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Long Island Power Authority
Calpine Stony Brook Energy Center

Environmental Assessment

Submitted to:
Long Island Power Authority

Submitted by:
Calpine Stony Brook Energy Center 2, Inc.
A Subsidiary of Calpine Corporation

January 2003

State Environmental Quality Review
NEGATIVE DECLARATION
Notice of Determination of Non-Significance

Project Number: ________________ Date: January 21, 2003

This notice is issued pursuant to Part 617 of the implementing regulations pertaining to Article 8 (State Environmental Quality Review Act) of the Environmental Conservation Law.

The Long Island Power Authority, as lead agency, has determined that the proposed action described below will not have a significant environmental impact and a Draft Impact Statement will not be prepared.

Name of Action: Calpine Stony Brook Energy Center

SEQR Status: Type 1 x__
Unlisted ___
Type II emergency action __

Conditioned Negative Declaration: ___ Yes
_x_ No

Description of Action:

The Long Island Power Authority (LIPA) is considering entering into a power purchase agreement with Calpine Stony Brook Energy Center 2, Inc., a subsidiary of Calpine Corporation, to purchase output from the proposed electrical generating facility to be constructed on property located on the State University of New York (SUNY) Stony Brook campus, in the Town of Brookhaven, Suffolk County, Long Island. The proposed facility, to be called the Calpine Stony Brook Energy Center, would consist of a 79.9 megawatts natural gas-fired General Electric (GE) LM6000 turbine with a steam turbine generator that would provide power to both LIPA and SUNY Stony Brook. Construction of the proposed project would occur in two phases. During the summer of 2003, the facility would operate in simple-cycle mode as a GE LM6000 natural gas turbine, producing a nominal gross output of 47 megawatts. The proposed facility would then convert to a combined-cycle facility, providing 79.9 megawatts of power by summer 2004. In addition to the GE LM6000 natural gas turbine, the combined-cycle facility would consist of a Once Through Steam Generator, gas fired duct burners, steam turbine generator and a two-cell cooling tower. The second phase would also include the construction of a steam interconnection from the existing 47 megawatts cogeneration facility owned and operated by Nissequogue Cogen Partners (NCP), a subsidiary of Calpine, which would allow excess steam from the NCP facility that would otherwise be vented to the atmosphere to be transferred to the new steam turbine generator.

Location:

The Calpine Stony Brook Energy Center would be located within the SUNY Stony Brook physical plant services complex, approximately 650 feet east of NYS Route 25A in Stony Brook, Town of Brookhaven, Suffolk County, Long Island.

Reasons Supporting This Determination:

A comprehensive Environmental Assessment (EA) was completed, and a determination of significance was issued by the LIPA Board of Trustees on January 21, 2003. The EA analyzed potential environmental impacts of the project related to land use and zoning, community facilities, cultural resources, visual resources, socioeconomic and environmental justice, traffic and transportation, air quality, noise, infrastructure, contaminated materials, soils and geology, natural resources, water resources, stormwater management and spill prevention, construction, and cumulative impacts and found that no significant adverse impacts would result from the proposed project in any of such areas. Based upon the EA, LIPA has determined that the proposed project would not have any significant adverse impact on the environment and, accordingly, that an environmental impact statement is not required for the proposed project. A full statement of the reasons supporting LIPA's determination that no significant adverse environmental impacts would result from the proposed project is set forth in the EA and is summarized in Section 2.0 of the Executive Summary of the EA.

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LONG ISLAND POWER AUTHORITY
CALPINE STONY BROOK ENERGY CENTER

ENVIRONMENTAL ASSESSMENT

SUBMITTED TO:

LONG ISLAND POWER AUTHORITY

SUBMITTED BY:

CALPINE STONY BROOK ENERGY CENTER 2, INC.

A SUBSIDIARY OF CALPINE CORPORATION

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EXECUTIVE SUMMARY

1.0 Project Description

1.1 Introduction

Calpine Stony Brook Energy Center 2, Inc., a subsidiary of the Calpine Corporation (Calpine) has proposed the construction of a state-of-the-art 79.9 megawatt (MW) natural gas-fired combined-cycle unit on property located on the State University of New York (SUNY) Stony Brook campus adjacent to an existing 47 MW cogeneration facility owned and operated by Nissequogue Cogen Partners (NCP), also a subsidiary of Calpine, in the Town of Brookhaven, Stony Brook, New York.

