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Memorandum

To:	Caitlyn Nichols, Division of Environmental Permits New York State Department of Environmental Conservation
From:	Henry Kearney, Kevin Edwards
Date:	July 9, 2025
Re:	Rikers Island Title V—Climate Leadership and Community Protection Act Greenhouse Gas Assessment
cc:	Sheveta Sharma/AKRF

INTRODUCTION

In July of 2019, New York State enacted the Climate Leadership and Community Protection Act (CLCPA). Among other requirements, the CLCPA directs state agencies to determine if their decisions are consistent with the Statewide greenhouse gas (GHG) emission limits established by the CLCPA in Environmental Conservation Law (ECL) Article 75. On December 14, 2022, NYSDEC issued guidance for determining if a permitting action requires an analysis to determine consistency with the CLCPA (The Climate Leadership and Community Protection Act and Air Permit Applications New York State Department of Environmental Conservation, DAR-21). Applicable permit actions would include new Title V and Air State Facility (ASF) permits, modifications to existing Title V and ASF permits, renewals of existing Title V and ASK permits, and Air Facility Registrations where NYSDEC determines an analysis is necessary or appropriate to ensure consistency with CLCPA.

METHODOLOGY

POLLUTANTS OF CONCERN

GHGs are those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere, and clouds. The general warming of the Earth's atmosphere caused by this phenomenon is known as the "greenhouse effect." The United States Environmental Protection Agency (EPA) identifies seven types of GHGs that are relevant for GHG inventory purposes: carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), nitrogen trifluoride (NF_3), and sulfur hexafluoride (SF_6). There are no significant direct or indirect sources of HFCs, PFCs, NF_3, or SF_6 associated with the facility; therefore, the GHG assessment of the facility focuses on CO_2, N_2O, and methane.

To present a complete inventory of all GHGs, component emissions are added together and presented as CO_2e emissions—a unit representing the quantity of each GHG weighted by its effectiveness using CO_2 as a reference. This is achieved by multiplying the quantity of each GHG emitted by a factor called global warming potential (GWP). GWPs account for the lifetime and the radiative forcing[1] of each chemical over a period of 20 years (e.g., CO_2 has a much shorter atmospheric lifetime than SF_6, and therefore has a much lower GWP). The GWPs for the main GHGs discussed here are presented in **Table 1**.

Table 1
Global Warming Potential (GWP) for Major GHGs

Greenhouse Gas	20-year Horizon GWP
Carbon Dioxide (CO_2)	1
Methane (CH_4)	84
Nitrous Oxide (N_2O)	264
Source: 6 NYCRR 496.5	

STATEWIDE GHG INVENTORY AND EMISSION LIMITS

As part of the adopted 6 NYCRR Part 496 in 2020, the New York State Energy Research and Development Authority (NYSERDA) developed the 1990 baseline GHG emissions for New York State consistent with the calculation requirements specified under the CLCPA. The statewide inventory was separated into four sectors across the statewide and included:

1. Energy Sector—This sector includes direct fuel combustion within the state (associated with building fuel usage, vehicle travel, and electricity generation), fugitive emissions within the state (associated with emission released during production and transportation of fuels), electricity transmission (associated with the leakage of GHGs during the manufacture, use, and disposal of equipment used in the transmission and distribution of electricity), fuels imported into the state (associated with emissions from out of state industrial production and transportation), and electricity imported into the state (associated with emissions from generation and transmission).
2. Industrial Processes and Product Use—This sector includes emissions from the manufacturing process or from a manufactured product and are separate from the combustion of fossil fuels by industries, which is accounted for in the Energy sector.
3. Agriculture Forestry and Other Land Use—This sector includes emission sources associated with land management relating to livestock, land use, and other aggregated sources.
4. Waste—This sector includes emissions associated with solid waste disposal, biological treatment of solid waste, waste combustion, and wastewater treatment.

The GHG inventory performed by NYSERDA determined a statewide 1990 annual baseline emission total of 409.78 million metric tons (MMT) of CO_2e. Subsequently, this established the statewide annual CO_2e emission limits for 2030 and 2050 as 245.87 MMT and 61.47 MMT, respectively.

FACILITY SOURCES

NYCDOC operates a facility on Rikers Island to generate electricity for various uses on the island, as well as to generate steam for heating, hot water and for other process uses such as the on-site laundry. The proposed modifications to the Rikers Island Title V would not involve any physical modifications to the existing installed equipment at the facility or the installation of additional equipment. Therefore, under the modified permit the Rikers Island facility would continue to consist of:

[1] *Radiative forcing* is a measure of the influence a gas has in altering the balance of incoming and outgoing energy in the Earth-atmosphere system and is an index of the importance of the gas as a GHG.

- Eight (8) 96 MMBtu/hr boilers firing primarily natural gas or Number 2 Fuel Oil as backup fuel;
- Two (2) 7.5 megawatt (MW) natural gas-fired combustion turbines equipped with a heat recovery steam generator (HRSG) that can be operated with a supplemental natural gas-fired duct burner in tandem;
- Nineteen (19) diesel-fired internal combustion engines which, under the expired Title V permit had the option to enroll in a peak load management (PLM);
- One (1) spray booth; and
- Thirty-seven (37) diesel-fired emergency generator engines with a combined maximum generating capacity of 18 MW.

During periods of peak steam demand on Rikers Island, or when one or both of the combustion turbines are undergoing maintenance, the existing boilers are needed to supply steam. Under the existing Title V permit, the boilers cannot be operated as needed due to annual emission limits, especially during short-term periods of peak demand or combustion turbine maintenance conditions. For this reason, modifications to the Rikers Island facility's Title V air permit have been proposed to ensure that the facility has additional operating flexibility, and to operate in compliance with the applicable regulations and permit conditions. These conditions include allowing the facility to operate the eight existing boilers as needed during periods of peak steam demand or when the combustion turbines are undergoing maintenance.

The operation of the facility's boilers and combustion turbines would be unchanged from current operations. In order to accurately reflect the operation of these pieces of equipment, the proposed permit modifications would revise the annual limit on NO_x emissions for the combustion turbines to 52 tpy (from the 42 tpy under the current Title V Permit) and would remove the annual limit on NO_x emissions for the boilers.

Of the nineteen engines, five have not undergone stack testing to show compliance with the NO_x RACT requirements. Four of the fourteen engines would no longer be eligible to operate under the PLM program due to the potential for exceedances of the 1-hour average nitrogen dioxide (NO_2) National Ambient Air Quality Standards (NAAQS). Furthermore, to ensure compliance with the 1-hour NO_2 NAAQS, the remaining engines would be operated at lower peak capacities. While the Title V Permit does not revise the NO_x emission cap associated with the PLM engines, this would lower the peak generating capacity of the engines when used in a PLM program from 19,765 kilowatts (kW) across nineteen engines to 5,223 kW across ten engines under the proposed permit modifications—a reduction of approximately 73 percent.

Under a PLM program, on-site electrical generation is performed to reduce the peak demand on the electric grid during periods where demand is expected to exceed generation capacity of the electrical grid. The frequency and duration of peak demand events is not dependent on the facility's generation capacity; therefore, the number of hours that the engines would be eligible to participate a PLM program is not anticipated to increase and GHG emissions would likely decrease by a similar amount as the facility's peak PLM generation capacity. This reduction is also anticipated for co-pollutants and would have direct benefits associated with short-term air quality conditions within close proximity to the facility. However, estimates of the facility's GHG emissions on a potential to emit basis assumes that annual generation would remain unchanged, since the annual limit on NO_x emissions to 22.5 tons per year (tpy) would remain unchanged under the proposed Title V permit modifications.

Each of the 37 emergency engines are assumed to operate for 500 hours per year to estimate the facility's total PTE and 52 hours per year to estimate annual emissions.

The facility's electricity consumption would not be affected by the proposed permit modifications; therefore, the facility emissions did not include estimates of emissions associated with in-state fossil-fuel fired electrical generation sources (including upstream emissions), in-state electricity transmission, and imported electricity.

FACILITY EMISSIONS

Direct Emissions

As a result of the proposed permit modifications, the permitted NO_x potential to emit (PTE) from the facility would increase due to modification of the permit conditions for emission limits for combustion turbines and boiler units to reflect the current equipment usage. Under the revised annual PTE limit on NO_x emissions, the combustion turbines are estimated to use 1,929,598,441 standard cubic feet (scf) of natural gas per year. With the removal of the annual PTE limit on NO_x and PM_{10} emissions, the boilers would be permitted to operate at full load throughout the year with no limitation on fuel type. Under these conditions, the boilers are estimated to use up to 6,557,192,982scf when burning natural gas, or 48,751,304 gallons when burning No. 2 fuel oil (increased from the calculated maximum of 178,687,459 scf when burning natural gas or 1,277,311 gallons when burning No. 2 fuel oil under the existing permitted annual limit on NO_x and PM_{10} emissions) per year. In order to estimate the maximum PTE for the facility, GHG emissions were calculated for both the maximum natural gas and maximum No. 2 fuel oil (including upstream emissions discussed below) and the higher value was used. In addition, the PLM engines are anticipated to use up to 277,530 gallons of No. 2 fuel oil and the emergency generators are anticipated to use up to 622,268 gallons of No. 2 fuel oil. To estimate GHG emissions from the facility, these quantities of fuel were multiplied by emission factors of 54.55 grams CO_2e per standard cubic feet of natural gas and 10.27 kilograms CO_2e per gallon of diesel fuel (No. 2 fuel oil) taken from EPA Emission Factors for Greenhouse Gas Inventories for stationary combustion.[2] These emissions correlate to direct fuel combustion under the Energy Sector of the 1990 baseline GHG Inventory.

However, actual GHG emissions are much lower since the combustion turbines are designed to meet the steam demands of Rikers Island under most conditions, and the facility's boilers are only used to provide steam during periods of peak steam demand or when the combustion turbines are undergoing maintenance, and under such conditions are not operated at maximum load. Based on annual fuel consumption records from 2017 through 2019 by equipment and fuel type, the combustion turbines and HRSG consumed a annual maximum of 678,792,593 scf of natural gas per year—approximately 35 percent of the maximum potential annual fuel consumption estimated to represent turbines operating at the proposed 52 tpy NO_x emissions limit. Similarly, the boilers were reported to consume annual maximums of 748,330,000 scf of natural gas per year and 305,350 gallons of No. 2 fuel oil per year (approximately 11 and 1 percent of the estimated maximum potential annual fuel consumption for natural gas and No. 2 fuel oil, respectively, under the proposed permit modifications). Engines participating in the PLM Program consumed 31,952 gallons of No. 2 fuel oil (approximately 12 percent of the annual fuel consumption under the current NO_x PTE permit conditions). Lastly, emergency generators were estimated to consume approximately 64,716gallons of No. 2 fuel oil (approximately 10 percent of the estimated maximum potential annual fuel consumption).

