests that halogen-treated PAC makes no difference in controlling mercury emissions from a kiln. Specifically, the report states, "While studies at coal-fired power plants have indicated that the use of halogen-treated PAC can result in higher Hg control efficiencies, testing on the Durkee exhaust gas indicated that untreated carbon provides equivalent control to halogen-treated carbon. This is believed to be due to the low sulfur levels in the Durkee cement kiln exhaust gases as compared to coal-fired power plants."[27] We believe that, based on our review, the addition of halogenated PAC controls to further reduce mercury emissions do not result in a substantial reduction of mercury emissions beyond current controls.

The Ash Grove facility in Durkee, Oregon, had the highest mercury emissions of any Portland cement manufacturing facility prior to promulgation of the cement NESHAP. To reach the NESHAP limit of 55 lbs mercury per million tons of clinker, Ash Grove installed a $20 million system for mercury capture. It consists of a baghouse with ACI. Dust collected in the baghouse is sent to an electric furnace where it is heated to 800 degrees Fahrenheit, which puts the mercury back into a gaseous state. The gaseous mercury moves into a cooling chamber where

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[27] *Mercury Control Slipstream Baghouse Testing at Ash Grove's Durkee Cement Facility*, September 2007.

it is converted into liquid that is captured in a heat exchanger/condenser. The liquid mercury is then sold for use in electronic devices and other products.

Praxair has developed a technology of feeding a stream of hot oxygen into a cement kiln to lower emissions of CO and hydrocarbons. This technology involves oxidation of CO at the kiln inlet with oxygen enhanced combustion, and has been in commercial practice since 2014 at a kiln in Europe. It has not been installed on any cement kiln in the U.S. Oxygen is injected in the riser with the goal of lowering NOx and CO emissions to below permitted levels of 230 milligrams per normal cubic meter (mg/Nm^3) and 4,000 mg/Nm^3, respectively, without use of a more expensive SCR system.

As discussed before, there are several technologies that can be effective in reducing emission from the cement kiln. However, most of these technologies have not been widely used in the industry so source category specific data on their long term performance and costs are lacking. Their performance is typically similar to technologies already employed or, in some cases, only marginally better. In the case of SCR, it had been noted that this might be an alternative to current THC controls. However, we note that SCR is most effective on non-dioxin organic HAP and is not effective on other hydrocarbons. The organic HAP portion of the 24 parts per million by volume THC limit is typically low and is near the actual detection limits for measurement. Therefore, even if SCR were more widely applied in the industry, the emissions impact on THC and organic HAP would be small.

D. What other actions are we proposing?

In addition to the proposed actions described above, we are proposing additional revisions, which include changes to clarify monitoring, testing, and recordkeeping and reporting requirements and the correction of typographical errors. Our analyses and proposed changes related to these issues are discussed below.

We are proposing to correct a paragraph in the reporting requirements that mistakenly requires that affected sources report their 30-operating day rolling average for D/F temperature monitoring. There are no 30-day operating rolling average temperature requirements pertaining to D/F in the rule. The removal of the reference to the D/F temperature monitoring system in 40 CFR 63.1354(b)(9)(vi) is also consistent with the EPA's October 2016 rule guidance for the subpart LLL NESHAP. See *NESHAP for the Portland Cement Manufacturing Industry Subpart LLL Rule Guidance*, which has been updated to include revisions from this proposed rule. (*https://www.epa.gov/sites/production/files/2016-03/documents/ruleguidance_mar2016.pdf*).

We are proposing to correct a provision that requires facility owners or operators to keep records of both daily clinker production and kiln feed rates. Section 63.1350(d)(1)(ii) requires daily kiln feed rate records only if the facility derives their clinker production rates from the measured feed rate.

The EPA is proposing to clarify that the submittal dates for semiannual summary reports required under 40 CFR 63.1354(b)(9) are 60 days after the end of the reporting period consistent with the Agency's statement in the October 2016 rule guidance for the subpart LLL NESHAP. In addition, the October 2016 rule guidance was revised in September 2017 to ensure it reflects the various changes proposed in this rule.