The proposed facility will be called the Calpine Stony Brook Energy Center, and for purposes of this assessment may be referred to as the proposed facility or proposed project. The Calpine Stony Brook Energy Center would be available to provide power to the SUNY Stony Brook campus to accommodate future energy demands and would provide financial and operational benefits to SUNY Stony Brook. Until SUNY energy demands increase to the point where all or most of the energy produced at the proposed facility is needed to supply SUNY needs, the proposed facility would provide energy to the Long Island Power Authority (LIPA) grid. LIPA would purchase the power via a power purchase agreement with Calpine. As part of the financial arrangement with Calpine, SUNY would be permitted to purchase electricity and steam at a significant cost savings.

In order to meet LIPA's projected peak load demand and improve system reliability for summer 2003, the project, if approved, would be constructed in two phases. Phase I would include construction and installation of a new GE LM6000 PC combustion turbine with a nominal gross output of 47 MW. Due to internal loads required to operate the turbine, available capacity to the electric transmission system would be a nominal 45 MW. The new combustion turbine would burn only natural gas and would use selective catalytic reduction (SCR) and water injection for nitrogen oxides (NO_x) control, and an oxidation catalyst to control emissions of carbon monoxide (CO) and volatile organic compounds (VOC). A Once Through Steam Generator (OTSG) would be constructed to accommodate the air pollution control equipment, but the OTSG would not be operational until Phase II. During Phase II of the proposed project, a steam interconnection between the proposed LM6000 CT and the existing NCP facility would be built. This interconnection would not increase net output of electricity above 79.9 MW, but would eliminate the need to occasionally vent steam as is the current practice. The project schedule calls for the Phase I unit to be in operation by August 1, 2003. During the summer of 2003, the LM6000 combustion turbine would operate in simple-cycle mode.

The proposed project site is an approximately 1.5-acre parcel of land, wholly within the SUNY physical plant services complex on the SUNY Stony Brook campus. The SUNY physical plant services complex is located on the western edge of the campus and is approximately 12 acres. The physical plant services complex consists of the existing NCP building and associated structures (2 acres), a brick SUNY Central Stores Warehouse with loading dock, a parking lot (proposed facility site), the SUNY West Steam Plant, the abandoned SUNY West Steam Plant cooling tower, electrical substations and a natural gas pump station.

The objective of this Environmental Assessment is to analyze the potential impacts of the proposed Calpine Stony Brook Energy Center Project in accordance with the State Environmental Quality Review Act (SEQRA), and to allow for an informed determination of whether the proposed project may result in any significant adverse environmental effects. This Environmental Assessment examines potential environmental impacts the relevant environmental disciplines, including land use and zoning, community facilities, cultural resources, visual resources, traffic and transportation, air quality, noise, infrastructure, contaminated materials, and construction. Because it is expected that the Phase I unit would be constructed and operating within approximately 6 months and no material changes are expected during this period, future conditions without the proposed project would be the same as existing conditions. Consequently, impacts are assessed by comparing future conditions with the proposed facility to existing conditions without the facility.

Although construction of the proposed facility constitutes a discrete action under SEQRA, and is not dependent on approval of any other facility, this assessment nevertheless includes, where relevant to ensure a conservative analysis, potential impacts from other proposed facilities under consideration by LIPA for the Summer of 2003, as well as the other facilities referred to in the discussion of cumulative impacts below.

1.1.1. Purpose and Need

SUNY Stony Brook campus was built in 1962, on land donated by Ward Melville. Over the past forty years, the University has grown tremendously. The campus originally housed 9 buildings on a 480-acre site. Currently Stony Brook has 123 buildings on nearly 1,200 acres. Stony Brook is a major research university on Long Island. Excluding the state and county governments, the University is Long Island's second largest employer, with approximately 9,590 people on the campus payroll. It is the largest single-site employer in Suffolk County. During the fall of 2002, the full time undergraduate enrollment was 12,815 students. Along with graduate students, total enrollment was about 21,000 students.