As discussed above, the operation of the facility's boilers and combustion turbines would be unchanged from current operations and the proposed elimination of the NO_x emission limit for the boilers and increase in the NO_x PTE would not correspond to an increase in actual emissions of GHG. However, while the annual NO_x emissions limit for the PLM engines would remain unchanged, the facility would operate fewer engines and at reduced peak capacities under the proposed permit modifications. Therefore, the actual GHG emissions from the facility's combustion sources were conservatively calculated based on these annual fuel consumption records. Reductions in actual GHG emissions associated with the reduced peak capacities of the PLM engines were estimated by scaling the reported fuel consumption associated with the PLM engines by the decrease in peak generating capacity.

[2] EPA. Emission Factors for Greenhouse Gas Inventories. January 15, 2025.

Upstream Emissions

Upstream emissions were projected for the annual fuel consumed on site. Upstream emission factors for natural gas and diesel fuel have been specified by NYSDEC for upstream and out-of-state emission.[3] Fuel deliveries may originate from either in-state or out-of-state sources; therefore, portions of the facility's upstream emissions would correlate to the Industrial Processes and Product Use Sector as fuel production emissions. The remaining portion would correlate to the Energy Sector as either direct fuel combustion associated with in-state vehicle travel, fugitive emissions occurring within the state, as well as out-of-state emissions associated with the production and transport of imported fuel.

GREENHOUSE GAS EMISSIONS

The maximum potential fuel consumption, usage, emission factors, and resulting GHG emissions for the combustion sources under the existing and proposed permit modifications for the Rikers Island facility are presented in **Tables 2** and **3**, respectively. Under the proposed permit modifications, the GHG PTE the Rikers Island facility would increase from approximately 216 to 857 thousand metric tons of CO2e per year.

Table 2
Current Permitted Annual PTE GHG Emissions from Fuel Consumption

Type	Maximum Potential Annual Usage	Category	Emission Factors			PTE Emissions (metric tons CO_2e/year) (1)
			CO_2	CH_4	N_2O	
Natural Gas	1,929,598,441 scf	Direct(2)	53,060 g/MMBtu	1.00 g/MMBtu	0.10 g/MMBtu	105,265
		Upstream(3)	12,549 g/MMBtu	337 g/MMBtu	0.140 g/MMBtu	80,961
					Natural Gas Total	**186,226**
Distillate Fuel Oil No. 2	2,178,876 gallons	Direct(2)	73,960 g/MMBtu	3.00 g/MMBtu	0.60 g/MMBtu	22,367
		Upstream(3)	13,634 g/MMBtu	117 g/MMBtu	0.250 g/MMBtu	7,075
					Distillate Fuel Total	**29,442**
					Facility Total	**215,668**

Notes:
scf—standard cubic feet
g—grams
kg—kilograms
MWh—megawatt-hour
MMBtu—million British thermal units

(1) PTE GHG emissions were calculated assuming the facility's dual-fuel boilers would operate exclusively on Distillate Fuel Oil No 2.
(2) Direct emission factors for natural gas and diesel fuel (No. 2 fuel oil) consumption taken from EPA Emission Factors for Greenhouse Gas Inventories for stationary combustion (https://www.epa.gov/system/files/documents/2025-01/ghg-emission-factors-hub-2025.pdf).
(3) Upstream emission factors for natural gas and diesel/distillate fuel (No. 2 fuel oil) specified by NYSDEC, *Appendix A of the 2024 Statewide GHG Emission Report. December 2024*.

[3] NYSDEC. Appendix A of the 2024 Statewide GHG Emission Report. December 2024

Table 3
Proposed Facility Annual PTE GHG Emissions from Fuel Consumption

Type	Maximum Potential Annual Usage	Category	Emission Factors			PTE Emissions (metric tons CO_2e/year) (1)
			CO_2	CH_4	N_2O	
Natural Gas	1,929,598,441 scf	Direct(2)	53,060 g/MMBtu	1.00 g/MMBtu	0.10 g/MMBtu	105,265
		Upstream(3)	12,549 g/MMBtu	337 g/MMBtu	0.140 g/MMBtu	80,961
					Natural Gas Total	**186,226**
Distillate Fuel Oil No. 2	49,652,870 gallons	Direct(2)	73,960 g/MMBtu	3.00 g/MMBtu	0.60 g/MMBtu	509,715
		Upstream(3)	13,634 g/MMBtu	117 g/MMBtu	0.250 g/MMBtu	161,216
					Distillate Fuel Total	**670,931**
					Facility Total	**857,156**

Notes:
scf—standard cubic feet
g—grams
kg—kilograms
MWh—megawatt-hour
MMBtu—million British thermal units

(1) PTE GHG emissions were calculated assuming the facility's dual-fuel boilers would operate exclusively on Distillate Fuel Oil No 2.
(2) Direct emission factors for natural gas and diesel fuel (No. 2 fuel oil) consumption taken from EPA Emission Factors for Greenhouse Gas Inventories for stationary combustion (https://www.epa.gov/system/files/documents/2025-01/ghg-emission-factors-hub-2025.pdf).
(3) Upstream emission factors for natural gas and diesel/distillate fuel (No. 2 fuel oil) specified by NYSDEC, *Appendix A of the 2024 Statewide GHG Emission Report. December 2024*.

The maximum actual annual fuel consumption, usage, emission factors, and resulting GHG emissions for the combustion sources under the existing and proposed permit modifications for the Rikers Island facility are presented in **Table 4.**

Table 4
Existing & Proposed Facility
Actual Annual GHG Emissions from Fuel Consumption

Type	Annual Usage	Category	Emission Factors			Emissions (metric tons CO_2e/year)
			CO_2	CH_4	N_2O	
Natural Gas	1,427,122,593 scf	Direct(1)	53,060 g/MMBtu	1.00 g/MMBtu	0.10 g/MMBtu	77,854
		Upstream(2)	12,549 g/MMBtu	337 g/MMBtu	0.140 g/MMBtu	59,878
					Natural Gas Total	**137,732**
Distillate Fuel Oil No. 2	403,785 gallons	Direct(1)	73,960 g/MMBtu	3.00 g/MMBtu	0.60 g/MMBtu	4,145
		Upstream(2)	13,634 g/MMBtu	117 g/MMBtu	0.250 g/MMBtu	1,311
					Distillate Fuel Total	**5,456**
					Facility Total	**143,188**(3)

Notes:
scf—standard cubic feet
g—grams
kg—kilograms
MWh—megawatt-hour
MMBtu—million British thermal units

(1) Direct emission factors for natural gas and diesel fuel (No. 2 fuel oil) consumption taken from EPA Emission Factors for Greenhouse Gas Inventories for stationary combustion (https://www.epa.gov/system/files/documents/2025-01/ghg-emission-factors-hub-2025.pdf).
(2) Upstream emission factors for natural gas and diesel/distillate fuel (No. 2 fuel oil) specified by NYSDEC, Appendix A of the *2024 Statewide GHG Emission Report*. December 2024.
(3) Due to the reduced generating capacity of the diesel-fired internal combustion engines within the PLM Program under the proposed permit modifications, emissions from these engines are expected to be reduced by 239 metric ton CO_2e per year.

As discussed above, the facility would limit the total generation capacity from the diesel-fired internal combustion engines within the PLM Program under the proposed permit modifications. This would reduce the generating capacity from 19,765 kW across the fourteen eligible engines currently being used to a total generating capacity of 5,233 kW for the remaining ten engines—a 73 percent reduction. Therefore, estimated actual GHG emissions associated with operation of the PLM engines at the reduced peak capacities were assumed to be similarly reduced by 73 percent compared to the equipment operating records from 2017 through 2019. This would represent reduction of 239 metric tons per year and would reduce the annual facility emissions by less than 1 percent.

The facility's electricity consumption would not be affected by the proposed permit modifications; therefore, the facility emissions did not include estimates of emissions the facility's electrical consumption. Electrical demand at the facility is offset by the operation of the cogeneration plant as well as the PLM engines during peak load events. This would minimize demand on the region's electrical power grid and allow for increased reliability across the power grid.

Furthermore, both New York City and New York State have enacted policies to achieve an electric grid that is powered by 100 percent renewable sources. Therefore, emissions associated with the facility's electrical consumption (net of the power generated by the cogeneration plant) would decrease over time as this goal is achieved.

The proposed permit modifications would also increase the facility's PTE for co-pollutants (see **Table 5**). However, as mentioned earlier, the operation of the facility's boilers and combustion turbines would be unchanged from current operations, and modifications to the permit are proposed in order to accurately reflect the current operation of this equipment. The facility's anticipated emissions of co-pollutants based on annual fuel consumption records from 2017 through 2019 by equipment and fuel type are shown in

Table 6. While the proposed permit modification does not revise the NO_x emission cap associated with the PLM engines, the modifications would lower the peak generating capacity of the engines when used in a PLM program to avoid the potential for air quality impacts to a maximum total of 5,223 kW across ten engines. Subsequently, the emissions of co-pollutants from the PLM engines are anticipated to be reduced by a similar amount (up to 62 percent).

Table 5
Proposed Facility Annual Co-Pollutants PTE (tpy)

Pollutants	Permitted Emission Sources							Facility Total
	U-00001 (Boilers)	U-00002 (Boilers)	U-00003 (Boilers)	U-00009 (Spray Booth)	U-00010 (PLM Engines)	U-00011 (Turbines)	Emergency Generators	
NO_x	134.6	67.3	67.3	-	22.5	52.0	126.2	469.8
CO	137.2	68.6	68.6	-	10.6	59.8	40.6	386.4
VOC	9.0	4.5	4.5	2.5	1.2	3.3	6.1	31.2
SO_2	2.6	1.3	1.3	-	3.1	2.6	2.8	13.7
PM_{10}	29.0	14.5	14.5	-	1.3	1.1	4.9	65.3
$PM_{2.5}$	26.0	13.0	13.0	-	1.3	1.1	4.8	33.2
Total HAPS	3.08	1.54	1.54	-	0.02	0.31	0.06	7.3

Table 6
Proposed Facility Annual Co-Pollutants Actual Emissions (tpy)

Pollutants	Permitted Emission Sources							Facility Total
	U-00001 (Boilers)	U-00002 (Boilers)	U-00003 (Boilers)	U-00009 (Spray Booth)	U-00010 (PLM Engines)	U-00011 (Turbines)	Emergency Generators	
NO_x	28.5	7.4	6.0	-	6.0	18.4	13.1	79.4
CO	28.6	7.2	5.9	-	2.8	21.1	4.2	69.8
VOC	1.9	0.5	0.4	2.5	0.3	1.2	0.6	7.4
SO_2	0.2	0.1	<0.1	-	0.8	0.9	0.3	2.4
PM_{10}	2.8	0.8	0.6	-	0.4	0.4	0.5	5.4
$PM_{2.5}$	2.7	0.7	0.6	-	0.4	0.4	0.5	5.3
Total HAPS	0.63	0.16	0.13	-	<0.01	0.10	<0.01	1.03

ALTERNATIVES/MITIGATION

Under the proposed permit modifications, GHG PTE the Rikers Island facility would increase from approximately 216 to 857 thousand metric tons of CO2e per year. However, the proposed modifications to the Rikers Island Title V would not involve any physical modifications to the existing installed equipment at the facility or the installation of additional equipment. The operation of the facility's boilers, combustion turbines and emergency generators would be unchanged from current operations. Consequently, the increase in the facility's GHG emissions on a PTE basis would not result in increased emissions of GHG on an actual annual basis. Actual conditions under the proposed permit modifications would result in GHG emissions well below the facility's PTE during facility operations. Based on annual fuel consumption reports, the actual CO_2 emissions from the facility are estimated to be approximately 143 thousand metric tons of CO_2e per year—approximately 17 percent of the facility's total PTE and would be reduced by 2 thousand metric tons per year due the proposed permit modifications for the PLM engines. Similarly, emissions of co-pollutants at the facility would increase on a PTE basis but would result in reduction of actual emissions due to the proposed permit modifications. In addition, an analysis of co-pollutants emissions was performed and determined there would be no adverse air quality impacts at modeled receptor

locations. Nevertheless, potential alternative and mitigation measures were considered to further reduce actual emissions of GHG and co-pollutants from the facility.

