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

Interoffice Memo

To:	File
From:	Rahel Gebrekidan, Edward Wiener, and Henry Kim
Date:	11/21/2017
Subject:	Plan Approval No: IP17-000009 for Southeastern Pennsylvania Transportation Authority (SEPTA) Roberts Complex

---

Company Description:
The South Eastern Pennsylvania Transportation Authority (SEPTA) is a regional public transportation authority that operates bus, subway, and rail service in and around Philadelphia. SEPTA operates bus maintenance and rail facilities, referred to collectively as the SEPTA Roberts Complex. The SEPTA Roberts Complex consists of the Roberts Train Yard at 341-342 Roberts Avenue, the Midvale Bus Facility at 4301 Wissahickon Avenue, and the Liberty Yard at 440 Clarissa Street, all located in Philadelphia, PA 19140. SEPTA operates a number of air pollution sources at the SEPTA Roberts Synthetic Minor Operating Permit (SMOP) No. S12-019. The contact regarding the operation of the facility is Richard Harris, SEPTA Environmental Safety Officer, Rharris@septa.org, (215) 580-8144.

Project Description:
SEPTA is proposing to install two natural gas-fired Combined Heat and Power (CHP) Generator Units, rated at 6,113 horsepower (hp) each, at the SEPTA Roberts Complex. Electricity generated by the CHP units will be used to provide base electrical load for regional rail operations, and provide hot water / steam to bus maintenance facilities that are part of the SEPTA Roberts Complex. In order for the facility to remain a Synthetic Minor Source, SEPTA requested a nitrogen oxides (NOx) emissions limit for the facility that is below the Major Source - Title V threshold (i.e. < 25 tons per year). The facility's potential to emit other air pollutants will remain below their respective Major Source - Title V thresholds absent any restrictions.

The installation of the CHP units will largely replace the regular use of two, 9,900,000 BTU/hr dual fuel (natural gas or fuel oil) boilers, that currently provide steam and heat to the bus maintenance portion of the SEPTA Roberts Complex. SEPTA has accepted combined fuel usage limits on these boilers, as well as an operational restriction that will generally prohibit the use of the boilers when the CHP units are operating normally.[1] SEPTA also proposed to take fuel usage/type and /or operating hour restriction for other fuel burning sources at the facility.

Emission Control Technology:
Each CHP unit will be equipped with a Selective Catalytic Reduction (SCR) and Oxidation Catalyst (OC) System. The SCRs will reduce NOx emissions, while the OCs will reduce Carbon

[1] Boilers operations will be limited to maintenance and testing while the CHP units are operating normally.

Monoxide (CO), Volatile Organic compound (VOC) and Formaldehyde (CH2O) emissions, from the CHP units. The SCRs will use a urea reactant, as opposed to the more toxic ammonia that was originally proposed. The SCR/OC system manufacturer guarantees the following emission reductions:

Table I – Anticipated SCR/OC System Pollution Reductions

81.8% of NOx reduction
90% of CO reduction,
62.5% of VOC reduction, and
87.5 % of Formaldehyde (CH_2O) reduction.

Project Emissions:
The proposed plan approval includes the short-term emission limits for the CHP units as listed in Table II below. AMS based the emission limits on the emission information included in the plan approval application, and from vendor guarantees. AMS has determined that these emission limits meet the Best Available Technology (BAT) requirements of 25 Pa Code § 127.1.

Table II – Short Term Emission Limits for the CHP Units

Pollutant	Emission Limit
Nitrogen Oxides (NOx)	0.2 g/bhp-hr
Non Methane Non Ethane Hydrocarbons, excluding Formaldehyde (NMNEHC)	0.15 g/bhp-hr
Carbon Monoxide (CO)	0.25 g/bhp-hr
Formaldehyde (CH2O)	0.05 g/bhp-hr
Ammonia Slip (NH3)[2]	5 ppmdv @ 15% O2

