A. INTRODUCTION

The air quality analysis presents an assessment of the potential criteria air pollutant impacts of the proposed action. Criteria air pollutants are air contaminants for which the U.S. Environmental Protection Agency (EPA) or New York State has established maximum ambient air concentrations to protect public health. This chapter includes a discussion of the selection of criteria air pollutants for analysis; benchmarks for carbon monoxide and particulate matter less than 2.5 μm in diameter ($PM_{2.5}$) and regulations for assessing future potential impacts and determining their significance; existing conditions and background concentrations; the methodologies used for the analyses; and the probable impacts of the proposed action.

Under the proposed action, the only new proposed source , not previously reviewed in the Phase II environmental review and not included in the plant's existing air permits, with the potential to emit criteria pollutants is the one 500 kilowatt (kW) emergency generator located outside the digester building (see Figure 8-1). The 500 kW emergency generator would be subjected to maintenance testing, but would not participate in a Peak Load Management (PLM) program. In addition, as part of the Phase III Upgrade, there are three existing open gas burners that are being replaced with three enclosed waste gas burners. These new replacement waste gas burners were included in the permit as well as in the air quality impact assessment for the Phase II environmental review.

The remaining criteria pollutant emission sources are either being constructed under Phases I and II or are already existing at the plant, including six 2,000 kW emergency generators, five 750 horsepower (hp) boilers located in the main building, and two 400 hp boilers located in the dewatering building. The latest facility-wide air permit from the New York State Department of Environmental Conservation (NYSDEC) was issued in February 2006 including these sources. A detailed stationary source air quality analysis was previously performed in support of the air permit application that included Phase I, Phase II, and the waste gas burners for Phase III. The results of the air quality analysis were discussed and presented in the Negative Declaration for the Phase II Upgrade.

The proposed action's analysis includes the plant equipment proposed under the Phase III Upgrade and the latest meteorological data, building profiles, and estimates of operating hours in addition to the equipment from the rest of the plant that will be upgraded under Phase I and Phase II. The analysis for the proposed action includes reasonable worst case operating conditions based on how the plant is expected to operate.

Dispersion modeling was utilized to assess the impacts of criteria air pollutants from the plant's stationary combustion sources under the multi-phase plant upgrade. The criteria air pollutants of concern include carbon monoxide (CO), particulate matter less than 10 microns in aerodynamic diameter (PM_{10}), particulate matter less than 2.5 microns in aerodynamic diameter ($PM_{2.5}$), sulfur dioxide (SO_2), and nitrogen dioxide (NO_2).

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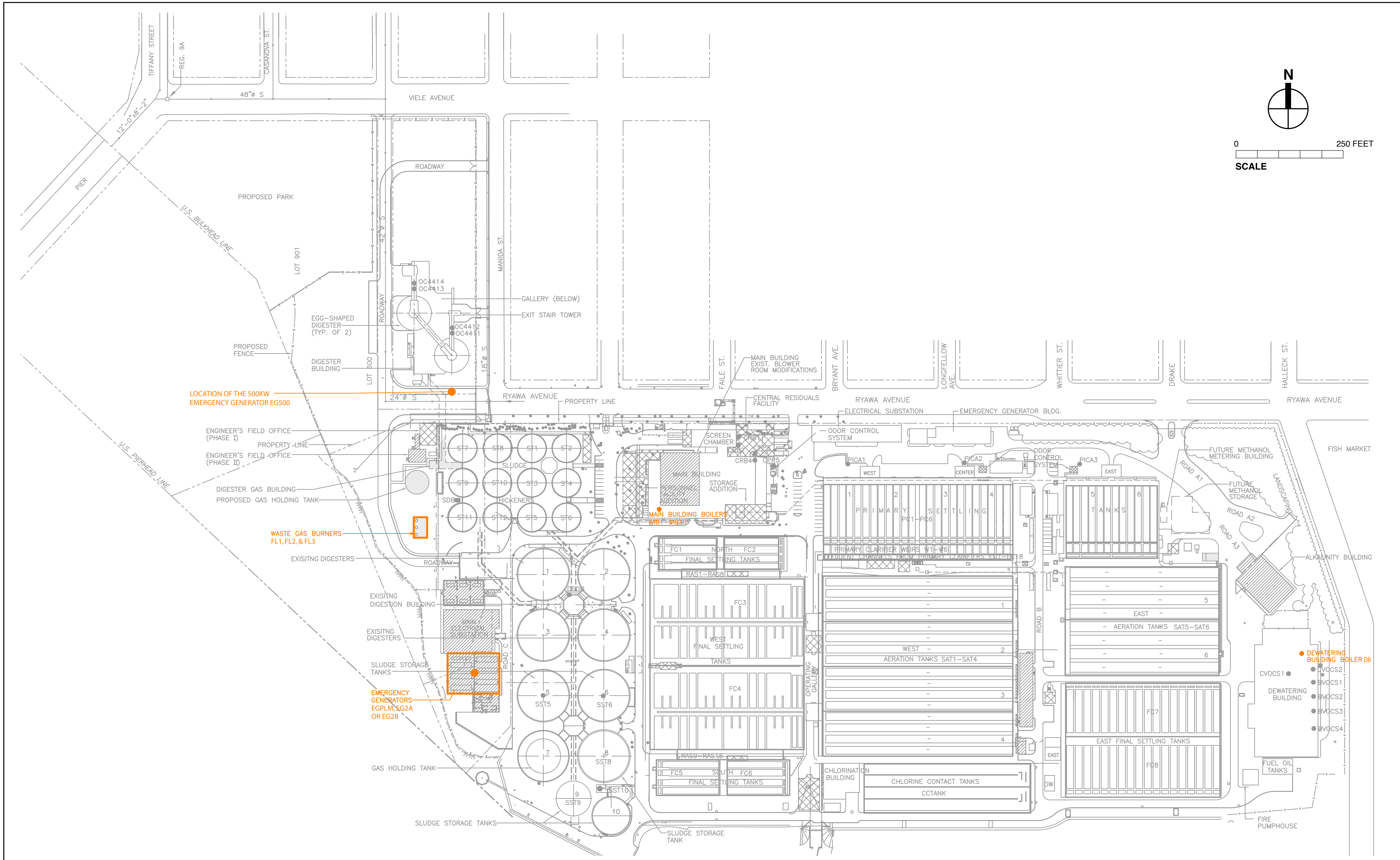

Combustion Point Sources

Hunts Point WPCP

Combustion Sources for
Criteria Air Pollutant and VOC Analysis
Figure 8-1

EPA models and procedures outlined in the City of New York's *CEQR Technical Manual (2001)* were used to evaluate potential impacts associated with the upgraded plant's combustion sources, including the boilers, waste gas burners and emergency generators. Emissions from the emergency generators were modeled to assess the effects of both maintenance testing and potential participation in a PLM program. For NO_2, CO, PM_{10}, and SO_2, the air quality analysis considered impacts from the multi-phase plant upgrade (Phases I, II, and III and carbon addition facility), rather than the incremental impact from Phase III only, in order to determine the WPCP's overall impacts and compliance with the National Ambient Air Quality Standards (NAAQS). For $PM_{2.5}$, incremental impacts were also analyzed from the entire plant as upgraded under Phases I, II, and III and the carbon addition facility and compared to the updated NYCDEP $PM_{2.5}$ interim guidance criteria. The analysis performed for the Phase II Upgrade negative declaration was updated for this EIS analysis with updated meteorological data, and both short-term and annual operating analysis scenarios that are based on how the plant is expected to operate.

Between the issuance of the Draft Environmental Impact Statement (DEIS) and Final EIS (FEIS), NYCDEP has committed to the use of ultra low sulfur diesel (ULSD) fuel in the generators that are being installed under the Phase II Upgrade and the new emergency generator associated with the Phase III Upgrade. The commitment to use ULSD allowed the analyses to be updated to reflect the lower $PM_{2.5}$ emissions from these units. The modeling analysis for the $PM_{2.5}$ 24-hour averaging period was updated using lower $PM_{2.5}$ emissions from the generators (with ULSD), more reasonable worst-case operating scenarios for the other plant combustion sources, and EPA's AERMOD dispersion model. NYCDEP has also agreed to reduce the maximum number of emergency generators participating in a PLM program to five of the six 2,000 kW generators that are being installed under the Phase II Upgrade. The evaluation of $PM_{2.5}$ impacts from the revised analysis considered NYCDEP's updated $PM_{2.5}$ interim guidance criteria. In addition, NYCDEP will design and implement a PM monitoring program for both construction and operation of the upgrade.

In addition to the analysis of the proposed action with the two egg-shaped digesters (the two-digester scenario), an analysis was performed to analyze the effect of installing two additional egg-shaped digesters (the four-digester scenario) and decommissioning the existing, outdated digesters. As part of this analysis, the building profile changes on-site were analyzed and the worst-case modeling run (the $PM_{2.5}$ 24-hour run) was re-run to determine if the overall conclusions would change as a result of the additional digesters.

