

Technical Support Document

Regulation Proposal

7 DE Admin. Code 1104

“Particulate Emissions from Fuel Burning Equipment”



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List of Acronyms

CAA	Clean Air Act
CFR	Code of Federal Regulations
DNREC	Department of Natural Resources and Environmental Control
EPA	U.S. Environmental Protection Agency
FR	Federal Register
GHG	Greenhouse Gas
MMBTU	Million British Thermal Unit
NAAQS	National Ambient Air Quality Standards
NEI	National Emissions Inventory
PM	Particulate Matter
PM ₁₀	Course Particulate Matter
SIP	State Implementation Plan
SSM	Startup, Shutdown, and Malfunction

1.0 Introduction

The Division of Air Quality of the Department of Natural Resources and Environmental Control (DNREC) is proposing to amend 7 **DE Admin. Code** 1104, *Particulate Emissions from Fuel Burning Equipment*. Regulation 1104 sets air emission limits for particulate matter (PM) for fuel burning equipment, to protect public health and the environment.

2.0 Background

Under the Clean Air Act (CAA), states are required to implement plans for national primary and secondary ambient air quality standards, these plans are known as State Implementation Plans (SIP). Section 110(k)(5) of the CAA requires the U.S. Environmental Protection Agency (EPA) to determine the completeness of these plans.

A SIP is a federally enforceable plan that is developed by states to explain how they will comply with the CAA, in order to improve air quality. It is comprised of a collection of regulations and documents used by a state to demonstrate that they are protecting public health and the environment.

7 DE Admin. Code 1104 is part of Delaware’s SIP. When regulations that are part of the SIP are amended, states are required to submit the proposed amendments to the EPA for approval. If the amendments are approved by EPA, they become part of the SIP and become federally enforceable through 40 Code of Federal Regulations (CFR) Part 52, Subpart I - Delaware.¹

¹ 40 CFR Part 52, Subpart I – Delaware. <https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-52/subpart-I>

3.0 2015 Startup, Shutdown, & Malfunction State Implementation Call (SSM SIP CALL)

On June 30, 2011, the Sierra Club filed a petition with the EPA administrator, concerning emissions during periods of startup, shutdown or malfunction (SSM). A startup is the setting in operation of a source and a shutdown is the cessation of operation of a source. A malfunction is a sudden and unavoidable breakdown of process or control equipment. During periods of SSM, equipment is not running at peak efficiency, resulting in excess emissions during these times. Air pollution emitted during these periods may adversely impact the health of people nearby and contribute to smog and other problems in communities that are further downwind.

The Sierra Club petition included requests concerning the treatment of excess emissions during SSM; specifically, how those emissions are treated in SIP provisions that the EPA approved in the past. The CAA section 110(k)(5) provides a mechanism commonly called a “SIP Call” for correcting SIPs that the Administrator finds to be substantially inadequate to meet CAA requirements.

On June 12, 2015, EPA took final action on the Sierra Club petition; this final rule is commonly known as the 2015 SSM SIP Call [80 Federal Register (FR) 33840].² In the SIP Call, EPA asked states to ensure they had plans in place that require industrial facilities to follow air pollution rules during periods of SSM; specifically, how these emissions are treated in SIPs. In issuing the SIP Call action, the EPA directed states to correct specific SSM provisions in their SIPs, giving a SIP submission deadline of November 22, 2016. 7 DE Admin. Code 1104 was one of the Delaware regulations included in this SIP Call.

In the SSM SIP Call, the EPA found 7 DE Admin. Code 1104, Subsection 1.5 deficient because it provided a potential exemption from the emission limit in Section 2.0 of the regulation, during SSM events:

“1.5 The provisions of this Regulation shall not apply to the start-up and shutdown of equipment which operates continuously or in an extended steady state when emissions from such equipment during start-up and shutdown are governed by an operation permit issued pursuant to the provisions of 2.0 of 7 DE Admin. Code 1102.

2.0 Emission Limits

No person shall cause or allow the emission of particulate matter in excess of 0.3 pound per million BTU heat input, maximum two-hour average, from any fuel burning equipment.”

