Reasonably Available Control Technology (RACT) for Oxides of Nitrogen (NOx) Determination for the 2015 8-Hour Ozone National Ambient Air Quality Standards (NAAQS)

DRAFT State Implementation Plan (SIP) Revision

June 14, 2021
Update April 10th, 2026

DEPARTMENT OF ENERGY & ENVIRONMENT
GOVERNMENT OF THE DISTRICT OF COLUMBIA

Prepared by:
Air Quality Division
1200 First Street, NE, Fifth Floor
Washington, DC 20002

Table of Contents

List of Tables

List of Figures

List of Appendices

1.0 Background

The Washington, DC Department of Energy and Environment (DOEE or the Department) is proposing a revision to the District of Columbia's State Implementation Plan (SIP) under the federal Clean Air Act (CAA), as amended in 1990. This SIP revision addresses the federal requirements for ozone and nitrogen oxide (NOx) for areas located in the Ozone Transport Region (OTR) and for marginal nonattainment areas, and provides analysis to demonstrate that Washington, DC (the District) has met its Reasonably Available Control Technology obligations under the CAA for the 2015 ozone national ambient air quality standards (NAAQS) and the nonattainment designations for the 2015 ozone NAAQS.[1]

The CAA, which was last amended in 1990, requires the U.S. Environmental Protection Agency (EPA) to set NAAQS (40 C.F.R. part 50) for pollutants considered harmful to public health and the environment. On October 26, 2015, the EPA promulgated revised 8-hour primary and secondary ozone NAAQS. 80 Fed. Reg. 65292 (October 26, 2015).

States with areas designated as nonattainment for the revised 2015 ozone NAAQS and states located in the Ozone Transport Region (OTR) are required to revise their relevant SIPs to ensure that their SIP complies with updated statutory and regulatory requirements. These SIP Revisions must be submitted to EPA for review and approval. 42 U.S.C. § 7502(b).

The District was classified as marginal attainment for the 2015 ozone NAAQS. Due to this designation and Washington, DC's location within the OTR, the District is required to submit a revised SIP for EPA approval. 83 Fed. Reg. 25776, 25795 (June 4, 2018). In revising the SIP, the District must review its regulations and determine if the District has implemented all Reasonably Available Control Technology (RACT) requirements on all major stationary sources of precursor pollutants of ozone—volatile organic compounds (VOCs) and oxides of nitrogen (NOx) (40 C.F.R. Part 51, Subpart X) for NAAQS. This SIP Revision covers the RACT standards for NOx under the 2015 8-hour ozone NAAQS; a separate evaluation will address RACT with respect to VOCs

EPA has defined RACT as "the lowest emission limitation that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility… In evaluating economic feasibility for RACT determinations, the EPA gives

1 History of the District's Previous SIP Revisions based on revised NAAQS: Under the CAA amendments of 1990, the District was classified as a serious nonattainment area for the 1979 1-hour ozone NAAQS; the District submitted to the EPA certification of RACT provisions under the 1979 1-hour ozone NAAQS and this certification was adopted into the District's SIP effective December 26, 2000 (65 Fed. Reg. 81369).

The District was classified as a moderate nonattainment area for the 1997 8-hour ozone NAAQS; the District submitted its certification of RACT provisions under the 1997 8-hour ozone NAAQS and this certification was adopted into the District's SIP effective July 16, 2009 (74 Fed. Reg. 28447, June 16, 2009)

The District was classified as a marginal nonattainment area for the 2008 8-hour ozone NAAQS. The District submitted its certification of RACT provisions under the 2008 8-hour ozone NAAQS and this certification was adopted into the District's SIP effective November 12, 2019 (85 Fed. Reg. 10295, February 24, 2020).

significant weight to economic efficiency and relative cost effectiveness." 83 Fed. Reg. 62998, 63007, FN 16 (December 6, 2018).

DOEE's RACT analysis included with this SIP Revision supports the District's RACT determination for the 2015 8-hour ozone NAAQS. It concludes with a certification that proposed RACT controls now represent RACT for the 2015 ozone NAAQS, except with respect to the District of Columbia Water and Sewer Authority (DC Water) – Blue Plains Wastewater Treatment Plant. This exception is addressed in Section 2.2.4 under the subsection for Other Sources.

1.1 RACT Requirements

To help determine RACT, EPA developed control techniques guidelines (CTGs) and alternative control techniques (ACT) documents. While CTGs from the 1970s through the 1990s are still used to presumptively limit RACT for VOC sources, there are no CTG-like presumptive RACT limits for NOx sources. ACTs were developed for VOCs and NOx in the late 1980s and 1990s, and describe available control technologies and their respective cost-effectiveness. ACTs provide historical background on controls but do not identify RACT. Additionally, since RACT can change over time, states must consider newly available information to supplement ACT documents, and when establishing NOx RACT requirements.

In addition to evaluating economic feasibility for RACT Determinations, DOEE also considers current ozone levels in its evaluation of RACT. The District is required under its marginal ozone classification to achieve levels at or below 0.070 parts per million (ppm) by August 3, 2021. Using the 2017-2019 design value, ozone levels at the lead monitor in the District (McMillan Reservoir) are 0.071 ppm, and at the lead monitor in the Washington, DC-MD-VA nonattainment area (Beltsville, MD) are 0.072 ppm, so decisions concerning RACT standards must be made in light of these levels.

States implementing the 2015 8-hour ozone standard must ensure that their RACT determination is met either with a RACT regulation, or a certification (with supporting information) that previously required RACT controls represent RACT for 8-hour implementation purposes.[2]

In the 2008 ozone NAAQS Implementation Rule, EPA states that, "in some cases, a new RACT determination under the 2008 standard would result in the same or similar control technology as the initial RACT determination under the 1-hour or 1997 standard because the fundamental control techniques, as described in the CTGs and ACTs, are still applicable. In cases where controls were applied due to the 1-hour or 1997 NAAQS ozone RACT requirement, we expect that any incremental emissions reductions from application of a second round of controls would be small and, therefore, the cost for advancing that small additional increment of reduction would not be reasonable" (80 Fed. Reg. 12279). In the 2015 ozone NAAQS Implementation Rule, EPA states that it is "retaining existing general

[2] In the case of VOCs, states may also certify their RACT determination with a negative declaration that there are no sources in the nonattainment area covered by a specific CTG category that would require RACT.

RACT requirements for purposes of the 2015 ozone NAAQS," which implies that the previous statement still holds (83 Fed. Reg. 63007).

The District was designated as a marginal nonattainment area for the 2015 ozone NAAQS. According to CAA Section 182(a)(2)(A), states in marginal nonattainment of a NAAQS must submit a "RACT fix-up," which is "a revision that includes such provisions to correct requirements in (or add requirements to) the plan concerning [RACT] as were required [prior to November 15, 1990]."

Secondly, the District is a member of the Ozone Transport Region (OTR)[3], and therefore, CAA Section 184 is applicable; it requires states in the OTR to implement more stringent moderate area RACT at a minimum for major sources of NOx.[4]

Finally, the EPA redesignated the District as a moderate nonattainment area for the 2015 8-hour Ozone National Ambient Air Quality Standards (NAAQS) on October 7th, 2022 (87 Fed. Reg. 60897, October 7, 2022). The District was originally designated as marginal nonattainment on June 4th, 2018 (83 Fed. Reg. 25776, June 4, 2018) and did not meet the attainment deadline for marginal areas. Furthermore, *Implementation of the 2015 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements* (83 Fed. Reg. 62998, December 6, 2018) states that areas classified as "moderate" non-attainment for ozone must submit a certification that their existing rules fulfill the 8-hour ozone RACT requirements.

1.2 Major Source Thresholds

Regarding major source thresholds, several factors must be taken into consideration. The District was classified as marginal nonattainment for the 2015 ozone NAAQS RACT. The OTR requires major source thresholds of 50 tons per year (tpy) for VOCs and 100 tpy for NOx.[5] Additionally, the District had been severe-15 nonattainment under the one-hour ozone NAAQS, for which a 25 tpy threshold for a NOx major source is required. Therefore, all facilities that have the potential to emit 25 tpy NOx must be regulated under the District's NOx RACT Rule unless a case-by-case RACT determination is completed.

[3] States in the OTR include Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and the Consolidated Metropolitan Statistical Area that includes the District of Columbia.

[4] CAA Section 184 requires states in the OTR to implement more stringent RACT on any stationary source that has the potential to emit (PTE) at least fifty tons per year (tpy) of VOC, which shall be considered a major stationary source and subject to the requirements applicable to major stationary sources in moderate nonattainment areas (CAA § 184(b)(2)). (*The requirements for major stationary sources of VOCs also apply to major sources of NOx (CAA § 182(f)), where a "major stationary source" directly emits or has the potential to emit one hundred tons per year or more of any pollutant*.)

