

GOVERNMENT OF THE DISTRICT OF COLUMBIA
Department of Energy and Environment

CHAPTER 2 TECHNICAL SUPPORT MEMORANDUM

TO: File

FROM: Wyatt Bohmann
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THROUGH: Stephen S. Ours
Chief, Permitting Branch

SUBJECT: Lucy Webb Hayes National Training School for Deaconesses and Missionaries D/B/A Sibley Memorial Hospital Permit Nos. 7383 and 7384 to Modify and Operate Two Dual Fuel-Fired (Natural Gas/No. Fuel Oil) Hot Water Boilers

DATE: July 31, 2024

BACKGROUND INFORMATION

On April 17, 2024, the Air Quality Division (AQD) of the Department of Energy and Environment (DOEE) received applications to modify and operate two dual fuel-fired (natural gas as primary and No. 2 fuel oil as back-up fuel) boilers from the Lucy Webb Hayes National Training School for Deaconesses and Missionaries D/B/A Sibley Memorial Hospital (SMH). The modifications consist of replacing each boiler's burner system with new PowerFlame Incorporated low NO_x burners (LNB) with flue gas recirculation (FGR). These modifications have been taken as the boilers in their current state are unable to demonstrate NO_x emission rates that meet the new emission limits established in 20 DCMR 805 for fuel burning equipment with capacities between 25 MMBTU/hr and 100 MMBTU/hr that became effective January 1, 2023. The new burners, both guaranteed by the manufacturer to meet 30 ppm of NO_x when firing natural gas and 90 ppm of NO_x when firing #2 oil and corrected to 3.0% O₂(dry), will allow the units to comply with the NO_x emission limits required by 20 DCMR 805.

In addition to the modification mentioned above, SMH is also proposing to impose a limitation on the amount of No.2 fuel oil that each boiler is able to burn to 2,009,000 gallons annually pursuant to 20 DCMR 200.7. This limit is being taken to avoid applicability to 20 DCMR 209 as a result of the modification increasing the potential VOC emissions from each boiler above five (5) tons per year (TPY). For further information about this action, please see the 20 DCMR 209 section in the regulatory review portion of this technical memorandum.

The No. 2 fuel oil annual limitation, in addition to the limitations of secondary fuel already accepted to meet the definition of a gas-fired boiler in 40 CFR Subpart JJJJJ, will ensure the modification of the units will not result in an increase of 5 or more tons per year of VOC.

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Both boilers are currently operating under Title V Operating Permit No. 002-R2.

SMH has not requested that any of the materials submitted with these applications be held confidential.

REGULATORY REVIEW

20 DCMR Chapter 2, Section 200: General Permit Requirements

The two boilers will be rated at 38.532 MMBTU/hr heat input (natural gas-fired/ No. fuel oil-fired). These units have heat input ratings greater than 5 MMBTU/hr, and therefore require pre-construction permits pursuant to 20 DCMR 200.1 to perform the modifications and must maintain permits to operate pursuant to 20 DCMR 200.2.

Pursuant to 20 DCMR 200.7, SMH has requested limitations on the use of No. 2 fuel oil, limiting both the times when it can be used and the total quantity that can be used in any 12-consecutive-month rolling period in order to avoid the applicability of 20 DCMR 209 and 40 CFR 63, Subpart JJJJJ. The details of these limitations are discussed further below.

20 DCMR Chapter 2, Section 209: Permit Requirements For Non-Major Stationary Sources (Minor New Source Review)

20 DCMR 209 applies to any source required to obtain a permit under § 200 to construct a new stationary source, modify an existing stationary source, or install or modify an air pollution control device on a stationary source that results in a collateral emission increase, where the increase in potential emissions is equal to or greater than 5 TPY for VOCs, NO_x, SO₂, PM₁₀, PM_{2.5}, or the aggregate of any hazardous air pollutants (HAPs) listed in § 112(b) of the Clean Air Act.

To provide the most conservative estimate of the potential VOC emissions from each boiler after the modifications, DOEE requested that SMH use the No. 2 fuel oil hydrocarbon emissions data provided by PowerFlame Incorporated for the LNB. This decision to switch from the VOC AP-42 factor that was previously used to determine the potential emissions from the boilers in prior permitting actions to the new burners manufacturer emission factor resulted in a potential increase of VOC emissions above 5 TPY. As a result, the boilers would be subject to the requirements of 20 DCMR 209.3, which would require SMH to conduct a best available control technology (BACT) analysis, or similar analysis for VOC.

To avoid this, SMH has proposed a No. 2 fuel oil usage limit of 2,009,000 gallons annually, to be taken pursuant to 20 DCMR 200.7. With this limit imposed, the potential yearly emission increase for VOC would be 4.44 TPY for each boiler. This brings the VOC increase as a result of the modification to below 5 tons per year and thus, making it not applicable to 20 DCMR 209. The fuel limitation is contained in condition III(c) and monitoring and recordkeeping requirements have also been incorporated into the permits.