² State Implementation Plans: Response to Petition for Rulemaking; Restatement and Update of EPA’s SSM Policy Applicable to SIPs; Findings of Substantial Inadequacy; and SIP Calls to Amend Provisions Applying to Excess Emissions During Periods of Startup, Shutdown and Malfunction. EPA Final Rule. 80 FR 33840. June 12, 2015. <https://www.govinfo.gov/content/pkg/FR-2015-06-12/pdf/2015-12905.pdf>

3.1 Delaware’s SSM SIP Call Response

On November 22, 2016, Delaware submitted a SIP revision, in response to EPA’s SSM SIP Call. The SIP submittal included a revised version of 7 DE Admin. Code 1104. The revision removed the offending exemption from the SIP, and created a new 30-day rolling average emission limit in a new subsection 2.2, that would now apply at all times:

“1.5 The provisions of this Regulation shall not apply to the start-up and shutdown of equipment which operates continuously or in an extended steady state when emissions from such equipment during start-up and shutdown are governed by an operation permit issued pursuant to the provisions of 2.0 of 7 DE Admin. Code 1102.

2.0 Emission Limits

~~*2.1 Reserved No person shall cause or allow the emission of particulate matter in excess of 0.3 pound per million BTU heat input, maximum two-hour average, from any fuel burning equipment.*~~

2.2 No person shall cause or allow the emission of particulate matter in excess of 0.3 pound per million BTU heat input, maximum 30-day rolling average, from any fuel burning equipment.”

3.2 Retention of a “State Only” Regulation

It should be noted, that Delaware did not agree with EPA’s position that the SSM components of Delaware’s SIP were deficient, in relation to the 2015 SSM SIP Call. Delaware’s approach has been to require a permit for facilities that limits emissions during start-up and shutdown, and to subject the conditions of the permit to upfront environmental review, ample public scrutiny and demonstration that no National Ambient Air Quality Standards (NAAQS) would be violated if the permit conditions are met. Therefore, Delaware believed that the SSM components of its SIP were protective of the NAAQS and not deficient.

Despite this disagreement, in order to avoid the imposition of CAA sanctions (CAA 110(m) and 179(b)),³ Delaware proposed to: 1) revise the SIP as referenced above and 2) adopt a separate “state only” version of Regulation 1104. The “state only” regulation resulted in the same 0.3 lb/million British Thermal Unit (MMBTU) 2-hour average for regular operation (subsection 2.1), but allowed a 0.3 lb/MMBTU 30-day rolling average for SSM events (subsection 2.2):

³The two types of sanctions are: 1) highway funding sanctions, which impose a funding moratorium for all but exempt projects (safety, mass transit) and 2) offsets, which require a ratio of at least 2:1 emissions reductions within a nonattainment area for new or modified major facilities undergoing New Source Review permitting.

“1.5 The provisions of subsection 2.1 of this Regulation shall not apply to the start-up and shutdown of equipment which operates continuously or in an extended steady state when emissions from such equipment during start-up and shutdown are governed by an operation permit issued pursuant to the provisions of Section 2.0 of 7 DE Admin. Code 1102.

2.0 Emission Limits

2.1 No person shall cause or allow the emission of particulate matter in excess of 0.3 pound per million BTU heat input, maximum two-hour average, from any fuel burning equipment.

2.2 No person shall cause or allow the emission of particulate matter in excess of 0.3 pound per million BTU heat input, maximum 30-day rolling average, from any fuel burning equipment.”

3.3 Disapproval of Delaware’s SSM SIP Call Submittal for 1104

On October 23, 2023, EPA issued a final rule disapproving Delaware’s November 22, 2016, SSM SIP Call submittal for Regulation 1104 (88 FR 72688).⁴ EPA did not agree that a proper evaluation of the impacts of a change of averaging period was adequate to ensure that the longer 30-day rolling averaging period would not cause backsliding, in accordance with CAA Section 110(l).

Therefore, Delaware is proposing to amend Regulation 1104 in response to EPA’s disapproval, to comply with 2015 SSM SIP Call. These amendments are described in more detail in Section 4.0, below.

⁴ Air Plan Disapproval; Delaware; Removal of Excess Emissions Provisions. EPA Final Action. 88 FR72688. October 23, 2023. <https://www.govinfo.gov/content/pkg/FR-2023-10-23/pdf/2023-23242.pdf>

4.0 Current Proposed Amendments to DE Admin. Code 1104

The current proposed amendments address Section 1.0 “General Provisions” and Section 2.0 “Emissions Limits”. The intent of the new amendments is to remove the “0.3 lb/MMBTU, maximum 30-day rolling average” emission limit for SSM events in Delaware’s “state only” regulation and make the “0.3 lb/MMBTU, maximum two-hour average” emission limit apply at all times, as shown below in the proposed regulation language:

~~“1.5—The provisions of subsection 2.1 of this Regulation shall not apply to the start-up and shutdown of equipment which operates continuously or in an extended steady state when emissions from such equipment during start-up and shutdown are governed by an operation permit issued pursuant to the provisions of Section 2.0 of 7 DE Admin. Code 1102.~~

2.0 Emission Limits

2.1 No person shall cause or allow the emission of particulate matter in excess of 0.3 pound per million BTU heat input, maximum two-hour average, from any fuel burning equipment.