Table III – Potential Emissions of the Proposed CHP Units

Pollutant	Potential Emissions (tons/yr)	Major Source – Title V Threshold (tons/yr)
Nitrogen Oxides (NOx)	21.8	25
Volatile Organic Compounds (VOC)	16.4	25
Carbon Monoxide (CO)	27.2	100
Particulate Matter Less Than 10 Microns (PM10)	0.08	100
Particulate Matter Less Than 2.5 Microns (PM2.5)	0.06	100
Sulfur Oxides (SOx)	0.09	100
Lead (Pb)	0.00	10
Formaldehyde (CH2O)	5.44	10
Total Hazardous Air Pollutants (HAPs) not including Formaldehyde	2.12	N/A
Total Hazardous Air Pollutants (HAPs) including Formaldehyde	7.56	25

[2] Although urea will be used as a reactant in the SCR, ammonia may be emitted as a byproduct of SCR operation.

Potential emissions of the CHP project are summarized in Table III.[3] Potential emissions are the maximum levels a source can emit based on physical restrictions (ex. capacity) and legal restrictions (ex. emission limits, fuel usage limits). The potential NOx, VOC, and CO emissions were calculated from the rolling 12-month emission limits in the proposed plan approval. The potential CH2O emissions were calculated by multiplying the short-term emission limit in the proposed plan approval (i.e. 0.05 g/bhp-hr) by the maximum number of hours the CHP units will operate in a year and the rated capacity in horsepower. The potential emissions for PM10 and PM2.5 are based on EPA's 2014 National Emissions Inventory Documentation emission factors. The potential HAPs emissions, not including CH2O, were derived from EPA AP-42 emission factors for uncontrolled engines, assuming a 62.5% control efficiency from the OC as guaranteed by the vendor. Potential HAP emissions are broken out in constituent species in Table IV.

Table IV – Potential HAP Emissions (Speciated)

Scenario:	87.5% formaldehyde control 62.5% HAP control (based on VOC guarantee)

	Potential Emissions (tons/yr)	
Pollutant	**1 engine**	**2 engines**
Formaldehyde	2.72	5.44
1,1,2,2-Tetrachloroethane	2.19E-03	4.38E-03
1,1,2-Trichloroethane	1.74E-03	3.48E-03
1,3-Butadiene	0.01	0.03
1,3-Dichloropropene	1.45E-03	2.89E-03
2-Methylnaphthalene	1.82E-03	3.64E-03
2,2,4-Trimethylpentane	0.01	0.03
Acenaphthene	6.85E-05	1.37E-04
Acenaphthylene	3.03E-04	6.06E-04
Acetaldehyde	0.46	0.92
Acrolein	0.28	0.56
Benzene	0.02	0.05
Benzo(b)fluoranthene	9.09E-06	1.82E-05
BenzoIpyrene	2.27E-05	4.55E-05
Benzo(g,h,i)perylene	2.27E-05	4.53E-05
Biphenyl	0.01	0.02
Carbon Tetrachloride	2.01E-03	4.02E-03
Chlorobenzene	1.66E-03	3.33E-03
Chloroform	1.56E-03	3.12E-03
Chrysene	3.79E-05	7.59E-05

[3] The May 23, 2017 Draft Technical Review Memo included a comparison of the facility's potential emissions as currently configured, and the facility's potential emissions following the installation of the CHP project. This comparison was misleading, because actual reported emissions from the facility as currently configured are far lower than its respective potential emissions. Actual emissions of the SEPTA Roberts Complex, from 2013-2016, were summarized in a table entitled "Septa Robert's Complex – Past Actuals" included in the Plan Approval Application materials.

