

GOVERNMENT OF THE DISTRICT OF COLUMBIA  
Department of Energy and Environment

CHAPTER 2 TECHNICAL MEMORANDUM

TO: File

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

FROM: John C. Nwoke *SSO for JCN*  
Environmental Engineer

SUBJECT: **General Services Administration, Saint Elizabeths West Campus  
Permit Nos 7174-A1, 7175-A1 and 7176-A1 to Construct and Operate Two  
Identical 3,500 kWe and One 2,500 kWe Diesel-Fired Emergency Generator  
Sets all with Associated Add-On Emission Control Systems at Saint Elizabeth  
West Campus, 2701 Martin Luther King Jr., Ave. SE, Washington, DC**

DATE: August 10, 2018

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**BACKGROUND INFORMATION**

On May 24, 2017, the Air Quality Division (AQD) of the Department of Energy and Environment (DOEE) received a set of Chapter 2 permits to construct two boilers and three diesel-fired emergency generator sets rated at 3,500 kWe, 3,500 kWe and 2,500 kWe, respectively, at the West Campus of the property formerly known as Saint Elizabeths Hospital. The equipment is required because the General Services Administration (GSA) identified a need for additional boilers and emergency generators in Central Utility Plant 2 (CUP2) in support of the U.S. Department of Homeland Security (DHS) at the site. The boilers were issued permit Nos. 7172 and 7173 on October 11, 2017. Also, that same day, the emergency generator sets were issued permit Nos. 7174, 7175 and 7176.

Subsequently, GSA decided that they wished to install add-on emission control systems consisting of a Miratech SNQ system consisting of selective catalytic reduction (SCR), diesel oxidation catalyst (DOC) and diesel particulate filters (DPF) to reduce emissions from the three generator sets to levels equivalent to EPA's Tier 4 standards. An application to amend the previously issued Chapter 2 permits was received on December 1, 2017.

The Miratech system features a dosing unit control based on urea injection at a temperature range of between 572 deg. F and 977 deg. F. The SCR system has a dosing capacity of 60 L/hr and a design exhaust flow rate of 18, 269 acfm and urea concentration of 40.0%.

The publication of the permit action is planned for August 17, 2018 in the D. C. Register. Public comment for the permit action will be solicited through September 17, 2018.

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

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### ISSUES

GSA contends that the SCR installation will lower emissions from the Tier 2 to Tier 4 emissions level. GSA's previously issued permits Nos. 7174, 7175, and 7176 limit the engines' emissions to the Tier 2 level.

Indications are that GSA will seek some form of credit for the avoided emissions associated with operating the emergency generators at the Tier 4 emissions level. A couple of questions arise from the proposed project: (1) How are the Tier 2 and Tier 4 emissions levels delineated for the purposes of quantifying the emission credit? (2) Is there a load threshold before urea injection? These issues are discussed in details below.

### ESTIMATE EMISSIONS

The estimated emissions from the equipment, assuming 500 hours per year of operation, of which 9 occurred meeting Tier 2 emission standards and the remaining 491 occurred meeting Tier 4 emission standards is shown in the table below:

Pollutant	Maximum Annual Emissions (tons/yr)		
	Each 5,051 hp Engine	The 3,640 hp Engine	Total
Particulate Matter (PM)	0.07	0.05	0.19
Carbon Monoxide (CO)	7.26	5.23	19.75
Oxides of Nitrogen (NO <sub>x</sub> )	1.60	1.16	4.36
Volatile Organic Compounds (VOC)	0.40	0.31	1.11
Oxides of Sulfur (SO <sub>x</sub> )	0.02	0.01	0.05

### REGULATORY REVIEW

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

#### DISTRICT REGULATIONS

##### 20 DCMR 200 – General Permit Requirements:

The emergency generators are stationary and have the potential to emit air pollutants. Therefore they are 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 ozone. The area was previously classified as severe non-attainment with respect to the 1979 1-hour ozone National Ambient Air Quality Standard (NAAQS). Although this standard has since

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been revoked and replaced, due to anti-backsliding requirements, the severe non-attainment NNSR threshold of 25 tons per year of oxide of nitrogen (NO<sub>x</sub>) remains in place.

The requirements of 20 DCMR 204 is 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 thresholds. The original CUP2 project, which included the installation of two boilers and the three emergency generator sets avoided applicability of this regulation by taking operating hour restrictions on the emergency generator sets as well as No. 2 fuel oil usage limits in the boilers.

This permitting action removes the operating hour restrictions on the emergency generator sets, but offsets the allowable increases by installing add-on emission control equipment. Prior to this permitting action, potential emissions from the three generator sets were estimated to be 10.05 tons per year of NO<sub>x</sub>. Following installation of the add-on emission control systems, the potential to emit NO<sub>x</sub> from these three generator sets is estimated to be 4.36 tons per year. As such, 20 DCMR 204 is not triggered despite the removal of the previous limits taken to avoid triggering NSR during the previous action.

