CITY OF PHILADELPHIA
Department of Public Health
Public Health Services
Air Management Services

InterOffice Memo

To: File

From: Rahel Gebrekidan and Edward Wiener

Date: 5/23/2017

Subject: Plan Approval No: IP17-000009 for Southeastern Pennsylvania Transportation Authority (SEPTA) Roberts Complex

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Company Description:

SEPTA Roberts Complex is located at 4301 Wissahicken Ave, Philadelphia, PA 19140. The contact regarding the facility's Air Permit is Richard Harris, Rharris@septa.org, (215) 580-8144.

Project Description

SEPTA Robert Complex is an existing Synthetic Minor facility and is proposing to install two identical natural gas-fired Combined Heat and Power (CHP) Generator Unit rated at 6,113 hours power (h) each to produce steam and electricity for use within the Midvale bus facility. A portion of the electricity generated by the two CHP will also be used as supplemental electricity for regional railcars. The facility requested the retention of its Synthetic Minor (SM) status by restricting NOx, VOC, CO, and HAP emission below the Title V threshold.

The project will eliminate the use of two 11,716,000 BTU/hr existing boilers, since the CHP engine also provides heat to the Midvale Maintenance building, reducing the overall PTE from the facility. The boilers will be used only as backups in the events there is an operational CHP heat transfer issue after startup, or when the engines are not operational. SEPTA also proposed to take fuel usage/type and /or operating hour restriction on other fuel burning sources at the facility.

Screen modeling was conducted following EPA's manual to see the NOx emission concentration in the ambient air from this project. AMS used the AERSCREEN dispersion model. Vender guarantee hourly emissions and stack temperature, diameters and height were input to the model, along with local geography. The Clean Air Act identifies two types of national ambient air quality standards- **Primary standards** provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly and **Secondary standards** provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

The results of the air quality assessment demonstrate that the total ambient pollutant concentrations of this project are below the Primary and Secondary standards for NOx.
The Maximum 1-hour NOx concentration from the combined stack is 20.28 ug/m3 or 10.78 ppb, which is below the EPA 1-hour Standard of 100 ppb.
AMS finds that the Project, as it is proposed, does not have the potential for significant health and environmental effects.

Emission Control Technology

Each CHP will be equipped with a Selective Catalytic reduction (SCR) and Oxidation Catalyst (OC) System. The SCR is used to reduce NOx emissions and the OC to reduce Carbon Monoxide (CO), Volatile Organic compound (VOC) and Formaldehyde (CH2O). The SCR provide a manufacturer guaranteed reduction of the following;

Table I

81.8% of NOx, reduction

90% of CO reduction,

62.5% of VOC reduction and

87.5 % of CH_2O reduction.

Project Emissions

Potential Emissions based on vender guaranteed hourly emissions from the two proposed CHP are as follow;

Table II

NOx, 21.75 tons per year

VOC, 16.3 tons per year

CO, 27.1 tons per year

Total PM < 0.5 tons per year

The following Table compares the facility's projected and past potential emissions

Table III

	Past PTE (before the installation of the CHPs)	Projected PTE after the installation of the CHP and limited use of the boilers	Increase/Decrease
NOx Tons/yr	21.488	24.846	3.358
CO tons/yr	7.975	28.843	20.868
VOC tons/yr	0.951	18.996	18.044
PM10 tons/yr	2.066	0.354	-1.712
PM 2.5tons/yr	1.84	1.008	-0.832

Emissions Impact:

AMS conducted screen modeling using the AERSCREEN dispersion model to determine the NOx emission concentration impact on the ambient air due to this project. AMS input vender guarantee hourly emissions and stack temperature, diameters and height into the model, along with local geography. AMS compared these results to the National Ambient Air Quality Standards (NAAQS) Primary Standard of 100 parts per billion (ppb)* established by EPA for Nitrogen Dioxide (NO2), a component of NOx. NAAQS primary standards provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly.

The results of the air quality assessment demonstrate that the total ambient pollutant concentrations of this project are below the primary standard for NO2. The Maximum 1-hour NOx concentration from the combined stack is 20.28 ug/m3 or 10.78 ppb. Adding this to a background NO2 level of 76 ppb*, the highest certified 1-hour level measured by AMS air monitors in Philadelphia since 2009, will still result in pollutant concentrations below the EPA 1-hour standard of 100 ppb*. AMS finds that the Project, as it is proposed, does not have the potential for significant health and environmental effects.

*Please note that the 100 ppb NAAQS primary standard for NO2 is based on the 98th percentile of 1-hour daily maximum concentrations, averaged over 3 years, not the highest 1-hour reading. The 76 ppb highest monitored level 1-hour level is also based on the 98th percentile of daily 1-hour concentrations. For more information on NAAQS standards, see https://www.epa.gov/criteria-air-pollutants/naaqs-table.

Applicability for Regulations:

Since SEPTA requested to maintain the SM status, NO_x, and VOC emissions from the facility shall be less than 25 tons per rolling 12-month period calculated monthly to qualify for Synthetic Minor permit. And NOx and VOC emissions from each CHP are limited to 10.9 tons, and 8.2 tons per rolling twelve month period respectively. To assure compliance with these emission limits the CHPs are restricted to 573 million cubic feet ($mmft^3$) per 12-month rolling period of natural gas usage combined.

Each CHP are applicable to 40 CFR Part 60, Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines for new or reconstructed stationary RICE located at an area source. The CHP also must meet the requirements of 40 CFR Part 63, Subpart ZZZZ, National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines, by meeting the requirements 40 CFR 60 subpart JJJJ, for spark ignition engines.

Each CHP unit is also applicable to the particulate matter emission limit. Particulate matter emissions from each exhaust stack into the outdoor atmosphere may not exceed 0.04 grain per dry standard cubic foot per 25 Pa Code §123.13(c)(1) & AMR II Sec VII.

Each control device shall be operated whenever its associated source is in operation. The Permittee shall install, maintain, and operate each engine and associated air pollution control equipment in accordance with manufacturer's specifications.

Testing Requirement

SEPTA Roberts Complex is required to perform initial stack testing within sixty (60) days of achieving the maximum production rate but not later than 180 days after initial startup to demonstrate compliance with NOx, CO, VOC and Formaldehyde emission limits and subsequent compliance with NOx, CO, VOC and ammonia slip emission limits. Following the initial performance tests, the SEPTA shall conduct subsequent performance testing for NO_x, CO, HCHO, and NMNEHC every 8,760 hours of operation of each CHP or 3 years, whichever comes first as required by NSPS JJJJ.

Monitoring and Recordkeeping Requirement

The Permittee shall keep records to verify compliance with the facility-wide emission limitations as well as the emission limits from each CHP. The records shall be maintained at a minimum on a monthly basis and the emissions shall be calculated on a 12-month rolling sum.

The Permittee needs to keep monthly records of fuel usage for each source at the facility to assure compliance with the facility wide natural gas and fuel oil usage. The Permittee shall maintain records of number of hours per month that each engine operated using a non-resettable hour meter, and the amount of fuel used per month in each engine.