Operation of the existing combustion turbines and boilers are necessary in order to provide reliable power supply as well as heating and cooling to the population and buildings on Rikers Island. Due to the isolated nature of the buildings and the physical limitations to power supply infrastructure, the existing combustion turbines and boilers are also critical to provide this power through on-site generation. The combustion turbines and HRSG systems were designed to reduce dependence on both utility power and reduce usage of older boilers at the facility. The system utilizes waste heat for heating and cooling, which allows the facility to operate more efficiently and reduces the amount of required fuel for steam generation from the facility's boilers. Mitigation measures to reduce GHG emissions associated with these units in the short-term would not be reasonable or practicable to meet the critical heating and power needs of Rikers Island to construct additional power transmission infrastructure to provide a reliable power supply. However, long-term planning for the Rikers Island facility will likely consider further measures to reduce emissions alongside the City's plan to relocate the Rikers Island population to other DOC facilities.

On-site power generation reduces the electric load that is typically supplied by existing power plants, helping to manage peak electricity usage, particularly during the summer months, where a portion of the power generated during peak periods is from older, more polluting and less efficient fossil fuel power plants. On-site power production also reduces losses that occur when electricity is transmitted and distributed over long distances. Therefore, operation of the combustion turbines and HRSG at the facility ensures reduced reliance on the electrical grid as well the need for additional reliance on steam from the facility's boilers. This results in reduced GHG and co-pollutants emissions compared to the existing electrical grid, and ensures the facility is able to resiliently provide the critical functions that are needed to Rikers Island.

In addition, the facility would reduce peak capacity of the PLM engines under the proposed permit modifications. Under the PLM Program, on-site electrical generation is performed to reduce the peak demand on the electric grid during periods where demand is expected to exceed generation capacity of the electrical grid. The frequency and duration of peak demand events is not dependent on the facility's generation capacity; therefore, the number of hours that the engines would be required to operate under the PLM Program is not anticipated to increase. This is anticipated to result in partial mitigation of GHG emissions and would likely decrease emissions from PLM engines by approximately 73 percent and up to 63 percent of co-pollutant emissions.

The Rikers Island buildings are also subject to the New York City carbon intensity requirements of Local Law 97 (LL97). As City-owned buildings, they are not required to meet the carbon intensity limits by occupancy group, and in place of the carbon intensity limits specified in LL97 the Department of Correction may instead ensure that the specific energy conservation measures (ECMs) are implemented to reduce energy consumption, where applicable.

The Department of Correction has already begun implementing several of the ECMs at the facility. This includes ensuring that all pipes for heat and hot water services are insulated to prevent heat losses in the system, replacing/repairing all steam traps such that all are in working order, and upgrading lighting fixtures throughout the facility. While work is currently ongoing, approximately 50 percent of all pipes have been insulated, 40 percent of all steam traps have been either replaced or repairs, and 80 percent of inefficient lighting at the facility have been upgraded with LED technology and controls where feasible. Additionally, the facility has upgraded most of their domestic heat water heaters to prevent leakage, and reduce heat loss.

The remaining ECMs specified under LL97 and applicable to the Rikers Island facility requirements under the New York City Building Code and operational constraints includes:

1. Adjusting temperature set points for heat and hot water to reflect appropriate space occupancy and facility requirements;
2. Repairing all heating system leaks;

3. Maintaining the heating system, including but not limited to ensuring that system component parts are clean and in good operating condition;
4. Insulating the steam system condensate tank or water tank;
5. Installing indoor and outdoor heating system sensors and boiler controls to allow for proper set-points;
6. Installing or upgrading steam system master venting at the ends of mains, large horizontal pipes, and tops of risers, vertical pipes branching off a main; and
7. Weatherizing and air sealing where appropriate, including windows and ductwork, with focus on whole-building insulation.

The Department of Correction will continue to implement the ECMs consistent with the requirements under LL97.

CONCLUSIONS

As discussed above, the Rikers Island facility would have a PTE of approximately 857 thousand metric tons of CO2e per year and estimated actual emissions of approximately 143 thousand metric tons of CO2e per year. While PTE emissions would increase under the proposed modifications to the existing Title V permit, the actual emissions from the facility would slightly decrease (less than 1 percent) with the inclusion of new limitations on the peak capacity the equipment would be allowed to be run at during operation of the PLM engines.

While there are currently no feasible or practicable measures to further reduce GHG emissions at the Rikers Island facility that would provide reliable heat and power to the Island, the facility has implemented several projects since 1990 in order to reduce GHG emissions and increase energy efficiency. These measures include the elimination of No. 6 fuel oil, installation of an on-site cogeneration plant and improved energy efficiency of the system. Furthermore, the Department of Correction is required to demonstrate the facility has implemented all applicable ECMs that are specified for City-owned buildings or compliance with New York City's carbon intensity limits for all buildings.

Therefore, the GHG emissions associated with the facility under the proposed permit modifications are consistent with the emission reduction goals of the CLCPA and would not interfere with achieving the Statewide GHG emission limits of the CLCPA.

NYC-DOC-Rikers Island
Facility Emission Calculations
Existing Potential To Emit

	Potential Fuel Consumption			Potential Direct Emissions		
Equipment	Residual Fuel Oil (1000 gal)	Distillate Fuel Oil (1000 gal)	NG (MMSCF)	Residual Fuel Oil (metric ton)	Distillate Fuel Oil (metric ton)	NG (metric ton)
Boilers	-	1,277.31	178.69	-	13,112.31	9,747.92
PLM Engines	-	277.53	-	-	2,849.00	-
Turbines	-	1.77	1,929.60	-	18.15	105,265.23
Emergency Generators	-	622.27	-	-	6,387.93	-
The maximum PTE emissions for the dual-fuel boilers were determined as the maximum of emissions associated with fuel usage						

Facility PTE Fuel Consumption

	Distillate Fuel Oil (gal)	NG (scf)
Boilers on Oil	2,178,876	1,929,598,441
Boilers on NG	901,565	2,108,285,900

Distillate Fuel Oil (metric ton)	NG (metric ton)
22,367	105,265
9,255	115,013

Upstream Emissions		
Residual Fuel Oil (metric ton)	Distillate Fuel Oil (metric ton)	NG (metric ton)
-	4,147.25	7,497.23
-	901.10	-
-	5.74	80,960.55
-	2,020.42	-

Upstream Emissions

	Distillate Fuel Oil (metric ton)	NG (metric ton)	Total
Boilers on Oil	7,075	80,961	**88,035**
Boilers on NG	2,927	88,458	**91,385**

Total Emissions		
Residual Fuel Oil (metric ton)	Distillate Fuel Oil (metric ton)	NG (metric ton)
-	17,259.57	17,245.15
-	3,750.10	-
-	23.88	186,225.78
-	8,408.34	-

Total Emissions

	Distillate Fuel Oil (metric ton)	NG (metric ton)	Total
Boilers on Oil	29,442	186,226	**215,668**
Boilers on NG	12,182	203,471	**215,653**

NYC-DOC-Rikers Island
Facility Emission Calculations
Future Potential To Emit

	Potential Fuel Consumption			Potential Direct Emissions		
Equipment	Residual Fuel Oil (1000 gal)	Distillate Fuel Oil (1000 gal)	NG (MMSCF)	Residual Fuel Oil (metric ton)	Distillate Fuel Oil (metric ton)	NG (metric ton)
Boilers	-	48,751.30	6,557.19	-	500,459.44	357,714.02
PLM Engines	-	277.53	-	-	2,849.00	-
Turbines	-	1.77	1,929.60	-	18.15	105,265.23
Emergency Generators	-	622.27	-	-	6,387.93	-
The maximum PTE emissions for the dual-fuel boilers were determined as the maximum of emissions associated with fuel usage						

Facility PTE Fuel Consumption

	Distillate Fuel Oil (gal)	NG (scf)
Boilers on Oil	49,652,870	1,929,598,441
Boilers on NG	901,565	8,486,791,423

Distillate Fuel Oil (metric ton)	NG (metric ton)	Total
509,715	105,265	**614,980**
9,255	462,979	**472,234**

Upstream Emissions		
Residual Fuel Oil (metric ton)	Distillate Fuel Oil (metric ton)	NG (metric ton)
-	158,288.86	275,121.48
-	901.10	-
-	5.74	80,960.55
-	2,020.42	-

Upstream Emissions

	Distillate Fuel Oil (metric ton)	NG (metric ton)	Total
Boilers on Oil	161,216	80,961	**242,177**
Boilers on NG	2,927	356,082	**359,009**

Total Emissions		
Residual Fuel Oil (metric ton)	Distillate Fuel Oil (metric ton)	NG (metric ton)
-	658,748.29	632,835.50
-	3,750.10	-
-	23.88	186,225.78
-	8,408.34	-

Total Emissions

	Distillate Fuel Oil (metric ton)	NG (metric ton)	Total
Boilers on Oil	670,931	186,226	**857,156**
Boilers on NG	12,182	819,061	**831,244**

	Potential Co-Pollutants Emissions (tons/year)							
Pollutant	U-00001 (Boilers)	U-00002 (Boilers)	U-00003 (Boilers)	U-00009 (Spray Booth) (1)	U-00010 (PLM Engines)	U-00011 (Cogeneration Plant)	Emergency Generators	Total
NOx	134.6	67.3	67.3	-	22.5	52.0	126.2	**469.8**
CO	137.7	68.9	68.9	-	10.6	59.8	40.6	**386.4**
VOC	9.0	4.5	4.5	2.5	1.2	3.3	6.1	**31.2**
SO2	2.6	1.3	1.3	-	3.1	2.6	2.8	**13.7**
PM10	29.0	14.5	14.5	-	1.3	1.1	4.9	**65.3**
PM2.5	26.0	13.0	13.0	-	1.3	1.1	4.8	**33.2**