Ethylbenzene	2.17E-03	4.35E-03
Ethylene Dibromide	2.43E-03	4.85E-03
Fluoranthene	6.08E-05	1.22E-04
Fluorene	3.10E-04	6.21E-04
Methanol	0.14	0.27
Methylene Chloride	1.10E-03	2.19E-03
n-Hexane	0.06	0.12
Naphthalene	4.07E-03	0.01
PAH	1.47E-03	2.95E-03
Phenanthrene	5.70E-04	1.14E-03
Phenol	1.31E-03	2.63E-03
Pyrene	7.45E-05	1.49E-04
Styrene	1.29E-03	2.58E-03
Tetrachloroethane	1.36E-04	2.72E-04
Toluene	0.02	0.04
Vinyl Chloride	8.16E-04	1.63E-03
Xylene	0.01	0.02
Total HAPs (Not including Formaldehyde)	**1.06**	**2.12**
Total HAPs (Including Formaldehyde)	**3.78**	**7.56**

Emissions Impact:

Evaluation of Certain Criteria Pollutants (NO2, CO, PM10, PM2.5, SO2) vis-a-vis the National Ambient Air Quality Standards (NAAQSs)

As a general rule a single Minor Source that otherwise complies with applicable emissions requirements does not emit a sufficient amount of air pollution to have a significant impact on local air quality. Nonetheless, emissions from the CHP units were modeled to determine if any impact they would have on air quality.

For this analysis, the EPA recommended AERSCREEN air quality dispersion screening model, was used to generate emission impacts from the CHP units. The AERSCREEN model produces estimates of "worst-case" 1-hour concentrations for a particular pollutant from a single source, without the need for hourly meteorological data, and also includes conversion factors to estimate "worst-case" 3-hour, 8-hour, 24-hour, and annual concentrations. The concentration estimates produced by the AERSCREEN model can then be compared to the applicable EPA National Air Quality Standard (NAAQS). Concentration estimates generated by AERSCREEN are generally more conservative (i.e. tend to overestimate) than estimates produced by other, more complex air quality dispersion models such as AERMOD.

As summarized in Table III, CO, NOx, and VOC will make up the majority of the air pollutants from the CHP units. AMS's analysis was focused on potential NOx emissions from the CHP project (i.e. 21.8 tons/yr) given existing NOx levels in the City, as reported historically by air monitors operated by AMS. Potential CO emissions from the CHP units pose a lesser concern because ambient CO levels within Philadelphia are well below applicable CO NAAQS. No modeling of potential VOC emissions was done, in part because there is no applicable NAAQS to make a valid comparison.[4]

Vendor guaranteed hourly NOx emissions for the CHP units and other parameters (temperature of exhaust stream, stack diameter, and stack height) were imputed into the AERSCREEN model. The maximum 1-hour NO2 concentration from the CHP project only was then calculated to be 20.28 ug/m3. The applicable background level of NO2 (i.e. the maximum 98th percentile of daily 1-hour concentrations from 2012 – 2016 as recorded by AMS Monitor 421010004, located at 1501 E Lycoming Street), the primary constituent of NOx, was determined to be 118 ug/m3. Adding the modeled NO2 concentration to the background concentrations resulted in a total NO2 pollutant concentration of 138.3 ug/m3. This falls below the 188 ug/m3 EPA primary 1-hour National Air Quality Standard (NAAQS) for NO2. AMS performed an additional analysis to specifically account for large NO2 sources in the vicinity of the SEPTA Roberts Complex. This additional analysis indicated that no exceedance of the NO2 NAAQS is to be expected.

SEPTA's environmental consultant, AECOM, performed additional air modeling using the more complex and comprehensive AERMOD model, to evaluate the CHP project's impact on the neighborhood air quality for NO2, and other expected criteria pollutants[5] (i.e. PM2.5, PM10, CO, SO2).[6] These results, as presented in Table V, were also added to background concentrations of the criteria pollutants as derived from AMS Monitor 421010004, and compared to the respective NAAQS where available.