It should be noted that, due to the character of the SCR system, NO<sub>x</sub> emission reductions are not achieved immediately upon activation of the engine. Rather, the engine must heat up before the catalyst can be effective. Language has been placed in the permit to ensure that the add-on emission control systems are activated as soon as they can be effectively operated. Based on estimates from the applicant and Miratech, it was estimated that the first half hour of each run would occur without effective NO<sub>x</sub> reductions. As such, the permit was written (and emission estimates were made) assuming that, of the 500 hours of allowable operation of the unit per year, 9 hours would be at the Tier 2 emission standards (reflecting operation of the engines without add-on controls) and the remainder would occur while meeting Tier 4 emission standards. This 9 hour period was established as a practically enforceable limit in the permit.

For reference, the 9-hour estimate was developed as shown in the table below:

<b>Testing, Maintenance and Emergency Schedule</b>			
<b>Event</b>	<b>Duration</b>	<b>Scenario</b>	<b>Distribution</b>
Monthly	30 minutes	30 min Tier 2, Yearly cumulative: 12x0.5 hr	= 6 hours
Annual	8 hours	30 min Tier 2, rest of run Tier 4: 1x0.5 hr	= 0.5 hours
Triennial			
(3 year cycle)	4 hours	30 min Tier 2, rest of run Tier 4: 1x0.5hr	= 0.5 hours

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Total Tier 2 Testing/Maintenance hours	= 7 hours
Emergency	Tier 2: 4 events per year 4x0.5 hr = 2 hours
<b>Tier 2 Total</b>	<b>= 9 hours</b>

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

The citation date in 20 DCMR 205 predates 40 CFR 60, Subpart IIII, but the requirements of this NSPS regulation are applicable to the emergency generator engines as will be discussed later.

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 sources use a stationary unit or air pollution control device that is involved in a project that results in an increase in an increase of 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).

As shown in the table in the Estimated Emissions section of this memo, above, no individual unit has the potential to emit more than 5 tons per year of any of the covered pollutants. No HAP calculation was performed, but emissions of HAPs would be expected to be well below the VOC emission rates.

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

These units will be located at the SEW facility, which is already subject to Chapter 3 (Title V) Permit No. 044. Though previously this Title V permit was used to establish federally enforceable limitations to keep potential emissions of the facility below major source thresholds, the addition of these units (and the CUP2 boilers) will ensure that the facility is now a major stationary source based on potential emissions. The permits being proposed establish requirements to apply to amend the requirements of these permits into the Title V permit for the facility within twelve (12) months of issuance of the original Chapter 2 permits. The deadline remains October 10, 2018, consistent with the previously issued permits.

Other District Regulations

The following other requirements of 20 DCMR are applicable and are incorporated as permit conditions: 20 DCMR 200.4, 20 DCMR 202.2, 20 DCMR502, 20 DCMR 500.8, 20 DCMR606.1, 20 DCMR 903.1, 20 DCMR 801.1, 20 DCMR 805.8, and 20 DCMR 201.

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#### FEDERAL REGULATIONS

##### 40 CFR 60, Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines:

Pursuant to 40 CFR 60.4200, NSPS Subpart IIII applies to compression ignition internal combustion engines: (1) with model year of 2007 or later, (2) constructed after July 11, 2005 and manufactured after April 1, 2006, or (3) modified or reconstructed after January 1, 2009.

The emergency generators are Model Year 2017 and thus are subject to this subpart. The requirements of this subpart have been included in the generator set permits.

##### 40 CFR 63 – Subpart ZZZZ – National Emissions Standards for Hazardous Air Pollutants (NESHAP) for Stationary Reciprocating Internal Combustion Engines:

For the evaluation of this NESHAP standard, it is noteworthy that this facility does not emit or have a potential to emit 10 tons per year of a single hazardous air pollutant (HAP) or 25 tons per year of any combination of HAPs. Consequently, no major source maximum achievable control technology (MACT) standards apply; the facility is considered an area source of HAP emissions.

None of the three diesel engine-driven emergency generator sets evaluated in this permitting action is subject to specific requirements of this subpart. The reason is that the engines were all ordered or manufactured after June 12, 2006, and therefore are new engines under this subpart. New engines, although subject to Subpart ZZZZ, have no additional requirements under this subpart beyond those of 40 CFR 60 Subpart IIII. The regulation of the new engines under 40 CFR 60 Subpart IIII occurs because EPA determined that for new sources, adequately regulating criteria pollutants also adequately regulates HAPs.

#### RECOMMENDATIONS

Subject to receiving no adverse no public comments with regard to a segment of this project or all of it. I recommend based on this regulatory review that the final permit be issued to the U.S. General Services Administration – Saint Elizabeths West Campus, following completion of the public review period. If comments are received during the public review period, they will be addressed before any final action is taken on the permit application.

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