The EPA is proposing to resolve conflicting provisions that apply when an SO_2 continuous parametric monitoring system is used to monitor HCl compliance. If the SO_2 level exceeds by 10 percent or more the site-specific SO_2 emissions limit, 40 CFR 63.1349(b)(x) requires that as soon as possible, but within 30 days, a facility must take corrective action, and within 90 days, conduct a performance test to demonstrate compliance with the HCl limit and verify or re-establish the site-specific SO_2 emissions limit. These conflict with 40 CFR 63.1350(l)(3), which requires corrective action within 48 hours and retesting within 60 days. We are proposing to adopt the requirements of 40 CFR 63.1349(b)(x) and change the requirement of 40 CFR 63.1350(l)(3) to reflect this.

We are proposing to clarify the requirement in section 63.1349(b)(1)(vi) which states that for each PM performance test, an owner or operator must conduct at least three separate test runs each while the mill is on and the mill is off. We are proposing that this provision only applies to kilns with inline raw mills, as inline raw mills are considered part of the kiln and can affect kiln PM emissions. It specifically would not apply to a kiln that does not have an inline raw mill or to a clinker cooler (unless the clinker cooler gases are combined with kiln exhaust and sent through an inline mill). As in these cases, the raw mill is a separate source from the kiln and has no effect on kiln or clinker cooler PM emissions.

We are proposing changes which affect the emission limits for D/F. Table 1 of 40 CFR 63.1343(b) lists the emission limits for D/F. The units of the emission limit are ng/dscm TEQ at 7-percent oxygen. The TEQ is developed by determining the mass of each congener measured during the performance test, then multiplying each congener by the toxic equivalency factor (TEF). After the TEQ is developed per congener, they are added to obtain the total TEQs. The TEFs were re-evaluated in 2005 by the World Health Organization – International Programme on Chemical Safety using a different scale of magnitude.[28] The 40 CFR part 63, subpart LLL standards were developed based on TEFs developed in 1989, as referenced in the TEQ definition section of the rule (40 CFR 63.1341). Laboratories calculating the TEQs should be using the

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[28] Van den Berg, Martin, et. Al. The *2005 World Health Organization Re-evaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds*. Toxicol. Sci. 2006, October 1993(2): 223-241

TEFs developed in 1989. We are proposing that the 1989 TEFs be incorporated into the rule to clarify that they are the appropriate factors for calculating TEQ.

Finally, we are proposing to clarify the performance test requirements for certain sources. According to a stakeholder, compliance with 40 CFR part 63, subpart LLL is required immediately upon startup and does not allow companies an operating window after periods of extended shutdown in order to assess compliance. The stakeholder states that extended shutdowns of existing kilns occur in the Portland cement manufacturing industry in the aftermath of economic downturns when companies have halted production at certain facilities. When the economy rebounds and sources are brought back on line, they must immediately comply with NESHAP and other CAA requirements for existing facilities. The stakeholder asserts that this mandatory compliance requirement does not account for the fact that owners or operators must start the facilities back up and run them for periods of time to determine whether any measures must be taken to come into compliance with updated NESHAP or other standards. In response, we are proposing to clarify the performance test requirements for affected sources that have been idle through one or more periods that required a performance test to demonstrate compliance. The proposed amendment would require any affected source that was unable to demonstrate compliance before the compliance date due to being idled, or that had demonstrated compliance, but was idled during the normal window for the next compliance test, to demonstrate compliance with the emissions standards and operating limits by conducting their performance using the test methods and procedures in 40 CFR 63.1349 and 63.7. Per 40 CFR 63.7, the necessary performance tests would need to be completed within 180 days of the date that compliance must be demonstrated.

E. What compliance dates are we proposing?

Because these amendments only provide corrections and clarifications to the current rule and do not impose new requirements on the industry, we are proposing that these amendments become effective upon promulgation of the final rule.

V. Summary of Cost, Environmental, and Economic Impacts

A. What are the impacts to affected sources?

The recent amendments to the Portland Cement Manufacturing NESHAP have included rule updates, addressing electronic reporting requirements, and changes in policies regarding startup, shutdown, and malfunction. Because we are proposing no new requirements or controls in this RTR, no Portland cement manufacturing facilities are adversely impacted by these proposed revisions. In fact, the impacts to the Portland cement manufacturing industry from this proposal will be minimal and potentially positive.