The proposed Calpine Stony Brook Energy Center would be available to provide power to the SUNY Stony Brook campus to accommodate future energy demands. In particular, over the long term, the Calpine Stony Brook Energy Center would provide a secure, cost-effective supply of electricity to support the educational mandates of SUNY Stony Brook. In addition, the proposed facility would provide savings on future energy costs for the SUNY campus. Finally, the proposed project would enhance the reliability of power supply to the campus. In addition, the proposed facility would help satisfy an immediate need for additional electrical generating capacity on Long Island beginning in the summer of 2003.

In October 2002, LIPA released its Draft Long Island Energy Plan. The draft plan covers the years 2002 to 2011 and addresses a series of "multi-faceted planning options that seek to make certain that Long Island has an adequate and reasonably priced supply of electricity well into the future." LIPA has determined that there is the potential for a shortfall of approximately 200 MW during the summer of 2003 in the LIPA service area. This need for additional generating capacity on Long Island became very evident during July 2002. On July 3, 2002, during a heat wave, power demand reached a new record of 5,030 MW. On July 29, 2002, that record was broken when the demand for electricity reached 5,059 MW. The total energy usage for July 2002 exceeded that of July 2001 by 21 percent.

The Calpine Stony Brook Energy Center, in conjunction with the two new on-island projects recently announced by LIPA, FPL Jamaica Bay Project (54 MW) and Global Common Greenport (54 MW), would help LIPA to address the projected summer 2003 demands.[1] The additional energy needed to meet projected summer 2003 demands is expected to come from energy efficiency and peak demand reduction measures.

It should be noted that the Calpine Stony Brook Energy Center has been designed as a two-phase project to help meet the immediate needs of LIPA for the summer of 2003. After 2003, LIPA's projections of future energy needs on Long Island indicate that the peak demand will grow each year by approximately 100 MW between now and 2011. The peak load is expected to increase approximately 1.7 percent per year during this period.

One key feature of the proposed project would be the ability in Phase II to operate as a combined cycle facility. Combined cycle operations are more efficient than simple cycle operations because they capture waste heat from the turbine exhaust. This facility would produce electricity with very low heat rates (i.e. less fuel is required to produce the same amount of electricity) and low pollutant emissions.

1.1.2. Description of the Physical Characteristics of the Proposed Action

The proposed project located on the SUNY Stony Brook campus site is a combined-cycle facility. The project would be constructed and operated in two phases (Phase I and Phase II). The proposed facility's primary equipment components would be a natural-gas-fired General Electric LM6000 SPRay INTercooling (SPRINT) Combustion Turbine (CT) Generator with associated OTSG, duct burners, and a steam turbine generator with a maximum net export to LIPA's and/or SUNY's distribution system capped at 79.9 MW (after Phase II is operational). The project would utilize only natural gas as its fuel source. The CT would be able to operate in the range of 50 percent to 100 percent load, and be capable of multiple start-ups and shut-downs per week.

a. Phase I

It is anticipated that Phase I of the project would start construction in the first quarter of 2003 and be operational by August 1, 2003. Phase I of the project would be constructed first in order to meet the immediate needs of on-island demands serviced by LIPA. Phase

[1] A facility proposed by PSEG in North Bellport, which would have provided 79.9 MW of energy, has recently been cancelled.

I of the project would operate in simple-cycle mode and consist of the following: CT Generator; SCR system; ammonia storage system; oxidation catalyst; OTSG (not to be operational, but to accommodate air pollution control systems); stack; control house; distributed control system (DCS); gas metering station; water treatment systems; inlet air chiller systems; electrical transformers; and fire protection system.

b. Phase II

Phase II of the project would begin construction shortly after Phase I of the project has commenced construction and is designed to be operational in 2004. Phase II contains two parts, Phase II-A and Phase II-B. Phase II-A includes the construction and installation of the following: OTSG activation; gas fired duct burners; steam turbine generator; and two-cell cooling tower. Upon completion of Phase II-A the facility would be able to operate in combined-cycle mode and would be able to produce 79.9 MW of electricity to the LIPA grid.

Phase II-B construction would consist of: steam interconnection to the existing NCP facility to permit the proposed facility to purchase and utilize steam from the existing NCP facility. The steam connection between the project and the existing NCP facility would not change the net output from the project, but would reduce the amount of fuel consumed at the proposed project, and eliminate the need to vent steam from the existing NCP facility during high electrical demand-low steam demand periods. The project output of electricity to the LIPA (or SUNY) distribution grid would be limited to no more than 79.9 MW.

c. Project Equipment Description

The proposed facility would incorporate one General Electric (GE) LM6000 CT generator with a gross electrical output of nominally 47 MW. The CT generator consists of an air compressor, combustion chamber, CT, and an electric generator. Part of the power produced in the CT is used to drive the air compressor; the remaining part drives the electric generator to produce electric power. Demineralized water would be injected into the CT to control NO_x emissions.

