

**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: John C. Nwoke  
Engineer *JCN*

SUBJECT: **District of Columbia Water and Sewer Authority (DC Water)  
Permits No. 7127, 7128, 7129, and 7130  
Permits to Construct and Operate Four Carbon Adsorber Odor Scrubbers  
for the Tunnel Dewatering Pumping Station and Enhanced Clarification  
Facility at Blue Plains Wastewater Treatment Plant**

DATE: October 4, 2017

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**BACKGROUND INFORMATION**

On June 22, 2016 the District of Columbia Water and Sewer Authority (DC Water) submitted an application to construct and operate four (4) odor scrubbers at the Blue Plains Wastewater Treatment Plant (WWTP). The scrubbers will be used to reduce odorous emissions from the Tunnel Dewatering Pump Station (TDPS) and Central Enhanced Clarification Facility (ECF). The scrubber operation is based on the principle of carbon adsorption of pollutants from dewatering and enhanced clarification processes at the Blue Plains facilities. The radial carbon adsorbers each has a capacity of 28,700 cfm while the vertical configuration has a capacity of 3,500 cfm.

DC Water's application is for the installation of the TDPS/ECF. DC Water requires a permit to construct and operate the control devices. DC Water has not requested that any aspects of the applications be held confidential.

**TECHNICAL INFORMATION**

The components of the installation consist of the Coarse Screening System and Surge Shaft, Tunnel Dewatering Screening Facility, Grit Removal, High Rate Clarification (HRC) Tanks, Chlorine Contact Tanks and other ancillary facilities. The components are described below:

**1. Tunnel Dewatering Pump Station (TDPS):**

- The components of the facility include vent shaft, fan, tunnel dewatering pumps enclosure shaft housing the TDPS, and other ancillary components.
- Coarse Screening System and Surge Shaft.

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**2. Enhanced Clarification Facility (ECF):**

- The equipment includes, chemical storage tanks for caustic soda, ferric chloride and polymer, pumps and other ancillary equipment
- New pH and oxidation reduction potential (ORP) instrumentation; and
- New variable frequency drives (VFDs) for pump control
  - Sodium hypochlorite pump with VFD
  - Sodium hydroxide pump with VFD
- New controls integrated with the plant-wide process control system
- Disinfection and Dechlorination System
- Grit removal facilities and ancillary equipment

**3. Ancillary Facilities:**

- Chemical systems – caustic soda, ferric chloride, polymer, sodium hypochlorite, and sodium bisulfite.
- Channel aeration systems – blowers, bubble diffusers, air piping for aeration to channels.
- Flushing water drain pump stations – duplex submersible wet pit system
- Pump stations- for water testing, etc.
- Odor control systems – TDPS system with one (1) activated carbon odor control vessel, one (1) fan, and one (1) mist eliminator and
- ECF system with three (3) activated carbon odor control vessels, three (3) fans and three (3) mist eliminators.
- Electrical buildings.

**REGULATORY REVIEW**

Federal and District air pollution control and permitting requirements were reviewed and are applicable (or not applicable) to the project as discussed below.

**Federal Regulations**

Prevention of Significant Deterioration (PSD)

The 1977 Clean Air Act Amendments establish the PSD permitting program to limit the degradation of air quality in areas that are currently in attainment of the NAAQS. Pursuant to 40 CFR 52.21, the PSD review is a federally- mandated program which applies to new major sources of regulated pollutants and major modifications to existing major sources. PSD is pollutant-specific and applies only to those pollutants for which a project is deemed major by comparison to major source thresholds or major modification thresholds (PSD significant

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emission rates) and the project area is designated as attainment or unclassified. Blue Plains is not an existing major source for PSD purposes, nor does the TDPS/ECF project belong to any of the 28 named source categories under the Clean Air Act. Consequently, the applicable PSD major source threshold is 250 tpy. Based on calculations, each pollutant associated with the project has a PTE that is less than 250 tpy, thus PSD requirements are not applicable and hence are therefore excluded from the permits.

Non-attainment New Source Review (NNSR)

NNSR applies to new major source and major modifications located in nonattainment areas. The project is located in an area that has been designated moderate and marginal non-attainment or for the 1997 and 2008 8-hour ozone standards, respectively, and is currently a maintenance area for the PM<sub>2.5</sub> standards. The District of Columbia is located in the Northeast Ozone Transport Region, making the ozone issue a regional matter. Thus Nitrogen oxides (NO<sub>x</sub>) and volatile organic compound (VOC) emissions which are potentially subject to NNSR (due to their precursor roles in the formation of ozone from photochemical reaction) are a regional concern.