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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. SMH currently holds Title V permit No. 002-R2. Condition I(g) of the application requires that SMH submit an application to incorporate the requirements of these Chapter 2 permits into the Title V operating permit within 12 months of issuance. Compliance with this set of permits must be certified with the Title V certifications pursuant to Condition V(m). Also, in part due to this regulation, records retention is set at five years, rather than the lesser durations found in other regulations.

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 can be fully evaluated.

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

Total suspended particulate (TSP) emissions from each of the boilers shall not exceed 0.07 pounds per MMBTU per 20 DCMR 600.1. This requirement is contained in Condition II(d) of the permit. Periodic testing for 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. Visible emissions shall not be emitted into the outdoor atmosphere from either boiler except that discharges shall be permitted for two (2) minutes during any startup, cleaning, adjustment of combustion or operational controls, or regeneration of emission control equipment, provided that such discharge shall not exceed twenty-seven percent (20%) opacity (unaveraged) when burning exclusively natural gas and (27%) opacity (unaveraged) when burning fuel oil or a combination of fuel oil and natural gas. This requirement is established in Condition II(b) of the permits. Monitoring and testing for compliance is contained in Conditions IV(b), (c), and (d).

Additionally, this regulation establishes certain operational, maintenance, and training requirements which have been incorporated into Conditions III(f), (g), and (h). Record keeping requirements are incorporated into Conditions V(j) and (k).

20 DCMR Chapter 8, Section 801: Sulfur Content of Fuel Oils

Pursuant to 20 DCMR 801.3, no No. 2 commercial fuel oil that contains more than fifteen ten-thousandths percent (0.0015%) by weight of sulfur shall be purchased, sold, offered for sale,

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stored, transported, or used in the District. This restriction is contained in Condition III(b) of the permits.

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. 20 DCMR 805.5(e), which came into effect on January 1, 2023, sets emission limits for NO_x on units with a capacity of 25,000,000 BTU per hour or greater. The modifications that are the subject of this permitting action have been proposed so the boilers can meet the emission limits laid out in conditions 20 DCMR 805.5(e)(3)(B) and (e)(3)(C).

20 DCMR 805.5(b) also states that any fuel burning equipment that is equal to or greater than 5 MMBTU/hr is subject to the tuning requirements as laid out in 805.9. Since both boilers remain above this threshold after the modifications, these conditions have been included in the permits as Conditions II(f) and V(h). DOEE is currently considering amending the schedule for performing this tuning in the regulation. As such, a footnote has been added to indicate that if the regulation is amended to modify this schedule, the timeline in the revised regulation will supersede the timeline in 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(g) of the permits. The affirmative defense provision of 20 DCMR 903.13(b) has also been incorporated into Condition II(g). The requirements to develop an odor control plan (OCP) do not apply to this facility at this time.

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

The units are subject to this regulation on the basis that both units, which are each rated at 38.532 MMBTU/hr, are within the applicability range of 10 MMBTU/hr to 100 MMBTU/hr. The second requirement is that the steam generating units are constructed, modified, or reconstructed after June 9, 1989; both were manufactured in 1996. As a result, the units are subject to the requirements of 40 CFR 60 Subpart Dc.

40 CFR 60 Subpart Dc applies specifically to sulfur dioxide (SO₂) and particulate matter (PM) emissions. 40 CFR 60.42(d) requires units subject to the subpart to limit SO₂ from facilities that combust oil to 0.50 lb/MMBTU; or, as an alternative, combust no fuel oil that contains greater than 0.5 weight percent sulfur. Condition III(b) of the permits incorporate 20 DCMR 801.3, which limits the percent sulfur by weight for No.2 fuel oil to 0.0015 percent, which is more stringent than the limits established in 40 CFR 60.42(d).

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For the limits set forth by 40 CFR 60 Subpart Dc for PM, the opacity limits required by 20 DCMR 606 are more stringent than the requirements of 40 CFR 60.43(c). However, due to differing monitoring and testing requirements, the 40 CFR 60, Subpart Dc requirement is separately included in Condition II(c). The testing requirements of 40 CFR 60.47c(a) and (c) are found in Condition IV(e) of the permit.

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

NESHAP subpart JJJJJ for area source ICI Boilers has the potential to be applicable because the boilers are existing boilers, capable of oil firing, located at an area source of hazardous air pollutants per 40 CFR 63.11193. However, the boilers use fuel oil only as back up fuel and have been characterized (and requested related fuel use limits pursuant to 20 DCMR 200.7) as “gas-fired boiler[s]” as defined in 40 CFR 63.11237, and are therefore not subject to 40 CFR 63, Subpart JJJJJ in the category of oil-fired boilers (see 40 CFR 63.11200) pursuant to 40 CFR 63.111959(e). On this basis, the requirements of this regulation have not been applied to the equipment, but Condition III(d), along with related monitoring and record keeping requirements, has been placed in the permits to ensure that the equipment continues to be operated as “gas-fired boilers”.

RECOMMENDATIONS

Based on AQD’s evaluation of the application package, the modification 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.

The permit action for the boilers will be published in the DC Register and on DOEE’s website on August 9, 2024. Public comments for the permit action will be solicited from August 9, 2024 through September 9, 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. 7383 and 7384 be issued in accordance with 20 DCMR 200 promptly following the end of the public comment period.

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