1. PTE emission rate obtained from the latest Title V permit. There are no emissions from the other pollutants.

NYC-DOC-Rikers Island
Facility Emission Calculations
Actual Emissions

	Fuel Consumption			Direct Emissions			
Equipment	Residual Fuel Oil (1000 gal)	Distillate Fuel Oil (1000 gal)	NG (MMSCF)	Residual Fuel Oil (metric ton)	Distillate Fuel Oil (metric ton)	NG (metric ton)	Total
Boilers	-	305.35	748.33	-	3,135	40,824	43,958.18
PLM Engines	-	31.95	-	-	328	-	328.01
Turbines	-	1.77	678.79	-	18	37,030	37,048.26
Emergency Generators	-	64.72	-	-	664	-	664.34
Total	**-**	**403.79**	**1,427.12**	**-**	**4,145**	**77,854**	**81,998.79**
1990 Boilers	*12,828.94*	*1,718.20*	*-*	*145,371.89*	*17,638.25*	*-*	*163,010.15*

	Distillate Fuel Oil (gal)		NG (scf)	
	305,350	1%	748,330,000	11%
239.44	31,952	12%	-	
	1,768	100%	678,792,593	35%
	64,716	10%	-	

	Upstream Emissions			
	Residual Fuel Oil (metric ton)	Distillate Fuel Oil (metric ton)	NG (metric ton)	Total
Boilers	-	991	31,398	32,389.26
PLM Engines	-	104	-	103.74
Turbines	-	6	28,480	28,485.98
Emergency Generators	-	210	-	210.12
Total	**-**	**1,311**	**59,878**	**61,189.11**
1990 Boilers	*37,285.80*	*5,578.75*	*-*	*42,864.55*

	Total Emissions					
	Residual Fuel Oil (metric ton)	Distillate Fuel Oil (metric ton)	NG (metric ton)	Total	Maximum PTE Total	Facility Utilization
Boilers	-	4,126	72,221	76,347	658,748	12%
PLM Engines	-	432	-	432	3,750	12%
Turbines	-	24	65,510	65,534	186,250	35%
Emergency Generators	-	874	-	874	8,408	10%
Total	**-**	**5,456**	**137,732**	**143,188**	**848,748**	**17%**
	PTE	**670,931**	**186,226**	**857,156**		
		1%	74%	17%		

	Actual Co-Pollutants Emissions (tons/year)							
Pollutant	U-00001 (Boilers)	U-00002 (Boilers)	U-00003 (Boilers)	U-00009 (Spray Booth) (1)	U-00010 (PLM Engines)	U-00011 (Cogeneration Plant)	Emergency Generators	Total
NOx	28.5	7.4	6.0	-	6.0	18.4	13.1	**79.4**
CO	28.6	7.2	5.9	-	2.8	21.1	4.2	**69.8**
VOC	1.9	0.5	0.4	2.5	0.3	1.2	0.6	**7.4**
SO2	0.2	0.06	0.05	-	0.8	0.9	0.3	**2.4**
PM10	2.8	0.8	0.6	-	0.4	0.4	0.5	**5.4**
PM2.5	2.7	0.7	0.6	-	0.4	0.4	0.5	**5.3**

1. PTE emission rate obtained from the latest Title V permit. There are no emissions from the other pollutants.

NYC-DOC-Rikers Island
Facility Fuel Usage
2017-2019

BOILERS

	Emission Unit U-00001		Emission Unit U-00002		Emission Unit U-00003		Boiler Total Fuel Consumption	
Year	Fuel Oil (1000 gal)	NG (MMSCF)	Fuel Oil (1000 gal)	NG (MMSCF)	Fuel Oil (1000 gal)	NG (MMSCF)	Fuel Oil (1000 gal)	NG (MMSCF)
2017	181.81	670.52	87.4	61.37	36.14	16.44	305.35	748.33
2018	98.17	224.51	110.44	164.29	64.73	137.64	273.34	526.45
2019	106.41	187.16	89.22	143.15	51.32	91.98	246.94	422.29
Max (2017-2019)	**181.81**	**670.52**	**110.44**	**164.29**	**64.73**	**137.64**	**305.35**	**748.33**

Combustion Turbines- Natural Gas

	Emission Unit U-00011		Turbine Fuel Consumption
Year	Turbine NG (MMSCF)	Ductburners NG (MMSCF)	NG (MMSCF)
2017	46.967	7.939	54.906
2018	571.37	37.06	608.44
2019	586.64	92.16	678.79
Max (2017-2019)	**586.64**	**92.16**	**678.79**

PLM Engines

Year	Fuel Oil (1000 gal)
2017	8.232
2018	31.952
2019	9.521
Max (2017-2019)	**31.95**

PLM Total Fuel Consumption
Fuel Oil (1000 gal)
8.232
31.952
9.521
31.95

NYC-DOC-Rikers Island
Boiler Fuel Usage
1990

BOILERS

	Boiler Total Fuel Consumption	
Year	#6 Fuel Oil (1000 gal)	#2 Fuel Oil (1000 gal)
1991	**12,829**	**1,718**

NYC-DOC-Rikers Island
Emission Unit U00001 Emission Calculations

U00001:Emission Sources: 00001, 00002, 00003, 00004

4 boilers	96	mmBtu/hr each	NG HHV:	1026	Btu/scf
	384	mmBtu/hr total firing rate	#2 Oil HHV:	138	mmBtu/1000 gal
PTE Operating hrs	8,760	hrs/yr per boiler			

PTE Fuel Usage

NG:	3,279	mmcf burned
#2 Oil:	24,376	1000 gals burned

Fuel Usage (2017-2019)

NG:	670.52	mmcf burned
#2 Oil:	181.81	1000 gals burned

	Natural Gas					#2 Oil					TOTAL				
		Actual Emissions		PTE Emissions			Actual Emissions		PTE Emissions		Actual Emissions[2]		PTE Emissions		
Pollutant	**Emission Factor (lbs/mmscf)**	**Emissions (lbs/yr)**	**Emissions (tpy)**	**Emissions (lbs/yr)**	**Emissions (tpy)**	**Emission Factor (lbs/10^3 gals)**	**Emissions (lbs/yr)**	**Emissions (tpy)**	**Emissions (lbs/yr)**	**Emissions (tpy)**	**Emissions (lbs/yr)**	**Emissions (tpy)**	**Emissions (lbs/yr)**	**Emissions (tpy)**	
NOx[1]	82.08	55,036	27.52	269,107	134.6	11.04	2,007.2	1.00	269,107.2	134.6	57,043.5	**28.5**	269,107.2	**134.6**	**Based on NOx RACT of 0.08 lb/MMBtu**
CO	84	56,324	28.16	275,402	137.7	5	909.1	0.45	121,878.3	60.9	57,232.7	**28.6**	275,402.1	**137.7**	
VOC	5.5	3,688	1.84	18,032	9.0	0.34	61.8	0.03	8,287.7	4.1	3,749.7	**1.9**	18,032.3	**9.0**	
SO2	0.6	402	0.20	1,967	1.0	0.213	38.7	0.02	5,192.0	2.6	441.0	**0.2**	5,192.0	**2.6**	
PM10	7.6	5,096	2.55	24,917	12.5	2.38	432.7	0.22	58,014.1	29.0	5,528.7	**2.8**	58,014.1	**29.0**	
PM2.5	7.6	5,096	2.55	24,917	12.5	2.13	387.3	0.19	51,920.1	26.0	5,483.2	**2.7**	51,920.1	**26.0**	

Notes:

1. NOx PTEs are based on the NOx RACT limits of 0.08 lbs/mmBtu on natural gas and #2 Oil.
CO, VOC, SO2, PM10, and PM2.5 PTEs are obtained from Federal AP-42 emission factors.
2. Annual Actual emissions are based on fuel usage estimates obtained from emission statements for 2017-2019.

Existing Permit Caps

	Emissions (tpy)	Emissions (lbs/yr)	Emission Factor (lbs/mmscf)	Fuel Consumption (mmscf/yr)
NOx	8	16000	123.12	129.95
PM10	1.1	2200	7.6	289.47

Emission Factor (lbs/10^3 gals)	Fuel Consumption (10^3 gals/yr)	
16.56	966.18	**Based on NOx RACT of 0.12 lb/MMBtu**
2.38	924.37	

NYC-DOC-Rikers Island
Emission Unit U00002 Emission Calculations

U00002:Emission Sources: 00005, 00006

2 boilers	96	mmBtu/hr each	NG HHV:	1026	Btu/scf
	192	mmBtu/hr total firing rate	#2 Oil HHV:	138	mmBtu/1000 gal
PTE Operating hrs	8,760	hrs/yr per boiler			

PTE Fuel Usage

NG:	1,639	mmcf burned
#2 Oil:	12,188	1000 gals burned

Fuel Usage (2017-2019)

NG:	164.29	mmcf burned
#2 Oil:	110.44	1000 gals burned

	Natural Gas					#2 Oil					TOTAL				
		Actual Emissions		PTE Emissions			Actual Emissions		PTE Emissions		Actual Emissions[2]		PTE Emissions		
Pollutant	**Emission Factor (lbs/mmscf)**	**Emissions (lbs/yr)**	**Emissions (tpy)**	**Emissions (lbs/yr)**	**Emissions (tpy)**	**Emission Factor (lbs/10^3 gals)**	**Emissions (lbs/yr)**	**Emissions (tpy)**	**Emissions (lbs/yr)**	**Emissions (tpy)**	**Emissions (lbs/yr)**	**Emissions (tpy)**	**Emissions (lbs/yr)**	**Emissions (tpy)**	
NOx[1]	82.08	13,485	6.74	134,554	67.3	11.04	1,219.3	0.61	134,553.6	67.3	14,704.6	**7.4**	134,553.6	**67.3**	**Based on NOx RACT of 0.08 lb/MMBtu**
CO	84	13,801	6.90	137,701	68.9	5	552.2	0.28	60,939.1	30.5	14,352.9	**7.2**	137,701.1	**68.9**	
VOC	5.5	904	0.45	9,016	4.5	0.34	37.6	0.02	4,143.9	2.1	941.2	**0.5**	9,016.1	**4.5**	
SO2	0.6	99	0.05	984	0.5	0.213	23.5	0.01	2,596.0	1.3	122.1	**0.1**	2,596.0	**1.3**	
PM10	7.6	1,249	0.62	12,459	6.2	2.38	262.9	0.13	29,007.0	14.5	1,511.5	**0.8**	29,007.0	**14.5**	
PM2.5	7.6	1,249	0.62	12,459	6.2	2.13	235.2	0.12	25,960.1	13.0	1,483.9	**0.7**	25,960.1	**13.0**	

Notes:

1. NOx PTEs are based on the NOx RACT limits of 0.08 lbs/mmBtu on natural gas and #2 Oil.
CO, VOC, SO2, PM10, and PM2.5 PTEs are obtained from Federal AP-42 emission factors.
2. Annual Actual emissions are based on fuel usage estimates obtained from emission statements for 2017-2019.