B. What are the air quality impacts?

In this proposal, we recommend no new emission limits and require no additional controls; therefore, no air quality impacts are expected as a result of the proposed amendments.

C. What are the cost impacts?

As previously stated, recent amendments to the Portland Cement Manufacturing NESHAP have addressed electronic reporting and changes in policies regarding startup, shutdown, and malfunction. Additionally, the proposed amendments recommend no changes to emission standards or add-on controls. Therefore, the proposed amendments impose no additional costs. In fact, the clarifications to rule language may actually result in a reduction of current costs because compliance will be more straightforward.

D. What are the economic impacts?

No economic impacts are expected as a result of the proposed amendments.

E. What are the benefits?

While the proposed amendments would not result in reductions in emissions of HAP, this action, if finalized, would result in improved monitoring, compliance, and implementation of the rule.

VI. Request for Comments

We solicit comments on all aspects of 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 Web site at *https://www3.epa.gov/ttn/atw/rrisk/rtrpg.html*. 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 Web site, 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, *etc.*).

4. Send the entire downloaded file with suggested revisions in Microsoft® Access format and all accompanying documentation to Docket ID No. EPA-HQ-OAR-2016-0442 (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. 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 RTR Web site at *https://www3.epa.gov/ttn/atw/rrisk/rtrpg.html*.

VIII. Statutory and Executive Order Reviews

Additional information about these statutes and Executive Orders can be found at *http://www2.epa.gov/laws-regulations/laws-and-executive-orders*.

A. Executive Order 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 the Office of Management and Budget (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)

This action does not impose any new information collection burden under the PRA. OMB has previously approved the information collection activities contained in the existing regulations (40 CFR part 63, subpart LLL) and has assigned OMB control number 2060-0416. This action does not change the information collection requirements.

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. In making this determination, the impact of concern is any significant adverse economic impact on small entities. An agency may certify that a rule will not have a significant economic impact on a substantial number of small entities if the rule relieves regulatory burden, has no net burden, or otherwise has a positive economic effect on the small entities subject to the rule. We estimate that three of the 26 existing Portland cement entities are small entities and comprise three plants. After considering the economic impacts of this proposed action on small entities, we have concluded that this action will have no net regulatory burden for all directly regulated small entities.

E. Unfunded Mandates Reform Act (UMRA)

This action does not contain an unfunded mandate 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. It will neither impose substantial direct compliance costs on federally recognized tribal governments, nor preempt tribal law. The EPA is aware of one tribally owned Portland cement facility currently subject to 40 CFR part 63, subpart LLL that will be subject to this proposed action. However, the provisions of this proposed rule are not expected to impose new or substantial direct compliance costs on tribal governments since the provisions in this proposed action are clarifying and correcting monitoring and testing requirements and recordkeeping and reporting requirements. This proposed action also provides clarification for owners and operators on bringing new or previously furloughed kilns back on line. Thus, Executive Order 13175 does not apply to this action.

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

The EPA interprets Executive Order 13045 as applying only to those regulatory actions that concern environmental health or safety risks that the EPA has reason to believe may disproportionately affect children, per the definition of "covered regulatory action" in section 2-202 of the Executive Order. This action is not subject to Executive Order 13045 because it does not concern an environmental health risk or safety risk.

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 rulemaking does not involve technical standards.

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.A of this preamble.

List of Subjects in 40 CFR Part 63

Environmental protection, Administrative practices and procedures, Air pollution control, Hazardous substances, Intergovernmental relations, Reporting and recordkeeping requirements.

Dated:________________________.

____

E. Scott Pruitt,
Administrator.

For the reasons stated in the preamble, the Environmental Protection Agency is proposing to amend title 40, chapter I, part 63 of the Code of Federal Regulations (CFR) as follows:

PART 63 — NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS FOR SOURCE CATEGORIES

1. The authority citation for part 63 continues to read as follows:

Authority: 42 U.S.C. 7401, *et seq*.

Subpart LLL—National Emission Standards for Hazardous Air Pollutants for the Portland Cement Manufacturing Industry

2. Section 63.1341 is amended by:

a. Removing the definition of “affirmative defense;” and

b. Revising the definitions of “dioxins and furans (D/F),” “in-line coal mill,” and “TEQ.”

