A. INTRODUCTION

This chapter discusses the energy requirements of the existing Hunts Point Water Pollution Control Plant (WPCP) and compares future conditions without the proposed action and future conditions with the proposed action.

This chapter separately analyzes the potential effects of the new egg-shaped digesters that would be constructed as part of the proposed action (the two-digester scenario) as well as the additional two digesters that are analyzed as a potential future action (the four-digester scenario).

B. EXISTING CONDITIONS

The Hunts Point WPCP uses energy to heat and light its buildings; operate pumps, blowers, and motors; and provide heat for the sludge digestion process. The WPCP uses digester gas to meet approximately 93 percent of the WPCP's total heating needs with natural gas, fuel oil, and electricity purchased from Consolidated Edison providing the rest.

Electricity for the WPCP is purchased from Consolidated Edison via an electrical substation at the plant. The substation has four transformers, each with a capacity of 7,500 kilo volt amp (kVa). Two of the transformers are standby units. The total electricity demand for the WPCP is approximately 391,200 kilowatts (kW)/hour/day.

The New York State Department of Environmental Conservation (NYSDEC) requires WPCPs that purchase power from a utility service to have a back-up power system. The plant currently has two existing 3,500 kW emergency generators (diesel fuel combustion turbines) located on Ryawa Avenue near Longfellow Avenue. 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.

Boilers (five 750 boiler hp units) that were installed under Phase I of the plant upgrade provide heat for the buildings and the sludge digesters. The boilers use natural or digester gas and use fuel oil as backup. The boiler units produce steam that is distributed through a piping system to the main building and the sludge facilities. Of the five units, four units are operating units and one serves as a standby unit. At the dewatering building, there are two additional 400 hp boiler units. One of these units is an operating unit; the other is a standby unit. From fuel use records compiled for 1999 to 2000, the average annual digester gas consumption was approximately 123 million cubic feet. The average annual supplemental natural gas consumption was approximately 0.365 million cubic feet and the supplemental fuel oil consumption was approximately 39,000 gallons.

C. THE FUTURE WITHOUT THE PROPOSED ACTION

In the future without the proposed action or the No Action condition, the existing WPCP will operate as upgraded under the Phase II Upgrade, which includes improvements required to enhance nitrogen removal. Phase II also includes upgrades to the plant's electrical power system, including a main electrical substation and six new 2,000 kW emergency generators (diesel-engine driven) to provide back-up power if utility service becomes unavailable. The new main electrical substation will have six transformers, each with a capacity of 7,500 kVa. Use of the emergency generators and other Phase II Upgrade equipment will be operated in accordance with its NYSDEC Air Facility Permit.

As in existing conditions, the boilers would use digester gas (gas produced during sludge digestion), but there would be an increase in natural gas consumption. Typically, digester gas would be utilized to meet plant heating demand during the cold months of the year. However, during the coldest months there would not be sufficient digester gas produced to meet demand. At such times, natural gas would be purchased to supplement the WPCP's digester gas production. During warm weather periods of the year (June through September), WPCP heating and cooling demands would not require use of all of the digester gas produced. During these warm weather months and at times when digester gas cannot be fully used, the excess digester gas would be used first in the plant's three fuel cells and any further excess would be burned off. On average, two gas burner units would be required to burn the excess digester gas in the warm weather months while one unit would remain on standby. The gas burners would be enclosed and would be located within the WPCP site just to the west of the sludge thickeners. A total of three emergency gas burners would be constructed on site. In addition to flaring excess gas during summer months, the three burners would be utilized in the event of an emergency situation that causes the boiler system to be inoperable for a period of time (i.e., a ruptured gas pipe). In these instances, the three burners would burn the volume of gas produced at the WPCP until repairs are made.

Overall, the anticipated increase in electrical energy consumption will be 51 percent more than under existing conditions to a total of 590,400 kW-hr per day.

NYCDEP could also operate the emergency generators during periods outside of "emergency" conditions under a Peak Load Management (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 this program, the Hunts Point WPCP may be requested to reduce electrical demand.