POLLUTANTS FOR ANALYSIS

Ambient air quality is affected by air pollutants produced by both motor vehicles and stationary sources. Emissions from motor vehicles are referred to as mobile source emissions, while emissions from fixed facilities are referred to as stationary source emissions. Typically, ambient concentrations of carbon monoxide (CO) and lead are predominantly influenced by mobile source emissions. Emissions of nitrogen oxides (NO and NO_2, referred to as NO_x) come from both mobile and stationary sources. Emissions of sulfur dioxide (SO_2) are associated mainly with stationary sources, but diesel-powered vehicles (primarily heavy-duty trucks and buses) also contribute. Particulate matter (PM) is emitted from both stationary and mobile sources. Fine particulate matter is also formed when emissions of NO_x, sulfur oxides (SO_x), ammonia, organic compounds, and other gases react in the atmosphere. Ozone is formed in the atmosphere by complex photochemical processes that include NO_x and volatile organic compounds (VOCs), emitted mainly from industrial process and mobile sources.

The additional number of incremental new peak hour trips generated by the proposed action (see Chapter 7, "Transportation") are below the screening thresholds provided in the *CEQR Technical Manual (2001)* and, therefore, a mobile source analysis is not warranted for the EIS.[1] A construction traffic analysis and construction mobile air quality analysis was performed, however, and is discussed in Chapter 17, "Construction."

CARBON MONOXIDE

Carbon monoxide (CO), a colorless and odorless gas, is produced in the urban environment primarily by the incomplete combustion of gasoline and other fossil fuels. In urban areas, approximately 80 to 90 percent of CO emissions are from motor vehicles. CO concentrations can vary greatly over relatively short distances. Elevated concentrations are usually limited to locations near crowded intersections along heavily traveled and congested roadways. Consequently, CO concentrations must be predicted on a localized or microscale basis. The operation of the WPCP after the Phase III Upgrade would not result in an increase in traffic volumes on streets near the Hunts Point WPCP and therefore would not result in localized increases in CO levels. Therefore, a mobile source analysis was not warranted for CO.

CO emissions could result from on-site stationary combustion equipment (boilers, waste gas burners, and emergency generators). Therefore, these sources were evaluated for potential CO impacts.

NITROGEN OXIDES AND VOLATILE ORGANIC COMPOUNDS

Nitrogen oxides (NO_x) and volatile organic compounds (VOCs) are of principal concern because of their role as precursors in the formation of ozone. The potential impacts of individual compounds that make up VOCs are discussed in Chapter 9, "Non-Criteria Air Pollutants." Ozone is formed through a series of reactions that take place in the atmosphere in the presence of sunlight. Because the reactions are slow, and occur as the pollutants are advected downwind, elevated ozone levels are often found many miles from sources of the precursor pollutants. The effects of NO_x and VOC emissions from mobile sources are therefore generally examined only on a regional basis. The proposed action would not result in substantial emissions from mobile sources; therefore a regional analysis was not warranted.

In addition, there is a National Ambient Air Quality Standard (NAAQS) for average annual nitrogen dioxide (NO_2) concentrations, which is normally examined only for fossil fuel energy sources. Potential impacts from the fuel to be burned for the plant's stationary combustion equipment (boilers, waste gas burners, and emergency generators) were evaluated for potential NO_2 impacts. An average NO_2/NO_x ratio of 0.62 measured within New York City over the past several years is representative. However, the NO_2/NO_x ratio was assumed at 100 percent to be conservative in this analysis.

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[1] Based on the recommendations in the *CEQR Technical Manual (2001)*, sites that generate fewer than 100 new peak hour trips are not subject to a detailed CO analysis and sites with less than 21 heavy-duty diesel vehicles (HDDV) per hour or its equivalent in vehicular emissions are not subject to a detailed $PM_{2.5}$ analysis.

LEAD

Lead emissions in air are principally associated with industrial sources and motor vehicles that use gasoline containing lead additives. Most U.S. vehicles produced since 1975, and all produced after 1980, are designed to use unleaded fuel. As these newer vehicles have replaced the older ones, motor-vehicle-related lead emissions have decreased. As a result, ambient concentrations of lead have declined significantly. Nationally, the average measured atmospheric lead level in 1985 was only about one quarter the level in 1975.

In 1985, EPA announced new rules drastically reducing the amount of lead permitted in leaded gasoline. The maximum allowable lead level in leaded gasoline was reduced from the previous limit of 1.1 to 0.5 grams per gallon effective July 1, 1985, and to 0.1 grams per gallon effective January 1, 1986. Monitoring results indicate that this action has been effective in significantly reducing atmospheric lead concentrations. Effective January 1, 1996, the Clean Air Act banned the sale of the small amount of leaded fuel that was still available in some parts of the country for use in on-road vehicles, concluding the 25-year effort to phase out lead in gasoline. Even at locations in the New York City area where traffic volumes are very high, atmospheric lead concentrations are far below the national standard of 1.5 micrograms per cubic meter (three-month average).

No significant sources of lead are associated with the proposed action. Therefore, no analysis was warranted.

RESPIRABLE PARTICULATE MATTER — PM_{10} AND $PM_{2.5}$

Particulate matter (PM) is a broad class of air pollutants that includes discrete particles of a wide range of sizes and chemical compositions, as either liquid droplets or solids suspended in the atmosphere (aerosols). The constituents of PM are both numerous and varied, and they are emitted from a wide variety of sources (both natural and anthropogenic). Natural sources include the condensed and reacted forms of naturally occurring VOCs; salt particles resulting from the evaporation of sea spray; wind-borne pollen, fungi, molds, algae, yeasts, rusts, bacteria, and material from live and decaying plant and animal life; particles eroded from beaches, soil, and rock; and particles emitted from volcanic and geothermal eruptions and from forest fires. Naturally occurring PM is generally greater than 2.5 micrometers in diameter. Major anthropogenic sources include the combustion of fossil fuels (e.g., vehicular exhaust, power generation, boilers, engines, and home heating); chemical and manufacturing processes; construction and agricultural activities; and, wood-burning stoves and fireplaces. PM also acts as a substrate for the adsorption (accumulation of gases, liquids, or solutes on the surface of a solid or liquid) of other pollutants, often toxic, and some likely carcinogenic compounds.

PM is regulated in two size categories: particles with an aerodynamic diameter of less than or equal to 2.5 micrometers, or $PM_{2.5}$, and particles with an aerodynamic diameter of less than or equal to 10 micrometers, or PM_{10}, which includes the smaller $PM_{2.5}$. $PM_{2.5}$ has the ability to reach the lower regions of the respiratory tract, delivering with it other compounds adsorbed to the surfaces of the particles, and is also persistent in the atmosphere. $PM_{2.5}$ is directly emitted by combustion sources (primary PM) and also forms in the atmosphere from precursor gases such SO_2, NO_x, and ammonia.

There is also a New York standard for total suspended particulate matter (TSP), which represents both coarse and fine particles. However, NYSDEC no longer conducts monitoring for this pollutant.

Since the projected vehicle trips resulting from the Phase III Upgrade would be below the screening thresholds for a mobile analysis of PM (the plant had less than 8 heavy-duty diesel vehicles (HDDV) per hour or its equivalent in vehicular emissions), a mobile analysis for PM impacts was not warranted. A PM_{10} impact analysis was performed to assess the potential impacts from project related stationary sources in the surrounding neighborhoods. Potential incremental impacts of $PM_{2.5}$ from project related stationary emission sources were analyzed from the proposed action.

SULFUR DIOXIDE — SO_2

SO_2 emissions are primarily associated with the combustion of sulfur-containing fuels: oil and coal. No significant quantities are emitted from mobile sources. Monitored SO_2 concentrations in New York City are in compliance with national standards. For the Phase III Upgrade, SO_2 emissions from the facilities' boilers, waste gas burners, and emergency generators were analyzed.

NATIONAL AND STATE AIR QUALITY STANDARDS

As required by the Clean Air Act (CAA), primary and secondary NAAQS have been established for six major air pollutants: CO, NO_2, ozone, respirable PM (both $PM_{2.5}$ and PM_{10}), SO_2, and lead. The primary standards represent levels that are requisite to protect the public health, allowing an adequate margin of safety. The secondary standards are intended to protect the nation's welfare, and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the environment. The primary and secondary standards for NO_2, ozone, lead, and PM are the same; there is no secondary standard for CO. EPA promulgated additional NAAQS which became effective September 16, 1997: a new 8-hour standard for ozone, which recently replaced the previous 1-hour standard; and in addition to retaining the PM_{10} standards, EPA adopted 24-hour and annual standards for $PM_{2.5}$. The standards for these pollutants are presented in Table 8-1. The NAAQS for CO, NO_2 , and SO_2 standards have also been adopted as the ambient quality standards for New York State, but are defined on a running 12-month basis rather than for calendar years only. New York State also has standards for TSP and ozone, which correspond to federal standards which have since been revoked or replaced, and for settable particulates, beryllium, fluoride, and hydrogen sulfide (H_2S).

EPA has revised the NAAQS for PM, effective December 18, 2006. The revision included lowering the level of the 24-hour $PM_{2.5}$ standard from the previous level of 65 micrograms per cubic meter ($\mu g/m^3$) to 35 $\mu g/m^3$ and retaining the level of the annual standard at 15 $\mu g/m^3$. The PM_{10} 24-hour average standard was retained and the annual average PM_{10} standard was revoked.