[5] **Per Appendix I guidance:** "For purposes of meeting the 8-hour RACT requirement, the State's RACT analysis only needs to include an evaluation of RACT for CTG sources and for non-CTG major sources based on the area's 8-hour classification. We note, however, that under the anti-backsliding requirements, the State may not remove RACT requirements for sources that were subject to RACT for the 1-hour standard (but that would not be subject to RACT based on the area's 8-hour classification). Similarly, if the State has never met the RACT requirement for one or more sources for the 1-hour standard, the anti-backsliding requirements require the State to meet that obligation. The anti-backsliding provisions can be found at 40 C.F.R. § 51.905 and apply to all former 1-hour non-attainment areas."

2.0 Existing NOx RACT in the District

In January 1994, the District submitted its first "Reasonably Available Control Technology for Major Stationary Sources of the Oxides of Nitrogen" (NOx RACT) rulemaking (20 DCMR § 805) to EPA as a SIP revision for the 1-hour ozone NAAQS. Since the District was a serious nonattainment area at the time, RACT was applicable for sources that emitted or had a PTE of 50 tons per year (tpy) or more of NOx. Section 805 contained presumptive emissions limits for certain source categories: stationary combustion turbines (§ 805.4), fossil fuel-fired steam generating units (§ 805.5), and asphalt concrete plants (§ 805.6). Through "generic RACT" provisions, major sources not otherwise covered by presumptive limits were required to identify source-specific RACT-level controls by a specified date that would later go through the SIP process. The District received no source-specific RACT determinations. In December 1998, the District submitted a "negative declaration" to EPA, stating that all major sources of NOx were covered by presumptive limits in §§ 805.4, 805.5, and 805.6. Minor revisions to the NOx RACT rule were submitted to EPA in 2000, and the regulation was first approved as a SIP revision on December 26, 2000 (65 Fed. Reg. 81369).

The region failed to meet the attainment date of November 15, 1999, so the District was reclassified from serious to severe nonattainment for the 1-hour standard. The major source thresholds dropped to a PTE of 25 tpy for both VOC and NOx. In 2004, the District submitted SIP revisions to meet the more stringent major source definitions and new source offset ratio requirements for areas with severe pollution. EPA approved the revised thresholds on December 28, 2004 (69 Fed. Reg. 77647).

Later, the District submitted to EPA, and EPA approved, a SIP amendment with revisions to the District's NOx RACT rule in response to requirements under the 2008 ozone NAAQS (85 Fed. Reg. 10295).

Table 1: Proposed NOx RACT Regulation Updates in the District

Source Category		**20 DCMR Section***	**Previous EPA Approval(s)**
Fuel-burning equipment with input capacity… **	Equal to or greater than 5, but less than 20, MMBtu/hr	805.5	n/a
	Equal to or greater than 20, but less than 50, MMBtu/hr	805.5	12/28/2004 (69 Fed. Reg. 77645 & 69 Fed. Reg. 77647)
	Equal to or greater than 50, but less than 100, MMBtu/hr	805.5, specifically (e)	
	100 MMBtu/hr or greater	805.5, specifically (d)	
Asphaltic concrete plants with a PTE of 25 tpy or greater		805.6	
Other fuel burning equipment with a PTE of 25 tpy or greater		805.8	
Combustion turbine with an input capacity of greater than 50 MMBtu/hr		805.4	2/24/2020 (85 Fed. Reg. 10295)
Stationary Engines (non-emergency)		805.7	n/a

* All listed categories are also covered for specific requirements (e.g., reporting) under §§ 805.1, 805.3, and 805.9 through 805.11

** The term used in § 805.5 is being updated from fossil-fuel steam generating units to fuel burning equipment so as to encompass more units, in particular water heaters

2.1 Major Non-CTG Sources of NOx

There are no CTGs for NOx, so the DOEE concludes that major sources of NOx are non-CTG sources.

There are limited categories of major sources of NOx in the District. The District's electric generating units (EGUs) at the Pepco-Benning Road and Pepco-Buzzard Point facilities were shut down by the end of 2012. Large combustion turbines at the Pepco-Buzzard Point facility are no longer in operation. There are, however, combustion turbines (CTs) that are part of newer combined heat and power (CHP) units at four of the 14 major source facilities.

The District is aware of 14 major source facilities in the District that have a PTE of 100 tons per year (TPY) or more of NOx. Most of the large units at major sources for NOx are Industrial/Commercial/Institutional (ICI) boilers with substantial contributions to PTE at some facilities from significant numbers of emergency engines:

Table 2: NOx Emissions Controls at 100+ TPY Major NOx Facilities in the District

Facility	NOx-Emitting Units (sizes) & Controls*	Fuel Type
American University (153.21 tpy NOx)	Four boilers (one 26.1, two 63.6, one 5.86 MMBtu/hr) w/low NOx burners	Natural gas (NG) & #2 oil
	20 emergency generator sets	Diesel
Catholic University (105.63 tpy NOx)	Four boilers (20.92 MMBtu/hr)	NG & #2 oil backup for gas interruptions
	26 emergency generator sets	Ultra-Low Sulfur Diesel (ULSD)
District of Columbia Water and Sewer Authority (DC Water) – Blue Plains Wastewater Treatment Plant	Three boilers (one 8.31, two 5.98 MMBtu/hr)	NG
	Auxiliary boiler (62.52 digester gas (DG)/61.79 NG MMBtu/hr)	NG & DG
	Three gas turbines (each 46.3 MMBtu/hr)	DG & NG
	Three duct burners (each 21 MMBtu/hr)	DG
	Two emergency flares (each 126 MMBtu/hr)	DG (NG pilot light)
	Siloxane Flare (6.14 MMBtu/hr)	DG (NG pilot light)
Fort Myer Plant #1 (156.91 tpy NOx)	Asphalt plant (200 ton per hour asphalt de-rated production rate) with 75 MMBtu/hr rotary kiln with baghouse (PM)	NG with #2 oil backup for gas interruptions
	Screener with 99.9 hp engine	ULSD
	Crusher with 275 hp engine	ULSD
Gallaudet University (108.24 tpy NOx)	Three boilers (49.8, 33.48, and 10.04 MMBtu/hr)	NG & #2 oil (was #4 until recent years); oil backup for gas interruptions
	17 emergency generator sets powered by compression ignition engines	ULSD
	2 emergency generator sets powered by spark ignition engines	NG
Georgetown University	Three boilers (two 127 MMBTU/hr with flue gas recirculation and one 120.6 MMBtu/hr)	NG & ULSD
	Approximately 28 compression ignition emergency engines	Diesel
	Four spark ignition emergency engines	NG

Facility	NOx-Emitting Units (sizes) & Controls*	Fuel Type
George Washington University** (473 tpy NOx)	21 boilers with heat inputs greater than 5 MMBtu/hr (two 48.7, two 20.9, two 10.2, two 9.7, thirteen between 5.0 and 7.0 inclusive, MMBtu/hr)	NG & #2 oil (many of these are NG only)
	Combustion turbine (52.9 MMBtu/hr) with heat recovery steam generator (HRSG) equipped with duct burner (16.8 MMBtu/hr)	NG
	52 emergency engines (51 for generators, one for a fire pump)	NG, Diesel (most are diesel; a few are NG or dual diesel/NG)
Howard University	Three boilers (~148 MMBtu/hr each), two w/low NOx burners	NG & #2 oil
	29 emergency generator sets powered by compression ignition engines	Diesel
	2 emergency generator sets powered by spark ignition engines	NG
Joint Base Anacostia-Bolling	Five boilers (three 30.25 NG/28.82 oil, two 8.0 MMBtu/hr, two 6.0 MMBtu/hr)	NG & #2 oil
	43 compression ignition emergency engines	Diesel
Naval Research Lab (214.89 tpy NOx)	Three boilers (two 84.8, one 56.7 MMBtu/hr)	NG & #2 oil
	27 compression ignition emergency engines (26 for generators, one for a fire pump)	Diesel
	2 spark ignition emergency engines for generators	NG
U.S. Capitol Power Plant (CPP)	Seven boilers: • One 203 MMBtu/hr NG and #2 oil • Two 160 MMBtu/hr coal and 60 MMBtu/hr NG • Four 60 MMBtu/hr NG and #2 oil	NG, #2 oil, & coal
	One 7.5 MW combustion turbine (heat input 78.4 MMBTU/hr on gas or 74.37 MMBTU/hr on #2 oil) with HRSG (71.9 MMBTU/hr on gas or 68.3 MMBTU/hr on #2 oil)	NG, #2 oil
	Two compression ignition emergency engines (one for a generator, one for a fire pump)	Diesel
U.S. General Services Administration (GSA), Central Heating and Refrigeration Plant (CHRP)	Five boilers (three 250, two 500 MMBtu/hr) w/low NOx burners or dry low-NOx burners***	NG with #2 oil backup for gas interruptions
	One cogeneration system consisting of two turbine generators, an HRSG, and duct burners (326 MMBtu/hr inclusive, high heating value (HHV) basis; NG-fired low NOx duct burners make up 211 MMBtu/hr of this total number; each of the two turbine generators are 64.58 MMBtu/hr)	NG with #2 oil backup for gas interruptions
	Three compression ignition emergency engines for generators	ULSD
Washington Navy Yard	Three boilers • Two 101 MMBtu/hr with low NOx burners and flue gas recirculation • One 20.92 MMBtu/hr	NG & #2 oil
	Approximately 17 compression ignition emergency engines	Diesel
	One spark ignition emergency engine	NG

