

GOVERNMENT OF THE DISTRICT OF COLUMBIA
Department of Energy and Environment

CHAPTER 2 TECHNICAL SUPPORT MEMORANDUM

TO: File

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**SUBJECT: MedStar Washington Hospital Center
Permit Nos. 7263 through 7268 to Operate Six Dual Fuel-Fired (natural
gas/No. fuel oil) Hot Water Boilers**

DATE: August 22, 2020

BACKGROUND INFORMATION

On July 8, 2019, the Air Quality Division (AQD) of the Department of Energy and Environment (DOEE) received applications for the construction and operation of six dual fuel-fired (natural gas as primary and No. 2 fuel oil as back-up fuel) boilers. The construction consists of the installation of new low oxides of nitrogen (NO_x) burners for all six existing boilers that are currently operating under Title V Operating Permit No. 014-R1. The construction project also includes the installation of flue-gas recirculation technology on the six boilers.

The applications proposed installing burners in the boilers such that each boiler would be rated at 60.00 MMBTU/hour of heat input. Boilers 1-4 are located in the lower plant of the MedStar Washington Hospital Center (WHC) building, 110 Irving Street NW, Washington DC, while Boilers 5 and 6 are located at the upper plant. The originally-proposed burners would have had a slightly higher capacity than the old burners they are replacing. Boilers 1-4 were previously rated at 56.8 MMBTU/hr each and Boilers 5 and 6 were previously rated at 57.3 MMBTU/hr.

The project was undertaken because the existing boilers failed the required stack tests contained in Title V permit No. 014-R1. In order to return to compliance, the facility decided to replace the existing boilers' burners with new low NO_x burners and install flue gas recirculation (FGR). The new burners will have different emission limits from those previously established in the Title V permit.

Based on these applications, draft permits were published in the D.C. Register on March 20, 2020 with comments solicited through April 20, 2020. During the public comment period, WHC submitted comments revising the boiler burner information and configuration and providing justification for those revisions. Specifically Boilers 1-4 are now proposed to have two 26 MMBtu/hr burners per boiler for a total of 52 MMBtu/hr per boiler, while Boilers 5 and 6 would

CHAPTER 2 TECHNICAL SUPPORT MEMORANDUM

MedStar Washington Hospital Center

Permits Nos. 7263 through 7268 to Modify and Operate Six Dual-Fuel Hot Water Boilers

August 22, 2020

Page 2

now each be rated at 54 MMBtu/hr. WHC also requested changes to certain emission limits found in the draft permit. A separate comment reconciliation memorandum has been developed to address these comments.

MedStar Washington Hospital Center, has not requested that any of the materials submitted with these applications be held confidential.

Emissions Evaluation:

The emissions effect of replacing the old burners with the most recently proposed burners is significant. Most importantly, NO_x emissions while burning natural gas, the primary fuel, will decrease substantially. Though they will increase substantially when burning oil, oil usage is strictly limited within the permit and the overall impact of this increase is minimal. Overall, the potential to emit NO_x is expected to be reduced by 14.4 tons per year.

The potential to emit carbon monoxide is predicted to increase substantially. Particulate matter emissions will increase slightly for natural gas operation, but the overall potential to emit will decrease due primarily to a requested limit on the use of No. 2 fuel oil. Sulfur dioxide will decrease marginally on natural gas (due to a slight decrease in the heat input ratings of the burners), but will decrease for oil as the new limits take into account the change-over from higher sulfur fuel oil to ultra-low sulfur fuel that was phased in from 2016 through 2018. As allowed by 20 DCMR 801, WHC has older, higher sulfur fuel in their fuel storage, but must now only purchase ultra-low sulfur fuel oil to gradually replace the older fuel in storage.

REGULATORY REVIEW

20 DCMR Chapter 2, Section 200: General Permit Requirements

The six boilers, as they are to be modified, will be rated at 60.00 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 to perform the modifications.

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. They currently hold Title V permit No. 014-R1. This permit is due for renewal. Condition I(g) of the application requires that they 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.

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.

CHAPTER 2 TECHNICAL SUPPORT MEMORANDUM

MedStar Washington Hospital Center

Permits Nos. 7263 through 7268 to Modify and Operate Six Dual-Fuel Hot Water Boilers

August 22, 2020

Page 3

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 MMBTU per 20 DCMR 600.1. 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 these six units. Visible emissions shall not be emitted into the outdoor atmosphere from the operation of the 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 in Conditions IV(a), (b) and (c).

Note that language has been included in the permit condition 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 superseded those expressed in the permit specifically.