The revisions read as follows:

§ 63.1341 Definitions

* * * * * *

Dioxins and furans (D/F) means tetra-, penta-, hexa-, hepta-, and octa-chlorinated dibenzo dioxins and furans.

* * * * * *

In-line coal mill means a coal mill using kiln exhaust gases in their process. A coal mill with a heat source other than the kiln or a coal mill using exhaust gases from the clinker cooler is not an in-line coal mill.

* * * * * *

TEQ means the international method of expressing toxicity equivalents for dioxins and furans as defined in U.S. EPA, Interim Procedures for Estimating Risks Associated with

Exposures to Mixtures of Chlorinated Dibenzo-p-dioxins and -dibenzofurans (CDDs and CDFs) and 1989 Update, March 1989. The 1989 Toxic Equivalency Factors (TEFs) used to determine the dioxin and furan TEQs are listed in Table 2 to subpart LLL of Part 63.

* * * * * *

3. Section 63.1343 is amended by removing paragraph (d) and Table 2.

4. Section 63.1348 is amended by:

a. Revising the first sentence in paragraph (a) introductory text;

b. Revising paragraph (a)(3)(i);

c. Revising the second sentence in paragraph (a)(3)(iv);

d. Revising paragraphs (a)(4)(ii), (a)(7)(ii), (b)(3)(ii), and (b)(4);

e. Redesignating paragraph (b)(5)(i) as paragraph (b)(5) introductory text;

f. Revising newly redesignated paragraph (b)(5) introductory text; and

g. Adding new paragraph (b)(5)(i).

The revisions and addition read as follows:

§ 63.1348 Compliance requirements.

(a) *Initial Performance Test Requirements.* For an affected source subject to this subpart, including any affected source that was unable to demonstrate compliance before the compliance date due to being idled, or that had demonstrated compliance but was idled during the normal window for the next compliance test, you must demonstrate compliance with the emissions standards and operating limits by using the test methods and procedures in §§ 63.1349 and 63.7.

* * *

* * * * * *

(3) *D/F compliance.* (i) If you are subject to limitations on D/F emissions under § 63.1343(b), you must demonstrate initial compliance with the D/F emissions standards by using the performance test methods and procedures in § 63.1349(b)(3). The owner or operator of a kiln with an in-line raw mill must demonstrate initial compliance by conducting separate performance tests while the raw mill is operating and the raw mill is not operating. Determine the D/F TEQ concentration for each run and calculate the arithmetic average of the TEQ concentrations measured for the three runs to determine continuous compliance.

* * * * * *

(iv) * * * Compliance is demonstrated if the system is maintained within ±5 percent accuracy during the performance test determined in accordance with the procedures and criteria submitted for review in your monitoring plan required in § 63.1350(p).

(4) * * *

(ii) *Total Organic HAP Emissions Tests.* If you elect to demonstrate compliance with the total organic HAP emissions limit under § 63.1343(b) in lieu of the THC emissions limit, you must demonstrate compliance with the total organic HAP emissions standards by using the performance test methods and procedures in § 63.1349(b)(7).

* * * * * *

(7) * * *

(ii) Perform required emission monitoring and testing of the kiln exhaust prior to the reintroduction of the coal mill exhaust, and also testing the kiln exhaust diverted to the coal mill. All emissions must be added together for all emission points, and must not exceed the limit per each pollutant as listed in § 63.1343(b).

(b) * * *

(3) * * *

(ii) *Bag Leak Detection System (BLDS).* If you install a BLDS on a raw mill or finish mill in lieu of conducting the daily visible emissions testing, you must demonstrate compliance using a BLDS that is installed, operated, and maintained in accordance with the requirements of § 63.1350(f)(4)(ii).

(4) *D/F Compliance.* If you are subject to a D/F emissions limitation under § 63.1343(b), you must demonstrate compliance using a continuous monitoring system (CMS) that is installed, operated and maintained to record the temperature of specified gas streams in accordance with the requirements of § 63.1350(g).

(5) *Activated Carbon Injection Compliance*. (i) If you use activated carbon injection to comply with the D/F emissions limitation under § 63.1343(b), you must demonstrate compliance using a CMS that is installed, operated, and maintained to record the rate of activated carbon injection in accordance with the requirements § 63.1350(h)(1).