Pursuant to Section 204 of 20 DCMR, projects with net emissions increases that exceed NNSR thresholds must: (1) analyze alternatives, (2) incorporate emission controls meeting the lowest achievable emission rate (LAER), (3) obtain emission offsets, and (4) certify compliance of all sources located within the District of Columbia that are owned or operated by the project proponent or applicant.

Based on the review of the application, there are no criteria pollutant emissions associated with this project that exceed the NNSR applicability thresholds, hence the project is not subject to NNSR provisions and no related requirements are included in the permits.

New Source Performance Standards (NSPS)

NSPS apply to new, modified, or reconstructed stationary sources meeting criteria established in 40 CFR 60. Subpart Dc sets standards of performance for small industrial-commercial-institutional steam generating units. It applies to steam generating units with a maximum design heat input capacity of greater or equal to 10 MMBtu/hr, but less than or equal to 100 MMBtu/hr, provided they were constructed, modified or reconstructed after June 9, 1989. There are some natural gas-fired boilers and heaters associated with the project, but they all have heat input ratings below 10 MMBtu/hr, thus they do not trigger Subpart Dc.

There is a compression ignition internal combustion engine associated with this project that triggers the applicability of 40 CFR 60, Subpart III, but that portion of the project is being addressed through a separate permitting process.

There are no other parts of the TDPS/ECF facility that trigger any NSPS standards, hence no such requirements are included in the permit conditions.

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National Emission Standards for Hazardous Air Pollutants (NESHAPs)

NESHAPs are based on specific source categories and on whether or not the affected facility is a major or minor for the specific hazardous Air Pollutant (HAP). There are no HAP emissions associated with the odor scrubber systems. The existing HAP emissions from the facility are below the 10 tons per year major source threshold for a single HAP, and below 25 tons per year for a combination of HAPS; thus the Blue Plains WWTP is minor for HAPS and not subject to NESHAPs for major sources. For that reason, Subpart VVV of 40 CFR 63 (that pertains to that part of NESHAPs which deals with Publicly Owned Treatment Works) is not applicable to this project as this subpart pertains only to major source of HAPs.

As noted above, there is a compression ignition internal combustion engine associated with this project. It triggers the applicability of 40 CFR 63, Subpart ZZZZ. However, it is being addressed through a separate permitting action.

The permits for the TDPS/ECF odor scrubbers do not have conditions that include NESHAPs requirements based on the above narrative.

Greenhouse Gas Monitoring and Reporting

The greenhouse gas (GHG) monitoring and reporting regulations (40 CFR 98) require certain facilities to monitor and report on the emissions of carbon dioxide (CO<sub>2</sub>), methane and nitrous oxide (greenhouse gases), if certain thresholds of the GHG are exceeded. For instance, if a facility emits 25,000 metric tons or more of GHG measured in terms of CO<sub>2</sub> equivalents (CO<sub>2</sub>e) from combustion sources such as boilers or process heaters, the federal GHG rules require that the facility report GHG emissions from these sources.

This particular odor scrubber system project does not involve greenhouse gas emissions and hence no regulatory requirement is in the permit conditions. That notwithstanding, the Blue Plains WWTP on a plant-wide scale is subject to the GHG monitoring and reporting rules because the CO<sub>2</sub>e emissions from existing sources at the plant exceed the applicability thresholds. DC Water will implement a fuel monitoring program to quantify annual greenhouse gas emissions.

It should be noted that this is a federal-only reporting program and is not expected to involve the Department.

Compliance Assurance Monitoring (CAM) Plan

Pursuant to 40 CFR 64 a CAM plan is required to be developed if a facility or emission unit meets the following conditions:

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- It is located at a major source subject to Title V permit and is subject to an emission limitation or standard for an applicable regulated air pollutant;
- It uses a control device to achieve compliance with the emission limit, and
- It has potential precontrolled emissions that are equal to or greater than 100 percent of the major source classification threshold.

