

GOVERNMENT OF THE DISTRICT OF COLUMBIA
Department of Energy and Environment

CHAPTER 2 TECHNICAL MEMORANDUM

TO: Stephen S. Ours, P.E.
Chief, Permitting Branch

FROM: Olivia Achuko *OA* 8/13/24
Environmental Engineer

SUBJECT: **Smithsonian Institution/Board of Regents, National Zoological Park
Permit Nos. 7379 and 7380 to Construct and Operate Two Natural Gas-Fired
Boilers**

DATE: August 13, 2024

BACKGROUND INFORMATION

On March 29, 2024, the Air Quality Division (AQD) received a set of Chapter 2 permit applications from the Smithsonian Institution/Board of Regents (the applicant) to install and operate two natural gas-fired boilers (CU-3A and CU-3B) at the Central Heat Plant of the National Zoological Park, located at 3001 Connecticut Avenue NW, Washington DC. The two boilers CU-3A and CU-3B are to replace the current CU-3 dual fuel-fired boiler rated at 20 MMBtu/hr. The remaining two large boilers will have their burners replaced with low NOx burners. The permit applications for the modification of those boilers were also submitted to our office on March 29, 2024 and are being processed under separate cover. The combined potential to emit of NOx emission from the two new boilers will be 2.46 tons per year compared to the 12.77 tons per year from the one boiler, CU-3, which is to be replaced. There will be a reduction of 16.36 tons per year of NOx after the installation the new boilers and the modification of the remaining boilers.

This draft permit action will be published in the D. C. Register on August 23, 2024. Public comment for the permit action will be solicited through September 23, 2024.

The applicant has not requested that any aspects of the application be held confidential.

TECHNICAL INFORMATION

The two new boilers are identified as Boiler CU-3A and Boiler CU-3B. They are each rated at 11.54 MMBTU/hr heat input and fire only natural gas. They are Miura LX-300 On-Demand Steam boilers. More detailed technical information is included with the permit applications, Attachment C.

REGULATORY REVIEW

Both federal and District of Columbia air quality regulations apply to this project. Applicability or non-applicability of key regulations is discussed below.

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DISTRICT REGULATIONS

20 DCMR 200 – General Permit Requirements: The boilers are stationary and have the potential to emit air pollutants. Each of the boilers has a heat input rating greater than 5 MMBTU/hr. Therefore, each is subject to the requirement to obtain a Chapter 2 permit pursuant to this regulation.

20 DCMR 204 – Permit Requirements for Major Stationary Sources Located in Non-attainment Areas (Non-attainment New Source Review (NNSR)):

The facility is located in a non-attainment area for ozone with a 25 ton per year major source threshold for oxides of nitrogen (NO_x) and volatile organic compounds (VOCs), the two categories of ozone precursors.

The installation of the two new boilers did not result in “significant” emissions increase for NO_x or VOCs. As a result, no net emissions increase calculations were necessary to determine NNSR applicability. Based on this analysis, 20 DCMR 204 is not applicable.

20 DCMR 205 – Permit Requirements for New Source Performance Standards (NSPS):

The requirements of this section adopt the federal NSPS codified in 40 CFR 60. Specifically, Subpart Dc of 40 CFR Part 60 sets forth the standards of performance for small Industrial-Commercial-Institutional steam generating units (ICI boilers) with maximum design heat input capacity less than 100 MMBTU/hr and greater than or equal to 10 MMBTU/hr. This Subpart includes steam generating units for which construction, modification, or reconstruction commenced after June 9, 1989.

Each of the natural gas-fired boilers to be installed at this facility has a maximum heat input of 11.54 MMBTU/hr and is therefore subject to this subpart. See the further discussion of applicability of this regulation below under the Federal Regulations heading.

20 DCMR 209 – Permit Requirements for Non-Major Stationary Sources (Minor New Source Review):

Minor New Source Review, which became effective January 1, 2014, is applicable to any source subject to 20 DCMR 200, if such source uses a stationary unit or air pollution control device that, individually, would have the potential to emit equal to or greater than 5 tons per year (tpy) per unit of any criteria pollutant (excluding CO, ozone, and lead) or aggregate of hazardous air pollutants (HAPs). The boilers do not individually have the potential to emit 5 tons per year of NO_x or any other pollutant listed in Section 209.1(b). Specifically, each boiler has the potential to emit approximately 0.56 tons per year of NO_x. Therefore, the boilers do not trigger a minor source review evaluation pursuant to this regulation.

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20 DCMR Chapter 3: Operating Permits and Acid Rain Programs

The facility is a major source of NO_x and is therefore subject to Chapter 3 permitting requirements. The facility currently holds Title V permit No. 024-R3. This permit does not expire until June 2027. Condition I(g) of the permits requires that the source submit an application to incorporate the requirements of these Chapter 2 permits into the Title V operating permit within 12 months of issuance of these permits. Additionally, Condition V(l) requires that the applicant includes the requirements of these permits in all compliance reports and certifications required under the Title V permit.