* * * * * *

5. Section 63.1349 is amended by:

a. Revising paragraphs (b)(1)(vi), (3)(iv), (4)(i), (6)(i)(A), (7)(viii)(A), (8)(vi), and (8)(vii)(B); and

b. Removing and reserving paragraph (d).

The revisions read as follows:

§ 63.1349 Performance testing requirements.

* * * * * *

(b)(1) * * *

(vi) For each performance test, conduct at least three separate test runs under the conditions that exist when the affected source is operating at the level reasonably expected to occur. Conduct each test run to collect a minimum sample volume of 2 dscm for determining compliance with a new source limit and 1 dscm for determining compliance with an existing source limit. Calculate the time weighted average of the results from three consecutive runs, including applicable sources as required by (b)(1)(viii), to determine compliance. You need not determine the particulate matter collected in the impingers "back half" of the Method 5 or Method 5I particulate sampling train to demonstrate compliance with the PM standards of this subpart. This shall not preclude the permitting authority from requiring a determination of the "back half" for other purposes. For kilns with inline raw mills, testing must be conducted while the raw mill is on and while the raw mill is off. If the exhaust streams of a kiln with an inline raw mill and a clinker cooler are comingled, then the comingled exhaust stream must be tested with the raw mill on and the raw mill off.

* * * * * *

(3) * * *

(iv) The run average temperature must be calculated for each run, and the average of the run average temperatures must be determined and included in the performance test report and will determine the applicable temperature limit in accordance with § 63.1346(b).

* * * * * *

(4) * * *

(i) If you are subject to limitations on THC emissions, you must operate a CEMS in accordance with the requirements in § 63.1350(i). For the purposes of conducting the accuracy and quality assurance evaluations for CEMS, the THC span value (as propane) is 50 to 60 ppmvw and the reference method (RM) is Method 25A of appendix A to part 60 of this chapter.

* * * * * *

(6) * * *

(i)(A) If the source is equipped with a wet scrubber, tray tower or dry scrubber, you must conduct performance testing using Method 321 of appendix A to this part unless you have installed a CEMS that meets the requirements § 63.1350(l)(1). For kilns with inline raw mills, testing must be conducted for the raw mill on and raw mill off conditions.

* * * * * *

(7) * * *

(viii) * * *

(A) Determine the THC CEMS average values in ppmvw, and the average of your corresponding three total organic HAP compliance test runs, using Equation 12.

$$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} X_{\mathrm{i}}\,, \bar{y} = \frac{1}{n}\sum_{i=1}^{n} Y_{\mathrm{i}} \qquad \text{(Eq. 12)}$$

Where:

$\overline{x}$ = The THC CEMS average values in ppmvw.

Xi = The THC CEMS data points for all three test runs i.

$\overline{y}$ = The organic HAP average values in ppmvw.

Yi = The organic HAP concentrations for all three test runs i.

n = The number of data points.

* * * * * *

(8) * * *

(vi) If your kiln has an inline kiln/raw mill, you must conduct separate performance tests while the raw mill is operating (“mill on”) and while the raw mill is not operating (“mill off”). Using the fraction of time the raw mill is on and the fraction of time that the raw mill is off, calculate this limit as a weighted average of the SO_2 levels measured during raw mill on and raw mill off compliance testing with Equation 17.

$$R = (y * t) + x * (1 - t) \qquad \text{(Eq. 17)}$$

Where:

R = Operating limit as SO_2, ppmvw.

y = Average SO_2 CEMS value during mill on operations, ppmvw.

t = Percentage of operating time with mill on, expressed as a decimal.

x = Average SO_2 CEMS value during mill off operations, ppmvw.

1-t = Percentage of operating time with mill off, expressed as a decimal.

(vii) * * *

(B) Determine your SO_2 CEMS instrument average ppm, and the average of your corresponding three HCl compliance test runs, using equation 18.

$$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} X_1 \, , \bar{y} = \sum_{i=1}^{n} Y_1 \qquad \text{(Eq. 18)}$$

Where:

$\bar{x}$ = The SO_2 CEMS average values in ppmvw.

X_1 = The SO_2 CEMS data points for the three runs constituting the performance test.