The following tables show the control device emission rates and removal efficiencies:

			Flow scfm	Removal Efficiency %	H <sub>2</sub> S		
					Emissions (per scrubber)		
					ppm	lb/hr	tpy
<b>(1) TDPS Odor Scrubber</b>	Avg.	Uncontrolled	3,500	99	2		
		Controlled			0.020		
	Peak	Uncontrolled	3,500	99	5	0.09	
		Controlled			0.050	0.001	

			Flow scfm	Removal Efficiency %	H <sub>2</sub> S		
					Emissions (per scrubber)		
					ppm	lb/hr	tpy
<b>(3) ECF Odor Scrubbers</b>	Avg.	Uncontrolled	28,700	99	2		
		Controlled			0.020		
	Peak	Uncontrolled	28,700	99	5	0.76	
		Controlled			0.050	0.008	

The uncontrolled emission rates for all of the proposed odor scrubbers are below the significant threshold (100 tpy of H<sub>2</sub>S) based on both average and peak load respectively. Therefore a CAM plan development is not a requirement for this project. No such requirement was placed in the permit conditions.

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**District of Columbia Regulations**

20 DCMR 107 – Control Devices and Practices

Section 107 of Chapter 1 of 20 DCMR requires the owner or operator of a control device that needs to be shut down for maintenance to report to the Department at least forty-eight (48) hours prior to shut down. Permit Condition VI(c) requires that DC Water comply with the provision of 20 DCMR 107.2 in order to appropriately notify the Department of any scrubber shut down. It should be noted that this regulation is subject to a call by EPA for a revision to the District's State Implementation Plan (a "SIP Call"). 20 DCMR 107 is expected to change as a result of that SIP Call. As a result, the permit notes this and indicates that when and if 20 DCMR 107 changes, the new requirements will supersede what is listed in the permit currently.

20 DCMR 204 – Permit Requirements for Sources Affecting Nonattainment Areas

Section 204 deals with NNSR in a similar fashion as the federal NNSR. However, in the District the major source threshold for NO<sub>x</sub> is 25 tpy. Despite the threshold, this requirement is also not triggered. As a result, the permit does not contain any related requirements for the scrubbers.

20 DCMR 205 – New Source Performance Standards

Section 205 provision adopts the federal standards by reference (40 CFR 60). This regulation is not applicable to the odor scrubbers as noted in earlier discussion on federal regulations.

20 DCMR 209 – Minor New Source Review

Section 209 discusses minor new source review requirements, which became effective on January 1, 2014. The requirements are applicable to any source required to obtain a permit under 20 DCMR 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 for a project that results in an increase of the potential to emit equal or greater than 5 tpy of any criteria pollutant or aggregate of HAPs. Sources not meeting these applicability requirements must submit, with their permit application, sufficient documentation showing that the proposed source does not meet the applicability requirements. No emissions of criteria pollutants are associated with this project. Hydrogen sulfide is not considered a HAP. Hence, the requirements of this section are not applicable.

20 DCMR Chapter 6, Section 606: Visible Emissions

The visible emissions limitations of 20 DCMR 606 are applicable to this facility. Proper operation of the equipment would preclude any visible emissions from being emitted into the outdoor atmosphere from the operation of the equipment. This more stringent requirement (required by 20 DCMR 201) is contained in Condition II(a) of the permits.

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20 DCMR 803 – Sulfur Process Emissions

This regulation, which requires discharges of sulfur oxides calculated as sulfur dioxide to not exceed 0.05% by volume is applicable to this equipment. Ensuring that the facility complies with Condition II(c) of the permits will ensure that the requirements of this regulation are met.

20 DCMR 903 Odorous or Other Nuisance Air Pollutants

Section 903 of 20 DCMR prohibits the release of odorous air pollutants from any source into the atmosphere. These pollutants may not be released for a time period likely to be injurious to the public health or welfare, or which interferes with the reasonable enjoyment of life or causes damage to property. The odor scrubbers' high removal efficiency are intended to ensure compliance with this requirement from the full set of TDPS/ECF equipment. Hence, the provisions of this regulation are found in Condition II(b) of the permits and most of the rest of the requirements of the permit are focused on ensuring compliance with this standard.

**RECOMMENDATIONS**

The draft permits are scheduled for posting in the D.C. Register and on the Department's website on November 17, 2017 and will be available for public comment through December 18, 2017.

The proposed project and attached permit comply with all applicable federal and District air pollution control laws and regulations. Assuming no comments are received during the public review period, I recommend that the attached permit document be issued. If comments are received, they will be reviewed and addressed appropriately before the permit is issued.

JCN