The proposed facility would be equipped with an inlet air chiller system (similar in operating principle to a refrigerator) to reduce the temperature of the incoming ambient air. The proposed CT would be among the cleanest fossil fuel electric generating facilities in the United States. NO_x emissions would be less than 2.5 parts per million volume dry (ppmvd) corrected to 15 percent oxygen (O_2) through the use of natural gas fuel, water injection technology, and SCR. Auxiliary equipment for the CT unit would include a CT auxiliary skid, a water injection skid, inlet air chiller system and an aqueous ammonia injection skid. The CT would discharge to a 125-foot exhaust stack.

Water treatment equipment would be located in an area designated as the raw water treatment area. Pumps, piping, tanks, and hook-ups would be provided for an anion/cation demineralization system, similar to the one already operating at the NCP facility. Above-ground storage tank systems would be located on site for storage of demineralized water and aqueous ammonia. There would be one main step-up transformer containing approximately 10,000 gallons of insulating oil. In addition, there would be one auxiliary transformer containing approximately 2,000 gallons of insulating oil. The proposed facility would interconnect to LIPA's electric system on the physical plant services complex, about 800 feet from the facility interconnect point. An underground line would be constructed between the project transformers and the LIPA switchyard

1.1.3. Timetables and Project Construction

If approved, Phase I of the project would commence construction during the first quarter of 2003 and be on-line by August 1, 2003. Phase II would commence construction during the second quarter of 2003, with operation anticipated in 2004.

1.2 Description of SUNY Stony Brook Project Site

The 1.5-acre proposed project site is located within the physical plant complex on the west side of the SUNY Stony Brook University Campus. The proposed project site is located adjacent to the existing cogeneration facility owned and operated by NCP. An electric substation owned by LIPA abuts the site to the northwest. The proposed project site is currently paved and used for physical plant and NCP personnel parking. A 3-acre construction laydown area would be located just to the north of the proposed project site.

Existing development in the vicinity of the proposed project site includes the SUNY physical plant services complex, which is located on the western edge of the campus and is approximately 12 acres. The physical plant services complex consists of the existing NCP building and associated structures (2 acres), a brick SUNY Central Stores Warehouse with loading dock, a parking lot (proposed project site), the abandoned SUNY west steam plant cooling tower, electrical substations and a natural gas pump station.

1.3 Public Outreach

As part of the Calpine Stony Brook Energy Center planning and development efforts, Calpine and LIPA representatives met with representatives of State, County and local governments and agencies. The intent of the outreach effort is to inform the individuals and groups of the need for, and purpose of, the planned generating facility, and to solicit and exchange information about the project.

An advisory group of SUNY personnel has been formed to participate with Calpine and LIPA on public outreach on an ongoing basis. As part of this outreach program, Calpine, LIPA, and/or SUNY will be meeting with various governmental officials, the surrounding community, environmental interest groups, residents, and other interested parties to discuss the need and design of the proposed facility, its environmental effects, and to answer questions about the proposed facility. An open house will be scheduled for early 2003 as part of this program.

1.4 Notifications, Actions, Permits and Approvals

Development and operation of the project may require or include the following federal, state and local regulatory agency notifications, actions, permits and approvals.

Federal Aviation Administration

- Determination of No Hazard to Air Navigation.

U.S. Environmental Protection Agency

- Spill Prevention Control and Countermeasure Plan.

Long Island Power Authority

- Facility power purchase agreement.
- Facility interconnection agreement.

New York State Department of Environmental Conservation

- New York State facility air permits (for construction) pursuant to 6 NYCRR Part 201-5 and 231-2.
- Prevention of Significant Deterioration permit pursuant to 40 CFR 52.21.
- Title IV acid rain permit.
- Title V operating permit pursuant to 6 NYCRR Part 201-6 (within one year from commencement of operation).
- General Permit for stormwater discharge associated with construction activities.