Facility	NOx-Emitting Units (sizes) & Controls*	Fuel Type
Washington Hospital Center (210.7 tpy NOx)	Six boilers (four 56.8, two 57.3 MMBtu/hr)	NG & #2 oil
	Eight compression ignition emergency engines (seven for generators, one for a fire pump)	Diesel or #2 oil

* Does not include miscellaneous/insignificant activities or units that do not emit NOx.
** George Washington University has approximately 365 units of equipment that burn fuel with heat input ratings of less than 5 MMBtu/hr, nearly all burning natural gas, but a few that can burn either natural gas or #2 fuel oil. These are individually insignificant, but in combination, contribute significantly to the facility's PTE.
*** U.S. General Services Administration has permits allowing temporary installation of lower-emitting boilers for periods of time when permanent boilers are offline for maintenance, etc. The information in this table reflects the highest-emitting configuration of the facility.

Only two facilities' NOx PTE is not dominated by boilers and/or emergency engines as follows:

1. Ft. Myer Plant #1 is an asphaltic concrete production plant subject to existing RACT requirements in 20 DCMR § 805.6.

2. District of Columbia Water and Sewer Authority (DC Water) – Blue Plains Wastewater Treatment Plant has NOx emissions dominated by their cogeneration facility, designed to run primarily on digester gas. The facility also has three flares and one auxiliary boiler that run on digester gas. These units are not covered by current NOx RACT standards as they are not "fossil-fuel-fired" and are therefore not being addressed in this submittal. However, they were all subject to lowest achievable emissions rate (LAER) controls based on a non-attainment new source review determination in 2011 (as revised in a 2018 permitting action that increased the LAER limit for the two emergency flares and was adopted into the District's SIP (85 Fed. Reg. 10295)).

Most of the major source facilities have emergency engines associated with generators or fire pumps (some in large numbers). Further discussion of emergency engines can be found in Section 2.2.4, specifically in the subsection on stationary engines.

At this time, the District considers emissions from boilers at major stationary sources with heat input ratings of less than 5 MMBtu/hr to be *de minimis* for NOx RACT purposes. In the State Implementation Plan (SIP), nearly all of them are inventoried as nonpoint sources instead of major point sources. The District believes that control of these small individual source units of *de minimis* emissions is not a cost-effective RACT as it relates to the 2015 NAAQS.

2.2 NOx RACT Analysis

Based on the evaluation of the sources listed above, the District has determined that presumptive NOx RACT must be established for non-emergency stationary generators and updated for fossil-fuel burning equipment. The District has also found that the existing presumptive NOx RACT for combustion turbines and asphaltic concrete operations continues to be what is reasonably available. The District also found that the existing case-by-case RACT for Blue Plains constitutes what is currently reasonably available. A review of the District's analysis in determining RACT for these sources follows.

2.2.1 Point Source Contribution

Point sources in the District have a relatively small influence on the region's nonattainment status. All point sources contributed less than ten percent of the District's NOx emissions in 2017, according to the base year (BY) emissions inventory. Most NOx emissions in the District are from mobile sources. Point sources in the District contributed 6.25% of the emissions within the District (See Figure 1). It should be noted that "point source" is a convention used in inventory analysis and, in the District's case, the point source inventory is nearly identical, though slightly more expansive, than the inventory of major stationary sources.

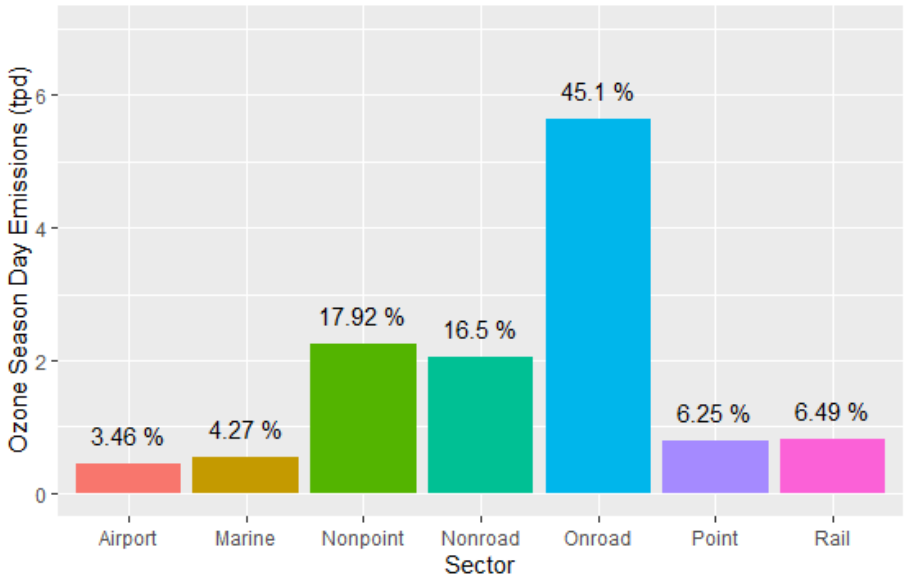

Figure 1: 2017 Base Year Ozone Season Day NOx Emissions in the District (Source: 2017 Base Year Inventory, SIP-Final Submitted to EPA on November 4, 2020)

In 2017, GSA produced nearly 20% of the NOx emissions from point sources, and eight other point sources produced nearly 90% of all the NOx emissions from point sources in the District (see Figure 2).

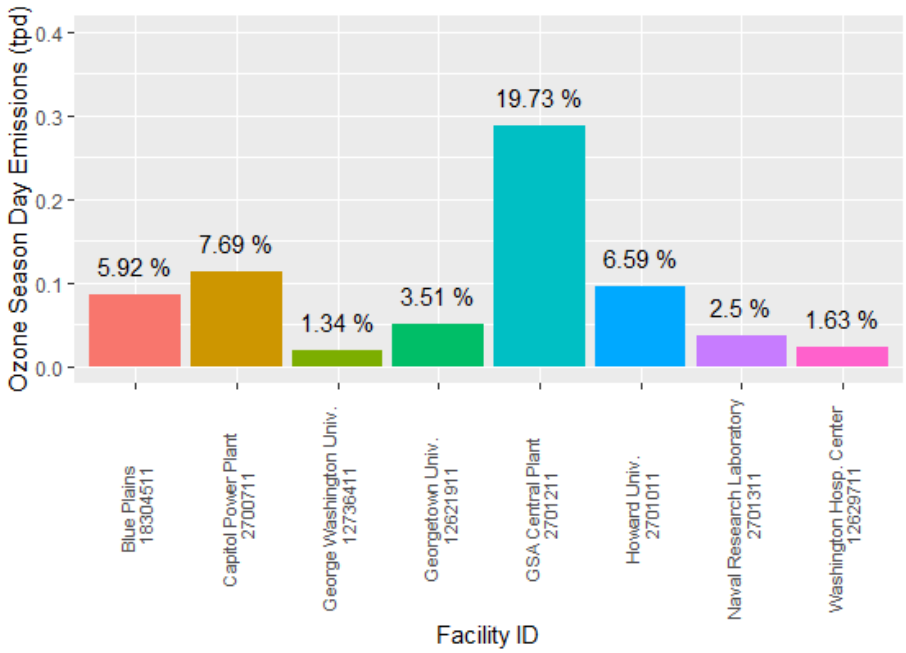

Figure 2: 2017 Base Year Ozone Season Day Point Source NOx Emissions in the District for Facilities that Produce More than One Percent of Emissions (Source: 2017 Base Year Inventory, Final Submitted to EPA on November 4, 2020)

2.2.2 Existing Emissions Controls and Limits

Existing emissions controls and limits on NOx already minimize the impact of several major sources in the District. While these limits are not established as RACT, *per se*, they do affect the cost effectiveness and necessity of establishing further control requirements on the equipment for RACT purposes.