Existing Permit Caps

	Emissions (tpy)	Emissions (lbs/yr)	Emission Factor (lbs/mmscf)	Fuel Consumption (mmscf/yr)	Emission Factor (lbs/10^3 gals)	Fuel Consumption (10^3 gals/yr)	
NOx	2	4000	123.12	32.49	16.56	241.55	**Based on NOx RACT of 0.12 lb/MMBtu**
PM10	0.28	560	7.6	73.68	2.38	235.29	

NYC-DOC-Rikers Island
Emission Unit U00003 Emission Calculations

U00003:Emission Sources: 00007, 00008

2 boilers	96	mmBtu/hr each	NG HHV:	1026	Btu/scf
	192	mmBtu/hr total firing rate	#2 Oil HHV:	138	mmBtu/1000 gal
PTE Operating hrs	8,760	hrs/yr per boiler			

PTE Fuel Usage

NG:	1,639	mmcf burned
#2 Oil:	12,188	1000 gals burned

Fuel Usage (2017-2019)

NG:	137.64	mmcf burned
#2 Oil:	64.73	1000 gals burned

	Natural Gas					#2 Oil					TOTAL				
		Actual Emissions		PTE Emissions			Actual Emissions		PTE Emissions		Actual Emissions[2]		PTE Emissions		
Pollutant	**Emission Factor (lbs/mmscf)**	**Emissions (lbs/yr)**	**Emissions (tpy)**	**Emissions (lbs/yr)**	**Emissions (tpy)**	**Emission Factor (lbs/10^3 gals)**	**Emissions (lbs/yr)**	**Emissions (tpy)**	**Emissions (lbs/yr)**	**Emissions (tpy)**	**Emissions (lbs/yr)**	**Emissions (tpy)**	**Emissions (lbs/yr)**	**Emissions (tpy)**	
NOx[1]	**82.08**	11,298	5.65	134,554	67.3	**11.04**	714.6	0.36	134,553.6	67.3	12,012.4	**6.0**	134,553.6	**67.3**	**Based on NOx RACT of 0.08 lb/MMBtu**
CO	84	11,562	5.78	137,701	68.9	5	323.6	0.16	60,939.1	30.5	11,885.7	**5.9**	137,701.1	**68.9**	
VOC	5.5	757	0.38	9,016	4.5	0.34	22.0	0.01	4,143.9	2.1	779.0	**0.4**	9,016.1	**4.5**	
SO2	0.6	83	0.04	984	0.5	0.213	13.8	0.01	2,596.0	1.3	96.4	**0.0**	2,596.0	**1.3**	
PM10	7.6	1,046	0.52	12,459	6.2	2.38	154.1	0.08	29,007.0	14.5	1,200.1	**0.6**	29,007.0	**14.5**	
PM2.5	7.6	1,046	0.52	12,459	6.2	2.13	137.9	0.07	25,960.1	13.0	1,184.0	**0.6**	25,960.1	**13.0**	

Notes:

1. NOx PTEs are based on the NOx RACT limits of 0.08 lbs/mmBtu on natural gas and on #2 Oil.
CO, VOC, SO2, PM10, and PM2.5 PTEs are obtained from Federal AP-42 emission factors.
2. Annual Actual emissions are based on fuel usage estimates obtained from emission statements for 2016-2018.

Existing Permit Caps

	Emissions (tpy)	Emissions (lbs/yr)	Emission Factor (lbs/mmscf)	Fuel Consumption (mmscf/yr)	Emission Factor (lbs/10^3 gals)	Fuel Consumption (10^3 gals/yr)	
NOx	1	2000	123.12	16.24	16.56	120.77	**Based on NOx RACT of 0.12 lb/MMBtu**
PM10	0.14	280	7.6	36.84	2.38	117.65	

NYC-DOC-Rikers Island
Existing Facility Potential - to - Emit (PTE) Emission Calculations

U0009: Spray Paint Booth: Emission Source: 0000P

Pollutant	Emissions (tpy)[1]
VOC	2.5

Notes:
1. PTE emission rate obtained from the latest Title V permit. There are no emissions from the other pollutants.

U00010: 19 generators: Emission Sources: 00010, 00011, 00012, 00013, 00014, 00015, 00016, 00017, 00018, 00019, 00020, 00021, 00022, 00023, 00024, 00025, 00026, 00027, 00028.

No. of Gens.	Output (KW)	TOTAL Output (KW)
4	1100	4400
2	800	1600
3	900	2700
1	625	625
9	1150	10350

22.5 TPY NOX Permitted Condition
19675 TOTAL KW
26384.61 Total hP

Pollutant	Emission Factor (lbs/hp-hr)[1]	Emissions (lbs/hr)	Annual hrs	Emissions (lbs/yr)	Emissions (tpy)	Emissions (metric ton)	
NOx	See (a) below	309	145.54	45000	**22.5**		
CO	5.50E-03	145		21,120	**10.56**		
VOC	6.42E-04	17		2,464	**1.23**		
SO2	0.001618	43		6,213	**3.11**		
PM10	0.0007	18		2,688	**1.34**		
PM2.5	0.0007	18		2,688	**1.34**		
CO2	1.34	35,321		5,140,615	**2,570**	2833	
CH4	0.000054	1.43		209	**0.10**	0.11	
N2O	0.000011	0.29		42	**0.02**	0.02	
CO2e					**2,584.6**	2,849	
					Fuel Usage	277,530 gal	

Reduced PLM Capacity Restrictions
5,223 TOTAL KW
7003.82 Total hP

Pollutant	Emission Factor (lbs/hp-hr)[1]	Emissions (lbs/hr)	Annual hrs	Emissions (lbs/yr)	Emissions (tpy)	Emissions (metric ton)		
NOx	See (a) below	82	145.54	11,944	**6.0**			
CO	5.50E-03	39		5,606	**2.8**			
VOC	6.42E-04	4		654	**0.3**			
SO2	0.001618	11		1,649	**0.8**			
PM10	0.0007	5		714	**0.4**			
PM2.5	0.0007	5		714	**0.4**			
CO2	1.34	9,376		1,364,582	**682.3**	752		
CH4	0.000054	0		55	**0.0**	0.03		
N2O	0.000011	0		11	**0.0**	0.01		
CO2e					**686.1**	756	(2,093)	
					Fuel Usage	73,671 gal	(203,859)	-73%

Notes:
1. Criteria pollutant emission factors are from AP-42. GHG emission factors are from 40 CFR 98.

(a): PLM unit NOx lb/hr emission limits in the latest Title V permit

Source	kW	NOx Emission Factor (g/hp-hr)	Emissions (lbs/hr)	PLM Annual hrs	Emissions (lbs/yr)	Emissions (tpy)
00010	1100	7.70	25	145.54	3644.50	**1.82**
00011	1100	9.20	30	145.54	4354.47	**2.18**
00012	625	7.50	14	145.54	2016.95	**1.01**
00013	900	7.40	20	145.54	2865.69	**1.43**
00014	800	7.80	18	145.54	2684.97	**1.34**
00015	800	8.10	19	145.54	2788.24	**1.39**
00016	900	6.70	18	145.54	2594.61	**1.30**
00017	900	4.74	13	145.54	1835.59	**0.92**
00018	1100	8.88	29	145.54	4203.01	**2.10**
00019	1100	8.56	28	145.54	4051.55	**2.03**
00020	1150	6.90	23	145.54	3414.30	**1.71**
00021	1150					
00022	1150	7.00	24	145.54	3463.78	**1.73**
00023	1150					
00024	1150	7.70	26	145.54	3810.16	**1.91**
00025	1150	6.60	22	145.54	3265.85	**1.63**
00026	1150					
00027	1150					
00028	1150					
TOTAL	19675		309.15			22.50

Conversion Factor
1.102311 MT/ton

NYC-DOC-Rikers Island
PLM Engine Capacity

Engines participating in PLM Source	Permitted NOx Cap Capacity (kW)	Future Conditions Maximum Allowed under Permit Modification (kW)	
00010	1,100	715	
00011	1,100	638	
00012	625	468.75	
00013	900	540	
00014	800	200	
00015	800	200	
00016	900	0	
00017	900	0	
00018	1,100	0	
00019	1,100	0	
00020	1,150	615.25	
00021	1,150	-	NOx RACT not performed
00022	1,150	615.25	
00023	1,150	-	NOx RACT not performed
00024	1,150	615.25	
00025	1,150	615.25	
00026	1,150	-	NOx RACT not performed
00027	1,150	-	NOx RACT not performed
00028	1,150	-	NOx RACT not performed
Total	**13,925**	**5,223**	
Permitted Total	**19,675**		

NYC-DOC-Rikers Island
Cogeneration Plant Emissions
Emission Unit U00011. Emission Sources 00029,00030, 00031, 00032, and 00033.

Solar Taurus 70

Turbine Heat Input	86.4	MMBtu/hr, HHV	NG HHV:	1026 Btu/scf
Number of Turbines	2			
Total Turbine Heat Input	172.8	MMBtu/hr		
Duct Burner Heat Input	38.2	MMBtu/hr, HHV		
Number of Duct Burners	2			
Total Duct Burner Heat Input	76.4	MMBtu/hr		
Turbine + DB Operating Hours	6,100	hours/year		
Turbine only Operating Hours	2,660	hours/year		

Annual Turbine Fuel Usage	448,000,000	cf
Annual Turbine +Duct Burner fuel usage	1,481,598,441	cf

	Combustion Turbine Emissions					Combustion Turbine with Duct Burner Emissions					Blackstart Generator		Total U-00011 Emissions		
			per Turbine	PTE Emissions				per unit	PTE Emissions				PTE Emissions		
Pollutant	Emission Factor (lbs/mmbtu)	Emission Factor (lbs/mmcf)	Emissions (lbs/hr)	Emissions (lbs/yr)	Emissions (tpy)	Emission Factor (lbs/mmbtu)	Emission Factor (lbs/mmcf)	Emissions (lbs/hr)	Emissions (lbs/yr)	Emissions (tpy)	Emissions (lbs/yr)	Emissions (tpy)	Emissions (lbs/yr)	Emissions (tpy)	
Nox	0.043	43.86	3.7	19,647	9.8	0.055	56.70	6.9	84,001	42.0	312.2	0.16	103,961	51.98	
CO	0.054	55.61	4.7	24,915	12.5	0.062	63.81	7.7	94,547	47.3	100.5	0.05	119,563	59.8	
VOC	0.003	3.08	0.3	1,379	0.7	0.008	7.70	0.43	5,259	2.6	20.6	0.01	6,659	3.3	
SO2	0.0001	0.10	0.01	46	0.0	0.003	3.49	0.42	5,177	2.6	0.4	0.0002	5,223	2.6	
PM10	0.0017	1.74	0.15	781	0.4	0.0009	0.92	0.11	1,368	0.7	10.6	0.01	2,160	1.1	Stack Test Data
PM2.5	0.0017	1.74	0.15	781	0.4	0.0009	0.92	0.11	1,368	0.7	10.6	0.01	2,160	1.1	