NAAQS ATTAINMENT STATUS AND STATE IMPLEMENTATION PLANS (SIP)

The CAA, as amended in 1990 defines non-attainment areas (NAA) as geographic regions that have been designated as not meeting one or more of the NAAQS. When an area is designated as non-attainment by EPA, the state is required to develop and implement a State Implementation Plan (SIP), which delineates how a state plans to achieve air quality that meets the NAAQS under the deadlines established by the CAA.

EPA has designated New York City as in attainment for the NO_2, SO_2, and lead NAAQS, and has re-designated New York City as in attainment for CO. The CAA requires that a maintenance plan ensure continued compliance with the CO NAAQS for former non-attainment areas. New York City is also committed to implementing site-specific control measures throughout the city to reduce CO levels, should unanticipated localized growth result in elevated CO levels during the maintenance period.

Manhattan has been designated as a moderate NAA for PM_{10}; however the Bronx and the rest of New York City are designated as in attainment with the PM_{10} NAAQS. On December 17, 2004, EPA took final action designating the five boroughs of New York City, and Nassau, Suffolk, Rockland, Westchester and Orange Counties as $PM_{2.5}$ non-attainment areas under the CAA. New York State and local governments are required to develop SIPs by early 2008, which will be designed to meet the annual average $PM_{2.5}$ standard by 2010. As described above, EPA has revised the PM standard for the $PM_{2.5}$ 24-hour standard. $PM_{2.5}$ attainment designations for the revised $PM_{2.5}$ 24-hour standard would be effective by April 2010, and SIPs to demonstrate attainment for the 24-hour $PM_{2.5}$ standard would be due by April 2013, and would need to demonstrate the methods to meet the $PM_{2.5}$ 24-hour standard by April 2015 (although these may be extended in some cases up to April 2020).

Nassau, Rockland, Suffolk, Westchester and the five counties of New York City had been designated as severe non-attainment for ozone 1-hour standard. In November 1998, New York State submitted its *Phase II Alternative Attainment Demonstration for Ozone*, which was finalized and approved by EPA effective March 6, 2002, addressing attainment of the 1-hour ozone NAAQS by 2007. New York State has recently submitted revisions to the SIP; these SIP revisions included additional emission reductions that EPA requested to demonstrate attainment of the standard, and an update of the SIP estimates using two new EPA models—the mobile source emissions model MOBILE6, and the non-road emissions model NONROAD—which have been updated to reflect current knowledge of engine emissions and the latest mobile and non-road engine emission regulations. On April 15, 2004, EPA designated these same counties as moderate non-attainment for the new 8-hour ozone standard which became effective as of June 15, 2004 (all of Orange County was moved to the Poughkeepsie moderate non-attainment area for 8-hour ozone). EPA revoked the 1-hour standard on June 15, 2005; however, the specific control measures for the 1-hour standard included in the SIP are required to stay in place until the 8-hour standard is attained. The discretionary emissions reductions in the SIP would also remain but could be revised or dropped based on modeling. A new SIP for ozone will be adopted by the state no later than June 15, 2007, with a target attainment deadline of June 15, 2010.

DETERMINING THE SIGNIFICANCE OF AIR QUALITY IMPACTS

The State Environmental Quality Review Act (SEQRA) regulations and the *CEQR Technical Manual* state that the significance of a likely consequence (i.e., whether it is material, substantial, large, or important) should be assessed in connection with:

- Its setting (e.g., urban or rural)
- Its probability of occurrence
- Its duration
- Its irreversibility
- Its geographic scope
- Its magnitude
- The number of people affected

In terms of the magnitude of air quality impacts (bullet 6, above), any action predicted to increase the concentration of a criteria air pollutant to a level that would exceed the concentrations defined by the NAAQS (see Table 8-1) would be deemed to have a potential significant adverse impact.

Table 8-1
Ambient Air Quality Standards

Pollutant	Primary		Secondary	
	ppm	µg/m³	ppm	µg/m³
Carbon Monoxide (CO)				
Maximum 8-Hour Concentration[1]	9	10,000	None	
Maximum 1-Hour Concentration[1]	35	40,000		
Lead				
Maximum Arithmetic Mean Averaged Over 3 Consecutive Months	NA	1.5	NA	1.5
Nitrogen Dioxide (NO2)				
Annual Arithmetic Average	0.053	100	0.053	100
Ozone (O3)				
8-Hour Average[2]	0.08	157	0.08	157
Respirable Particulate Matter (PM10)				
Average of 3 Annual Arithmetic Means -revoked December 18, 2006	NA	50	NA	50
24-Hour Concentration[1]	NA	150	[NA]	150
Fine Respirable Particulate Matter ($PM_{2.5}$)				
Average of 3 Annual Arithmetic Means	NA	15	NA	15
24-Hour Concentration[(3,4)]	NA	35	NA	35
Sulfur Dioxide (SO2)				
Annual Arithmetic Mean	0.03	80	NA	NA
Maximum 24-Hour Concentration	0.14	365	NA	NA
Maximum 3-Hour Concentration	NA	NA	0.50	1,300

Notes: ppm - parts per million
µg/m³ - micrograms per cubic meter
NA - not applicable
All annual periods refer to the calendar year
Particulate matter concentrations are in µg/m³. Concentrations of all gaseous pollutants are presented in ppm and approximately equivalent concentrations in µg/m³ are presented.
[1] Not to be exceeded more than once a year.
[2] Three-year average of the annual fourth highest daily maximum 8-hr average concentration.
[3] Not to be exceeded by the 98th percentile averaged over 3 years.
[4] EPA has reduced these standards down from 65 µg/m³, effective December 18, 2006.
Sources: 40 CFR Part 50: National Primary and Secondary Ambient Air Quality Standards; 6 NYCRR Part 257: Air Quality Standards.

In addition, to maintain concentrations lower than the NAAQS in attainment areas, or to ensure that concentrations will not be significantly increased in non-attainment areas, significance threshold levels have been defined for certain pollutants. Any action predicted to increase the concentrations of these pollutants above the thresholds could result in a potential significant adverse impact, even in cases where violations of the NAAQS are not predicted, requiring a detailed analysis of air quality impacts for that pollutant.

DE MINIMIS CRITERIA REGARDING CO IMPACTS

New York City has developed criteria to assess the significance of the incremental increase in CO concentrations that would result from proposed projects or actions, as set forth in the *City Environmental Quality Review (CEQR) Technical Manual*. These criteria (known as *de minimis* criteria) set the minimum change in CO concentration that defines a significant environmental impact. Significant increases of CO concentrations in New York City are defined as: (1) an increase of 0.5 ppm or more in the maximum 8-hour average CO concentration at a location where the predicted No Action 8-hour concentration is equal to or between 8 and 9 ppm; or (2) an increase of more than half the difference between baseline concentrations and the 8-hour standard, when No Action concentrations are below 8.0 ppm. The *CEQR Technical Manual* guidelines indicate that an impact analysis for CO is not required if the peak number of project-generated vehicles is less than 100 per hour for these study areas.

$PM_{2.5}$ INTERIM GUIDANCE CRITERIA

NYSDEC has published a policy to provide interim direction for evaluating $PM_{2.5}$ impacts[2]. This policy would apply only to facilities applying for permits or major permit modifications under SEQRA that emit 15 or more tons of PM_{10} annually. The policy states that such a project will be deemed to have a potential significant adverse impact if the project's maximum impacts are predicted to increase $PM_{2.5}$ concentrations by more than 0.3 µg/m^3 averaged annually, or more than 5 µg/m^3 on a 24-hour basis. Projects that exceed either the annual or 24-hour threshold will be required to prepare an Environmental Impact Statement (EIS) to assess the severity of the impacts, to evaluate alternatives, and to employ reasonable and necessary mitigation measures to minimize the $PM_{2.5}$ impacts of the source to the maximum extent practicable. Although the proposed action's annual emissions of PM_{10} are estimated to be well below the 15-ton-per-year threshold that would trigger review under NYSDEC's $PM_{2.5}$ policy guidance. The maximum impacts of the proposed action are compared to the NYSDEC threshold concentrations.

In addition, NYCDEP is currently recommending updated interim guidance criteria for evaluating the potential $PM_{2.5}$ impacts for projects subject to CEQR. NYSDEC is reviewing its 24-hour interim guidance criteria of 5 µg/m^3 and is expected to lower this threshold in the future. The updated interim guidance criteria currently employed by NYCDEP for determination of potential significant adverse $PM_{2.5}$ impacts under CEQR are as follows:

- 24-hour average $PM_{2.5}$ concentration increments which are predicted to be greater than 5 µg/m^3 at a discrete receptor location would be considered a significant adverse impact on air quality under operational conditions (i.e., a permanent condition predicted to exist for many years regardless of the frequency of occurrence);
- 24-hour average $PM_{2.5}$ concentration increments which are predicted to be greater than 2 µg/m^3 but no greater than 5 µg/m^3 would be considered a significant adverse impact on air quality based on the magnitude, frequency, duration, location, and size of the area of the predicted concentrations;
- Predicted annual average $PM_{2.5}$ concentration increments greater than 0.1 µg/m^3 at ground-level on a neighborhood scale (i.e., the annual increase in concentration representing the average over an area of approximately 1 square kilometer, centered on the location where the maximum ground-level impact is predicted for stationary sources; or at a distance from a roadway corridor similar to the minimum distance defined for locating neighborhood scale monitoring stations) is considered to be a significant adverse impact; or
- Predicted annual average $PM_{2.5}$ concentration increments greater than 0.3 µg/m^3 at a discrete or ground level receptor location is considered to be a significant adverse impact.

