

GOVERNMENT OF THE DISTRICT OF COLUMBIA  
Department of Energy and Environment

**CHAPTER 2 TECHNICAL MEMORANDUM**

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

FROM: Thomas Olmstead *TO For TO*  
Environmental Engineer

SUBJECT: **Howard University (HU), 2200 6th Street NW and Howard University Hospital (HUH), 2041 Georgia Avenue NW Permit Nos. 7248 through 7252 to Operate Five Temporary Boilers**

DATE: September 11, 2020

**BACKGROUND INFORMATION**

On February 22, 2019 the Air Quality Division (AQD) of the Department of Energy and Environment (DOEE) received from Howard University five Chapter 2 permit applications to operate five (5) natural gas-fired, with ultra-low sulfur diesel (ULSD) or No. 2 fuel oil as back-up, York Shipley Global boilers with low NOx burners and flue gas recirculation system as follows:

Emission Unit ID	Location	Chapter 2 Permit	Heat Input Capacity (MMBtu/hr)
Power Plant Temporary Boiler #3	2200 6th Street NW	7248	37
Power Plant Temporary Boiler #4	2200 6th Street NW	7249	37
Power Plant Temporary Boiler #5	2200 6th Street NW	7250	37.8
Power Plant Temporary Boiler #6	2200 6th Street NW	7251	37
Howard University Hospital Temporary Boiler	2041 Georgia Avenue NW	7252	37

It is noted that Washington Gas, Howard University's natural gas provider, converted Howard University from an interruptible contract to a firm customer on November 1, 2019 due to the inability to use the existing No. 2 fuel oil on site from the old power plant. Therefore, in an event of natural gas curtailment, Howard University would be required to bring temporary fuel tanks on-site and order ultra-low sulfur diesel fuel to be burned in these emission units, however the applicant nonetheless wants the option to implement this procedure if needed. The operation of the five temporary boilers is to support the Power Plant renovation with the operation of the Power Plant temporary boilers #3, #4, #5, and #6 to supply steam demand for both HU and HUH and the operation of the HUH temporary boiler to supply steam demand for the portion needed by

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HUH until the major repairs to their steam tunnel connections are completed. The Power Plant renovation replaces boilers CU-1, CU-3 and CU-4.

It is also noted that a revised application set was received on June 7, 2019. Additional emission calculation corrections and New Source Review (NSR) were received on June 4, 2020.

Howard University has not requested that any aspects of the application be held confidential.

### TECHNICAL INFORMATION

Based on the emission calculations provided by the facility, the boilers have the potential to emit the following:

Pollutant	Maximum Annual Emissions (tons/yr)
Total Particulate Matter (PM Total)	7.15
Sulfur Dioxide (SO <sub>2</sub> )	0.41
Nitrogen Oxides (NO <sub>x</sub> )	29.9
Volatile Organic Compounds (VOC)	3.32
Carbon Monoxide (CO)	25.9

### REGULATORY REVIEW

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

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 permitted project is located in an area that has been designated non-attainment with respect to the 1979 1-hour ozone National Ambient Air Quality Standard (NAAQS). The area was subsequently designated moderate and marginal non-attainment for the 1997 and 2008 8-hour ozone standards, respectively, and is currently a maintenance area for PM<sub>2.5</sub> standard. The District of Columbia is also located within the Northeast corridor of the Ozone Transport Region (OTR). Nitrogen oxide (NO<sub>x</sub>) and volatile organic compounds (VOCs) emissions are potentially subject to NNSR due to their role as precursors to the photochemical formation of ozone. Although the U.S. Environmental Protection Agency (U.S. EPA) revoked the 1-hr ozone standard, and despite the current designation of moderate non-attainment of the 8-hour ozone standard, the District has retained the 25-tpy NNSR applicability thresholds for NO<sub>x</sub> and VOCs that were applicable for

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severe nonattainment classification under the 1-hour ozone standard as a measure taken against backsliding.