For example, emissions from the two most significant major sources are operationally restricted:

- GSA – Three of GSA's boilers were large enough to participate in the NOx SIP Call, EPA's initial cap and trade programs for NOx. To transition out of the NOx SIP Call, the District was required to adopt sunset provisions for non-EGUs that did not join the Clean Air Interstate Rule (CAIR) trading program, including GSA[6]. In 2015, the District imposed a strict NOx emissions cap of 25 tons per ozone season on GSA's three applicable units (20 DCMR Chapter 10). The cap was SIP-approved on February 22, 2016 (81 Fed. Reg. 8656). There are other large boilers at GSA that emit NOx primarily during the winter season. GSA also has a facility-wide annual cap of 268 TPY NOx contained in their Title V permit.
- CPP – On June 3, 2013, DOEE issued permits at CPP that established facility-wide emissions limits (also called Plantwide Applicability Limits, or PAL). The PAL lowered CPP emissions limits from the equivalent of 925 tpy for NOx to 197 tpy. The PAL was issued under a SIP-approved program that makes the limit federally enforceable. The permits issued at that time also allowed for the installation of a highly efficient natural gas-fired cogeneration system that will reduce the facility's reliance on coal-burning units even further. This system is in the process of

[6] The District's EGUs were part of the NOx SIP Call and then CAIR. In 2012, they stopped operating. With the Cross-State Air Pollution Rule (CSAPR), which replaced CAIR, EPA determined that no sources in the District contribute significantly (at least 1%) to nonattainment in any other state. The District no longer participates in any of EPA's cap and trade programs for NOx.

commissioning as of July 2018 and is covered by a NOx RACT regulation discussed further in 2.2.4. Additionally, effective January 24, 2016, a limit in one of the permits, issued pursuant to a SIP-approved permit program, went into effect establishing a facility-wide limit of 16,666 tons per 12-month rolling period of coal usage to avoid being a major source of HAPs. This limit has co-benefits of limiting NOx emissions from coal burning at the facility.

Multiple regulations that are included in the District's original SIP reduce emissions of NOx in addition to 20 DCMR § 805 are shown in Table 3: Additional District regulations that impact NOx emissions and have been adopted as SIP measures.

Table 3: Additional District regulations that impact NOx emissions and have been adopted as SIP measures

Regulation	Requirement	EPA Approval Date (Fed. Reg. Citation)
20 DCMR § 107 - Control Devices or Practices	Requires that "the devices or practices provided for the control of air pollutants discharged from stationary sources…shall remain operative or effective, and shall not be removed."	10/27/99 (64 Fed. Reg. 57777)
20 DCMR § 801 - Sulfur Content of Fuel Oils	The rule is projected to achieve NOx reductions via a 22% reduction of fuel oil combustion. The typical emissions rates for number 6 fuel oil are 26 to 47 pounds of NOx per 1,000 gallons of fuel burned versus 10 to 24 pounds of NOx per 1,000 gallons of fuel burned for distillate oils.[7]	5/1/17 (82 Fed. Reg. 20270)

2.2.3 Attainment Status

The Washington DC-MD-VA nonattainment area is designated as a marginal nonattainment area for the 2015 8-hour ozone NAAQS. Based on EPA data for the period 2017 through 2019 for the Washington DC-MD-VA nonattainment area, the 2019 ozone design value (DV)[8] is 0.072 ppm. The DV for the District alone is also 0.071 ppm as the highest monitor in the nonattainment area is not in the District. Since the District is not monitoring attainment for the 2015 8-hour ozone NAAQS, the District finds it is reasonable and necessary to strengthen RACT and thus is placing new or stricter requirements to meet presumptive RACT for NOx for fuel-burning equipment and stationary engines.

2.2.4 Potential for Additional NOx Controls

According to the Connecticut Department of Energy and Environmental Protection (CT DEEP) SIP, "EPA generally considers controls that have been achieved in practice by other existing sources in the same source category to be technologically and economically feasible," and, thus, these controls meet the requirements to be RACT.[9] DOEE will demonstrate through a review of controls in place on existing sources what is reasonably available as presumptive RACT.

[7] Section 1.3 of EPA's AP 42, Fifth Edition Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, https://www3.epa.gov/ttn/chief/ap42/ch01/final/c01s03.pdf.

[8] A design value is a statistic that describes the air quality status of a given location relative to the level of the National Ambient Air Quality Standards (NAAQS) and is typically used to designate and classify nonattainment areas as well as to assess progress toward meeting the NAAQS.

[9] http://www.ct.gov/deep/lib/deep/air/ozone/ozoneplanningefforts/RACT_2008_NAAQS/2014-07-17_-_CT_Final_RACT_SIP_Revision.pdf

General Technological Feasibility Approach

To demonstrate technological feasibility, DOEE evaluated each sector based on the best available technical data from the U.S. EPA. DOEE also relied on information from EPA's WebFIRE tool, which is designed to house the most up to date emissions control data available, to determine what additional controls may be available.[10] Furthermore, DOEE examined data in the RACT/BACT/LAER clearinghouse to determine if additional controls have been implemented that warrant further evaluation. This approach assured consistency and transparency. Additionally, no additional technical information was provided during the public comment period to rely on.

General Economic Reasonableness Approach

To demonstrate economic reasonableness, DOEE checked what regulations had been adopted for each source type, particularly in OTR states.

Public comment expressed concern that comparisons to other states' RACT emission limits would not demonstrate the need for stricter presumptive RACT. DOEE agreed with aspects of this critique. DOEE does find the comparisons to other jurisdictions to be important in order to demonstrate that it is economically reasonable to require these controls. The original comparison was too broad, however, since it included many newer developed areas that are not affected by land use and historic preservation concerns. Furthermore, some of the areas included did not have nonattainment issues and, thus, a greater need to reduce emissions. As stated by Sierra Club v EPA (972 F.3d 290 (3d Cir. 2020)):

> *"RACT is not designed to rubber-stamp existing control methods. It is a technology-forcing mechanism. When originally introducing the standard, the EPA noted that 'the control agency, using the available guidance, should select the best available controls, deviating from those controls only where local conditions are such that they cannot be applied there and imposing even tougher controls where conditions allow'"*

DOEE is following this by examining areas where local conditions under the 2008 Ozone NAAQS were comparable our current conditions. To keep the analysis focused, we will demonstrate that our requirements are economically reasonable. This is since many other areas have implemented similar measures under similar circumstances for the 2008 Ozone NAAQS and share economic similarities with the District. We are limiting our review to areas that were classified as moderate or higher nonattainment under the 2008 Ozone NAAQS.

We are excluding nonattainment areas in the Mountain West and California due to their different ozone formation issues and are excluding the Indiana counties in the Chicago area since they underwent the 182(f) waiver process and thus have not implemented the NOX RACT program.[11]

These areas are all composed of major metropolitan areas, most of which face the same challenges in terms of density and local regulations that raise the costs associated with major construction work.

[10] EPA. "WebFIRE Tool." https://cfpub.epa.gov/webfire/
[11] 85 Fed. Reg. 21810. April 20, 2020

Many of these areas rank among leading metropolitan regions in both median household incomes[12] and gross domestic product.[13] Of the areas reviewed, the Washington, DC region has the highest median household income and the third- highest gross domestic product. Essentially, if it is reasonable economically for less wealthy regions that were facing persistent ozone nonattainment under the 2008 Ozone NAAQS to meet a threshold of control, it is economically reasonable for the District to as well under the 2015 Ozone NAAQS.

Alternative RACT

The presumptive RACT limits that DOEE is analyzing in this document do not mean there are not unique sources in the District for which further source-specific analysis may be warranted. For those sources, DOEE also has an Alternative RACT, or case-by-case by RACT, program. This program is built under the realization that a one size fits all approach could result in a small number of sources being required to do what is technologically and/or economically unreasonable for the particular source and that there are sources that are too unique to develop presumptive RACT for.

DOEE's Alternative RACT program requires sources to assess both the technological feasibility and economicreasonableness of controlling the source using:

1. Low-NOx burners;
2. Overfire air;
3. Flue gas recirculation;
4. Burners out of service;
5. Selective non-catalytic reduction;
6. Selective catalytic reduction; and
7. Other control options required for evaluation by the Department.

This program evaluates each source independently, requires the analysis to undergo a public review process, and to be submitted for approval to EPA, which is necessary given that any Alternative RACT will be a source-specific SIP amendment.

Combustion Turbines

DOEE, on behalf of the District, certifies that emissions limits adopted for the 2008 ozone NAAQS constitute RACT for natural gas fired combustion turbines as approved by EPA (85 Fed. Reg. 10295), with the exception of the emissions limits for oil fired combustion turbines. The presumptive emissions limits to meet RACT for the 2008 and 2015 ozone NAAQS are in Table 4.