New York State Public Service Commission

- Certificate of Public Convenience and Necessity pursuant to Section 68 of the Public Service Law (together with an Order for Lightened Regulation, and/or financing approval pursuant to Section 69 of the Public Service Law).

State University of New York

- Amendment to Energy Sales Contract.
- Site Use Permit.
- Building Permit.
- Well Water Supply Agreement.

Suffolk County Water Authority

- Authorization to Connect to water supply system.

Suffolk County Department of Public Works

- Sewer Discharge Permit (modification of existing SUNY discharge permit).

Suffolk County Department of Health Services

- Article 7 Hydrogeologic Zones and the Special Groundwater Protection Areas.
- Article 12 Bulk Storage Tank Registration.

2.0 Potential Environmental Impacts of the Proposed Actions

2.1 Land Use and Zoning

The proposed project is located approximately 650 feet east of NYS Route 25A in Stony Brook, Town of Brookhaven, Suffolk County, New York. The proposed project site is an approximately 1.5-acre parcel of land, wholly within the SUNY physical plant services complex on the approximately 1,100-acre SUNY Stony Brook campus. The SUNY physical plant services complex is located on the western edge of the campus and is approximately 12 acres. The physical plant services complex consists of the SUNY West Steam Plant, facilities offices, the existing NCP facility (2 acres), a brick SUNY Central Stores warehouse with loading dock, a parking lot (proposed project site), the abandoned SUNY West Steam Plant cooling tower, electrical substations, and a natural gas pump station. Landscaping consists of grass, small trees and ornamental shrubs.

The project site is a relatively level parcel of land that is paved and currently used for parking. The SUNY warehouse and gymnasium road bound the site to the north. North of the warehouse is a parking lot and an athletic track and a 7,500-seat stadium. East of the project site are buildings housing SUNY physical plant services personnel. To the south are additional physical plant services buildings and immediately west is the NCP facility. To the west is the SUNY cooling tower that is currently not in service, the University's North Loop Road, SUNY's stormwater recharge ponds, the Long Island Railroad (LIRR) and NYS Route 25A. Southwest of the project site is the SUNY West Steam Plant.

Land uses within a one-mile radius of the project site largely encompasses the SUNY Stony Brook campus, residential uses, and commercial development along Route 25A. North Country Road (NYS Route 25A) and the LIRR commuter rail line bisect the one-mile radius. Both the LIRR and Route 25A follow a similar path, traveling in the northeast/southwest direction. The North Country Learning Center on Suffolk Avenue, and the Stony Brook School on Chapman Parkway are located within 0.5 miles from the site.

2.1.1. Land Use

The existing land use conditions would not substantively change as a result of the proposed project. The area surrounding the proposed project site is developed and consists of the existing NCP facility, the SUNY West Steam Plant, and the facility management and maintenance buildings. Additionally, the project site has a natural gas pipeline connection and electrical transmission interconnect access within the 12-acre physical plant complex. Siting the proposed project within the physical plant services complex allows the project to use existing utilities, thereby minimizing the amount of land requiring disturbance. The existing NCP facility has been located in this area of campus for almost ten years and has coexisted with the residential uses located northwest of the campus. Therefore, the proposed facility would be consistent with current land use and would have no significant adverse land use impacts.

2.1.2. Zoning

The project site is within an area zoned "B Residence 1 District" by the Town of Brookhaven. Review of the Brookhaven Zoning Map (June 2002) indicates that the majority of zoning and land uses within a one-mile radius of the site is residential. Southwest of the project site is an area zoned industrial. Additionally, there is an area zoned for business use along Route 25A, west of the project site. Under Section 375(3) of the New York State Education Law, facilities constructed for state university purposes are not subject to local regulation, including zoning. SUNY facilities and facilities located on the Stony Brook Campus which are used for state university purposes are not subject to, nor required to conform to, local zoning requirements.

The proposed facility would be available to provide energy to the SUNY Stony Brook campus to accommodate future energy demands and would provide financial and operational benefits to SUNY Stony Brook. Consequently, based upon the State Educational Law, the proposed project would not be subject to the local zoning requirements of the Town of Brookhaven. Although not subject to local requirements, the proposed facility would conform to local zoning requirements except the maximum height restriction of 35 feet as detailed on the Brookhaven Zoning Code Subsections 85-56 and 85-61. While it would not conform to these requirements factually and in terms of process, the proposed facility would, in terms of use, size, and function, be consistent with adjacent facilities at the SUNY Stony Brook physical plant services complex.