Table V – AECOM AERMOD Modeling Results from November 16, 2017

Pollutant	**Averaging Period**	**Project Impact Based on Stack Height (Hs)**	**Background**	**Total Impacts**	**NAAQS**	**Percent of NAAQS**
		Hs = 50 ft		**Hs = 50 ft**		**Hs = 50 ft**
		(µg/m³)	**(µg/m³)**	**(µg/m³)**	**(µg/m³)**	**(%)**
NO_2	1-hour (Tier 1)	17.60	109.1	126.7	n/a	n/a
	1-hour (Tier 2)	14.08	109.1	123.1	188	65.5%
	Annual (Tier 1)	0.53	32.6	33.1	n/a	n/a
	Annual (Tier 2)	0.40	32.6	33.0	100	33.0%
CO	1-hour	50.83	2633	2684	40,000	6.7%

[4] Note, some VOCs are additionally classified as air toxics pursuant to Air Management Regulation (AMR) VI, that are discussed later in this Technical Review Memo.

[5] Lead (Pb) is classified as a criteria pollutant by EPA. However, Pb is not a constituent found in natural gas, and is accordingly not emitted from natural gas combustion sources.

[6] Note, SEPTA consultant Mondre Energy, Inc. conducted preliminary AERMOD modeling of CHP emissions in May 2016. The AERMOD modeling, performed by AECOM in November 2017, incorporated final parameters pertaining to the CHP project included in the plan application submitted to AMS. Accordingly, the AECOM AERMOD model results are a more accurate representation of the CHP project's emissions and their anticipated impact on air quality.

	8-hour	19.86	1946	1966	10,000	19.7%
PM_{10}	24-hour	0.05	64	64	150	42.7%
	Annual	2.55E-03	n/a	n/a	n/a	n/a
$PM_{2.5}$	24-hour	0.02	29.3	29.4	35	83.9%
	Annual	1.56E-03	9.8	9.8	12	81.4%
SO_2	1-hour	0.17	28.8	29.0	196	14.8%
	3-hour	0.16	28.8	29.0	1,300	2.2%
	24-hour	0.10	14.9	15.0	365	4.1%
	Annual	3.41E-03	n/a	n/a	n/a	n/a

These results also indicated that the emissions from the CHP units, even taking into account current background emissions of the respective criteria pollutants, will not exceed the NAAQSs.

EPA set the NAAQSs at levels sufficient to provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly. All of the air dispersion modeling and subsequent analysis performed by AMS and AECOM predicts the concentrations of expected criteria pollutants from the CHP project, on top of current background concentrations of the same pollutants, will not exceed the NAAQSs. Accordingly, the emissions from the CHP project, as estimated by the various air pollution models, will not significantly impact public health or air quality in the vicinity of the SEPTA Roberts Complex.

Evaluation of HAP Emissions, Air Toxics

An analysis of the HAP Emissions vis a vi Air Management Regulation (AMR) VI, governing Toxic Air Contaminants, was not required for the CHP project because emissions generated from sources that combust commercial fuel, like natural gas, are exempt. See AMR VI. § II.C. Nonetheless, the potential HAP emissions from the CHP project, as set out in Table IV above, were compared to the acceptable levels for selected toxic air contaminants as established pursuant to AMR VI. Air Quality Guidelines for Toxic Air Contaminants. See Report on Recommended Ambient Air Quality Guidelines for Toxic Air Contaminants, June 1983. None of the potential HAP emissions otherwise exceeded the accepted concentration limits established pursuant the AMR VI. Guidelines.

An additional analysis of the respective chronic inhalation cancer risk posed by the anticipated HAP emissions from the CHP project was also performed. Using AERMOD, AMS modeled anticipated emission for each HAP annually between 2012 and 2016. The highest modeled concentration for each HAP was then multiplied by its respective chronic inhalation cancer risk factors as compiled by EPA. See EPA Dose-Response Assessment for Assessing Health Risks Associated With Exposure to Hazardous Air Pollutants, Table 1. (https://www.epa.gov/fera/dose-response-assessment-assessing-health-risks-associated-exposure-hazardous-air-pollutants). The resulting chronic inhalation cancer risk for each HAP is reported on the following Table VI.