$\bar{y}$ = The HCl average values in ppmvw.

Y_1 = The HCl emission concentration expressed as ppmv corrected to 7 percent oxygen for the three runs constituting the performance test.

n = The number of data points.

* * * * * *

(d) [Reserved]

* * * * * *

6. Section 63.1350 is amended by:

a. Revising paragraphs (g) introductory text, (g)(4), (h)(2)(ii), (j), (k)(2) introductory text, (k)(2)(ii), and (k)(2)(iii);

b. Adding paragraph (k)(2)(iv); and

c. Revising paragraphs (k)(5)(ii), (l)(1) introductory text, and (l)(3).

The revisions and addition read as follows:

§ 63.1350 Monitoring requirements.

* * * * * *

(g) *D/F monitoring requirements*. If you are subject to an emissions limitation on D/F emissions, you must comply with the monitoring requirements of paragraphs (g)(1) through (g)(5) and paragraphs (m)(1) through (m)(4) of this section to demonstrate continuous compliance with the D/F emissions standard. You must also develop an emissions monitoring plan in accordance with paragraphs (p)(1) through (p)(4) of this section.

* * * * * *

(4) Every hour, report the calculated rolling three-hour average temperature using the average of 180 successive one-minute average temperatures. See S63.1349(b)(3).

* * * * * *

(h) * * *

(2) * * *

(ii) Each hour, calculate the three-hour rolling average of the selected parameter value for the previous 3 hours of process operation using all of the one-minute data available (*i.e.*, the CMS is not out-of-control).

* * * * * *

(j) *Total organic HAP monitoring requirements*. If you are complying with the total organic HAP emissions limits, you must continuously monitor THC according to paragraph (i)(1) and (2) of this section or in accordance with Performance Specification 8 or Performance Specification 8A of appendix B to part 60 of this chapter and comply with all of the requirements for continuous monitoring systems found in the general provisions, subpart A of this part. You must operate and maintain each CEMS according to the quality assurance requirements in Procedure 1 of appendix F in part 60 of this chapter. You must also develop an emissions monitoring plan in accordance with paragraphs (p)(1) through (4) of this section.

(k) * * *

* * * * * *

(2) In order to quality assure data measured above the span value, you must use one of the four options in paragraphs (k)(2)(i) through (iv) of this section.

* * * * * *

(ii) Quality assure any data above the span value by proving instrument linearity beyond the span value established in paragraph (k)(1) of this section using the following procedure. Conduct a weekly “above span linearity” calibration challenge of the monitoring system using a reference gas with a certified value greater than your highest expected hourly concentration or greater than 75 percent of the highest measured hourly concentration. The “above span” reference gas must meet the requirements of PS 12A, Section 7.1 and must be introduced to the measurement system at the probe. Record and report the results of this procedure as you would for a daily calibration. The “above span linearity” challenge is successful if the value measured by the Hg CEMS falls within 10 percent of the certified value of the reference gas. If the value measured by the Hg CEMS during the above span linearity challenge exceeds ±10 percent of the certified value of the reference gas, the monitoring system must be evaluated and repaired and a new “above span linearity” challenge met before returning the Hg CEMS to service, or data above span from the Hg CEMS must be subject to the quality assurance procedures established in paragraph (k)(2)(iii) of this section. In this manner all hourly average values exceeding the span value measured by the Hg CEMS during the week following the above span linearity challenge when the CEMS response exceeds ±20 percent of the certified value of the reference gas must be normalized using Equation 22.

$$\frac{Certified\ reference\ gas\ value}{Measured\ value\ of\ reference\ gas}\ x\ Measured\ stack\ gas\ result \qquad \text{(Eq. 22)}$$