The requirements of 20 DCMR 204 are that projects with emissions increases and net emissions increases that exceed NNSR thresholds do the following: (1) analyze alternatives, (2) incorporate emission controls meeting the lowest achievable emission (LAER), (3) obtain emission offsets, and (4) certify compliance of all sources located within the District that are owned or operated by applicant. Based on the natural gas 30 ppm NO<sub>x</sub> emission rate and the ULSD 90 ppm NO<sub>x</sub> emission rate contained in Condition II(a) of the permit, the five temporary boilers potential emissions were calculated in Table 1 of Attachment 6b of the permit application, based on a 1,271 MMscf/yr natural gas limit and 799 Mgal ultra-low sulfur diesel limit, both limits in aggregate for the five temporary boilers. The project does result in a “significant” emissions increase for NO<sub>x</sub>. CU-1, CU-3 and CU-4, the units being replaced by the temporary boilers, as well as other facility wide emission units that were removed from the facility, emissions were analyzed in 2016 and 2017, with emissions calculated in Table 6 of Attachment 6b of the application. Potential emissions for units installed between 2014 and 2018 were included in the NSR analysis in Table 5 of attachment 6b. Net emissions increase was calculated in Table 4 of Attachment 6b of the application with NO<sub>x</sub> emissions increases of 15.3 tons per year, below the “significant” emission rate, 25 tons per year for NO<sub>x</sub>. 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. See discussion below for New Source Performance Standards.

### 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 each individually have a potential to emit greater than 5 tons per year of NO<sub>x</sub>.

As a result, a NO<sub>x</sub> control technology evaluation was completed for Power Plant Temporary Boilers #3, #4, #5, and #6 and the HUH Temporary Boiler. The conclusions of the evaluation indicate that the proposed use of low NO<sub>x</sub> burners, flue gas recirculation systems, and good operating practices constitutes NO<sub>x</sub> BACT for these boilers and satisfies the requirements of 20 DCMR 209. AQD searched the RACT/BACT/LAER Clearinghouse and found similar requirements for BACT. These controls are designed to limit emissions and maximize the reduction of pollutants and have been incorporated as requirements in the permit. Please see Attachment 6A of the application for the details of this evaluation.

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Note that this determination is only being made with respect to rental boilers obtained on short notice for temporary use. Better-controlled units are reasonably available for permanent installation when sufficient lead time is provided.

### 20 DCMR Chapter 3 – Operating Permits and Acid Rain Programs:

These units will be located at Howard University, which is a major source of NO<sub>x</sub>. Howard University is already subject to Chapter 3 (Title V). They are operating under expired Permit No. 006 and a settlement agreement requiring compliance with the expired permit until a new Title V permit can be issued. The facility has included these units in its Title V permit renewal application. This is required pursuant to Condition I(g) of the permits.

### 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 Conditions V and VI 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 0.07 pounds per million BTU. This requirement is contained in Condition II(d) of the permit.

### 20 DCMR Chapter 6, Section 606: Visible Emissions

The visible emissions limitations of 20 DCMR 606.1 are applicable to all units. Visible emissions shall not be emitted into the outdoor atmosphere from the operation of these units; provided, that discharges not exceeding forty percent (40%) opacity (unaveraged) shall be permitted for two minutes in any sixty (60) minute period and for an aggregate of twelve (12) minutes in any twenty-four hour (24 hr.) period during start-up, or malfunction of equipment. 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.

Note that language has been included in the permit notifying the facility that there is an outstanding call for a State Implementation Plan (SIP) revision from EPA that may result in revisions to the applicable regulation. As such, if the regulation is changed, the new regulatory requirements will supersede those expressed in the permit specifically.

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

The purchase, sale, offer for sale, storage, transport, or use of No. 2 commercial fuel oil limitation of 20 DCMR 801.3 is applicable to these units. On and after July 1, 2018, the purchase, sale, offer for sale, storage, transport, or use of number two (No. 2) commercial fuel oil is prohibited if it contains more than fifteen parts per million (15 ppm) or fifteen ten-thousandths percent (0.0015%) by weight of sulfur, unless otherwise specified in § 801.5.

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Therefore, a limit of 0.0015% sulfur by weight has been included in Condition III(b) of the permits.

#### 20 DCMR Chapter 8, Section 804: Nitrogen Oxides Emissions

These units are fossil-fuel-fired steam-generating units with a heat input less than 100 MMBTU/hr. Therefore, this regulation is not applicable.

#### 20 DCMR Chapter 8, Section 805: Reasonably Available Control Technology for Major Stationary Sources of the Oxides of Nitrogen (NO<sub>x</sub> RACT)

Because the units are fossil-fuel-fired steam-generating units with a heat input greater than 20 MMBTU/hr at a major stationary source of NO<sub>x</sub>, 20 DCMR 805 is applicable to all five of the boilers. As such, requirements from 20 DCMR 805 were placed in the set of permits. Specifically, the requirement to perform combustion adjustments pursuant to 20 DCMR 805.8, which is contained in Conditions II(e) and V(h).

#### 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(f) of the permit.

#### 20 DCMR Chapter 14, Section 1410: Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers

20 DCMR 1401.1 adopts 40 CFR 63, Subpart JJJJJ by reference. Please see the more detailed discussion of the federal regulation below.