Table 4: Presumptive RACT emissions limits (ppmvd @ 15% O_2 (lb/MMBtu)) for combustion turbines > 50 MMBtu/hour in the District of Columbia for the 2008 and 2015 Ozone NAAQS

Operation Date	Duct Burner Operation	Natural Gas		Oil	
		2008	2015	2008	2015
After February 18, 2005	With Supplemental Duct Burning	25 (0.092)	25 (0.092)	74 (0.279)	42 (0.163)
	Without Supplemental Duct Burning	25 (0.092)	25 (0.092)	74 (0.279)	42 (0.163)

[12] https://www.statista.com/statistics/205609/median-household-income-in-the-top-20-most-populated-cities-in-the-us/, Accessed June 8, 2021

[13] https://en.wikipedia.org/wiki/List_of_U.S._metropolitan_areas_by_GDP, Accessed June 8, 2021

On or before February 18, 2005	With Supplemental Duct Burning	25 (0.092)	25 (0.092)	42 (0.163)	42 (0.163)

Technological Feasibility

Existing facilities were evaluated to determine if additional controls were reasonable. Existing facilities are classified by the District with Source Classification Codes (SCC)20300102, 20300202 (Internal Combustion Engines; Commercial/Institutional; Natural Gas; Turbine) and 20300203 (Internal Combustion Engines; Commercial/Institutional; Natural Gas; Turbine: Cogeneration). Emissions limits were compared to emissions limits found on the EPA WebFIRE (Table 5). Natural gas-fired units with and without duct burners were found to emit at a lower rate than all of the available technologies in WebFIRE. The current emissions limit for oil-fired combustion turbines not using duct burners were found to be higher than currently available controlled emissions limits, but the proposed emissions limits were found to be lower than all available technologies.

Table 5: Emissions Factors (lb/MMBtu) from EPA's WebFIRE database for Combustion Turbines

Control	Natural Gas	Oil
Uncontrolled	0.320	0.880
Steam or Water Injection	0.130	0.240
Pre-combustion Chamber	0.099	n/a

On July 31, 2020, the DOEE conducted a review of the RACT/BACT/LAER clearinghouse for combustion turbines less than or equal to 25 MW fired by natural gas and oil,[14] which included a search of permits from January 1, 2000, to date. A second review was conducted on June 2, 2021 limiting the analysis to units under 10 MW in response to public comment, though this review also included additional cogeneration units that were not included in the original analysis. A review of the controls that were found to have been implemented through the RACT/BACT/LAER clearinghouse is in Table 20. No units fired on oil were found to be sized under 10 MW. A review of the median emissions rates concluded that the current natural gas are equivalent to the median emissions limits in the RACT/BACT/LAER clearinghouse and thus are reasonable.

Table 6: Synopsis of controls for combustion turbines found in the RACT/BACT/LAER clearinghouse

Fuel	Controls	Median Emissions Rate	Median Unit Size
Natural Gas	Of 7 Entries: • 6 had LNB • 2 had Selective Catalytic Reduction, in addition to LNB • 1 had no controls	0.092 (lb/MMBtu) 25 (ppmvd @ 15% O_2)	4.45 MW

Finally, DOEE examined the permitted and 2019 actual emissions rates at individual combustion turbines in the District. As demonstrated in Table 7, in 2019 all of the units with available data located in the District exceeded the presumptive RACT limits for both oil and natural gas, and many are even permitted at rates stricter than the presumptive RACT limits. Notably, the units at Capitol Power Plant and George Washington have supplemental duct burning leading to lower emissions, thus enabling

[14] The District has no units larger than 25 MW

them to meet this lower presumptive RACT standard without additional controls. Additionally, the units at Capitol Power Plant and George Washington University each use supplemental duct burning, which is the primary factor since the tightened emissions limit applies to this process. Both facilities have demonstrated that they can meet the lower presumptive RACT standard without installing additional controls.

Table 7: Permitted and 2019 actual emissions limits (lb/MMBtu) for combustion turbines in the District

Facility	Size (MMBtu)	Fuel	Permitted	2019 Actual
American University	11.5	Natural Gas	0.035	n/a
Blue Plains – 3 Units*	138.9	Natural Gas	0.073	0.09
Capital Power Plant	79.07	Natural Gas	0.092	0.05
	83.2	Oil	0.279	0.11
GSA**	326	Natural Gas	0.20	0.10
		Oil		n/a
George Washington Univ.	52.9	Natural Gas	0.055/0.07	0.04

*Combustion turbines at Blue Plains are also permitted to burn digester gas, but this fuel burning is regulated under case-by-case RACT

** Permits are currently being rewritten at GSA

Economic Reasonableness

Table 8 shows the emissions limits in place for combustion turbines in comparable nonattainment areas and for the most relevant size range to the District.

Table 8: Emissions limits (ppmvd @15% O_2) for combustion turbines in comparable nonattainment areas

State	NAA of Concern	Gas-fired	Oil-fired	Size	Citation
CT	Statewide	25 2.5 (CHP)	42 9.6 (CHP)	>= 5 MMBtu/hr < 10 MW (CHP)	Sec. 22a-174-22e Sec. 22a-174-3d
GA	Atlanta area	30	30	>= 10 kW < 25 MW	391-3-1 (mmm)
IL	Chicago area	42	96	>= 3.5 MW	35 ILCS 217.388
MD	Baltimore Area	42 or PSD Limit	65 or PSD Limit	Capacity Factor > 15%	COMAR 26.11.09.08
NJ	NYC Area	25 (0.75 lb/MWh)	42 (1.20 lb/MWh)	>= 25 MMBtu/hr	NJAC 7:27-19.5
NY	NYC Area	42	65	>= 10 MMBtu/hr	6 CRR-NY 227-2.4
TX	Dallas and Houston areas	~42 (0.15 lb/MMBtu)	~42 (0.15 lb/MMBtu)	>= 1 MW < 10 MW	RULE §117.310
WI	Chicago area & Sheboygan	42	42	>= 10 MW (<25 MW for Natural Gas)	WI Chapter NR 428.22

Connecticut, Georgia, Illinois, New Jersey, New York, and Texas were all found to regulate combustion turbines of the size equivalent in the District, with Wisconsin coming close in size as well. Maryland likely does as well, but their approach differed too greatly to make a proper comparison.

The natural gas emissions limits in the District are equivalent to those found in Connecticut and New Jersey and are less strict than those in Connecticut for Combined Heat and Power (CHP) systems. Oil

emissions limits in the District are similar to those in Connecticut, New Jersey, Texas, and Wisconsin, and are less strict than in Georgia and for CHP systems in Connecticut.

DOEE's presumptive RACT emissions limits are also equivalent to regional priorities in the OTR, including the OTC High Electric Demand Day Turbine Model Rule and the MANE-VU Ask, the latter of which found these emission rates to be one of six "reasonable and cost-effective NO_X and SO_2 control measures".[15,16]

Economically, setting presumptive NOX RACT for oil-fired combustion turbines would not be unreasonable. Given that units are currently meeting the emission limits, the installation of controls does not seem necessary. Furthermore, during the public comment period, no evidence was provided in the record demonstrating that units for which DOEE is lacking data would need to invest in controls. The evidence supports the fact that presumptive RACT limits in Table 4 are also economically reasonable.

Summary
This review of emissions limits adopted in other nonattainment areas and agreed to regionally, the availability of control technologies, and the apparent lack of economic investment needed all support the fact that it is reasonable to maintain the presumptive RACT emissions limits for natural gas-fired combustion turbines and lower the presumptive emissions limits for oil-fired combustion turbines to 42 ppmvd @ 15% O_2.

Fuel Burning Equipment
ICI boilers contribute more NOx to the District's point source inventory than any other category. Most of the fuel used to operate ICI boilers is natural gas, with the remainder using #2 or #4 oil, with the exception of two coal-fired units used in limited operations at Capitol Power Plant. The currently adopted RACT and updated RACT emissions limits for the District are in Table 9. It should be noted that other fuel-burning equipment, such as water heaters, had no presumptive RACT but will be included under the new terms used in the regulation. It should also be noted that equipment powered by digester gas is evaluated separately under case-by-case RACT, given the different nature of operations and the limited number of sources. Additionally, only distillate oil was evaluated since residual oil is banned for use under 20 DCMR § 801.2(c).

