

GOVERNMENT OF THE DISTRICT OF COLUMBIA

District Department of the Environment



Air Quality Division

TECHNICAL SUPPORT MEMORANDUM

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

FROM: Abraham T. Hagos *ATH*
Environmental Engineer

SUBJECT: **Architect of the Capitol
Capitol Power Plant
Permit No. 6577 - Plantwide Applicability Limits (PALs) for NO_x and PM_{2.5}**

DATE: November 15, 2012

BACKGROUND INFORMATION

The Architect of the Capitol (AOC) submitted a series of applications related to the installation of a cogeneration plant at the Capitol Power Plant (CPP) facility, located at 25 E Street SE, on February 10, 2012. This series of applications consisted of a request to install two cogeneration units, a request to update an operation permit for existing Boiler 3, and a request to establish a plantwide applicability limit (PAL) for NO_x and PM_{2.5} for the facility. Separate memoranda were developed for the cogeneration systems permit document and the Boiler 3 permit. Supplemental information related to the application for PALs was received by the Air Quality Division (AQD) on March 14, 2012, March 28, 2012, July 11, 2012, July 20, 2012, and October 23, 2012.

The CPP is a major source of air pollution in the District of Columbia. The AOC application is asking to establish PALs for the regulated New Source Review (NSR) nonattainment pollutants (NO_x and PM_{2.5}) pursuant to section 208 of Title 20 of the District of Columbia Municipal Regulations (20 DCMR) to avoid applicability of the requirements of the NSR program under 20 DCMR 204 because installation of the cogeneration units would otherwise cause a significant increase in emissions and a significant net increase in emissions and trigger the requirements of that section.

The cogeneration project will produce electricity for direct consumption by the CPP and includes two (2) combustion turbines (CTs) rated at 7.5 megawatts (MW) each and two (2) Heat Recovery Steam Generation (HRSG) units rated at 71.9 Million BTU per hour each.



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AQD has prepared a separate Chapter 2 permit document (Permit numbers 6663 and 6664) and Chapter 2 technical support memorandum for the cogeneration plant and a separate permit and Chapter 2 technical support memorandum for the boiler (#6576). This Chapter 2 technical support memorandum is for the PAL permit (#6577) only.

Pursuant to §208 of Title 20 of the District of Columbia Municipal Regulations (20 DCMR), an existing major stationary source may obtain a Plantwide Applicability Limit (PAL) permit for NO_x and/or PM_{2.5} from the District Department of the Environment (DDOE) because the District of Columbia is classified as an ozone and PM_{2.5} nonattainment area and is not classified as an extreme nonattainment area for ozone.

AQD intends to issue a Chapter 2 operating permit (#6577). The permit action will be published in the DC Register on November 16, 2012. Public comments for the permit action will be solicited through December 17, 2012.

The applicant has not requested that any of the materials submitted with this application be held confidential.

TECHNICAL INFORMATION

The equipment under evaluation consists of all emission units at the CPP. The activities at this location include steam production and, with the proposed installation of a cogeneration system, electricity generation.

The primary technical evaluation in the development of this permit related to the establishment of the PAL emission limits pursuant to 20 DCMR 208. Please see the regulatory review section below relating to that section for an explanation of the establishment of the proposed initial PALs.

REGULATORY REVIEW

Chapter 2, Section 204: Permit Requirements for Sources Affecting Non-Attainment Areas:

Major new sources and major modifications to existing major sources that emit ozone precursors (NO_x and VOC) are subject to the requirement of 20 DCMR 204. AQD has evaluated the applicability of 20 DCMR 204 and has determined that the proposed combustion turbine project will not be subject to 20 DCMR 204 as long as the proposed PALs are established and complied with. As such, this section is not applicable to this application.

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20 DCMR Chapter 2, Section 208: General and Non-attainment Area Permit Requirements:

AOC has proposed establishment of plant-wide applicability limits (PALs) for NO_x and PM_{2.5} based on the requirements of the newly established 20 DCMR 208. All the requirements of 20 DCMR 208 are included in the proposed permit.

PALs are based, in part, on the historical emissions of the facility during the “PAL baseline period”, which is defined as:

“the two (2) consecutive calendar years immediately prior to the year the application for a PAL is submitted. The Department may allow the use of a different consecutive twenty-four (24) month period within the last five (5) years upon a determination that the operations during that period would be more representative of normal source operations.”