PPM to Lbs/Mmbtu conversion

EPA Reference Method 19, Table 19-1

Fd	8,710	dscf/MMBtu
1 ppm NOx	1.194E-07	lb/dscf
1 ppm CO	7.25E-08	lb/dscf
1 ppm VOC	4.14E-08	lb/dscf

Emission factor of NOx (lb/MMBtu) =Cd*Fd*[20.9/(20.9-%O2d)]
where:
Cd = Pollutant Concentration, dry basis, 0% O2 (lb/dscf) = ppm X (ppm to lb/dscf conversion factor)
Fd = volume of combustion components per unit of heat content, 8710 dscf/MMBtu 0% O2
%O2d = Concentration of O2 in Exhaust Gas, %
NOx ppm to lb/dscf conversion factor: 1ppm NOx = 1.194E-7 lb/dscf, at 0% O2)

NYC-DOC-Rikers Island
Emergency Blackstart Engine Emission Rates

Capacity	2000	kW	22.02 mmBtu/hr
Operating Hours	12	hours/yr	
Max. Fuel Flow	147	gals/hr	
Max. Fuel Flow	1768	gals/yr	

Pollutant	Emission Factor	Units	Emissions (lbs/hr)	Emissions (lbs/yr)	Emissions (tons/yr)
NOx + NMHC[1]	5.9	g/kW-hr	26.01	312	0.16
CO	1.9	g/kW-hr	8.38	101	0.050
VOC[2]	0.00064	lb/hp-hr	1.72	21	0.010
PM10/PM2.5	0.2	g/kW-hr	0.88	11	0.0053
SO2[3]	0.000012	lb/hp-hr	0.03	0.39	0.00020
CO2	163	lbs/mmBtu	3590	43,085	21.54
CH4	0.01	lbs/mmBtu	0.15	1.75	0.00087
N2O	0.00	lbs/mmBtu	0.029	0.35	0.00017

Notes:

1. Emission factors for NOx + NMHC, CO, and PM are from manufacturer data.
PM10/PM2.5 are assumed equal to PM emissions.

2. From AP-42. TOC is by weight 9% methane and 91% nonmethane.

3. Assumes a sulfur in fuel contect of 15 ppm.

NYC-DOC-Rikers Island
Existing Emergency Generator Information

													Applicability (Y/N)		NSPS g/KW (g/HP)				AP-42				
#	ENGINE	AREA SERVED	MAKE	MODEL	RATING (HP)	RATING (KW)	# of Cylinders	Disp./cyl. (L/cyl)	MFR DATE	STATUS	Fuel	Included in Emission Calcs (Y/N)	NSPS (Y/N)	NESHAP (Y/N)	NOx	CO	PM	Reference	NOx (lb/MMBtu)	CO (lb/MMBtu)	PM10 (lb/MMBtu)	PM2.5 (lb/MMBtu)	Reference
1	47	AMKC Mod 7,8	Cummins	NTA855GS2	465	347	6	Unk	1987	Operational	Diesel	Y	N	N	N/A	N/A	N/A		4.41	0.95	0.3100	0.3100	AP-42 3.3
2	76	ASRS	Cummins	NT855G4	375	280	6	Unk	1988	Out of Service	Diesel	Y	N	N	N/A	N/A	N/A		4.41	0.95	0.3100	0.3100	AP-42 3.3
3	80	NIC	Cummins	33115833	400	298	6	Unk	1989	Operational	Diesel	Y	N	N	N/A	N/A	N/A		4.41	0.95	0.3100	0.3100	AP-42 3.3
4	AMKC	AMKC Kitchen	Cummins	VTA-28-G5	840	626	6	Unk	1994	Operational	Diesel	Y	N	N	N/A	N/A	N/A		3.20	0.85	0.0573	0.0556	AP-42 3.4
5	104	AMKC Visits	Cummins	NTA855G6	435	324	6	Unk	1990	Operational	Diesel	Y	N	N	N/A	N/A	N/A		4.41	0.95	0.3100	0.3100	AP-42 3.3
6	119	EMTC Hi Impact	Catterpillar	3516	1322	986	16	Unk	1990	Operational	Diesel	Y	N	N	N/A	N/A	N/A		3.20	0.85	0.0573	0.0556	AP-42 3.4
7	121	EMTC Hi Impact	Catterpillar	3516	1322	986	16	Unk	1990	Operational	Diesel	Y	N	N	N/A	N/A	N/A		3.20	0.85	0.0573	0.0556	AP-42 3.4
8	154	Harts Island Mod	Cummins	125DGEA	207	154	6	Unk	1994	Operational	Diesel	Y	N	N	N/A	N/A	N/A		4.41	0.95	0.3100	0.3100	AP-42 3.3
9	155	Chapel	Kohler	Detroit Series 60	400	298	6	Unk	2001	Out of Service	Diesel	Y	N	N	N/A	N/A	N/A		4.41	0.95	0.3100	0.3100	AP-42 3.3
10	156	GMDC Mod 3	Mitsubishi	56R-PTA	851	635	6	Unk	2002	Operational	Diesel	Y	N	N	N/A	N/A	N/A		3.20	0.85	0.0573	0.0556	AP-42 3.4
11	157	GMDC Mod 2	Volvo	TAD1032GE	400	298	6	Unk	2002	Operational	Diesel	Y	N	N	N/A	N/A	N/A		4.41	0.95	0.3100	0.3100	AP-42 3.3
12	161	RMSC Mod 17-20	Volvo	TAD1242GE	532	397	6	Unk	2003	Operational	Diesel	Y	N	N	N/A	N/A	N/A		4.41	0.95	0.3100	0.3100	AP-42 3.3
13	162	RNDC Mod 2,4,10	Mitsubishi	S12A-PTA	1100	820	6	Unk	2001	Operational	Diesel	Y	N	N	N/A	N/A	N/A		3.20	0.85	0.0573	0.0556	AP-42 3.4
14	164	Central Freezer	Cummins	Unk	605	451	6	Unk	2001	Operational	Diesel	Y	N	N	N/A	N/A	N/A		3.20	0.85	0.0573	0.0556	AP-42 3.4
15	165	Central Storage	Detroit Diesel	6063TK35	550	410	6	Unk	Pre-2005	Operational	Diesel	Y	N	N	N/A	N/A	N/A		4.41	0.95	0.3100	0.3100	AP-42 3.3
16	TELECOM	Telecom	Mitsubishi	Unk	1881	1403	16	<10	2008	Operational	Diesel	Y	Y	N	6.4	3.5	0.2	1039 Table 2	-	-	-	-	
17	SAM PERRY	Sam Perry	Cummins	HCEXL0540AAB	411	306	6	<10	2017	Operational	Diesel	Y	Y	N	6.4	3.5	0.2	1039 Table 2	-	-	-	-	
18	PABX	AMKC	CUMMINS	4BT39	86	64	4	Unk	1992	Operational	Diesel	Y	N	N	N/A	N/A	N/A		(4.4)	(1.0)	0.3100	0.3100	AP-42 3.3
19	PABX	EMTC	CUMMINS	4BT39	86	64	4	Unk	1992	Operational	Diesel	Y	N	N	N/A	N/A	N/A		4.41	0.95	0.3100	0.3100	AP-42 3.3
20	PABX	RSMC	CUMMINS	4BT39	86	64	4	Unk	1992	Operational	Diesel	Y	N	N	N/A	N/A	N/A		4.41	0.95	0.3100	0.3100	AP-42 3.3
21	PABX	GMDC	CUMMINS	4BT39	86	64	4	Unk	1992	Operational	Diesel	Y	N	N	N/A	N/A	N/A		4.41	0.95	0.3100	0.3100	AP-42 3.3
22	PABX	RNDC	CUMMINS	4BT39	86	64	4	Unk	1992	Operational	Diesel	Y	N	N	N/A	N/A	N/A		4.41	0.95	0.3100	0.3100	AP-42 3.3
23	EMTC	EMTC Main Bldg	Catterpillar	C9	374	279	6	Unk	Pre-2005	Operational	Diesel	Y	N	N	N/A	N/A	N/A		4.41	0.95	0.3100	0.3100	AP-42 3.3
24	AMKC	BLDG 3&4 BSMT	Unk	70DJF	94	70	N/A	Unk	1970	Operational	Diesel	Y	N	N	N/A	N/A	N/A		4.41	0.95	0.3100	0.3100	AP-42 3.3
25	AMKC	KC#1 PERM-MOD 1	Unk	600DFGM	805	600	N/A	Unk	1994	Operational	Diesel	Y	N	N	N/A	N/A	N/A		3.20	0.85	0.0573	0.0556	AP-42 3.4
26	AMKC	DG#8 PERM-MOD 9	Unk	NTA855GS1	369	275	N/A	Unk	1987	Operational	Diesel	Y	N	N	N/A	N/A	N/A		4.41	0.95	0.3100	0.3100	AP-42 3.3
27	AMKC	DG#36 PERM-MOD 10	Unk	NTA855G4	282	210	N/A	Unk	1987	Operational	Diesel	Y	N	N	N/A	N/A	N/A		4.41	0.95	0.3100	0.3100	AP-42 3.3
28	AMKC	DG#148 PERM-BOILER RM	Unk	1500DFMB	2012	1500	N/A	Unk	1995	Operational	Diesel	Y	N	N	N/A	N/A	N/A		3.20	0.85	0.0573	0.0556	AP-42 3.4
29	EMTC	EM#1 PERM OUTSIDE OF L.I	Unk	Unk	67	50	N/A	Unk	1990	Operational	Diesel	Y	N	N	N/A	N/A	N/A		4.41	0.95	0.3100	0.3100	AP-42 3.3
30	Cogen	Cogen	MTU	500500D6SRAH14	671	500	N/A	1.75	Post 2005	Operational	Diesel	Y	Y	N	6.4	3.5	0.2	1039 Table 2	-	-	-	-	
31	PH-1	Power House-1	MTU	1250RXC6DT2	1676	1250	N/A	4.8	2014	Operational	Diesel	Y	Y	N	6.4	3.5	0.2	1039 Table 2	-	-	-	-	
32	PH-2	Power House-2	MTU	1250RXC6DT2	1676	1250	N/A	4.8	2014	Operational	Diesel	Y	Y	N	6.4	3.5	0.2	1039 Table 2	-	-	-	-	
33	RNDC	AR#1-PERM-ACROSS NSD	CUMMINS	AR1	67	50	N/A	Unk	1992	Operational	Diesel	Y	N	N	N/A	N/A	N/A		4.41	0.95	0.3100	0.3100	AP-42 3.3
34	RNDC	DG#163 PERM-YARD	RUDOX	RM800	1073	800	N/A	Unk	2001	Operational	Diesel	Y	N	N	N/A	N/A	N/A		3.20	0.85	0.0573	0.0556	AP-42 3.4
35	RNDC	NUTRITIONIST/Visits	CATERPILLAR	C27	1105	824	N/A	<10	2006	Operational	Diesel	Y	Y	N	9.2 (6.9)	11.4 (8.5)	0.54 (0.4)	Table 1 (pre-2007)	-	-	-	-	
36	RNDC	DG#162 PERM-YARD	RUDOX	RM800	1073	800	N/A	Unk	2001	Operational	Diesel	Y	N	N	N/A	N/A	N/A		(3.2)	(0.9)	0.0573	0.0556	AP-42 3.4
37	RNDC	KITCHEN	CATERPILLAR	C15	671	500	6	<10	2009	Operational	Diesel	Y	Y	N	6.4	3.5	0.2	1039 Table 2	-	-	-	-	

N/A Not Available
Unk Unknown
Engines previously missing from the list. Changes are shown in red.