$$= Normalized\ stack\ gas\ result$$

(iii) Quality assure any data above the span value established in paragraph (k)(1) of this section using the following procedure. Any time two consecutive one-hour average measured concentrations of Hg exceeds the span value you must, within 24 hours before or after, introduce a higher, “above span” Hg reference gas standard to the Hg CEMS. The “above span” reference gas must meet the requirements of PS 12A, Section 7.1, must target a concentration level between 50 and 150 percent of the highest expected hourly concentration measured during the period of measurements above span, and must be introduced at the probe. While this target represents a desired concentration range that is not always achievable in practice, it is expected that the intent to meet this range is demonstrated by the value of the reference gas. Expected values may include “above span” calibrations done before or after the above span measurement period. Record and report the results of this procedure as you would for a daily calibration. The “above span” calibration is successful if the value measured by the Hg CEMS is within 20 percent of the certified value of the reference gas. If the value measured by the Hg CEMS exceeds 20 percent of the certified value of the reference gas, then you must normalize the one-hour average stack gas values measured above the span during the 24-hour period preceding or following the “above span” calibration for reporting based on the Hg CEMS response to the reference gas as shown in equation 22. Only one “above span” calibration is needed per 24 hour period.

* * * * * *

(5) * * *

(ii) On a continuous basis, determine the mass emissions of mercury in lb/hr from the alkali bypass and coal mill exhausts by using the mercury hourly emissions rate and the exhaust gas flow rate to calculate hourly mercury emissions in lb/hr.

* * * * * *

(l) * * *

(1) If you monitor compliance with the HCl emissions limit by operating an HCl CEMS, you must do so in accordance with Performance Specification 15 (PS 15) or PS 18 of appendix B to part 60 of this chapter, or, upon promulgation, in accordance with any other performance specification for HCl CEMS in appendix B to part 60 of this chapter. You must operate, maintain, and quality assure a HCl CEMS installed and certified under PS 15 according to the quality assurance requirements in Procedure 1 of appendix F to part 60 of this chapter except that the Relative Accuracy Test Audit requirements of Procedure 1 must be replaced with the

validation requirements and criteria of sections 11.1.1 and 12.0 of PS 15. If you choose to install and operate an HCl CEMS in accordance with PS 18 of appendix B to part 60 of this chapter, you must operate, maintain, and quality assure the HCl CEMS using the associated Procedure 6 of appendix F to part 60 of this chapter. For any performance specification that you use, you must use Method 321 of appendix A to part 63 of this chapter as the reference test method for conducting relative accuracy testing. The span value and calibration requirements in paragraphs (l)(1)(i) and (ii) of this section apply to HCl CEMS other than those installed and certified under PS 15 or PS 18.

* * * * * *

(3) If the source is equipped with a wet or dry scrubber or tray tower, and you choose to monitor SO_2 emissions, monitor SO_2 emissions continuously according to the requirements of § 60.63(e) and (f) of part 60 subpart F of this chapter. If SO_2 levels increase above the 30-day rolling average SO_2 operating limit established during your performance test by 10 percent or more, you must:

(i) As soon as possible but no later than 30 days after you exceed the established SO_2 value conduct an inspection and take corrective action to return the SO_2 emissions to within the operating limit; and

(ii) Within 90 days of the exceedance or at the time of the next compliance test, whichever comes first, conduct an HCl emissions compliance test to determine compliance with the HCl emissions limit and to verify or re-establish the SO_2 CEMS operating limit.

* * * * * *

7. Section 63.1354 is amended by revising paragraph (b)(9) introductory text, (9)(vi), (9)(viii), and (10); and paragraph (c) to read as follows:

§ 63.1354 Reporting requirements.

* * * * * *

(b) * * *

(9) The owner or operator shall submit a summary report semiannually within 60 days of the reporting period to the EPA via the Compliance and Emissions Data Reporting Interface (CEDRI). (CEDRI can be accessed through the EPA's Central Data Exchange (CDX) (*www.epa.gov/cdx*).) You must use the appropriate electronic report in CEDRI for this subpart. Instead of using the electronic report in CEDRI for this subpart, you may submit an alternate electronic file consistent with the extensible markup language (XML) schema listed on the CEDRI Web site (*https://www.epa.gov/electronic-reporting-air-emissions/compliance-and-emissions-data-reporting-interface-cedri*), once the XML schema is available. If the reporting form specific to this subpart is not available in CEDRI at the time that the report is due, you must submit the report the Administrator at the appropriate address listed in § 63.13. You must begin submitting reports via CEDRI no later than 90 days after the form becomes available in CEDRI. The excess emissions and summary reports must be submitted no later than 60 days after the end of the reporting period, regardless of the method in which the reports are submitted. The report must contain the information specified in § 63.10(e)(3)(vi). In addition, the summary report shall include:

* * * * * *

(vi) For each PM CPMS, HCl, Hg, and THC CEMS, or Hg sorbent trap monitoring system, within 60 days after the reporting periods, you must report all of the calculated 30-operating day rolling average values derived from the CPMS, CEMS, CMS, or Hg sorbent trap monitoring systems.