Table VI. – Chronic Inhalation Cancer Risk for HAPs Emissions Anticipated from CHP Project

		Emission Rate (g/s)	**Modeled Concentration, Grouped by Year (ug/m3)**								**CHRONIC INHALATION - CANCER[7]**	
Pollutant	Cancer Risk	2 engines (62.5% HAP Control)	2012	2013	2014	2015	2016	MAX	CAS NO.	HAP NO.	1/(ug/m3)	SOURCE
Formaldehyde	4.39E-06	1.70E-01	2.83E-01	2.95E-01	3.38E-01	3.17E-01	3.05E-01	3.38E-01	50-00-0	87	0.000013	IRIS
1,1,2,2-Tetrachloroethane		1.37E-04	2.28E-04	2.38E-04	2.72E-04	2.55E-04	2.46E-04	2.72E-04	79-34-5	149		
1,1,2-Trichloroethane	3.46E-09	1.09E-04	1.81E-04	1.89E-04	2.17E-04	2.03E-04	1.95E-04	2.17E-04	79-00-5	158	0.000016	IRIS
1,3-Butadiene	5.45E-08	9.13E-04	1.52E-03	1.59E-03	1.82E-03	1.71E-03	1.64E-03	1.82E-03	106-99-0	23	0.00003	IRIS
1,3-Dichloropropene	7.19E-10	9.03E-05	1.51E-04	1.57E-04	1.80E-04	1.69E-04	1.62E-04	1.80E-04	542-75-6	56	0.000004	IRIS
2-Methylnaphthalene		1.14E-04	1.89E-04	1.97E-04	2.26E-04	2.12E-04	2.04E-04	2.26E-04	91-57-6	187		
2,2,4-Trimethylpentane		8.55E-04	1.43E-03	1.49E-03	1.70E-03	1.60E-03	1.54E-03	1.70E-03				
Acenaphthene		4.28E-06	7.13E-06	7.43E-06	8.51E-06	7.98E-06	7.68E-06	8.51E-06	83-32-9	187		
Acenaphthylene		1.89E-05	3.15E-05	3.29E-05	3.77E-05	3.53E-05	3.40E-05	3.77E-05	206-96-8	187		
Acetaldehyde	1.25E-07	2.86E-02	4.77E-02	4.97E-02	5.69E-02	5.34E-02	5.14E-02	5.69E-02	75-07-0	1	0.0000022	IRIS
Acrolein		1.76E-02	2.93E-02	3.05E-02	3.50E-02	3.28E-02	3.16E-02	3.50E-02	107-02-8	6		
Benzene	2.34E-08	1.51E-03	2.51E-03	2.61E-03	3.00E-03	2.81E-03	2.70E-03	3.00E-03	71-43-2	15	0.0000078	IRIS
Benzo(b)fluoranthene	1.24E-10	5.68E-07	9.46E-07	9.87E-07	1.13E-06	1.06E-06	1.02E-06	1.13E-06	205-99-2	187	0.00011	CAL
Benzo(e)pyrene		1.42E-06	2.37E-06	2.47E-06	2.83E-06	2.65E-06	2.55E-06	2.83E-06	192-97-2	187		
Benzo(g,h,i)perylene		1.42E-06	2.36E-06	2.46E-06	2.82E-06	2.64E-06	2.54E-06	2.82E-06	191-24-2	187		
Biphenyl		7.25E-04	1.21E-03	1.26E-03	1.44E-03	1.35E-03	1.30E-03	1.44E-03	92-52-4	19		