AOC proposed that an alternate 24-month period, from February 2007 through January 2009, be used to as the PAL baseline period. AOC submitted supporting documentation justifying that baseline period selection. Please see the October 23, 2012 whitepaper submitted by Ian Donaldson of Trinity Consultants for a full explanation of the basis for this selection.

In short, the applicant explained that operation of the five boilers, the main emission units at the site, are based on the need of AOC to provide heating service to various government buildings. Thus, the need to operate the boilers is lower in a year with a mild winter, as compared to a year with a colder winter. AOC provided an analysis of the need to provide heat based on the concept of “heating degree days” (HDDs). AOC showed that 2010 and 2011 had historically mild winters, resulting in a total of 3,800 HDDs over the two year period. As a comparison, they showed that the average two year HDDs over the last 30 years was 4,053. The 24-month period proposed by AOC, February 2007 through January 2009 resulted in 3,956 HDDs, between the immediate two year period and the past 30 year average levels.

AQD has recognized that climate is changing and there is a gradual warming trend occurring in the area. As such, when DDOE adopted its new NSR rule and the related PAL regulations, it adopted a maximum 5-year look-back period to establish the PAL baseline period, as compared to the less stringent federal 10-year look-back period. Nonetheless, AQD does not believe that it is appropriate to limit operations of the facility based on the immediately previous two year period when it can be clearly demonstrated that the winters were substantially milder than other winters, even in the last 5 years, but especially in the last 30 years. While climate change science does indicate that average world temperatures will increase over time, it does not indicate that winters in any one place will continually and consistently increase in temperature each year.

As such, AQD believes that it is reasonable to take the period of February 2007 through January 2009 as a period more representative of normal source operations than the 2010 and 2011 calendar year period.

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It should also be noted that CPP addressed the concept of cooling degree days (CDDs) in their October 23, 2012 whitepaper as well. In short, their conclusion was that, although summers are gradually warming, thus requiring the use of more energy for cooling purposes, this energy use does not directly affect the use of the boilers at the facility, but rather the refrigeration equipment. As such, an analysis of CDDs is not relevant to the evaluation of boiler use, and thereby, emissions from the facility.

Based on the selected PAL baseline period, the two year average PAL baseline emissions of NO_x is calculated to be 171.7 tons per year, while the PM_{2.5} level is 25.4 tons per year. Based on the requirements of 20 DCMR 208.9, the PAL level is therefore established at these levels plus the significance levels found in the definition of "significant" in 20 DCMR 299. The significance level for NO_x is 25 tons per year, while the significance level for PM_{2.5} is 10 tons per year. As such, the initial PALs are proposed to be set at 196.7 tons per year of NO_x and 35.4 tons per year of PM_{2.5}. It should be noted here that the baseline two years average only added 10 tons per year of NO_x emissions from Boiler #3, though actual emissions were higher. This is because there was a 10 ton per year NO_x emission limit established in a permit issued in 2000 for Boiler #3 to avoid NSR applicability. As such, per the definition of PAL baseline emissions (20 DCMR 299), the average rate was adjusted downward to account for non-compliant emissions from the unit.

The permit has been written to establish monitoring approaches for all existing equipment at the facility to show compliance with the PALs, pursuant to the requirements of 20 DCMR 208.6(g).

Chapter 3, Section 301: Operating Permit Requirements:

The Capitol Power Plant facility is a major source subject to Chapter 3 and continues to need an operating permit in accordance with 20 DCMR 300.1. The Capitol Power Plant will be required to apply for a Chapter 3 permit amendment within 12 months of the issuance of the PAL permit, pursuant to 20 DCMR 301.1(a)(3). This requirement is contained in Condition I(j) of the proposed permit.

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

Once the PAL level is determined for a PAL pollutant, CPP is required to monitor emissions to ensure that the PALs are complied with. The proposed PAL permit includes extensive monitoring, and testing requirements in order ensure that CPP will consistently demonstrates compliance (or non-compliance) with the PAL levels and document and report this information as appropriate.

The main testing requirements are contained in Condition IV(f)(3) and related conditions. The primary monitoring requirements are established in Condition IV(k) for NO_x and IV(l) for PM_{2.5}.

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RECOMMENDATIONS

Based on AQD's analysis, the proposed project and attached permit comply with all applicable federal and District air pollution control laws and regulations.

Public comments for the permit action will be solicited from November 16 through December 17, 2012. AQD will resolve any comments received before issuing a final permit. If no comments are received, I recommend that permit (#6577) be issued in accordance with 20 DCMR 200.2 following the close of the comment period.

SSO/ATH