* * * * * *

(viii) You must submit the information specified in paragraphs (b)(9)(viii)(A) and (B) of this section no later than 60 days following the initial performance test. All reports must be signed by a responsible official.

(A) The initial performance test data as recorded under § 63.1349(a) of this section.

(B) The values for the site-specific operating limits or parameters established pursuant to § 63.1349 (b)(1), (3), (6), (7), and (8), as applicable, and a description, including sample calculations, of how the operating parameters were established during the initial performance test.

(C) As of December 31, 2011, and within 60 days after the date of completing each performance evaluation or test, as defined in § 63.2, conducted to demonstrate compliance with any standard covered by this subpart, you must submit the relative accuracy test audit data and performance test data, except opacity data, to the EPA by successfully submitting the data electronically to the EPA's Central Data Exchange (CDX) by using the Electronic Reporting Tool (ERT) (see *https://www.epa.gov/electronic-reporting-air-emissions/electronic-reporting-tool-ert*). For any performance evaluations with no corresponding RATA pollutants listed on the ERT Web site, you must submit the results of the performance evaluation to the Administrator at the appropriate address listed in § 63.13.

* * * * * *

(10) If the total continuous monitoring system downtime for any CEM or any CMS for the reporting period is 10 percent or greater of the total operating time for the reporting period, the owner or operator shall submit an excess emissions and continuous monitoring system performance report along with the summary report.

(c) Reporting a failure to meet a standard due to a malfunction. For each failure to meet a standard or emissions limit caused by a malfunction at an affected source, you must report the failure in the semi-annual compliance report required by §63.1354(b)(9). The report must contain the date, time and duration, and the cause of each event (including unknown cause, if applicable), and a sum of the number of events in the reporting period. The report must list for each event the affected source or equipment, an estimate of the amount of each regulated pollutant emitted over the emission limit for which the source failed to meet a standard, and a description of the method used to estimate the emissions. The report must also include a description of actions taken by an owner or operator during a malfunction of an affected source to minimize emissions in accordance with §63.1348(d), including actions taken to correct a malfunction.

* * * * * *

8. Section 63.1355 is amended by revising paragraph (e) to read as follows:

§ 63.1355 Recordkeeping requirements.

* * * * * *

(e) You must keep records of the daily clinker production rates according to the clinker production monitoring requirements in § 63.1350(d).

* * * * * *

9. Table 1 to Subpart LLL of Part 63 is amended by revising the entry “63.10(e)(3)(v)” to read as follows:

Table 1 to Subpart LLL of Part 63—Applicability of General Provisions

Citation	Requirement	Applies to subpart LLL	Explanation
* * * * * * *			
63.10(e)(3)(v)	Due Dates for Excess Emissions and CMS Performance Reports	No	§63.1354(b)(9) specifies due date.
* * * * * * *			

10. Table 2 to Subpart LLL of Part 63 is added to read as follows:

Table 2 to Subpart LLL of Part 63—1989 Toxic Equivalency Factors (TEFs)

Dioxins/Furans	TEFs 1989
2,3,7,8-TCDD	1
1,2,3,7,8-PeCDD	0.5
1,2,3,4,7,8-HxCDD	0.1
1,2,3,6,7,8-HxCDD	0.1
1,2,3,7,8,9-HxCDD	0.1
1,2,3,4,6,7,8-HpCDD	0.01
OCDD	0.001
2,3,7,8-TCDF	0.1
1,2,3,7,8-PeCDF	0.05
2,3,4,7,8-PeCDF	0.5
1,2,3,4,7,8-HxCDF	0.1
1,2,3,6,7,8-HxCDF	0.1
1,2,3,7,8,9-HxCDF	0.1
2,3,4,6,7,8-HxCDF	0.1
1,2,3,4,6,7,8-HpCDF	0.01
1,2,3,4,7,8,9-HpCDF	0.01
OCDF	0.001