#### 40 CFR 60, Subpart D - Standards of Performance for Fossil-Fuel-Fired Steam Generators

The requirements of 40 CFR 60, Subpart D are not applicable to the boilers because they each have heat input rates of less than 250 MMBtu/hr.

#### 40 CFR 60, Subpart Db - Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units

The requirements of 40 CFR 60, Subpart Db are not applicable to the boilers because they each have heat input rates of less than 100 MMBtu/hr.

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

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

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commenced after June 9, 1989. Note that these five boilers do not meet the definition of a temporary boiler as defined in 60.41c because each unit is a steam generating unit or a replacement that will remain at a location for more than 180 consecutive days.

Each of the boilers has a maximum heat input of 37.0 MMBtu/hr or 37.8 MMBtu/hr and is therefore subject to this subpart. The permits contain the relevant requirements in Condition II(c), for visible emissions, and a streamlined fuel sulfur requirement in Condition III(b).

Because the power plant temporary boilers are not connected to a fuel oil supply, the testing requirements of 40 CFR 60.8 do not yet apply and will not apply until such time as they are connected. See 40 CFR 60.43c(c). The testing requirements of 40 CFR 60.8 do apply to the HUH Temporary Boiler. Visible emissions testing was performed in December 2019.

### 40 CFR 63, Subpart DDDDD - National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters

The requirements of 40 CFR 63, Subpart DDDDD are not applicable to the boilers because Howard University is not a major source of HAPs.

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

Howard University is considered an area source of HAP emissions. This facility does not emit or have a potential to emit 10 tons per year or more of a single hazardous air pollutant (HAP) or 25 tons per year or more of any combination of HAPs.

The requirements of 40 CFR 63, Subpart JJJJJ are not applicable to the Power Plant Temporary Boilers #3, #4, #5, and #6 at Howard University. Pursuant to 40 CFR 63.11195(e), boilers that meet the definition of a gas-fired boiler are not subject to this subpart and to any requirements in this subpart. The four boilers operate primarily on natural gas and will burn liquid fuel only during periods of gas curtailment, gas supply interruption, startups, or for periodic testing, maintenance, or operator training on liquid fuel. Periodic testing, maintenance, or operator training on liquid fuel shall not exceed a combined total of 48 hours during any calendar year. This requirement is contained in Condition III(d) of the permit. Therefore, the boilers meet the definition of gas-fired boiler and are not subject to the requirements of 40 CFR 63, Subpart JJJJJ.

The HUH temporary boiler will burn natural gas and ULSD, has a heat input rating greater than 10 MMBTU/hr, and was constructed after June 4, 2010. It is the intent of Howard University to combust NG as the primary fuel and have the flexibility to fire ULSD during certain times of maximum steam demand when the facility deems it necessary. Pursuant to 40 CFR 63.11194, 63.11200 and 63.11237, the HUH Temporary Boiler is subject to the requirements of Subpart JJJJJ. Therefore, the following Subpart JJJJJ work practice standards and management practices apply to the HUH temporary boiler:

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1. Minimize the boiler's startup and shutdown periods and conduct startups and shutdowns according to the manufacturer's recommended procedures. [40 CFR 63.11201(b)]
2. Conduct a tune-up of the boiler biennially as specified in §63.11223. [40 CFR 63.11201(b)]
3. At all times you must operate and maintain the boiler, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions. [40 CFR 63.11205(a)]

Compliance will be demonstrated as specified in 40 CFR 63.11223. Records shall be kept and notifications shall be submitted as specified in 40 CFR 63.11225. All requirements of 40 CFR 63, Subpart JJJJJ have been incorporated into the permit. Certain relevant requirements have been streamlined with other regulatory requirements, as noted in the permit.

Additionally, as a result of the applicability of this subpart, certain notification and reporting requirements are applicable to the HUH Temporary Boiler. These are included in Conditions VI(b), (f), and (g).

Additional reporting is required if certain changes are made to the equipment, as specified in Condition VI(d).

Note that these five boilers do not meet the definition of a temporary boiler as defined in 63.11237 because each unit is a boiler or a replacement that remains at a location within the facility and performs the same or similar function for more than 12 consecutive months.

### **CONCLUSIONS**

The proposed project (as it relates to the five boilers addressed in this action) and attached permits comply with all applicable federal and District air pollution control laws and regulations.

Public comments for the permit action will be solicited from September 18, 2020 through October 19, 2020. AQD will resolve any comments received before taking final action on the applications. If no comments are received, I recommend that permit Nos. 7248 through 7252 be issued in accordance with 20 DCMR 200.1 and 200.2 promptly following the end of the public comment period.

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