~~2.2 No person shall cause or allow the emission of particulate matter in excess of 0.3 pound per million BTU heat input, maximum 30-day rolling average, from any fuel burning equipment.”~~

This action eliminates EPA’s backsliding concerns, as the current proposed amendments both eliminate the original SSM exemption and make the more stringent “0.3 lb/MMBTU, maximum two-hour average” now apply at all times.

5.0 Impact of Proposed Amendments

Regulation 1104 was promulgated to control the emission of PM from fuel burning equipment. The paragraphs below describe the general impact of the proposed amendments.

5.1 Impact on Facilities

The provisions of Regulation 1104 apply where the heat input capacity of the equipment is equal to or greater than 1 MMBTU per hour. As a result of the 1 MMBTU applicability cutoff, Regulation 1104 affects larger, commercial and industrial sources. Affected sources include commercial and industrial generators, engines, boilers, and turbines. Delaware is proposing to amend 7 DE Admin. Code 1104 to apply a PM emission limit of 0.3 lb/MMBTU, maximum two-hour average, from any fuel burning equipment, at all times. Currently, the emission limit for start-up and shutdown of equipment is 0.3 lb/MMBTU heat input, maximum 30-day rolling average, from any fuel burning equipment.

Several, more stringent, Federal and state regulations, or state permit limits already exist for the large majority of sources covered by this regulation, as discussed in more detail in Section 5.1.1 – 5.1.3 below. This means that facilities covered by these regulations and permits are already complying with the emission limit in Regulation 1104. Therefore, it is not expected that these facilities will need to install new controls on their equipment or expend additional resources, in order to comply with the proposed amendments to Regulation 1104.

In addition, since the large majority of sources are already required to meet the proposed emission limits in 1104, substantial emission reductions are not expected to result from the promulgation of the amendments, as detailed in Sections 5.1.1 – 5.1.3 below.

5.1.1 State and Federal Regulations

5.1.1.1 Control of Stationary Generators - 7 DE Admin. Code 1144

7 DE Admin. Code 1144⁵, *Control of Stationary Generator Emissions*, applies to new and existing, emergency and distributed, stationary non-residential generators, with a standby power rating of over 10 kW. Particulate emission rates are determined by installation date. The highest, least stringent, emission limit for PM, for generators that were existing as of January 11, 2006 is 0.7 lb/MWh or 0.32 g/kwhr. When converted to pound per MMBTU, using the following calculation, the emission limit in 1144 is, 0.21 lb/MMBTU, which is lower than the 0.30 MMBTU PM emission limit in Regulation 1104.

$$\frac{\text{g}}{\text{kW-hr}} \times \frac{\text{lb}}{\text{g}} \times \frac{\text{kW-hr}}{\text{BTU}} \times \frac{\text{BTU}}{\text{MMBTU}} = \frac{\text{lb}}{\text{MMBTU}}$$

⁵ 7 DE Admin. Code 1144 – Control of Stationary Generator Emissions.
<https://regulations.delaware.gov/AdminCode/title7/1000/1100/1144.pdf>

In conclusion, generators covered by Regulation 1144 must at least meet a “0.21 lb/MMBTU” limit. Consequently, these generators will already meet the new proposed “0.30 lb/MMBTU, maximum two-hour average”, SSM emission limit in Regulation 1104. Therefore, new controls will not be needed or additional resources expended for these generators to comply with the proposed amendments to Regulation 1104.

5.1.1.2 EPA Nonroad Compression-Ignition Engine Standards

The EPA established Exhaust Emission Standards for Nonroad Compression-Ignition Engines, also known as “Tier Standards”, between 1994 and 2004. EPA has 4 Tiers of exhaust emission standards 1-4, with 4 being the most stringent. Tier standards vary greatly based on equipment size (8-900 kW) and manufacturer date (1996-present), with the Tier 1 being the oldest manufacturer dates and Tier 4 the most recent manufacture dates.⁶ Regulation 1104 only applies to sources over 1 MMBTU which is equivalent to 293 kW. A comparison of each Tier standard to the 0.30 lb/MMBTU, maximum two-hour average PM emission limit in regulation is shown below.