Carbon Tetrachloride	1.50E-09	1.26E-04	2.09E-04	2.18E-04	2.50E-04	2.34E-04	2.26E-04	2.50E-04	56-23-5	29	0.000006	IRIS
Chlorobenzene		1.04E-04	1.73E-04	1.81E-04	2.07E-04	1.94E-04	1.87E-04	2.07E-04	108-90-7	37		
Chloroform		9.75E-05	1.62E-04	1.69E-04	1.94E-04	1.82E-04	1.75E-04	1.94E-04	67-66-3	39		
Chrysene	5.19E-11	2.37E-06	3.95E-06	4.12E-06	4.72E-06	4.43E-06	4.26E-06	4.72E-06	218-01-9	187	0.000011	CAL
Ethylbenzene	6.76E-10	1.36E-04	2.26E-04	2.36E-04	2.70E-04	2.54E-04	2.44E-04	2.70E-04	100-41-4	77	0.0000025	CAL
Ethylene Dibromide	1.81E-07	1.52E-04	2.53E-04	2.63E-04	3.02E-04	2.83E-04	2.72E-04	3.02E-04	106-93-4	80	0.0006	IRIS
Fluoranthene		3.80E-06	6.33E-06	6.60E-06	7.56E-06	7.09E-06	6.82E-06	7.56E-06	206-44-0	187		
Fluorene		1.94E-05	3.23E-05	3.37E-05	3.86E-05	3.62E-05	3.48E-05	3.86E-05	86-73-7	187		
Methanol		8.55E-03	1.43E-02	1.49E-02	1.70E-02	1.60E-02	1.54E-02	1.70E-02	67-56-1	103		
Methylene Chloride	1.36E-12	6.84E-05	1.14E-04	1.19E-04	1.36E-04	1.28E-04	1.23E-04	1.36E-04	75-09-2	116	0.00000001	IRIS
n-Hexane		3.80E-03	6.33E-03	6.60E-03	7.56E-03	7.09E-03	6.82E-03	7.56E-03	110-54-3	95		
Naphthalene	1.72E-08	2.55E-04	4.24E-04	4.42E-04	5.07E-04	4.75E-04	4.57E-04	5.07E-04	91-20-3	119	0.000034	CAL
PAH		9.20E-05	1.53E-04	1.60E-04	1.83E-04	1.72E-04	1.65E-04	1.83E-04				
Phenanthrene		3.56E-05	5.93E-05	6.18E-05	7.08E-05	6.64E-05	6.39E-05	7.08E-05	85-01-8	187		
Phenol		8.21E-05	1.37E-04	1.43E-04	1.63E-04	1.53E-04	1.47E-04	1.63E-04	108-95-2	130		
Pyrene		4.65E-06	7.75E-06	8.08E-06	9.26E-06	8.69E-06	8.36E-06	9.26E-06	129-00-0	187		
Styrene		8.07E-05	1.35E-04	1.40E-04	1.61E-04	1.51E-04	1.45E-04	1.61E-04	100-42-5	146		
Tetrachloroethane		8.48E-06	1.41E-05	1.47E-05	1.69E-05	1.58E-05	1.52E-05	1.69E-05				
Toluene		1.40E-03	2.33E-03	2.42E-03	2.78E-03	2.61E-03	2.51E-03	2.78E-03	108-88-3	152		
Vinyl Chloride	8.93E-10	5.10E-05	8.49E-05	8.86E-05	1.01E-04	9.52E-05	9.16E-05	1.01E-04	75-01-4	167	0.0000088	IRIS
Xylene		6.29E-04	1.05E-03	1.09E-03	1.25E-03	1.18E-03	1.13E-03	1.25E-03	1330-20-7	169		