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

The historic standard for fuel sulfur of 1% sulfur by weight is found in 20 DMR 801.1. In 2015, the regulation was revised and adopted a phase-in of lower sulfur "commercial fuel oil" where after July 1, 2016, No. 2 fuel oil could not be purchased with sulfur in excess of 500 ppm (0.05%) by weight and after July 1, 2018 No. 2 fuel oil could not be purchased with sulfur in excess of 15 ppm (0.0015%) by weight. However, pursuant to 20 DCMR 801.4, fuel stored by the ultimate consumer prior to these dates could continue to be used until spent. WHC is required to comply with these purchasing requirements, but reports that they have legacy oil in storage that will take some time to use, considering the limited use of oil at the facility. The current purchase limit found in the rule is reflected 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. See the discussion above related to 20 DCMR Chapter 3 applicability. As such, requirements from 20 DCMR 805 were placed in the set of permits. Specifically, there are two main requirements related to this regulation: 1) the requirement to perform combustion adjustments pursuant to 20 DCMR 805.8, which is contained in Conditions II(g) and V(h); and 2) a 0.30 lb/MMBTU NO_x emission limit applicable on a calendar day average basis when burning fuel oil exclusively (20 DCMR 805.5(b)). This latter limit is streamlined with more stringent requirements established pursuant to 20 DCMR 201 authority in Condition II(e) of the permits. Stack testing for this limit is required in Condition IV(a).

CHAPTER 2 TECHNICAL SUPPORT MEMORANDUM

MedStar Washington Hospital Center

Permits Nos. 7263 through 7268 to Modify and Operate Six Dual-Fuel Hot Water Boilers

August 22, 2020

Page 4

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 permits.

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

AQD has determined that this regulation is applicable to these units. Each unit has a heat input rating of either 52.0 or 54.0 MMBTU/hr, which is within the size applicability range of between 10 MMBTU/hr and 100 MMBTU/hr. The secondary requirement that the equipment must meet is that the equipment must be constructed, modified, or reconstructed after June 9, 1989. Previously, it was reported that the units had not met that threshold, and in the February 10, 2012 Fact Sheet and Statement of Basis related to the Title V permit (No. 014-R1) it was determined that the regulation was not applicable for that reason. It should be noted, however, that the construction dates for Boilers 4-6 are different in the old evaluation documents and the more recent Chapter 2 permit applications and that Subpart Dc requirements were incorporated in the Title V permit language, perhaps in error.

As a result, AQD evaluated whether installation of these new burners and the flue gas recirculation system would be considered a “modification” pursuant to 40 CFR 60.14 (note that this definition differs from the definition in 20 DCMR 199, which is not relevant for this NSPS applicability determination). Installation of the new burners (with slightly lower heat input ratings than the old burners) and the flue gas recirculation system is a “physical or operational change to an existing facility which results in an increase in the emission rate to the atmosphere of [a] pollutant to which [NSPS Subpart Dc] applies” on a kg/hr basis. Specifically, NSPS Subpart Dc applies to sulfur dioxide (SO₂) and particulate matter emissions. It is unclear whether past particulate matter emission limits were appropriate for the equipment, however, compared to previous limits, the new hourly emission limits for particulate matter will be higher following the modification than they were before the modification, for the natural gas operating mode, but not for the fuel oil operating mode.

With respect to SO₂, due to the decreased heat input capacity of the burners and the dependence of SO₂ emissions on the sulfur content of the fuel used, the potential emissions of SO₂ decrease slightly if one assumes a constant fuel type for comparison. For natural gas, the sulfur content can reasonably be assumed to be constant, so potential to emit using natural gas will decrease slightly. Fuel oil operation is more complicated because the units, for regulatory reasons unrelated to this project, has experienced a reduction in sulfur content of its fuel oil over several years. However, if you remove this consideration and assume a constant fuel sulfur content, similar to natural gas operations, due to the decrease in capacity of the units, the SO₂ potential to emit decreases.

CHAPTER 2 TECHNICAL SUPPORT MEMORANDUM

MedStar Washington Hospital Center

Permits Nos. 7263 through 7268 to Modify and Operate Six Dual-Fuel Hot Water Boilers

August 22, 2020

Page 5

On this basis, AQD has determined that the project will constitute a “modification” for purposes of NSPS Subpart Dc applicability with respect to particulate matter, but not for SO₂.

The permits contain the relevant requirements related to particulate matter in Condition II(c), for visible emissions. Because Subpart Dc was not triggered for SO₂, the fuel sulfur content limit in the regulation has not been incorporated, however, due to the applicability of 20 DCMR 801, a still more stringent fuel sulfur requirement applies and is found in Condition III(b).

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) 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

The proposed project and attached permits comply 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 September 4, 2020. Public comments for the permit action will be solicited from September 4, 2020 through October 5, 2020. AQD will resolve any comments received before taking final action on the applications. If no comments are received, we recommend that permit Nos. 7263 through 7268 be issued in accordance with 20 DCMR 200 promptly following the end of the public comment period.

SSO/JCN