Table 9: Presumptive RACT emissions limits (lb/MMBTU) for fuel burning equipment in the District of Columbia for the 2008 and 2015 ozone NAAQS

Size	Coal		Natural Gas		Distillate		
	2008*	2015	2008*	2015	2018*	2015	2015 (during curtailment)
>=100 MMBtu/hr	0.43	0.12	0.25	0.05	0.2	0.12	0.12
>=50 & <100 MMBtu/hr	0.3	0.12	0.3	0.05	0.3	0.09	0.12

[15] Ozone Transport Commission. High Electric Demand Day Turbine Model Rule. 2010. https://otcair.org/upload/Documents/Model%20Rules/OTC%20Model%20Rule%20-%20HEDD%20Turbines%20Final.pdf
[16] Mid-Atlantic Northeast Visibility Union. "Statement of the Mid-Atlantic/Northeast Visibility Union (MANE-VU) Concerning a Course of Action within MANE-VU toward Assuring Reasonable Progress for the Second Regional Haze Implementation Period (2018-2028)." August 2017. https://otcair.org/MANEVU/Upload/Publication/Formal%20Actions/MANE-VU%20Intra-Regional%20Ask%20Final%208-25-2017.pdf

>=25 & <50 MMBtu/hr	Tune-up	0.12	Tune-up	0.05	Tune-up	0.09	0.12
>=20 & <25 MMBtu/hr	Tune-up	Tune-up	Tune-up	Tune-up	Tune-up	Tune-up	Tune-up
>=5 & <20 MMBtu/hr	None	Tune-up	None	Tune-up	None	Tune-up	Tune-up

*2008 presumptive RACTis only applicable to fossil-fuel steam generating units, and not all fossil fuel equipment

Technological Feasibility

All existing facilities were evaluated for additional potential emission reductions. To begin, DOEE searched for potential controls using the SCCs listed in Table 10, which corresponded to the types of ICI boilers in the District.

Table 10: SCCs of ICI boilers in the District

SCC	LEVEL2	LEVEL3	LEVEL4
10200501	Industrial	Distillate Oil	Grades 1 and 2 Oil
10200601	Industrial	Natural Gas	> 100 Million Btu/hr
10300209	Commercial/Institutional	Bituminous/Subbituminous Coal	Spreader Stoker (Bituminous Coal)
10300501	Commercial/Institutional	Distillate Oil	Grades 1 and 2 Oil
10300502	Commercial/Institutional	Distillate Oil	10-100 Million Btu/hr
10300503	Commercial/Institutional	Distillate Oil	< 10 Million Btu/hr
10300601	Commercial/Institutional	Natural Gas	> 100 Million Btu/hr
10300602	Commercial/Institutional	Natural Gas	10-100 Million Btu/hr
10300603	Commercial/Institutional	Natural Gas	< 10 Million Btu/hr

Table 11 shows the emissions limits from EPA's WebFIRE tool. DOEE's updated NOx RACT emissions limits for coal-fired boilers are well below what EPA currently considers to be available technologies and warrant no further evaluation. The 2008 NOx RACT emissions limits for oil- and natural gas-fired boilers are less strict than what were found in WebFIRE, and further evaluation follows.

Table 11: Emissions factors (lb/MMBtu) from EPA's WebFIRE database for ICI Boilers

Control	Bituminous/Subbituminous Coal*	Distillate Oil*	Natural Gas	
	No Post Comb.	No Post Comb.	No Post Comb.	SNCR
Uncontrolled	0.423	0.171/0.142**	0.098	0.085
Over-Fire Air (OFA)	0.338	n/a	n/a	n/a
Low NOx Burner (LNB)	0.275	0.071	0.049	0.043
LNB+OFA	0.254	n/a	n/a	n/a
Flue Gas Recirculation (FGR)	n/a	0.071	0.049	0.043
LNB+FGR	n/a	n/a	0.031	0.027

* EPA's current documentation states that SNCR and SCR are "Commercially offered but not widely demonstrated on large boilers."[17,18]
** Emissions factors for boilers greater than 100 MMBTU and less than or equal to 100 MMBTU, respectively

[17]

[18] AP-42 VOL. I: 1.3: Fuel Oil Combustion. https://www3.epa.gov/ttn/chief/ap42/ch01/final/c01s03.pdf

DOEE then conducted a review of the RACT/BACT/LAER clearinghouse on July 31, 2020, for engines fired by distillate, natural gas, and digester. This included a search of permits from January 1, 2000, to date. Given that DOEE determined that the proposed emissions limit for coal-fired units was already reasonable in the last portion of the analysis, coal units were not included. Table 14 provides a review of the implemented controls from the RACT/BACT/LAER clearinghouse.

Table 12: Synopsis of controls for ICI boilers found in the RACT/BACT/LAER clearinghouse

Fuel	> 100 MMBtu	<= 100 MMBtu
Distillate	Of 10 entries: • 1 relied on Water Injection • 1 relied on Over-Fire Air (OFA) • 4 relied on Flue Gas Recirculation (FGR) • 7 relied on Low NOX Burners (LNB) • 2 had no listed control	Of 5 entries: • 1 relied on Good Combustion Processes • 2 relied on LNB • 2 had no listed control
Natural Gas	Of 97 entries: • 5 relied on Water Injection • 7 relied on Good Combustion Processes • 66 had installed LNB • 14 had installed SCR • 13 had no listed control	Of 157 entries: • 16 relied on Good Combustion Processes • 41 relied on FGR • 95 had installed LNB • 5 had installed SCR • 19 had no listed control

Note: some boilers rely on several technologies (e.g., SCR and Lean Burn)

DOEE examined the median emissions rate for ICI boilers less than 250 MMBtu (the District does not have any industrial boilers larger than that size). The results are presented in Table 13. Based on this data, DOEE concludes that the presumptive RACT emissions limits are indeed reasonable.

Table 13: Median emissions from applicable ICI boiler permits from RACT/BACT/LAER database

Fuel	Boilers > 100 MMBtu	Boilers <= 100 MMBtu
Distillate	0.11	0.1
Natural Gas	0.04	0.05

Finally, DOEE reviewed the 2019 actual emissions limits for large boilers (greater than 100 MMBtu/hr). The results are in Table 22. DOEE found that many of these units do not meet the emissions limits in Table 9. However, given the rates of adoption of Low NOx Burners around the United States for this type of source, the installation or upgrade, and use of modern Low NOx Burners is indeed reasonable. Additionally, DOEE is not presupposing that installation of post-combustion controls, such as SCR or SNCR, is technically infeasible seeing that this type of control has also been installed on many sources.

Table 14: 2019 actual emissions limits (lb/MMBtu) for ICI Boilers sized greater than 100 MMBtu/hr in the District

Facility	Unit	Size (MMBtu)	Natural Gas	Oil	Coal
Capital Power Plant*	001	160	0.092	n/a	0.092
	003	160	0.092		0.092
	004	203	0.042	0.042	n/a
GSA**	001	250	0.063	0.099	
	002	250	0.070	0.518	
	003	500	0.126	1.591	

Facility	Unit	Size (MMBtu)	Natural Gas	Oil	Coal
	004	500	n/a	n/a	
	006	250	0.086	0.442	
Georgetown	EPN-1	127	0.079	0.075	
	EPN-2	127	0.079	0.075	
	EPN-3	120.6	0.085	0.075	
Navy Yard	3	101	0.085	n/a	
	5	101	0.74		

*Based on the lowest monthly emission factor for fuel type provided by Architect of Capitol in 2019 Title V Compliance report

** Calculations are based on inferred monthly emissions rates for months when only one fuel was burned, as was reported from 2019 Title V Compliance report for GSA (Note: assumptions may have differed from the proposal in terms of which months were used in calculations and an error was corrected in the calculations of 006). Full calculations are in Attachment A.

Economic Reasonableness

Table 15 shows the emissions limits in place for combustion turbines in comparable nonattainment areas and for the most relevant size range to the District.

Table 15: Emissions limits (lb/MMBTU) for ICI boilers in comparable nonattainment areas

State	NAA of Concern	Coal - Fired	Gas-fired		Distillate-fired		Citation
		>100 *,**	25-100	>100 *	25-50	>100*	
CT	Statewide	0.12	0.05	0.1	0.1	0.15	Sec. 22a-174-22e
GA	Atlanta area	30 ppmvd @ 3% O2 (~0.036)	30 ppmvd @ 3% O2 (~0.036)	30 ppmvd @ 3% O2 (~0.036)	30 ppmvd @ 3% O2 (~0.036)	30 ppmvd @ 3% O2 (~0.036)	391-3-1 (lll)
IL	Chicago area	0.12	Tune-up	0.08	Tune-up	0.1	35 ILCS 217.160
MD	Baltimore Area	0.7	Tune-up	0.2	Tune-up	0.2	COMAR 26.11.09.08
NJ	NYC Area	n/a	0.05	0.1	0.08	0.1	NJAC 7:27-19.7
NY	NYC Area	0.08 to 0.20	0.05	0.06	0.08	0.15	6 CRR-NY 227-2.4
TX	Dallas and Houston areas	Unknown	0.036 (< 40 MMBtu/hr) 0.03 (>= 40 MMBtu/hr)	0.02	0.25 (0.002 lb/ gal)	0.25 (0.002 lb/ gal)	RULE §117.310
WI	Chicago area & Sheboygan	0.1 to 0.25	No Limits	0.08	No Limits	0.1	WI Chapter NR 428.22

* In many cases these or more stringent limits apply to units over 250 MMBtu/hr

** The District does not have any coal-fired units < 100 MMBtu/hr and thus this is not being evaluated

Table 16: Comparison of updated presumptive RACT emissions limits in the District to other states

Size	Coal			Natural Gas			Distillate (excepting curtailment)		
	Equiva-lent	Higher Than	Lower Than	Equiva-lent	Higher Than	Lower Than	Equiva-Lent	Higher Than	Lower Than
>=100 MMBtu/hr	CT, IL	GA, NY, WI	MD	CT, NJ, TX	GA, IL, NY	MD	None	GA, IL, NJ, WI	CT, MD, NY, TX
>=25 & <100 MMBtu/hr	n/a			CT, NJ, NY	GA	IL, MD, TX, WI	None	GA, NJ, NY	CT, IL, MD, TX, WI

As shown in Table 16, the District's emissions limits for coal, natural gas, and distillate fall within the mid-range of limits adopted by nonattainment areas that faced similar challenges in achieving compliance with the 2008 Ozone NAAQS—challenges comparable to those the District now faces under the 2015 Ozone NAAQS.