Actions under CEQR that would increase $PM_{2.5}$ concentrations by more than the NYCDEP or NYSDEC interim guidance above will be considered to have potential significant adverse impacts. NYCDEP recommends that actions subject to CEQR that exceed the interim guidance criteria should prepare an EIS and examine potential measures to reduce or eliminate such potential significant adverse impacts.

2 CP-33, Assessing and Mitigating Impacts of Fine Particulate Matter Emissions, NYSDEC, December 29, 2003.

The above NYSDEC and NYCDEP interim guidance criteria have been used for the purpose of evaluating the significance of predicted impacts of the proposed action on $PM_{2.5}$ concentrations and to determine the need to minimize PM emissions from the proposed action.

B. METHODOLOGY

Following the guidance in the *CEQR Technical Manual*, dispersion modeling was performed to assess the impacts of the criteria air pollutant emissions from the plant's combustion sources. This section describes the EPA dispersion models employed, meteorological data utilized in these models, and the locations simulated in the nearby community ("receptors") to evaluate potential criteria pollutant impacts from the proposed action.

MODEL SELECTION

Air quality impacts from stationary source emissions were evaluated using the Industrial Source Complex Short Term (ISCST3) dispersion model developed by EPA (version 02035)[3] and described in *User's Guide for the Industrial Source Complex (ISC3) Dispersion Models* (EPA-454/B-95-003a). The ISCST3 model calculates pollutant concentrations from one or more point, area, or volume sources based on hourly meteorological data. The ISCST3 model has the capability of calculating pollutant concentrations at locations where the plume from the exhaust stack is affected by the aerodynamic wakes and eddies (downwash) produced by nearby structures. Computations with the ISCST3 model to determine impacts from the Hunts Point WPCP were made assuming stack tip downwash, buoyancy-induced dispersion, gradual plume rise, urban dispersion coefficients, wind profile exponents (with and without building downwash), and elimination of calms.

Since the ISCST3 model does not predict impacts within the cavity region that is created beyond buildings and other structures, impacts within this area were estimated using the ISC Plume Rise Model Enhancements (ISCPRIME) model. The ISCPRIME model is a modification of the ISCST3 model that can predict impacts within the cavity wake region. The highest (worst-case) of the two model predicted impacts, ISCST3 or ISCPRIME, was used for comparison to the NAAQS and the $PM_{2.5}$ interim guidance criteria.

EPA's Building Profile Input Program (BPIP) program, which is described in the *User's Guide to the Building Profile Input Program*, EPA, Research Triangle Park, North Carolina, was used to determine the projected building dimensions for the ISCST3 modeling with the building downwash algorithm enabled. EPA's building profile program for ISCPRIME, BPIPPRIME, was used in conjunction with that model. Modeling of downwash accounted for all obstructions within a radius equal to five obstruction heights of each stack. The modeling assumptions, methodology, and preparation of basic input data are similar to those described later in Chapter 9, "Non-Criteria Air Pollutants" and Chapter 10, "Odors."

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[3] Between the issuance of the DEIS and FEIS, additional modeling of the $PM_{2.5}$ 24-hour averaging period was performed using EPA's AERMOD dispersion model (See Chapter 10, "Odors" for more information on AERMOD modeling inputs). AERMOD was designed as a replacement for ISCST3 and as of December 9, 2006 is EPA's preferred model. Since the short-term $PM_{2.5}$ emissions were updated for the FEIS as a result of NYCDEP's commitment to use ULSD fuel in the plant's emergency generators, the $PM_{2.5}$ 24-hour analyses were also updated with the AERMOD model for the FEIS. Since the emission rates for other criteria pollutants did not substantively change for the FEIS and the predicted impacts for these pollutants where well within thresholds, the results from the ISC modeling are reported in the FEIS.

METEOROLOGICAL DATA

The meteorological data set consisted of five years of meteorological data: surface data collected at La Guardia Airport (2000 to 2004) and concurrent upper air data collected at Brookhaven, New York. These meteorological data provide hour-by-hour wind speeds and directions, stability states and temperature inversion elevation over the five-year period. The purpose of using such an extensive meteorological data set (almost 44,000 hours of meteorological data) is to ensure that a wide array of atmospheric conditions that include diurnal and seasonal variations, as well as inversion and convective conditions are evaluated when assessing the compliance of the facility emissions with air quality standards and guidance thresholds.

RECEPTOR NETWORK

The receptors used in the criteria pollutant analysis are similar to the receptors employed in the ISCST3 modeling discussed in Chapter 9, "Non-Criteria Air Pollutants," and Chapter 10, "Odors." The receptor network included locations where highest concentrations would be expected, receptors at the plant property periphery, and receptors at selected locations in the surrounding neighborhood. One 2,000 x 1,500 meter Cartesian receptor grid extending from the center of the plant with 100 meter grid spacing was utilized for the criteria pollutant and $PM_{2.5}$ microscale analysis. For the $PM_{2.5}$ neighborhood analysis, one Cartesian receptor grid was utilized and placed at the center of maximum annual ground level concentration determined from the microscale analysis, extending 500 meters in each direction with 25 meter grid spacing.

In addition to the Cartesian grids, discrete receptors were placed at 25 meter intervals except in the location around the construction area. For this portion of the fence line, receptors were placed at 10 foot (3.05 meter) intervals (similar to the fence line used for the analysis in Chapter 17, "Construction"). The northern fence line is at the Viele Avenue lot line and the waterfront fence line is at the location of natural shoreline, moved from the bulkhead line. Appendix 8 provides an exhibit depicting receptors near the plant.

Discrete receptors were placed at several locations at residences in the vicinity of the Hunts Point WPCP, within the Barretto Point Park located northwest of the plant that will include the 1.2 acre parcel on Lot 901 used as a construction staging area, and at Tiffany Pier. Sensitive and discrete receptors were also placed north of the facility up to 3 kilometers (km) away, at locations such as residences, schools, and churches. All receptors were referenced to Universal Transverse Mercator (UTM) coordinates.

C. EXISTING CONDITIONS

AMBIENT AIR MONITORING DATA

Monitored concentrations of SO_2, NO_2, CO, PM_{10}, and $PM_{2.5}$ for the area are shown in Table 8-2 below. These values (2005) are the most recent monitored data that have been made available by NYSDEC for the IS52 High School monitoring site and the Botanical Gardens monitoring site (See Figure 8-2 for locations of these monitoring sites). These sites were selected because they are the closest representative monitoring stations to the Hunts Point WPCP. There were no monitored violations of NAAQS for NO_2, SO_2, CO, or PM_{10} at these monitoring sites. The ambient $PM_{2.5}$ concentrations were 52.4 $\mu g/m^3$ and 13.7 $\mu g/m^3$ for the maximum 24-hour and annual averaging periods; the 24-hour concentration would exceed the revised NAAQS of 35 $\mu g/m^3$.

Hunts Point WPCP

Nearby Background Monitoring Stations

Figure 8-2

Table 8-2
Most Recent Monitored Ambient Air Quality Data

Pollutants	Location	Units(1)	Period	Concentration	Exceeds Federal Standard? Primary	Exceeds Federal Standard? Secondary
CO	Botanical Gardens	Ppm	8-hour	2.2	N	-
			1-hour	3.9	N	-
SO_2	IS 52	μg/m^3	Annual	29	N	-
			24-hour	110	N	-
			3-hour	183	-	N
Respirable particulates (PM_{10})	IS 52	μg/m^3	Annual	18 (2)	-	N
			24-hour	40 (2)	-	N
Respirable particulates ($PM_{2.5}$)	IS 52	μg/m^3	Annual	13.7	-	N
			24-hour	52.4	-	Y[3]
NO_2	IS 52	μg/m^3	Annual	55	N	N

Notes:
[1] Units are either in parts per million (ppm) or micrograms per cubic meter (μg/m^3)
[2] Ambient monitoring data are not yet available from NYSDEC for 2005. The latest available value was used instead. The annual PM_{10} standard has been rescinded by EPA.
[3] The most recent monitoring data show concentrations that exceed the recently promulgated 24-hour $PM_{2.5}$ standard of 35 μg/m^3
Source: NYSDEC, 2004-2005 New York State Ambient Air Quality Data.

BACKGROUND CONCENTRATIONS

To estimate the maximum expected pollutant concentration at a given receptor, the calculated impact from the Hunts Point WPCP exhaust stacks must be added to a background value that accounts for existing pollutant concentrations from other sources (see Table 8-3).

The background levels were based on concentrations monitored at the nearest NYSDEC ambient air monitoring stations as follows. The 3-hour and 24-hour background levels for SO_2 are the maximum second-highest concentrations measured for the 2001-2005 period. The annual average background values for NO_2 and SO_2 are the highest annual averages measured over the same period. The 24-hour background value for PM_{10} is the maximum second-highest concentration from 2002-2004. For CO, the background values are also based on the maximum second highest concentrations measured from 2001-2005. No background concentration was developed for $PM_{2.5}$ since $PM_{2.5}$ impacts will be compared to the interim guidance criteria and not the NAAQS.