[7] chronic inhalation cancer risk factors compiled by EPA, Dated May 9, 2014 (https://www.epa.gov/sites/production/files/2014-05/table1.xlsx)

Per EPA risk assessment guidelines, the upper limit of acceptable cancer risk is roughly 100 in a million. Out of all the HAPs which are to be emitted by the CHP project, formaldehyde had the highest chronic inhalation cancer risk of 4.39E-06 (or 4 in a million), or a twenty fifth (i.e. 4%) of the EPA standard. The chronic inhalation cancer risk figures calculated in Table VI. assume a continuous, 24 hour exposure to the specified HAP, at the given concentration, over a 70 year period. The formaldehyde chronic inhalation cancer risk was determined to be one twenty fifth of the EPA standard. As all the chronic inhalation cancer risk posed by each of the anticipated HAP pollutants from the CHP project falls well under the 100 in a million threshold, the cancer risk posed by the anticipated HAP emissions do not appear to be excessive.

Special Note: Ultrafine Particles (UFPs)

Although it is expected the CHP Project will emit UFPs (typically defined as particles smaller than 100 nanometers in diameter), neither EPA nor PADEP have established standards for UFPs at this time. After a review of the available literature, AMS has been unable to identify UFP emission factors for gas-burning engines, or otherwise obtain UFP emission factors from the vendor of the proposed CHP units.

Nonetheless, AMS determined that the UFP emissions from the CHP project are not expected to have a significant impact on public health or air quality. UFPs are a component of PM10 and PM2.5 criteria pollutants that, as discussed above, were subject to air modeling and analysis by AMS and AECOM. As confirmed by this analysis, PM emissions from natural gas combustion sources like the CHP units, is generally very low.

Applicable Regulatory Requirements:
SEPTA has requested to maintain the Synthetic Minor classification for SEPTA Roberts Complex. Accordingly, actual NO_x and VOC emissions from the facility will be limited to less than 25 tons per rolling 12-month period calculated monthly in the proposed plan approval. NOx and VOC emissions from each CHP unit will also be limited to 10.9 tons, and 8.2 tons per rolling 12-month period respectively. To assure compliance with these emission limits, natural gas usage for the CHP units will be collectively restricted to 573 million cubic feet ($mmft^3$) per 12-month rolling period.

In order to ensure compliance with emission limits set forth in the proposed plan approval, the SCR and OC Systems must be operated whenever its respective CHP unit is in operation. The CHP units, and associated emission control equipment must be installed, maintained, and operated in accordance with manufacturer's specifications.

Each CHP unit is subject to New Source Performance Standards (NSPS), 40 CFR Part 60, Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines. The BAT emission limits in the proposed plan approval are more stringent than the emission limits in this regulation.

Each CHP unit is also subject to the PM emission limits established by PADEP. Specifically, PM emissions from each CHP unit's exhaust stack may not exceed 0.04 grain per dry standard cubic foot. See 25 Pa. Code §123.13(c)(1).

25 Pa. Code §§ 129.203-205 require the purchase of allowances for NOx emissions from internal combustion sources in excess of 3.0 g/bhp-hr that occur from May 1 through September 30 annually. The CHP units will have 0.2 g NOx / bhp-hr emission limit as provided in the proposed plan approval. Accordingly, no such NOx allowances will be required if the CHP units are operated in compliance with the 0.2 g NOx / bhp-hr emission limit.

Testing Requirements:

Pursuant to the proposed plan approval, SEPTA must perform initial stack tests of the CHP units to demonstrate compliance with NOx, CO, VOC, ammonia slip, and Formaldehyde emission limits, within sixty (60) days of achieving the maximum production rate but not later than 180 days after initial startup. Operating parameters for the SCR (i.e. urea injection rate) and the OC Systems (i.e. pressure drop) for each CHP unit will also be established during the initial stack tests.

Additional performance testing to demonstrate continuing compliance with NO_x, CO, HCHO, and VOC emission limits is required after 8,760 hours of CHP unit operation, or every 3 years, whichever comes first as required by NSPS, 40 CFR Part 60, Subpart JJJJ . As SEPTA projects that each CHP unit will operate up to 8,068 hours per year, a little over a year will pass between such performance testing if the CHP units are operated near or at their maximum annual capacity.

Portable analyzer tests for NOx and CO for each CHP unit will also be required every quarter to verify the installed SCR and OC Systems are functioning properly.

Monitoring and Recordkeeping Requirements:

To ensure compliance with the various requirements in the proposed plan approval, SEPTA will also be required to continuously monitor and record the SCR and OC operating parameters such as SCR urea injection rate, pressure drop across the OC, and OC inlet temperature.

Records of the various stack test results, subsequent performance testing results, portable analyzer test results, fuel usage, CHP unit operating hours and various SCR and OC parameters must be kept by SEPTA so that compliance with the facility-wide emission limitations as well as the emission limits from each CHP can be verified. The emissions from the CHP units shall be calculated on a 12-month rolling sum.