Additionally, with the exception of sources smaller than 100 MMBtu/hr powered by fuel oil, the levels match what was agreed to in the inter-Regional Planning Organization (RPO) collaborative in 2006. At the time, these levels were considered "technically feasible and cost-effective" by the states of the Mid-Atlantic and Northeast.[19] DOEE's technical analysis did not find the limit of sources smaller than 100MMBtuhr powered by fuel oil of 0.08 lb/MMBtu to be feasible, so the higher limit of 0.09 is being used.

Furthermore, during the public comment period, no cost-benefit evidence was provided in the record demonstrating that units for which DOEE is lacking data would need to invest in controls. While there may be real concerns at specific sources, DOEE cannot base its rule-making on assertions without evidence, especially when the publicly available evidence is to the contrary.

The evidence showing presumptive RACT emission limits that were considered economically reasonable in other similar nonattainment areas, the agreement amongst the states that these limits are cost-effective, and the lack of specific contrary evidence supports the fact that presumptive RACT limits in Table 9 are also economically reasonable.

We also must address the use of a discrete emission rate for the use of oil solely during natural gas curtailment. Natural gas curtailment events are rare, in fact. "According to an April 2017 INGAA survey of 51 interstate pipelines, over the ten-year period 2006-2016, pipelines delivered 99.79 percent of "firm" contractual commitments to firm transportation customers at primary delivery points." [20] This same report went on to describe how, during recent extreme winter storms in the region, natural gas supplies were still available. A source that is not limited to burning distillate only during curtailment events could theoretically burn such fuel every hour of the year, creating the potential for a high level of emissions and a justifiable cost of control. A source that is limited to only burning distillate during curtailment would largely burn the fuel only for maintenance and testing purposes given the rarity of curtailment events, making the cost of control unreasonable economically. As a result, DOEE finds it reasonable to establish a less strict emissions limit for units with curtailment-only permit conditions, just as DOEE finds it reasonable for less well-controlled generators to operate only during emergency conditions.

Summary

[19] Ozone Transport Commission. "Resolution 06-02 of the Ozone Transport Commission Concerning Coordination and Implementation of Regional Ozone Control Strategies for Certain Source Categories." June 7, 2006. https://otcair.org/upload/Documents/Model%20Rules/2006%20Jun%20Resolution%20RACT.PDF

[20] Natural Gas Council. "Natural Gas Systems: Reliable & Resilient." July 2017.

DOEE's review of emissions limits adopted in other states, and agreed to regionally, concludes that the level of emissions in Table 9 is presumptive RACT in the District, and stricter emissions limits are not reasonable.

Asphaltic Concrete Units

The DOEE, on behalf of the District, certifies that existing emissions limits constitute RACT for asphaltic concrete units as approved by EPA (69 Fed. Reg. 77645, 69 Fed. Reg. 77647). The emissions limit approved as RACT for asphaltic concrete units with a PTE of 25 tons of NOx per year or more found in 20 DCMR § 805.6 is 150 ppmvd at 7% O_2 for all types of fuels (0.235 lb/MMBtu for natural gas, 0.247 lb/MMBtu for oil). There is only one unit in the District (Fort Meyer #1) that has a PTE of 25 tons of NOx per year or more.

Technological Feasibility

DOEE completed an examination of additional control techniques for asphaltic concrete units to determine if additional requirements were necessary. Existing facilities are classified by the District with SCCs of 30500245 (Industrial Processes; Mineral Products; Asphalt Concrete; Batch Mix Plant: Hot Elevators, Screens, Bins, Mixer & NG Rot Dryer) and 30500246 (Industrial Processes; Mineral Products; Asphalt Concrete; Batch Mix Plant: Hot Elevators, Screens, Bins, Mixer & NG Rot Dryer). Emissions limits were examined in WebFIRE and only uncontrolled emissions limits were available.
DOEE conducted a review of the RACT/BACT/LAER clearinghouse on July 21, 2020 for asphaltic concrete plants, which included a search of permits from January 1, 2000 to date. Only two plants were found in this search, both of which were for drum mixers rather than batch mixers, so comparable emissions limits were not available.

Economic Reasonableness

Table 17 shows the emissions limits in place for asphaltic concrete units throughout the United States based on data compiled by OTC.[21] Compared to other types of sources analyzed in the District, very few other states have presumptive RACT emissions limits for asphaltic concrete units, so DOEE expanded the list of states analyzed. Compared to the states that do have these limits, all of which are in the OTR, the District's emissions limits are less strict than those in Massachusetts, New Jersey, and Wisconsin and stricter than those in Maine and New Hampshire. Additionally, New Jersey and Wisconsin are the only states whose presumptive RACT is considered directly comparable in this analysis. Based on the review of emissions limits adopted in other states, the existing emissions limits appear to be economically reasonable.

Table 17: Emissions limits for asphaltic concrete units in comparable nonattainment areas and OTC states

State	Natural Gas	No. 2 Oil	Other Oils	Citation
MA	0.044 lb/MMBtu	0.113 lb/MMBtu	0.113 lb/MMBtu	
ME	0.12 lb/ton asphalt (0.429 lb/MMBtu)	0.12 lb/ton asphalt (0.429 lb/MMBtu)	0.12 lb/ton asphalt (0.429 lb/MMBtu)	

[21] Ozone Transport Commission. "White Paper on Control Technologies and OTC State Regulations for Nitrogen Oxides (NOx) Emissions from Eight Source Categories." 2017.
https://otcair.org/upload/Documents/Reports/WhitePaper_NOx_Control_04052017.pdf

NH	0.12 lb/ton asphalt (0.429 lb/MMBtu)	0.12 lb/ton asphalt (0.429 lb/MMBtu)	0.12 lb/ton asphalt (0.429 lb/MMBtu)	
NJ	75 ppmvd @7% O2	100 ppmvd @7% O2	125 ppmvd @7% O2	NJAC 7:27-19.9
WI	0.15 lb/MMbtu	0.2 lb/MMbtu	0.27 lb/MMbtu	WI Chapter NR 428.22

Furthermore, during the public comment period, no concerns were raised with the District's analysis of asphaltic concrete units.

Summary

The lack of evidence of additional available controls in EPA datasets that are technologically feasible and the comparison of emissions limits adopted in other states and agreed to regionally imply that the existing emissions limits remain presumptive RACT in the District, and stricter emissions limits are not reasonable.

Stationary Engines

Previously, the District did not have presumptive RACT emissions limits for stationary engines. Upon review of the regulations in place in other states and regionally agreed-upon emissions limits, DOEE finds that presumptive RACT is necessary for stationary engines used for non-emergency purposes. DOEE has found that the updated emissions limits shown in Table 18 are presumptive RACT for stationary engines.

Table 18: Presumptive RACT emissions limits (g/bh-hr) for non-emergency stationary engines in the District of Columbia

Construction	Burn	Fuel	Emissions Limit
New or Existing	Rich Burn	All Fuels	0.7
	Lean Burn	Natural Gas	0.7
		Landfill, Waste, or Digester Gas	0.6
New		Liquid Fuels	2.3
Existing			6.5

Technological Feasibility

DOEE reviewed additional control techniques to determine if further requirements were necessary. Existing units are not included in the District's emissions inventory, and SCCs have not been assigned to existing engines. As a result, a broader look at all potential SCCs was done for the SCCs listed in Table 19. Emissions limits were examined in WebFIRE and only uncontrolled emissions limits were available.