Table 8-3
Maximum Background Pollutant Concentrations

Pollutant	Average Period	Location	Concentration (μg/m^3)	NAAQS (μg/m^3)
NO_2	Annual	IS 52	60	100
SO_2	3-hour	IS 52	210	1,300
	24-hour		134	365
	Annual		34	80
CO	1-hour	Botanical Gardens	5,600	40,000
	8-hour		3,086	10,000
PM_{10}	24-Hour	I.S. 52	46	150

Notes: Background concentrations for short-term standards represent second-highest concentrations, except for CO, which is the five-year highest concentration.
Background concentrations for annual standards represent five-year highest concentrations. Therefore, background values in Table 8-3 can be greater than most recent monitored values reported in Table 8-2.
Sources: New York State Ambient Air Quality Report, NYSDEC 2001 -2005.
NYCDEP Memorandum on Background Data for Modeling NO_2, SO_2 and PM_{10} (April 19, 2006).

D. THE FUTURE WITHOUT THE PROPOSED ACTION

In the future without the proposed action, air quality in the region is anticipated to be similar to that described for existing conditions. Land uses are expected to remain generally the same in this neighborhood and since air quality regulations mandated by the Clean Air Act are anticipated to maintain or improve air quality in the region, it can be expected that air quality conditions in the future without the proposed action would be no worse than those that presently exist.

Most of the sources of criteria air pollutants at the plant would already be in place by the completion of the Phase II Upgrades, Therefore, the subsequent predicted off-site air quality impacts from such sources would occur in the future without the proposed action. This section provides a summary of changes made to the previous Phases I and II criteria pollutant modeling and the short-term and annual impact scenarios for the future without the proposed action. Discussions of the potential additional source (the 500 kW emergency generator) associated with the proposed action), along with the predicted impacts from the entire plant as upgraded under the Phase I and II Upgrades and the proposed action are provided later in this chapter, under "Probable Impacts of the Proposed Action."

PREVIOUS PHASES I AND II CRITERIA POLLUTANT MODELING

In the future without the proposed action, the plant would operate as upgraded under the Phase I and Phase II Upgrades. An air quality impact assessment was performed for the Phase I and Phase II portions of the facility upgrade and was discussed and presented in the Phase II Negative Declaration. The assessment included all of the plant sources including the proposed Phase I and Phase II sources plus three replacement waste gas burners proposed for the Phase III Upgrade. The heating loads anticipated with the Phase III Upgrade were also considered in the earlier analyses.

UPDATES TO THE IMPACT ANALYSES IN THIS EIS

This EIS analysis generally employs the same information and data that were utilized in the modeling for the Phase I and II Upgrade elements that were reported in the Phase II negative declaration. Criteria pollutant emission rates and combustion source stack parameters were obtained from the previous modeling analysis. However, this EIS analysis updates the previous modeling in the following areas:

- Meteorological data have been updated.
- The use of AERMOD for the $PM_{2.5}$ 24-hour averaging period.
- The emergency generator operating scenarios were updated for this EIS based on expected plant operation. In the Phase II Negative Declaration, the six 2,000 kW generators were modeled at full continuous operation for a maximum of six hours a day. A time period of 6AM to noon was selected as the worst-case time period and run for the short-term analysis. For this EIS, three emergency generator scenarios were modeled to account for participation in the PLM program and for two maintenance testing scenarios. These scenarios are discussed in detail below. In addition, for $PM_{2.5}$, more reasonable worst-case operating scenarios were modeled for the other plant combustion sources.

- The use of ULSD fuel in the emergency generators, including the use of revised emergency generator PM_{10} and $PM_{2.5}$ emission rates based on an updated emission factor obtained from Cummins (the supplier of the 2,000 kW generators).
- Additional receptor sites were placed in Barretto Point Park and along the property lines of the Hunts Point WPCP
- Additional annual operating hours for the emergency generators. The emergency generators in the Phase II negative declaration were modeled for 65 hours per year per generator. For this EIS, the emergency generators were modeled for 106 hours per year per generator.

SHORT-TERM IMPACTS SCENARIO FOR THIS EIS

This section discusses the short-term impacts scenario for this EIS. Except for the updates noted above, the analyses followed the parameters and assumptions employed in the Negative Declaration for the Phase II Upgrade.

BOILERS AND WASTE GAS BURNERS

For the boilers, it was assumed that emissions from four main building boilers would be released through three flues, located in the southeast corner of the main building. Main building boilers are capable of burning both natural and digester gas. During cold months, digester gas is typically beneficially used to meet the heating demands of the plant. During these months, the digester gas is collected and used to fuel the plant boilers. The plant boilers in turn provide hot water for the sludge digester operations and the building heating systems. Natural gas is used to supplement the digester gas when additional demand exists. During the warmer months, the excess digester gas is sent to the gas burners. The short-term analysis assumes that, due to some unlikely operating problems, using digester gas in the Main building boilers would not be possible and that the gas would have to be flared. This is conservative, since it was assumed that 4 of the 5 boilers in the main building, 1 of the 2 boilers in the dewatering building, and 2 of the 3 waste gas burners would be operating concurrently at full load for 24 continuous hours for the short-term analysis for all pollutants except $PM_{2.5}$. It was assumed that Boilers 1 2, 3, and 4 would operate on natural gas. Boilers 1 and 2 and Boilers 3 and 4 would each be exhausted through a common stack. Boiler 5, which is exhausted through a separate flue, is standby equipment and was not used in the modeling analysis. It was also assumed that two 40,000 standard cubic feet (scf) replacement waste gas burners would be operating at 100 percent capacity, and the dewatering building boiler would be operating at 100 percent capacity firing distillate oil.

Between the DEIS and the FEIS, more reasonable worst-case operating conditions were employed under the PLM and generator testing scenarios for the $PM_{2.5}$ analysis. Unrealistic conservative assumptions were used in the DEIS which led to over predictions of emissions because it considered the fuel combustion equipment operating at expected maximum loads concurrently, when such conditions would not occur at the plant. There would be less equipment operating at any given time of the year. For example, in the summer months when there is no heating demand, it was assumed in the DEIS that four out of five boilers would be operating at 100 percent load to provide heat to the plant facilities. Conversely, in the winter months when the heating demand is high, the waste gas burners would not be operating concurrently with the boilers, as was assumed in the DEIS.

For the FEIS, the assumptions were revised for the $PM_{2.5}$ 24 hour analysis. Under PLM, it was assumed that 1 out of 4 main building boilers are operating on natural gas at 0.32 utilization, 2 out of 3 waste gas burners are operating at 100 percent load, and there would be no operation of the dewatering building boilers or the 500 kW emergency generator. Under the emergency generator testing scenarios it was assumed that 2 out of 4 main building boilers are operating on natural gas at 100 percent load, 1 out of the four main building boilers are operating on digester gas at 100 percent load, 1 out of the three waste gas burners are operating at 100 percent load, 1 out of 2 dewatering building boilers are operating at 100 percent load on natural gas, and the 1-500 kW emergency generator would be operating at 100 percent load for 2 hours per day.

2,000 kW EMERGENCY GENERATORS

The emergency generators would provide back-up power if utility service becomes unavailable and would be operated regularly for maintenance testing and exercising. In addition, NYCDEP could also operate the emergency generators during periods outside of "emergency" conditions under a PLM program, which aims to reduce peak load demand and prevent the possibility of blackouts or brownouts due to insufficient electric supply within New York City. Under these programs, the Hunts Point WPCP may be requested to reduce electrical demand. Emissions from the emergency generators were modeled to assess the effects of maintenance testing and potential participation in a PLM program.

Emergency generator operating scenarios were developed based on how the generators are expected to be utilized. Three short-term operating scenarios were modeled to predict short-term stationary source impacts from the Hunts Point WPCP. The PLM program would only be in effect from June 1 though September 30 between the hours of 11 AM to 7 PM. During this period, the analysis assumed five 2,000 kilowatt (kW) emergency generators would operate for up to a maximum of six hours per day (11 AM to 5 PM), under non-emergency conditions. Based on discussions with NYCDEP's plant operators, the 2,000 kW generators are never expected to operated at 100 percent load, and the generators were assumed to operate simultaneously at their expected maximum loads (75 percent). This is considered the maximum PLM scenario, and operation of the emergency generators assuming participation in the PLM program is considered Scenario 1.

The analyses in the Phase II Negative Declaration and this EIS assume in the short-term analysis that all combustion equipment at the Hunts Point WPCP would be operated simultaneously at maximum load when the 2,000 kW emergency generators are utilized except for the $PM_{2.5}$ analysis as discussed above.

During the rest of the year or the hours in the June through September period when the PLM program is not in effect, or if NYCDEP decides not to participate in the PLM program, the six 2,000 kW emergency generators would be subjected to maintenance testing under two operating scenarios. The first scenario, Scenario 2A, would be operation of four (4) out of the six (6) generators operating at 75 percent load for two hours per day. The second scenario, Scenario 2B, would be operation of three (3) out of the six (6) generators operating at partial load for two hours per day. For modeling purposes, 50 percent load conditions were used to simulate partial load operation. These scenarios were developed since they are reasonable worst-case scenarios and would cover the range of impacts expected from maintenance testing.