Total Active Generators	**37**
Total KW	**18,297**
Total HP	**24,541**
Total MMBtu/hr	**171.8**
Conversion (btu/hp-hr)	**7,000**

	Pre-NSPS		NSPS Applicable		
	>600 HP	<=600 HP	Pre-2007	Post 2007	Total
# of Generators	10	20	1	6	**37**
Total Capacity (KW)	8,204	4,060	824	5,209	**18,297**
Total Capacity (HP)	11,003	5,447	1,105	6,986	**24,541**
Total Input (MMBtu/hr)	77.0	38.1	7.7	48.9	**171.8**

NYC-DOC-Rikers Island
Existing Emergency Generators: Pre-NSPS Engines >600 HP

PTE Operating Hours (hrs/yr)	**500**
Estimated Actual Hours (hrs/yr)	**52**

Pre NSPS Engines >600 HP

Total Capacity 8,204 KW

Total Capacity 77.0 MMBtu/hr

				PTE Emissions		Actual Emissions	
Pollutant	**Emission Factor[1]**	**Units**	**Emissions (lbs/hr)**	**Emissions (lbs/yr)**	**Emissions (tons/yr)**	**Emissions (lbs/yr)**	**Emissions (tons/yr)**
NOx	3.2	lb/MMBtu	246.47	123,234	**61.62**	12,816	**6.41**
CO	0.85	lb/MMBtu	65.47	32,734	**16.37**	3,404	**1.70**
VOC[2]	0.0819	lb/MMBtu	6.31	3,154	**1.58**	328	**0.16**
SO2[3]	0.0015	lb/MMBtu	0.12	58	**0.03**	6	**0.00**
PM10	0.0573	lb/MMBtu	4.41	2,207	**1.10**	229	**0.11**
PM2.5	0.0556	lb/MMBtu	4.28	2,141	**1.07**	223	**0.11**
CO2	163	lb/MMBtu	12,559	6,279,279	**3,140**	653,045	**327**
CH4	0.01	lb/MMBtu	0.51	255	**0.13**	26	**0.01**
N2O	0.001	lb/MMBtu	0.10	51	**0.03**	5	**0.00**
CO2e, short tons					**3,157**		**328**

Notes

1. From AP-42 Tables 3.4-1 and 3.4-2
2. From AP-42. TOC is by weight 9% methane and 91% nonmethane.
3. Sulfur content in fuel of 15 ppm.

NYC-DOC-Rikers Island
Existing Emergency Generators: Pre-NSPS Engines <= 600 HP

PTE Operating Hours (hrs/yr)	**500**
Estimated Actual Hours (hrs/yr)	**52**

Pre NSPS Engines <= 600 HP

Total Capacity 4,060 KW

Total Capacity 38.1 MMBtu/hr

				PTE Emissions		Actual Emissions	
Pollutant	**Emission Factor[1]**	**Units**	**Emissions (lbs/hr)**	**Emissions (lbs/yr)**	**Emissions (tons/yr)**	**Emissions (lbs/yr)**	**Emissions (tons/yr)**
NOx	4.41	lb/MMBtu	168.15	84,074	**42.04**	8,744	**4.37**
CO	0.95	lb/MMBtu	36.22	18,111	**9.06**	1,884	**0.94**
VOC	0.350	lb/MMBtu	13.35	6,673	**3.34**	694	**0.35**
SO2	0.290	lb/MMBtu	11.06	5,529	**2.76**	575	**0.29**
PM10	0.31	lb/MMBtu	11.82	5,910	**2.95**	615	**0.31**
PM2.5	0.31	lb/MMBtu	11.82	5,910	**2.95**	615	**0.31**
CO2	163	lb/MMBtu	6,217	3,108,537	**1,554**	323,288	**162**
CH4	0.01	lb/MMBtu	0.25	126	**0.06**	13	**0.01**
N2O	0.001	lb/MMBtu	0.05	25	**0.01**	3	**0.001**
CO2e, short tons					**1,563**		**163**

Notes

1. From AP-42 Table 3.3-1

NYC-DOC-Rikers Island
Existing Emergency Generators: NSPS Engines Pre-2007

PTE Operating Hours (hrs/yr)	**500**
Estimated Actual Hours (hrs/yr)	**52**

NSPS Engines Pre-2007

Total Capacity 824 KW

Total Capacity 7.7 MMBtu/hr

				PTE Emissions		Actual Emissions	
Pollutant	**Emission Factor**	**Units**	**Emissions (lbs/hr)**	**Emissions (lbs/yr)**	**Emissions (tons/yr)**	**Emissions (lbs/yr)**	**Emissions (tons/yr)**
NOx (Pre-2007)	9.2	g/kW	16.71	8,356	**4.18**	869	**0.43**
CO (Pre-2007)	11.4	g/kW	20.71	10,355	**5.177**	1,077	**0.54**
VOC[1]	0.0819	lb/MMBtu	0.63	317	**0.16**	33	**0.016**
SO2	0.0015	lb/MMBtu	0.01	6	**0.003**	1	**0.000**
PM10/PM2.5 (Pre-2007)	0.54	g/kW	0.98	490	**0.2452**	51	**0.03**
CO2	163	lb/MMBtu	1261.22	630,610	**315**	65,583	**33**
CH4	0.01	lb/MMBtu	0.05	26	**0.01**	3	**0.00**
N2O	0.001	lb/MMBtu	0.01	5	**0.00**	1	**0.000**
CO2e, short tons					**317**		**33**

NYC-DOC-Rikers Island
Existing Emergency Generators: NSPS Engines Post 2007

PTE Operating Hours (hrs/yr)	**500**
Estimated Actual Hours (hrs/yr)	**52**

NSPS Engines Pre-2007

Total Capacity 5,209 KW

Total Capacity 48.9 MMBtu/hr

				PTE Emissions		Actual Emissions	
Pollutant	**Emission Factor**	**Units**	**Emissions (lbs/hr)**	**Emissions (lbs/yr)**	**Emissions (tons/yr)**	**Emissions (lbs/yr)**	**Emissions (tons/yr)**
NOx (Post 2007)	6.4	g/kW	73.50	36,749	**18.37**	3,822	**1.91**
CO (Post-2007)	3.5	g/kW	40.19	20,097	**10.048**	2,090	**1.05**
VOC[1]	0.0819	lb/MMBtu	4.01	2,003	**1.00**	208	**0.104**
SO2	0.0015	lb/MMBtu	0.07	37	**0.019**	4	**0.002**
PM10/PM2.5 (Post-2007)	0.2	g/kW	2.30	1,148	**0.5742**	119	**0.06**
CO2	163	lb/MMBtu	7973.65	3,986,826	**1,993**	414,630	**207**
CH4	0.01	lb/MMBtu	0.32	162	**0.08**	17	**0.01**
N2O	0.001	lb/MMBtu	0.06	32	**0.02**	3	**0.002**
CO2e, short tons					**2,004**		**208**

NYC-DOC-Rikers Island
HAPS Emissions Calculations
PTE

NG HHV: 1026 Btu/scf
#2 Oil HHV: 138 mmBtu/1000 gal

	Units Opperating 4		Units Opperating 2		Units Opperating 2															
	EU: 00001, 00002, 00003		EU: 00001, 00002, 00003		EU: 00001, 00002, 00003		EU: 00001, 00002, 00003		EU: 00001, 00002, 00003		EU: 00001, 00002, 00003		EU:00010		EU:00011		EU:00011		Emergency Generators		
Total KW	-		-		-		-		-		-		19,675		-		2,000		18,297		
Heat Input (MMBtu/hr)	384		384		192		192		192		192		-		249.2		-		172		
Annual Hours/yr	8,760		8,760		8,760		8,760		8,760		8,760		146		8,760		12		500 (PTE hours)		
	Boilers No. 2 Oil		Boilers Natural Gas		Boilers No. 2 Oil		Boilers Natural Gas		Boilers No. 2 Oil		Boilers Natural Gas		PLM Engines		Turbines & Duct Burner		Black Start Generator (lb/MMBtu		Emergency Generators (lb/MMBtu		Total HAP
	(lb/10^3 Gal)	tons/yr	(lb/10^6 scf)	tons/yr	(lb/10^3 Gal)	tons/yr	(lb/10^6 scf)	tons/yr	(lb/10^3 Gal)	tons/yr	(lb/10^6 scf)	tons/yr	(lb/MMBtu)	tons/yr	(lb/MMBtu)	tons/yr	)	tons/yr	u)	tons/yr	tons/yr
Acetaldehyde	--	0.000	--	0.000	--	0.000	--	0.000	--	0.000	--	0.000	2.52E-05	0.0004	4.00E-05	0.04	2.52E-05	0.000	2.52E-05	0.0011	0.045
Acrolein	--	0.000	--	0.000	--	0.000	--	0.000	--	0.000	--	0.000	7.88E-06	0.0001	6.40E-06	0.007	7.88E-06	0.000	7.88E-06	0.0003	0.007
Benzene	0.000214	0.003	2.10E-03	0.003	0.000214	0.001	2.10E-03	0.002	0.000214	0.001	2.10E-03	0.002	7.76E-04	0.0122	1.20E-05	0.013	7.76E-04	0.000	7.76E-04	0.0333	0.066
1,3-Butadiene	--	0.000	--	0.000	--	0.000	--	0.000	--	0.000	--	0.000	--	0.0000	4.30E-07	0.000	--	0.000	--	0.0000	0.000
Ethylbenzene	6.36E-05	0.001	--	0.000	6.36E-05	0.000	--	0.000	6.36E-05	0.000	--	0.000	--	0.0000	--	0.000	--	0.000	--	0.0000	0.002
Formaldehyde	0.033	0.402	7.50E-02	0.123	0.033	0.201	7.50E-02	0.061	0.033	0.201	7.50E-02	0.061	7.89E-05	0.0012	--	0.000	7.89E-05	0.000	7.89E-05	0.0034	0.809
Hexane	--	0.000	1.80E+00	2.951	--	0.000	1.80E+00	1.475	--	0.000	1.80E+00	1.475	--	0.0000	--	0.000	--	0.000	--	0.0000	5.901
Methyl chloroform (1,1,1-Trichloroethane)	2.36E-04	0.003	--	0.000	2.36E-04	0.001	--	0.000	2.36E-04	0.001	--	0.000	--	0.0000	--	0.000	--	0.000	--	0.0000	0.006
Naphthalene	0.00113	0.014	6.10E-04	0.001	0.00113	0.007	6.10E-04	0.000	0.00113	0.007	6.10E-04	0.000	1.30E-04	0.0020	1.30E-06	0.001	1.30E-04	0.000	1.30E-04	0.0056	0.037
Propylene oxide	--	0.000	--	0.000	--	0.000	--	0.000	--	0.000	--	0.000	--	0.0000	2.90E-05	0.032	--	0.000	--	0.0000	0.032
Toluene	0.0062	0.076	3.40E-03	0.006	0.0062	0.038	3.40E-03	0.003	0.0062	0.038	3.40E-03	0.003	2.81E-04	0.0044	1.30E-04	0.142	2.81E-04	0.000	2.81E-04	0.0121	0.310
Xylenes (isomers and mixture)	--	0.000	--	0.000	--	0.000	--	0.000	--	0.000	--	0.000	1.93E-04	0.0030	6.40E-05	0.070	1.93E-04	0.000	1.93E-04	0.0083	0.081
o-Xylenes	0.000109	0.001	--	0.000	0.000109	0.001	--	0.000	0.000109	0.001	--	0.000	--	0.0000	--	0.000	--	0.000	--	0.0000	0.003
PAH	--	0.000	--	0.000	--	0.000	--	0.000	--	0.000	--	0.000	--	0.0000	2.20E-06	0.002	--	0.000	--	0.0000	0.002
		0.50		**3.08**		**0.25**		**1.54**		**0.25**		**1.54**		**0.02**		**0.31**		**0.00**		**0.06**	**Total HAP** **7.30**