Tier 2, 3 and 4

The highest, least stringent, emission standard for PM for engines over 293 Kw, for Tier 2 through Tier 4 engines, is 0.20 g/kW-hr. When converted to pound per MMBTU, using the following calculation, the 0.20 g/kW-hr emission standard is 0.13 lb/MMBTU, which is lower than the 0.30 lb/MMBTU, maximum two-hour average, emission limit in Regulation 1104.

$$\frac{\text{g}}{\text{kW-hr}} \quad \times \quad \frac{\text{lb}}{\text{g}} \quad \times \quad \frac{\text{kW-hr}}{\text{BTU}} \quad \times \quad \frac{\text{BTU}}{\text{MMBTU}} \quad = \quad \frac{\text{lb}}{\text{MMBTU}}$$

It should also be noted that large, over 1 MMBTU (293 kW) generators, may not be covered by the Tier standards because they are older Tier 1 engines. However, these grandfathered engines will likely be covered by Delaware’s stationary generator Regulation 1144, as Regulation 1144 does not differentiate by manufacturer date (see Section 5.1.1.1).

In conclusion, Tier 2 through 4 engines, over 1 MMBTU (23 kW) will already meet the 0.30 lb/MMBTU, maximum two-hour average, proposed PM SSM emission limit in Regulation 1104; through compliance with EPA’s Tier engine standards. Therefore, new controls will not be needed or additional resources expended for these engines to comply with proposed amendments to Regulation 1104.

⁶ Nonroad Compression-Ignition Engines: Exhaust Emissions Standards. <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P1000A05.pdf>

5.1.1.3 Standards of Performance for Fossil-Fuel-Fired Steam Generators - 40 CFR Part 60 Subpart D - (Boilers)

40 CFR Part 60, Subpart D — *Standards of Performance for Fossil-Fuel-Fired Steam Generators* applies to fossil-fuel-fired steam generating units, specifically, as stated in Section 60.40 of Subpart D:

“(a) The affected facilities to which the provisions of this subpart apply are:

(1) Each fossil-fuel-fired steam generating unit of more than 73 megawatts (MW) heat input rate (250 million British thermal units per hour (MMBtu/hr)).

(2) Each fossil-fuel and wood-residue-fired steam generating unit capable of firing fossil fuel at a heat input rate of more than 73 MW (250 MMBtu/hr).”

The particulate emission limit in 40 CFR Subpart D, Section 60.42(a)(1)⁷ is 0.10 lb/MMBTU, which is lower than the 0.30 lb/MMBTU emission limit in Regulation 1104. Therefore, applicable sources already meet the 0.30 lb/MMBTU, maximum two-hour average, PM emission limit in Regulation 1104.

Therefore, applicable sources already meet the proposed PM SSM emission limit in Regulation 1104, through compliance with Subpart D. Consequently, new controls will not be needed or additional resources expended for these sources to comply with proposed amendments to Regulation 1104.

5.1.2 Permitted Turbines (Not covered by the above regulations)

Turbines are not covered by EPA’s Tier Engine Standards. However, these “uncovered” sources may have Delaware permits, because their emission rates meet the permitting threshold in 7 DE Admin. Code 1102, Permits.⁸

A review of Delaware’s permitted turbines showed that the units have limits equal to or under the 0.30 lb/MMBTU, maximum two-hour average emission limit in Regulation 1104, that apply at all times (no SSM exemptions listed in the permit). Therefore, these sources are already complying with the proposed emission limit.

In conclusion, these permitted turbines will already meet the 0.30 lb/MMBTU, maximum two-hour average, emission limit in Regulation 1104; through compliance with their permit limits. Therefore, new controls will not be needed or additional resources expended for these permitted turbines to comply with proposed amendments to Regulation 1104.

⁷ 40 CFR Part 60, Subpart D, Section 60.42. <https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-60/subpart-D/section-60.42>

⁸ 7 DE Admin. Code 1102 – Permits. <https://regulations.delaware.gov/AdminCode/title7/1000/1100/1102.pdf>

5.1.3 Permitted Boilers (Not covered by the above regulations)

While the Federal regulations above (Sections 5.1.1 – 5.1.3) may cover some boilers in Delaware, some small boilers are not covered by federal regulations. However, these “uncovered” sources may have Delaware permits, because their emission rates meet the permitting threshold in 7 DE Admin. Code 1102, Permits.