Tables 8-4 and 8-5 summarize the number and type of combustion equipment assumed to be operating for the short-term analysis. Table 8-6 summarizes the short-term model inputs and emission rates. All of the stack parameters and emission rates were based on the permit and conservative estimates of concurrent fuel combustion from the boilers, waste gas burners, and emergency generators. In addition, in the time period between the issuance of the DEIS and the FEIS, the NYCDEP has committed to the use of ultra low sulfur distillate (ULSD) oil in the emergency generators. With the use of ULSD in these generators, the guaranteed emission factors from the vendor were incorporated into the analysis.

Table 8-4
Future Without the Proposed Action
Combustion Equipment for the Short-term Impacts Analysis
NO_2, CO, PM_{10}, and SO_2

Number and Type of Equipment
4 - Main Bldg. Boilers at 100 percent load
2 - Waste Gas Burners at 100 percent load [1]
1 – Dewatering Facility Boiler at 100 percent load firing distillate oil.
Emergency Generator Scenarios:
Scenario 1: Participation in the PLM program: 6 - 2,000 kW Emergency Generators at 75 percent load for 6 hours per day, from June 1 through September 30. NYCDEP will only operate 5 generators, however, modeling for these pollutants was done with 6 generators.
Scenario 2A: 4 – 2,000 kW Emergency Generators at 75 percent load operating for 2 hours per day each.
Scenario 2B: 3 – 2,000 kW Emergency Generators at 50 percent load operating for 2 hours per day each.
Note: 1. Considered in the Phase II assessment even though they are Part of the Phase III Upgrade.

Table 8-5
Future Without the Proposed Action
Combustion Equipment for the Short-term Impacts Analysis
$PM_{2.5}$

Number and Type of Equipment
Scenario 1: PLM Condition
1 - Main Bldg. Boilers at 0.32 utilization firing natural gas.
2 - Waste Gas Burners at 100 percent load [1]
0 - Dewatering Facility Boilers
Scenarios 2A and 2B: Emergency Generator Testing Conditions
2 – Main Bldg. Boilers at 100 percent load firing natural gas.
1 – Main Bldg. Boiler at 100 percent load firing digester gas.
1 – Waste Gas Burner at 100 percent load
1 – Dewatering Facility Boiler at 100 percent load firing natural gas.
Note: 1. Considered in the Phase II assessment even though they are Part of the Phase III Upgrade.

Table 8-6
Future Without the Proposed Action
Short-term Model Input Parameters [1]

Source ID / Source Description		Grade Elev. (m)	Stack Ht. (m)	Stack Temp. (K)	Exit Velocity (m/s)	Stack Diam. (m)	Stack Emissions (g/sec)[2] SO$_2$	CO	PM$_{10}$	PM2.5
MB1	Main Bldg. Boilers 1 and 2 (100 percent, Natural Gas)	3.66	23.16	402.6	8.84	1.067	0.00791	0.293	0.0395	0.0395
MB2	Main Bldg. Boilers 3 and 4 (100 percent, Natural Gas)	3.66	23.16	402.6	8.84	1.067	0.00791	0.293	0.0395	0.0395
MB1-PLM - PM$_{2.5}$	Main Building Boiler 1 (0.32 percent utilization, Natural Gas)	3.66	23.16	402.6	4.42	1.067	NA	NA	NA	0.00633
MB2 S2A/S2B PM$_{2.5}$	Main Building Boiler 3 (100 percent, Digester Gas)	3.66	23.16	402.6	4.321	1.067	NA	NA	NA	0.0374
FL1	Waste Gas Burner 1 (100 percent)[3]	4.57	13.84	1144.3	8.82	1.83	0.166	0.605	0.0181	0.0181
FL2	Waste Gas Burner 2 (100 percent)[3]	4.57	13.84	1144.3	8.82	1.83	0.166	0.605	0.0181	0.0181
DB	Dewatering Bldg. Boiler (100 percent, fuel oil No. 2)	3.35	26.52	436.0	8.84	0.581	0.43[4]	0.148	0.0278	0.0213
EGPLM	Six 2,000 kW emergency generators (diesel)[5,7]	4.57	18.29[6]	708.2	9.62[6]	2.13	3.653	2.009	0.877	---
EGPLM	Five 2,000 kW emergency generators (diesel)[5,7]	4.57	18.29[6]	708.2	8.02[6]	2.13	---	---	---	0.487
EG2A	Four, 2,000 kW emergency generators (diesel)[5]	4.57	18.29[6]	708.2	6.41[6]	2.13	2.436	1.340	0.585	0.390
EG2B	Three, 2,000 kW emergency generators (diesel)[4]	4.57	18.29[6]	688.7	3.55[6]	2.13	1.218	0.791	0.292	0.195

Notes:
1. All source parameters and emissions used in the tables are obtained from the Project engineers.
2. Emissions were prorated based on the maximum number of units assumed to be simultaneously operating. For the emergency generators, the emissions for each generator were multiplied by the number of generators assumed to be running.
3. The SO$_2$ emissions from the dewatering building boiler were adjusted down to 0.2 percent sulfur used at the facility, since the emission estimates provided by the vendor were based on 0.5 percent sulfur content in oil.
4. The five emergency diesel generators under EGPLM were assumed to be operating for six hours per day during the periods from June 1 though Sept. 30. The generators operating under EG2A and EG2B were assumed to be operating for 2 hours per day.
5. The existing emergency generator stack was constructed at a height of 60 ft (18.29 m). This is different from the Phase II modeling analysis performed that assumed a 50 foot stack height.
6. The velocity was prorated based on the maximum number of generators assumed to be operating. EGPLM and EG2A reflect 75 percent load conditions. EG2B reflects 50 percent load conditions.
7. NYCDEP will only operate five out of six generators, however, the modeling analysis was run with six generators for SO$_2$, CO, and PM$_{10}$, and for five generators for PM$_{2.5}$.

ANNUAL IMPACTS SCENARIO FOR THIS EIS

This section discusses the annual impacts scenario for this EIS. Except for the updates noted above, the analyses followed the parameters and assumptions employed in the Negative Declaration for the Phase II Upgrade.

For the annual modeling analysis, projected utilization of the combustion equipment was used. The degree to which the boilers would be utilized depended on the plant’s heat load, which varied throughout the year. The dewatering building boiler was projected to operate for seven months of the year at a 62 percent utilization rate, firing distillate oil. This projection of boiler fuel usage was based on previous years of operation.

Annual emissions for the emergency generators were conservatively assumed to operate as part of the PLM program. If the plant participates in the program, the plant may be requested to operate the emergency generators which would reduce the peak electrical demand from the power utilities. For each request, the emergency generators would be operated for a maximum of six hours per day up to 15 times per year, potentially resulting in each emergency generator operating for an additional 90 hours per year between June and September (four months). Normal exercising for maintenance purposes would require average operation of 16 hours per year per unit between October and May (eight months). Therefore, the total number of hours for any given emergency generator could be up to 106 hours per year per unit. Note that five out of six generators will be operated under the PLM program.

The degree to which the boilers and waste gas burners would be utilized depends on the plant's heat load, which varies throughout the year. The average annual plant operating conditions from the previous Phase I and II analyses are presented in Appendix 8. This same information was employed in the future without the proposed action for this EIS.

Table 8-7 presents the source input parameters used for the annual impacts modeling. All of the stack parameters and emission rates are based on the permit and reasonable conservative assumptions for how the plant is expected to operate.

Table 8-7
Future Without The Proposed Action
Annual Model Input Parameters

Source ID	Source description(1)	Grade elev. (m)	Stack height (m)	Stack temp. (K)	Exit Velocity (m/s)	Stack diam. (m)	Emissions (g/s)			
							SO_2	NOx	PM_{10}	$PM_{2.5}$ (2)
MB1	Boiler 1 digester gas (0.85)[1] (shares flue)	3.66	23.16	402.6	8.74	1.067	0.175	0.149	0.0318	0.0318
MB2	Boiler 1 digester gas (0.20)	3.66	23.16	402.6	4.321	1.067	0.0411	0.0350	0.00748	0.00748
MB3	Boiler 1 digester gas (0.50)	3.66	23.16	402.6	4.321	1.067	0.105	0.0892	0.0191	0.0191
MB4	Boiler 4 natural gas (0.20)	3.66	23.16	402.6	4.42	1.067	0.000830	0.0291	0.00415	0.00415
MB5	Boiler 2 natural gas) (1.00) (shares flue)	3.66	23.16	402.6	8.74	1.067	0.00395	0.138	0.0198	0.0198
MB6	Boiler 3 natural gas (1.00)	3.66	23.16	402.6	4.42	1.067	0.00395	0.138	0.0198	0.0198
MB7	Boiler 3 natural gas (1.00)	3.66	23.16	402.6	4.42	1.067	0.00395	0.138	0.0198	0.0198
MB8	Boiler 2 natural gas (0.50)	3.66	23.16	402.6	4.42	1.067	0.00198	0.069	0.0099	0.0099
MB9	Boiler 3 natural gas (0.30)	3.66	23.16	402.6	4.42	1.067	0.00119	0.0415	0.00593	0.00593
MB10	Boiler 3 natural gas (0.91)	3.66	23.16	402.6	4.42	1.067	0.00360	0.126	0.0180	0.0180
DB	Dewatering Bldg. Boiler (Fuel oil No. 2) (0.62)	3.35	26.52	436.0	8.84	0.581	0.269	0.327	0.0173	0.0132
FL1	Flare 1 (0.81)	4.57	13.84	1144.3	7.14	1.83	0.135	0.122	0.0147	0.0147
FL2	Flare 2 (0.43)	4.57	13.84	1144.3	3.80	1.83	0.0715	0.065	0.0078	0.0078
EG	Six 2,000 kW generators (Diesel)	4.57	18.29	708.2	9.62	2.13	0.0442	0.239	0.01061	0.01061

Note: (1) The number in parentheses indicates the actual projected utilization (i.e., percent of maximum capacity) of the combustion equipment.
(2) The $PM_{2.5}$ annual impacts are conservatively modeled assuming #2 diesel fuel even though the generators will operate on ultra low sulfur diesel (ULSD) fuel.