NYC-DOC-Rikers Island
HAPS Emissions Calculations
Actual Emissions

NG HHV: 1026 Btu/scf
#2 Oil HHV: 138 mmBtu/1000 gal

	EU: 00001, 00002, 00003		EU: 00001, 00002, 00003		EU: 00001, 00002, 00003		EU: 00001, 00002, 00003		EU: 00001, 00002, 00003		EU: 00001, 00002, 00003		EU:00010		EU:00011		EU:00011		Emergency Generators		
Total KW											-		5,223		-		2,000		18,297		
Heat Input (MMBtu/hr)													-		79.5		-		172		
Annual Hours/yr													146		8,760		12		52		
Acutal Annual Fuel Consumption	182	1,000 gal	671	mmscf	110	1,000 gal	164	mmscf	65	1,000 gal	138	mmscf			679	mmscf					
	Boilers No. 2 Oil		Boilers Natural Gas		Boilers No. 2 Oil		Boilers Natural Gas		Boilers No. 2 Oil		Boilers Natural Gas		PLM Engines		Turbines & Duct Burner		Black Start Generator (lb/MMBtu		Emergency Generators (lb/MMBtu		Total HAP
	(lb/10^3 Gal)	tons/yr	(lb/10^6 scf)	tons/yr	(lb/10^3 Gal)	tons/yr	(lb/10^6 scf)	tons/yr	(lb/10^3 Gal)	tons/yr	(lb/10^6 scf)	tons/yr	(lb/MMBtu)	tons/yr	(lb/MMBtu)	tons/yr	)	tons/yr	u)	tons/yr	tons/yr
Acetaldehyde	--	0.000	--	0.000	--	0.000	--	0.000	--	0.000	--	0.000	2.52E-05	0.0001	4.00E-05	0.01	2.52E-05	0.000	2.52E-05	0.0001	0.014
Acrolein	--	0.000	--	0.000	--	0.000	--	0.000	--	0.000	--	0.000	7.88E-06	0.0000	6.40E-06	0.002	7.88E-06	0.000	7.88E-06	0.0000	0.002
Benzene	0.000214	0.000	2.10E-03	0.001	0.000214	0.000	2.10E-03	0.000	0.000214	0.000	2.10E-03	0.000	7.76E-04	0.0032	1.20E-05	0.004	7.76E-04	0.000	7.76E-04	0.0035	0.012
1,3-Butadiene	--	0.000	--	0.000	--	0.000	--	0.000	--	0.000	--	0.000	--	0.0000	4.30E-07	0.000	--	0.000	--	0.0000	0.000
Ethylbenzene	6.36E-05	0.000	--	0.000	6.36E-05	0.000	--	0.000	6.36E-05	0.000	--	0.000	--	0.0000	--	0.000	--	0.000	--	0.0000	0.000
Formaldehyde	0.033	0.000	7.50E-02	0.025	0.033	0.002	7.50E-02	0.006	0.033	0.001	7.50E-02	0.005	7.89E-05	0.0003	--	0.000	7.89E-05	0.000	7.89E-05	0.0004	0.040
Hexane	--	0.000	1.80E+00	0.603	--	0.000	1.80E+00	0.148	--	0.000	1.80E+00	0.124	--	0.0000	--	0.000	--	0.000	--	0.0000	0.875
Methyl chloroform (1,1,1-Trichloroethane)	2.36E-04	0.000	--	0.000	2.36E-04	0.000	--	0.000	2.36E-04	0.000	--	0.000	--	0.0000	--	0.000	--	0.000	--	0.0000	0.000
Naphthalene	0.00113	0.000	6.10E-04	0.000	0.00113	0.000	6.10E-04	0.000	0.00113	0.000	6.10E-04	0.000	1.30E-04	0.0005	1.30E-06	0.000	1.30E-04	0.000	1.30E-04	0.0006	0.002
Propylene oxide	--	0.000	--	0.000	--	0.000	--	0.000	--	0.000	--	0.000	--	0.0000	2.90E-05	0.010	--	0.000	--	0.0000	0.010
Toluene	0.0062	0.000	3.40E-03	0.001	0.0062	0.000	3.40E-03	0.000	0.0062	0.000	3.40E-03	0.000	2.81E-04	0.0012	1.30E-04	0.045	2.81E-04	0.000	2.81E-04	0.0013	0.050
Xylenes (isomers and mixture)	--	0.000	--	0.000	--	0.000	--	0.000	--	0.000	--	0.000	1.93E-04	0.0008	6.40E-05	0.022	1.93E-04	0.000	1.93E-04	0.0009	0.024
o-Xylenes	0.000109	0.000	--	0.000	0.000109	0.000	--	0.000	0.000109	0.000	--	0.000	--	0.0000	--	0.000	--	0.000	--	0.0000	0.000
PAH	--	0.000	--	0.000	--	0.000	--	0.000	--	0.000	--	0.000	--	0.0000	2.20E-06	0.001	--	0.000	--	0.0000	0.001
		0.00		**0.63**		**0.00**		**0.15**		**0.00**		**0.13**		**0.01**		**0.10**		**0.00**		**0.01**	**Total HAP** **1.03**
				0.63				**0.16**				**0.13**									

NYC-DOC-Rikers Island
Natural Gas Emission Factors

EPA Emission factors--(Federal Register EPA, January 15, 2025)

https://www.epa.gov/climateleadership/ghg-emission-factors-hub

	Natural Gas	
CH4	1.00	g/MMBtu
N2O	0.10	g/MMBtu
CO2	53,060	g/MMBtu
CH4	0.00103	g/scf
N2O	0.00010	g/scf
CO2	54.44	g/scf

CO2e	5.317E-02	metric ton/MMBtu

CO2e	5.455E-05	metric ton/scf

https://www.epa.gov/system/files/documents/2025-01/ghg-emission-factors-hub-2025.pdf

Natural Gas Heating Value	
1,026	btu/scf

NYSDEC Upstream Emission Factor

Table 1. Current Upstream and Out-of-State Emission Factors for Imported Fossil Fuels

	Natural Gas as Stationary Fuels	
CH4	337.000	g/MMBtu
N2O	0.140	g/MMBtu
CO2	12,549	g/MMBtu

	Natural Gas as Stationary Fuels	
CH4	0.0003	metric ton/MMBtu
N2O	0.0000	metric ton/MMBtu
CO2	0.0125	metric ton/MMBtu
CO2e	0.0409	metric ton/MMBtu
	41.9572	metric ton/MMscf

NYSDEC, *Appendix A of the 2024 Statewide GHG Emission Report. December 2024*

NYC-DOC-Rikers Island
Number 2 Fuel Oil Emission Factors

EPA Emission factors--(Federal Register EPA, January 15, 2025)

https://www.epa.gov/climateleadership/ghg-emission-factors-hub

	Distilate Fuel Oil 2	
CH4	3.00	g/MMBtu
N2O	0.60	g/MMBtu
CO2	73,960	g/MMBtu
CH4	0.41000	g/gal
N2O	0.08000	g/gal
CO2	10,210.00	g/gal

CO2e	7.437E-02	metric ton/MMBtu

CO2e	1.027E-02	metric ton/gal

https://www.epa.gov/system/files/documents/2025-01/ghg-emission-factors-hub-2025.pdf

No 2 Fuel Oil HHV	
138,000	btu/gal

NYSDEC Upstate Emission Factor

Table 1. Current Upstream and Out-of-State Emission Factors for Imported Fossil Fuels

	Conv. Diesel	
CH4	117.000	g/MMBtu
N2O	0.250	g/MMBtu
CO2	13,634	g/MMBtu

	Conv. Diesel	
CH4	0.0001	metric ton/MMBtu
N2O	0.0000	metric ton/MMBtu
CO2	0.0136	metric ton/MMBtu
	0.0235	metric ton/MMBtu
CO2e	3.2469	metric ton/1,000 gal

NYSDEC, *Appendix A of the 2024 Statewide GHG Emission Report. December 2024*

NYC-DOC-Rikers Island
Number 6 Fuel Oil Emission Factors

EPA Emission factors--(Federal Register EPA, January 15, 2025)

https://www.epa.gov/climateleadership/ghg-emission-factors-hub

	Residual Fuel Oil 6	
CH4	3.00	g/MMBtu
N2O	0.60	g/MMBtu
CO2	75,100	g/MMBtu
CH4	0.45000	g/gal
N2O	0.09000	g/gal
CO2	11,270.00	g/gal

CO2e	7.551E-02	metric ton/MMBtu

CO2e	1.133E-02	metric ton/gal

https://www.epa.gov/system/files/documents/2025-01/ghg-emission-factors-hub-2025.pdf

No 6 Fuel Oil HHV	
150,000	btu/gal

NYSDEC Upstate Emission Factor

Table 1. Current Upstream and Out-of-State Emission Factors for Imported Fossil Fuels

	Resid. Diesel	
CH4	107.000	g/MMBtu
N2O	0.170	g/MMBtu
CO2	10,343.000	g/MMBtu

	Resid. Diesel	
CH4	0.0001	metric ton/MMBtu
N2O	0.0000	metric ton/MMBtu
CO2	0.0103	metric ton/MMBtu
	0.0194	metric ton/MMBtu
CO2e	2.9064	metric ton/1,000 gal

NYSDEC, *Appendix A of the 2024 Statewide GHG Emission Report. December 2024*

NYC-DOC-Rikers Island
Global Warming Potentials

	GWP
CH4	84
N2O	264
CO2	1

6 NYCRR 496.5