Table 19: SCCs of stationary engines

SCC	LEVEL2	LEVEL3	LEVEL4
20100102	Electric Generation	Distillate Oil (Diesel)	Reciprocating
20100202	Electric Generation	Natural Gas	Reciprocating
20200102	Industrial	Distillate Oil (Diesel)	Reciprocating
20200202	Industrial	Natural Gas	Reciprocating
20200252	Industrial	Natural Gas	2-cycle Lean Burn
20200252	Industrial	Natural Gas	2-cycle Lean Burn

SCC	LEVEL2	LEVEL3	LEVEL4
20200253	Industrial	Natural Gas	4-cycle Rich Burn
20200253	Industrial	Natural Gas	4-cycle Rich Burn
20200254	Industrial	Natural Gas	4-cycle Lean Burn
20200254	Industrial	Natural Gas	4-cycle Lean Burn
20200301	Industrial	Gasoline	Reciprocating
20300101	Commercial/Institutional	Distillate Oil (Diesel)	Reciprocating
20300201	Commercial/Institutional	Natural Gas	Reciprocating
20300301	Commercial/Institutional	Gasoline	Reciprocating

DOEE then conducted a review of the RACT/BACT/LAER clearinghouse on July 21, 2020 for engines fired by distillate, natural gas, and digester, which included a search of permits from January 1, 2000 to date. While we are including all of these fuels in our analysis, it should be noted that, currently, diesel-fired engines are permitted for non-emergency use in the District. Units that were strictly for emergency engines (to be discussed shortly) and for mining operations and natural gas compressor stations, neither of which exist in the District, were excluded from consideration. A review of the controls that were found to have been implemented through the RACT/BACT/LAER clearinghouse is in Table 20.

Table 20: Synopsis of controls for stationary engines found in the RACT/BACT/LAER clearinghouse

Fuel	> 500 hp	<= 500 hp
Distillate	Of 17 entries: • 2 relied on Good Combustion Processes • 2 had Turbocharges • 3 had installed SCR • 6 had no listed control	Of 2 entries: • 1 had Turbocharges • 1 had no listed control
Natural Gas	Of 44 entries: • 2 relied on Air/Fuel Ratio Control • 5 relied on Lean Burn Technology • 10 relied on Good Combustion Processes • 3 had installed 3-way catalyst • 1 had installed LNB • 4 had installed NSCR • 6 had installed SCR • 15 had no listed control	Of 6 entries: • 3 had installed 3-way catalyst • 3 had no listed control
Landfill Gas	Of 45 entries: • 17 relied on Air/Fuel Ratio Control • 12 relied on Lean Burn Technology • 9 relied on Good Combustion Processes • 1 had installed SCR • 7 had no listed control	No controls found

Note: some engines rely on several technologies (e.g., SCR and Lean Burn)

DOEE examined the median emissions rate for engines greater than 500 hp. Engines that appeared to be miscalculated or were otherwise outliers.[22] DOEE did not examine units less than or equal to 500 hp since the data sets were too small for a sufficient analysis. The results are presented in Table 21. Thus, in addition to other evidence presented, the DOEE finds the presumptive RACT emissions limits to be reasonable.

Table 21: Median emissions from applicable stationary engine permits (units greater than 500hp) from RACT/BACT/LAER database

Fuel	Median Emission Limit (g/bh-hr)
Distillate	7.1
Natural Gas	0.7
Landfill Gas	0.6

DOEE reviewed permitted and 2019 actual emissions at existing permitted units under its jurisdiction. This analysis only affected diesel engines, since only diesel engines are currently permitted for non-emergency purposes. The results are in Table 22.

Table 22: Permitted emissions limits for non-emergency stationary engines in the District

Facility	Units	Size	Fuel	Control	Permitted	
						g/hp-hr
Ft Meyer #1	Crusher	275 hp	Diesel	None	4.0 (g/kWh NOx+NMHC)	5.36
	Screener	99.9 hp	Diesel	None	4.7 (g/kWh NOx+NMHC)	6.30
Washington Convention Center	4 Generators	1,000 kW	Diesel	SCR	10.61 (lb/hr)	6.34

Emergency engines have been exempted from requirements to meet presumptive NOx RACT. In the District, emergency engines are not permitted to participate in demand response programs and are limited to 500 hours of operation per year or less (including emergency operations). Most operate far fewer hours than that. Additionally, given the intermittent nature of emergency generators, post-combustion controls are not efficient for removing pollution due to the amount of time these units spend in start up or shut down. Finally, given the small number of hours per year these units operate, the sources are *de minimis*.

Economic Reasonableness

Table 23 shows the emissions limits in place for combustion turbines in comparable nonattainment areas and for the most relevant size range to the District.

Table 23: Emissions limits (g/hp-hr) stationary engines in comparable nonattainment areas

State	Geographic Area	Gas-fired, Lean Burn	Gas-fired, Rich Burn	Diesel	Waste Gas	Citation
CT	Statewide	1.5	1.5	1.5 - 2.3	2.0	Sec. 22a-174-22e
GA	Atlanta area	80 ppmvd @ 15% O_2	80 ppmvd @ 15% O_2	80 ppmvd @ 15% O_2 (~ 1.25 g/hp-hr)	n/a	391-3-1 (mmm)

[22] Outliers were instances of permits that were for more than one engine where total emissions rates were assumed to be for more than one engine.

State	Geographic Area	Gas-fired, Lean Burn	Gas-fired, Rich Burn	Diesel	Waste Gas	Citation
		(~ 1.25 g/hp-hr)	(~ 1.25 g/hp-hr)			
IL	Chicago area	210 ppmvd @ 15% O_2 (~ 3.3 g/hp-hr)	150 ppmvd @ 15% O_2 (~ 2.35 g/hp-hr)	660 ppmvd @ 15% O_2 (~ 10.4 g/hp-hr)	n/a	35 ILCS 217.388
MD	Baltimore Area	150 ppmvd @ 15% (~ 2.35 g/hp-hr)	110 ppmvd @ 15% O_2 (~ 1.7 g/hp-hr)	175 ppmvd @ 15% O_2 (~ 2.8 g/hp-hr)	n/a	COMAR 26.11.09.08
NJ	NYC Area	1.5	1.5	2.3	n/a	NJAC 7:27-19.8
NY	NYC Area	1.5	1.5	2.3	2.0	6 CRR-NY 227-2.4
TX	Dallas and Houston areas	0.5	0.5	0.5 (start > 12/31/00) 5.83 (start > 12/31/00)	0.6	RULE §117.310
WI	Chicago area & Sheboygan	3.0	3.0	3.0	n/a	WI Chapter NR 428.22

Table 24: Comparison of presumptive RACT emissions limits in the District to other states

Size	Natural Gas		
	Equivalent	Higher Than	Lower Than
Gas-fired, Lean Burn		TX	CT, GA, IL, NJ, NY, MD, WI
Gas-fired, Rich Burn		TX	CT, GA, IL, NJ, NY, MD, WI
Diesel-fired	NJ, NY	CT, GA, TX	IL, MD, WI
Waste Gas	TX	CT, NY	

As the preceding table (Table 24) demonstrates, the District's presumptive RACT emissions limits for lean burn, rich burn, and diesel-powered stationary engines are economically reasonable. The emissions limits are in the median for states that faced similar nonattainment issues for the 2008 Ozone NAAQS that the District currently faces for the 2015 Ozone NAAQS.

Furthermore, during the public comment period, no concerns were raised with the District's analysis for non-emergency stationary engines.

The evidence showing presumptive RACT emission limits that were considered economically reasonable in other similar nonattainment areas and that the lack of specific contrary evidence supports the fact that presumptive RACT limits in Table 18 are also economically reasonable.

Summary

The availability of control technologies and the review of emissions limits adopted in other states facing similar nonattainment issues that were determined to be reasonable support the conclusion that the presumptive NOx RACT emissions limits for stationary engines are reasonably available.

Other Sources

The District only has one other major NOx stationary source, the Blue Plains Wastewater Treatment Plant. Emissions limits are in place in its operating permit, and these emissions limits have been

adopted into the District's SIP. At this point, the DOEE finds that the emissions limits that were based on LAER for the unit continue to represent RACT.

3.0 Public Comment

A public comment period was held from April 23 to May 24, culminating in a public hearing on May 24. No comments were provided at the public hearing, but three comment letters were submitted by the U.S. General Services Administration, the U.S. Naval Research Lab, and the Architect of the Capitol. The comments both addressed the NOx RACT rulemaking and the analysis presented in the SIP amendment. The detailed response to the comments is in Attachment B, and the comment letters are Attachments C-E.

4.0 NOx RACT Certification

The Department of Energy and Environment, on behalf of the District of Columbia, certifies that the combination of existing NOx controls already established in the SIP and approved by EPA under the 1-hour ozone NAAQS, the 1997 8-hour ozone NAAQS, the 2008 8-hour ozone NAAQS, the approved case-by-case RACT determination for Blue Plains Wastewater Treatment Plant, and the District's proposed NOx RACT regulation updates, represent NOx RACT controls for the 2015 8-hour ozone NAAQS for the "RACT fix-up," OTR, and moderate nonattainment requirements.