The standard permit language for boilers is a 0.30 lb/MMBTU, maximum two-hour average emission limit, that applies at all times (no SSM exemptions listed in the permit):

“The Company shall not cause or allow the emissions of particulate matter in excess of 0.3 lb/MMBTU heat input, maximum 2-hour average.”

Therefore, these sources are already complying with the proposed emission limit in Regulation 1104. In addition, the permits contain standard language regarding the minimization of emissions during startup and shutdown of the units:

“At all times, including periods of startup, shutdown, and malfunction, the owner or operator shall, to the extent practicable, maintain and operate the facility including associated air pollution control equipment in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating procedures are being used will be based on information available to the Department which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the source.”

In conclusion, these permitted boilers will already meet the 0.30 lb/MMBTU, maximum two-hour average, proposed PM SSM emission limit in Regulation 1104; through compliance with their permit limits. Therefore, new controls will not be needed or additional resources expended for these permitted boilers to comply with proposed amendments to Regulation 1104.

5.1.4 Unpermitted Sources (Not covered by the above regulations)

Some small boilers, turbines, and older Tier 1 engines (see Section 5.1.1.2), may not be covered by more stringent state/federal regulations or Delaware Regulation 1102 permits. Given that these “uncovered” sources do not require a permit, it is difficult to determine the exact universe of these sources in Delaware.

The potential emissions from these “uncovered” sources is estimated to be a small portion of Delaware’s total PM emissions. Every three years, Delaware conducts a National Emissions Inventory (NEI). These “uncovered” sources would fall within the “industrial and commercial non-point (non-permitted) fuel combustion” emission category.

The estimated coarse particulate matter (PM₁₀) fuel combustion category for the 2020 NEI was 0.22% of the total PM₁₀ emissions for 2020. This emissions inventory category includes any potential non-point boilers, engines and turbines; some of which may not meet the 1104 applicability cutoff and/or are covered by more stringent state or federal regulations. Therefore, the percent of total PM₁₀ emissions for “industrial and commercial non-point fuel combustion” (2020 NEI), from “uncovered” sources that fall under Regulation 1104, is likely even less than 0.22%. Consequently, any potential emissions reductions from the compliance of “uncovered” sources with the proposed 1104 amendments, is expected to be insignificant.

5.1.5 Conclusion

To summarize, the following, more stringent, Federal and state regulations and/or Delaware permits already exist for many sources covered by this regulation:

- 7 DE Admin. Code 1144 - *Control of Stationary Generator Emissions*
- EPA Nonroad Compression-Ignition Engine (Tier) Standards
- 40 CFR Part 60, Subpart D - *Standards of Performance for Fossil-Fuel-Fired Steam Generators* (Boilers)
- Permitted Turbines and Boilers

Therefore, it is expected that the large majority of sources will need not to install new controls or expend additional resources to comply with the proposed amendments to Regulation 1104. In addition, since the large majority of sources are already required to meet the proposed emission limits in 1104, substantial emission reductions are not expected to result from the promulgation of the amendments.

5.2 Impact on Delaware’s Greenhouse Gas Emissions Reduction Targets

Regulation 1104 regulates emissions of PM from fuel burning equipment. Fuel combustion produces greenhouse gas (GHG) emissions; primarily, carbon dioxide, methane, and nitrous oxide. Therefore, a reduction in PM emission limits for fuel combustion equipment, would likely result in an associated reduction in combustion related greenhouse gas emissions.

DNREC is required to review the impacts that proposed regulatory amendments have on the State of Delaware’s GHG emission reduction targets, in accordance with 7 Del.C. §10003⁹ and 29 Del.C. §10118(b)(3).¹⁰ As detailed in Section 5.1 above, the amendments are not expected to result in any substantial emissions reductions or increases of pollutants; because more stringent Federal and state regulations or permits already exist for most sources. Therefore, the impact of this regulation on the achievement of the State of Delaware's greenhouse gas emissions reduction targets is expected to be de minimis.

⁹ Greenhouse gas emissions reductions. 7 Del.C. §10003. <https://delcode.delaware.gov/title7/c100/index.html>

¹⁰ Agency findings; form of regulations. 29 Del.C. §10118(b)(3). <https://delcode.delaware.gov/title29/c101/sc02/index.html>

5.3 Impact on Communities

The proposed amendments are not expected to impact overburdened or underserved communities located in Delaware; as the amendments are not expected to result in any substantial emissions reductions or increases, as detailed in Section 5.1.