D. PROBABLE IMPACTS OF THE PROPOSED ACTION

TWO-DIGESTER SCENARIO

Under the proposed action, the digestion facility would be constructed. The digestion facility would consist of two egg-shaped digesters and a one-story building to house mechanical, electrical, and HVAC equipment. In addition to the digestion facility, a utility tunnel would be constructed between the facility and the thickener gallery. A new control building would be constructed at the sludge thickener operation level to house electric control equipment for the sludge thickeners. Improvements would be made to four of the existing conventional digesters. In addition, carbon and polymer addition facilities would be constructed on the plant site.

As in future without the proposed action, the boilers would use digester gas (gas produced during sludge digestion), supplemented by natural gas, as fuel. With the proposed action, it is estimated that annual digester gas consumption would be 236 million cubic feet and supplemental natural gas consumption would be 260 million cubic feet for the plant upgraded through Phases I and II and the proposed action. Additional heating demands associated with the proposed action would result from the new digester building, upgraded heating systems for the sludge thickeners, and digester heat exchangers. The new digester and thickener buildings will be ventilated at 12 air changes per hour, compared to the existing buildings which have little or no ventilation.

Like the future without the proposed action, typically, digester gas would be utilized to meet plant heating demand during the cold months of the year. However, during the coldest months there would not be sufficient digester gas produced to meet demand. At such times, natural gas would be purchased to supplement the WPCP's digester gas production. During warm weather periods of the year (June through September), WPCP heating and cooling demands would not require use of all of the digester gas produced. During these warm weather months and at times when digester gas cannot be fully used, the excess digester gas would be used first in the plant's three fuel cells and any further excess would be burned off.

Overall, the proposed action would result in increased energy usage at the WPCP site. It is expected that energy demand at the plant would increase by 16 percent over the future without the proposed action. The total electricity demand for the WPCP would increase to 686,400 kW/hour/day.

A 500 kW emergency generator (diesel-engine driven) would be provided at the digester building to provide back-up power to elevators and fire pumps if utility service becomes unavailable (blackout periods). The emergency generator would be operated periodically for routine maintenance functions to ensure operability should off-site power service ever be interrupted. Diesel fuel storage equipment would be provided. NYCDEP is committed to using ULSD in all of the plant's emergency generators.

This expected additional power demand under the proposed action would not require any significant change in Consolidated Edison's regional distribution system or on the region's power supplies. The required amount of supplemental natural gas to fuel the boilers is minute compared with total use in the city, and the existing distribution system would be able to supply the WPCP without difficulty. For the most typical operation conditions at the plant, no emergency generators would be operating. Under the proposed action, the plant could participate in the PLM program. NYPA's PLM program is citywide, and when an event is called all the PLM customers, besides NYCDEP, participate in the effort to reduce power intake from the grid. The intention of the PLM program is to reduce the potential for power outages in New York City during peak demand for power, including the Hunts Point area of the Bronx. When NYCDEP participates in a PLM program, it is not plant specific; NYCDEP makes a total commitment to reduce. Commitments are chosen below the real emergency generating capacity of the plant. An event is called for all participating plant sites, not for each plant separately. In 2007, NYCDEP has not committed the Hunts Point WPCP for PLM participation; the existing generators are being replaced under the Phase II Upgrade with six new generators. In the future, NYCDEP may participate in PLM at Hunts Point, but has agreed to reduce the maximum number of emergency generators participating in the PLM program to five of the six 2,000 kW generators being installed under the Phase II Upgrade.

In conclusion, no potential significant adverse impacts from the project's energy demands with two digesters are expected.

FOUR-DIGESTER SCENARIO

Once the renovated digesters reach the end of their useful life, an additional two digesters would be required. The two additional egg-shaped digesters would result in a small incremental increase in energy demand, as the four existing digesters would no longer be operational. No potential significant adverse impacts from the project's energy demands from the four-digester scenario are expected. ✷