E. PROBABLE IMPACTS OF THE PROPOSED ACTION

As discussed above, for NO_2, CO, PM_{10}, and SO_2, the air quality analysis considered impacts from the entire plant as upgraded under the Phase I, II, and III Upgrades and the carbon addition facility, rather than the incremental impact from Phase III only, in order to determine the WPCP's overall impacts and compliance with NAAQS. For $PM_{2.5}$, impacts were also analyzed from the entire plant as upgraded (Phases I, II, and III and carbon addition) and compared to the NYSDEC and NYCDEP $PM_{2.5}$ interim guidance criteria. The Phase III Upgrade analysis incorporated building profiles due to the egg-shaped digesters, and a new 500 kW emergency generator.

In addition to the analysis of the proposed action with the two new egg-shaped digesters (the two-digester scenario), an analysis was performed to analyze the effect of installing two additional egg-shaped digesters (the four-digester scenario) and decommissioning the existing, outdated digesters. As part of this analysis, building profile changes were analyzed and the worst-case modeling run (the $PM_{2.5}$ 24-hour run) was re-run to determine if the overall conclusions would change as a result of the additional digesters.

TWO-DIGESTER SCENARIO

500 kW EMERGENCY GENERATOR

The only proposed source not covered under the existing permit and not previously modeled in an environmental review is the 500 kW emergency generator. Therefore, an assessment of the emissions from this equipment was done for the modeling of the entire plant.

Short-term Impacts Parameters

The 500 kW emergency generator would not participate in the PLM program. For normal maintenance testing, this generator would operate up to 100 percent load for 2 hours once per month. These tests would not occur on the same day that the other generators could be employed in the PLM program. To determine the worst case 24-hour impacts for maintenance testing, the generator was first modeled using separate source groups consisting of two-hour block periods for maintenance testing. The block hourly time periods yielding the worst-case impacts were used in subsequent analyses. This generator could potentially be subjected to maintenance testing on the same day as the six existing 2,000 kW generators are also subjected to maintenance testing. Table 8-8 presents the short-term stack parameters and emission rates for the 500 kW emergency generator.

Table 8-8
Short-term Model Input Parameters from the Proposed Action

Source ID / Source Description		Grade Elev.	Stack Ht.	Stack Temp.	Exit Velocity	Stack Diam.	Stack Emissions (g/sec)[2]			
		(m)	(m)	(K)	(m/s)	(m)	SO_2	CO	PM_{10}	$PM_{2.5}$
EG500	One 500 kW emergency generator[(1)]	6.10	10.67	755.9	23.45	0.305	0.15	0.54	0.050	0.50

Note:
[(1)] Low sulfur fuel was conservatively assumed for this unit in the modeling analysis even though the unit will operate on ULSD.

Annual Impacts Parameters

Annual operation of the 500 kW emergency generator assumed that the generator would operate for 24 hours per year for maintenance testing. The modeling analysis assumed 65 hours per year as a conservative worst-case annual condition. Table 8-9 presents the annual stack parameters and emission rates for the 500 kW emergency generator.

Table 8-9
Annual Model Input Parameters from the Proposed Action

Source ID	Source description	Grade elev. (m)	Stack height (m)	Stack temp. (K)	Exit Velocity (m/s)	Stack diam. (m)	Emissions (g/s) SOx	NOx	PM_{10}	$PM_{2.5}$
EG500	One 500 kW generator[(1)]	6.1	10.67	755.9	23.45	0.305	0.0011	0.0074	0.00037	0.00037

Note:
[(1)] Low sulfur fuel was conservatively assumed for this unit in the modeling analysis even though the unit will operate on ULSD.

ENTIRE PLANT AS UPGRADED UNDER PHASES I, II, AND THE PROPOSED ACTION

To disclose the full impacts of previous plant upgrades and the proposed action, criteria pollutant impacts from the entire facility as upgraded under Phases I and II, and the proposed action were determined and compared to the NAAQS. In addition, an analysis for $PM_{2.5}$ was performed, which also analyzed impacts from the entire plant as upgraded and compared them to the updated $PM_{2.5}$ interim guidance criteria. Figure 8-1 presents the locations of all the combustion sources (including the Phase I and II sources) that were included in the criteria pollutant modeling analysis.

Potential $PM_{2.5}$ impacts from generator maintenance testing of the new emergency generator associated with the proposed action and the 2,000 kW generators installed under Phase II on the same day were compared with $PM_{2.5}$ impacts under PLM operation. The impacts under simultaneous generator maintenance testing of all generators were lower than impacts under PLM operation.

Criteria Pollutant Impacts

Using the procedures described above, the ISCST3 and PRIME models were used to estimate the maximum off-site pollutant concentrations. The maximum predicted concentrations from the modeling of the WPCP were added to the background concentrations to estimate the ambient air quality at the locations near the project site.

Table 8-10 presents the maximum criteria pollutant impacts at the upgraded Hunts Point WPCP.

The results of the modeling analysis indicated that the entire plant as upgraded under Phases I, II, and the proposed action would not result in any impacts exceeding the NAAQS for NO_2, SO_2, PM_{10}, and CO. Therefore, no significant adverse air quality impacts are predicted from these emissions.

As part of the previous environmental evaluation of the Phase II Upgrade, additional cumulative analyses of the impacts from other major regional air pollution sources were performed. These included an identification of existing or planned major sources of air contaminants that could have cumulative impacts for criteria air pollutants that require comparisons to the NAAQS to determine the significance of potential air quality impacts. In a cumulative assessment, these sources are modeled in addition to background conditions that are based on ambient air quality monitoring stations. Based on review of the Phase II detailed cumulative emissions inventory and other cumulative emissions inventory assessments in the area, NYCDEP has determined that a new detailed cumulative emissions inventory is not necessary for the purposes of assessing the impacts of the proposed action. Based on the results of the Phase II assessment, there were no significant cumulative air quality impacts from the Hunts Point plant's sources and those from the surrounding region for criteria air pollutants. NYCDEP has determined that no substantive changes in permitted regional emission sources have occurred since the Phase II Upgrade environmental evaluation was completed that would affect the conclusion of the previous cumulative assessment. Therefore, including a cumulative emissions inventory as part of the proposed action's air quality analysis would not change the impact conclusions related to the proposed action.

Table 8-10
Maximum Predicted Total Concentrations[1]

Pollutant	Averaging Period	Background Conc. (μg/m³)	Predicted Impact (μg/m³)[2]	Total Max Predicted Conc. (μg/m³)	Ambient Standard (μg/m³)
NO_2	Annual	60	3.1	63	100
SO_2	3-hour	210	280	490	1,300
	24-hour	134	48	182	365
	Annual	34	2.5	36.5	80
PM_{10}	24-hour	46	12	58	150
CO	1-hour	5,600	383	5,983	40,000
	8-hour	3,086	125	3,211	10,000

Notes:
1. The impacts presented are the total impacts from the entire plant as upgraded under Phases I and II, and the proposed action.
2. Short-term concentrations represents the highest impact from the PLM scenario, generator maintenance testing scenario 2A, and generator maintenance testing scenario 2B. For the criteria pollutant analysis, the PLM program was conservatively modeled assuming six 2,000 kW emergency generators operating even though only five would operate.

$PM_{2.5}$ Impacts

$PM_{2.5}$ concentrations were also determined for the entire facility as upgraded under Phases I, II, and the proposed action, with the updated modeling and inclusion of the use of ULSD for the generators for the FEIS noted above, and with five out of six generators operating under PLM conditions. The potential $PM_{2.5}$ impacts were evaluated on both a localized and neighborhood-scale. The results were then compared to the applicable interim guidance criteria (described above) to evaluate whether such predicted incremental impacts would be considered potential significant adverse impacts. For the 24-hour impact assessment, the potential frequency and extent of the predicted off-site $PM_{2.5}$ incremental impacts, especially at locations where 24-hour exposure could occur, were examined. In addition, since the 2,000 kW generators installed under Phase II are the predominant sources contributing to the maximum predicted short-term off-site $PM_{2.5}$ incremental impacts, the analyses considered the potential impacts under various operating scenarios for the generators. This included potential impacts from participation in the PLM program with five generators operating, maintenance testing, and no emergency generators operating, which represents the most typical operation condition at the plant. A summary of the maximum predicted $PM_{2.5}$ impacts for these three scenarios—participation in PLM program with five generators operating, maintenance testing scenarios, and no emergency generators operating—are discussed below, followed by the conclusions of $PM_{2.5}$ impacts for the two-digester scenario.