20 DCMR Chapter 5, Section 500: Source Monitoring and Testing Requirements

Appropriate monitoring and testing requirements have been included in Condition IV of the permits with associated record keeping and reporting requirements in Condition V of the permits to ensure that compliance with the conditions of the permit can be evaluated.

20 DCMR Chapter 6, Section 600: Fuel Burning Particulate Emission

Total suspended particulate emission from each of the boilers shall not exceed 0.10 pounds per million BTU. This requirement is contained in Condition II(c) of the permit. Stack testing to determine compliance is required pursuant to Condition IV(b).

It should be noted that this regulation refers to “particulate matter” rather than TSP, however, at the time that the regulation was promulgated, this term was understood to refer to TSP. Since that time, the more general term “particulate matter” is no longer specific enough to clarify what is meant. As a result, the permit document refers to TSP rather than using the specific term used in the regulation.

20 DCMR Chapter 6, Section 606: Visible Emissions

Both boilers are subject to the visible emissions limitations of 20 DCMR 606.1. Visible emissions shall not be emitted from the equipment covered by this permit except that discharges shall be permitted for two (2) minutes during any startup, cleaning, adjustment of combustion or operational controls, or regeneration of emissions control equipment; provided, that such discharges shall not exceed twenty percent (20%) opacity (unaveraged). This requirement is contained in Condition II(b) of the permits. Specific testing requirements related to this regulation are also included in the boiler permits in Conditions IV(b), (c), and (d).

Additionally, this regulation establishes certain operational, maintenance, and training requirements which have been incorporated into Conditions III(c), (d), and (e). Record keeping requirements are incorporated into Conditions V(i) and (j).

20 DCMR Chapter 8, Section 805: Reasonably Available Control Technology for Major Stationary Sources of the Oxides of Nitrogen (NO_x RACT)

NO_x RACT is applicable to this facility pursuant to 20 DCMR 805.1(a) because it is a major source of NO_x. Any individual emission unit at a major stationary source of NO_x having the

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potential to emit less than one (1) ton per year of NO_x is except from the requirements according to 805.1(c)(4) unless there are specific requirements applicable pursuant to 20 DCMR 805.4 through 805.7. In this particular case, although each of the two boilers has the potential to emit less than one (1) ton per year of NO_x, there are requirements applicable pursuant to 20 DCMR 805.5. Specifically, boilers with heat input ratings in excess of 5 MMBTU/hr are subject to tune-up requirements according to 20 DCMR 805.5(b). This requirement has been included in Condition II(e). Tuning is only required biennially per 20 DCMR 805.9(b)(1). The record keeping requirements of 20 DCMR 805.9(c) are included in Condition V(e) of the permit.

20 DCMR Chapter 9, Section 903: Odorous or Other Nuisance Air Pollutants

“An emission into the atmosphere of odorous or other air pollutants from any source in any quantity and of any characteristic, and duration which is, or is likely to be injurious to the public health or welfare, or which interferes with the reasonable enjoyment of life or property is prohibited [20 DCMR 903.1]” is applicable to all sources. This requirement is contained in Condition II(d) of the permit. The affirmative defense provision of 20 DCMR 903.13(b) has also been incorporated into Condition II(d). The requirements to develop an odor control plan (OCP) do not apply to this facility at this time.

FEDERAL REGULATIONS

40 CFR 60, Subpart Dc – Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units

This regulation is applicable because the units are above the size applicability threshold of 10 MMBTU/hr heat input and were installed after June 9, 1989. The sulfur dioxide requirements of 40 CFR 60.42c(d) are not applicable since the units are natural gas only boilers. The particulate matter requirements of this regulation are not applicable since the boilers burn only natural gas. 40 CFR 60.48c(g)(2), which requires monthly records of fuel usage to be maintained, is found in Condition V(d) of the permit. The only other requirement in Subpart Dc that applies to this equipment is the 40 CFR 60.48c(i) requirement to maintain records for a minimum of two years, but since other requirements require longer periods, this requirement has been streamlined with those other requirements in Condition V and a five-year record retention period applies.

40 CFR 63, Subpart JJJJJ: National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers at Area Sources

The boilers operate on natural gas exclusively and are therefore exempted from the provisions of this subpart pursuant to the exemption for gas-fired boilers at 40 CFR 63.111195(e).

CONCLUSIONS

Based on AQD’s evaluation of the application package, the construction and operation of the equipment as proposed, and the draft permits as written, are consistent with all applicable federal and District air pollution control laws and regulations.

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The permit action for the boilers will be published in the DC Register and on DOEE's website on August 23, 2024. Public comments for the permit action will be solicited from August 23, 2024 through September 23, 2024. Additionally, during that time, any person may request a public hearing on this subject. A public hearing will not be held unless requested. If public comments are received, they will be reviewed and addressed before any final action is taken on the permit application package. If no adverse comments are received, I recommend that permit Nos. 7379 and 7380 be issued in accordance with 20 DCMR 200.2 promptly following the end of the public comment period.

SSO/NOA