Participation in PLM Program. As discussed above under the future without the proposed action, if NYCDEP participates in the PLM program, it would only be in effect from June 1 though September 30 between the hours of 11 AM to 7 PM. If the plant participates in the program, the plant may be requested to operate the emergency generators which would reduce the peak electrical demand from the power utilities. For each request, up to five of the 2,000 kW emergency generators would be operated for a maximum of six hours per day up to 15 times per year, potentially resulting in each emergency generator operating for an additional 90 hours per year between June and September (four months). Therefore, the impact presented in this section would be limited to these timeframes, and only when the NYCDEP participates in the PLM. Figure 8-3 presents a contour map (isopleths) illustrating the extent of the $PM_{2.5}$ 24-hour exceedance of the applicable interim guidance criterion and the maximum predicted total off-site incremental $PM_{2.5}$ concentrations with the PLM program for any off-site location, which is over the water in areas inaccessible to the general public.

With participation in the PLM program, the maximum $PM_{2.5}$ 24-hour impact was calculated at 6.3 μg/m^3 located on the western fence line on the waterfront near the bulk head line, which is considered part of NYCDEP property and not a place of public access. This area is only accessible by boat. The area south of Barretto Point Park at Ryawa Avenue will be fenced off from the public, restricting access to the western fence line of the plant.

As shown in Table 8-11, the maximum predicted impacts at the nearest residential receptor was 0.62 μg/m^3 under the PLM scenario. At the nearest residential neighborhood, the maximum predicted 24-hour incremental $PM_{2.5}$ concentrations would also be less than 1 μg/m^3 under the PLM scenario. Also shown in Table 8-11 is the maximum predicted $PM_{2.5}$ impacts under the PLM scenario at the Barretto Point Park, 1.80 μg/m^3, which includes the 1.2 acre parcel that would be transferred to NYCDPR for inclusion in the Barretto Point Park. On the Ryawa-Viele Connection of the proposed South Bronx Greenway, the maximum 24-hour incremental $PM_{2.5}$ concentrations was 1.86 μg/m^3 under the PLM scenario.

The annual microscale $PM_{2.5}$ impact at a discrete location was determined as 0.15 μg/m^3, below the 0.3 μg/m^3 interim guidance threshold and the annual $PM_{2.5}$ neighborhood impact was determined as 0.04, well below the 0.1 μg/m^3 neighborhood threshold.

Table 8-11
Maximum Predicted $PM_{2.5}$ Concentrations at Barretto Point Park and Nearest Residential Receptor

Pollutant	Scenario	Maximum Impacts (μg/m^3)	
		Barretto Point Park	Nearest Residential Receptor
$PM_{2.5}$	PLM	1.8	0.62
	Maintenance Testing 2A	1.5	0.80
	Maintenance Testing 2B	1.4	0.72
	No Emergency Generators	0.79	0.63

Maintenance Testing Scenarios. As discussed above, for normal maintenance testing, the 500 kW generator associated with the proposed action and each of the 2,000 kW generators implemented under the Phase II Upgrade would be subjected to maintenance testing for 2 hours once per month. Under the scenario, the engine generators are being subjected to maintenance testing on a short-term, monthly basis. Therefore, the impact presented in this section would be limited to the days such maintenance testing is performed.

6.20.07

Project Site Boundary

Maximum Impact

Hunts Point WPCP

$PM_{2.5}$ 24-Hour Maximum Impacts Under the PLM Scenario

Figure 8-3

The maximum $PM_{2.5}$ 24-hour impact from the emergency generator maintenance testing scenario was determined as 2.76 µg/m^3. This location is also located along the western fence line at the bulkhead near where the comparable maximum $PM_{2.5}$ impacts were determined for the PLM scenario, and would be inaccessible to the general public.

As shown in Table 8-11, the maximum predicted impacts at the nearest residential receptor were 0.80 µg/m^3 under the maintenance testing scenario. At the nearest residential neighborhood, the maximum predicted 24-hour incremental $PM_{2.5}$ concentrations would also be less than 1 µg/m^3 under this scenario. Also shown in Table 8-11 is the maximum predicted $PM_{2.5}$ impacts under the maintenance testing scenario at the Barretto Point Park (1.50 µg/m^3), which includes the 1.2 acre parcel that would be transferred to NYCDPR for inclusion in the Barretto Point Park. On the proposed Ryawa-Viele Connection of the proposed South Bronx Greenway, the maximum 24-hour incremental $PM_{2.5}$ concentrations was 1.71 µg/m^3 under the maintenance testing scenario, which is the maximum predicted $PM_{2.5}$ 24-hour impact at a location of public access.

No Emergency Generators. For most of the year, none of the emergency generators would be operating under either the PLM program or for maintenance testing. This section summarizes this scenario that would be most typical of how the plant would operate, while still incorporating a number of conservative operating assumptions as discussed in "Future Conditions Without the Proposed Action" above. During the period from June through September, this includes 1 main building boiler at 0.32 percent utilization firing natural gas and 2 out of the three waste gas burners at 100 percent load, and no dewatering building boilers. During the period from October through May, these include 2 out of 4 main building boiler at 100 percent load burning natural gas, 1 out of 4 main building boilers at 100 percent load burning digester gas, 1 out of 3 waste gas burners at 100 percent load, and 1 out of 2 dewatering facility boilers burning natural gas at 100 percent load.

As shown in Table 8-11, the maximum predicted impacts at the nearest residential receptor were 0.63 µg/m^3 under the no emergency generators operating scenario. At the nearest residential neighborhood, the maximum predicted 24-hour incremental $PM_{2.5}$ concentrations would also be less than 0.63 µg/m^3 under this scenario. Also shown in Table 8-11 is the maximum predicted $PM_{2.5}$ impacts under the no emergency generators operation scenario at the Barretto Point Park (0.79 µg/m^3), which includes the 1.2 acre parcel that would be transferred to NYCDPR for inclusion in the Barretto Point Park. On the proposed Ryawa-Viele Connection of the proposed South Bronx Greenway, the maximum 24-hour incremental $PM_{2.5}$ concentrations was 1.57 µg/m^3 under the no emergency generators operating scenario.

$PM_{2.5}$ Impact Conclusions. Based on the analyses and results summarized above, for the plant as upgraded under the Phase I and II Upgrades and the proposed action, the maximum predicted $PM_{2.5}$ annual average and 24-hour impacts would be below the interim guidance criteria of 0.1 µg/m^3 and 2 µg/m^3, respectively at all locations of public access. The only location where the 2 µg/m^3 or 5 µg/m^3 $PM_{2.5}$ 24-hour criteria would be exceeded is along the waterfront where there would be no public access.

The nearest sensitive receptor location with potential continual 24-hour exposure would be the closest residence. At this residence, when no emergency generators are operating, the maximum predicted incremental $PM_{2.5}$ 24 hour concentration would be 0.63 µg/m^3, and less than 0.63 µg/m^3 in the nearest residential neighborhoods. During PLM participation and emergency generator testing periods, the maximum predicted incremental $PM_{2.5}$ 24 hour concentration would be 0.62 and 0.8 µg/m^3, respectively. These values are well below the 2 µg/m^3 criterion.

Other nearby receptors include Barretto Point Park and the proposed South Bronx Greenway. At the park, under typical, yet conservative conditions, the maximum predicted incremental $PM_{2.5}$ 24 hour concentration would be 0.79 µg/m^3. During PLM participation and emergency generator testing periods, the incremental concentration would be 1.8 and 1.5 µg/m^3, respectively. At the proposed South Bronx Greenway, under typical, yet conservative, conditions, the maximum predicted incremental $PM_{2.5}$ 24 hour concentration would be 1.57 µg/m^3. During PLM participation and emergency generator testing periods, the incremental concentration would be 1.86 and 1.71 µg/m^3, respectively.

Therefore, no potential significant air quality impacts related to $PM_{2.5}$ are expected to occur with the plant as upgraded under the Phases I and II Upgrades and the proposed action.

FOUR-DIGESTER SCENARIO

In addition to the two-digester modeling analysis, analyses were performed with the two additional egg-digesters to determine whether there would be any differences in maximum predicted off-site concentrations. The result of these analyses indicated that the maximum predicted increments under the four-digester scenario were less than or equal to the maximum predicted increments estimated for the two egg-digester scenario including all pollutants analyzed. The lower values were due to the effect of additional dispersion as a result of the wake effects from the two additional digesters. Therefore, there would be no significant adverse criteria air pollutant impacts under the four-digester scenario.

CONCLUSIONS

Based on the analyses conducted above, the entire Hunts Point plant as upgraded under the proposed action would not result in any predicted potential significant adverse air quality impacts associated with criteria air pollutants including NO_2, SO_2, $PM_{2.5}$, PM_{10}, and CO. ✷