Review of the project for design and planning purposes would be performed through the SUNY Stony Brook Office of Facilities Design and Construction. Detailed site plans and construction specifications would be provided to the Office of Facilities Design and Construction for its review and approval prior to construction of the project. This review would ensure that the project is designed in accordance with good engineering practices, meets applicable building code standards and is compatible with existing and planned future development on the SUNY Stony Brook campus.

The proposed facility would not impact zoning districts within a one-mile radius of the project site. The project and proposed interconnections would not prevent the orderly and reasonable use of permitted or legally established uses on surrounding zoning districts. Additionally, the proposed facility and its interconnections are similar to the existing campus facilities in the immediate project area. Consequently, the proposed facility would not have a significant adverse impact on zoning.

2.2 Community Facilities

An inventory of community facilities (schools, hospitals, religious facilities, etc.) has been taken within a one-mile radius of the project site to assess the potential impacts, if any, of the proposed Calpine Stony Brook Energy Center on these facilities. Eleven community facilities have been identified within the one-mile radius of the study area. The State University of New York (SUNY) Stony Brook, the North Country Learning Center, and the Stony Brook School are approximately located within a ½-mile of the project site. Additionally, three schools, three places of worship, the Saint Georges Golf and Country Club, and the University Hospital on the SUNY campus are located within one mile of the project site.

The proposed facility would not create a significant demand for community nor public safety services such as fire, police, and ambulance service. SUNY has an Emergency Operations Center and organized an Emergency Management Team that has been trained to evaluate and respond to major emergency situations. All onsite emergencies are channeled through the onsite Campus Police. The Stony Brook Volunteer Ambulance Corps (SBVAC) is a collegiate ambulance corporation that primarily serves the community and the project would not increase demand for police, fire, or ambulance services. The existing emergency plan would be modified to incorporate the proposed facility. This revised plan would be provided to emergency service agencies, and certain emergency service personnel (e.g., fire, hazardous materials, and police officers) would tour the facility in order to be familiarized with the layout and operation in order to better respond in the event of an emergency.

The proposed facility would not result in the placement of additional students in local schools or impact the ability of local religious institutions to serve their community. Moreover, the proposed facility would not have any significant adverse air quality, noise, or visual impacts on any community facilities. Consequently, the proposed facility would not result in any significant adverse impacts on any community facilities.

2.3 Cultural Resources

The project site is within the SUNY physical plant services complex, which comprises approximately 12 acres. The majority of the project site is a paved parking area or contains existing structures. The portion of the project site that is not used for parking or does not contain structures exhibits prior disturbance. As seen in the historical aerial photographs the project site has been used for agricultural purposes as well as for part of the SUNY Stony Brook educational facility. Further construction of the SUNY Stony Brook campus included installation of underground facilities on the project site.

A Phase IA archaeological investigation was performed for the proposed project site. Fifty-one recorded archaeological sites were identified within a one-mile radius of the project site. However, due to the generally disturbed nature of the project site, the likelihood that any intact archaeological sites exist on the site is extremely low. In the unlikely event that archaeological resources are encountered during construction, measures will be taken to either avoid or to catalogue and preserve any archaeological resources that may be encountered. Therefore, it is not anticipated that the project would have any significant adverse impacts with regard to historical resources.

There are no known architectural resources located on the project site. Five architectural resources and the Stony Brook Historic District are located within a one-mile radius of the project site. It is not anticipated that the proposed project would have any visual or contextual impacts on any historic resources, as the project site would not be visible from any of these resources. Therefore, there is no potential for adverse impacts on historic resources or any physical, visual, or contextual effects on architectural resources.

2.4 Visual Resources

The project site consists of approximately 1.5 acres of land and is wholly within the SUNY Stony Brook campus physical plant services complex, which comprises approximately 12 acres. The physical plant services complex consists of the existing NCP building and associated structures (2 acres), a brick SUNY Central Stores Warehouse with loading dock, a parking lot (proposed project site), an inactive cooling tower, an electrical substations, and a natural gas pump station. Landscaping consists of grass, small trees, and ornamental shrubs. The existing physical plant services complex and surrounding area is fully developed. To the north of the physical plant services complex are a parking lot, athletic fields, and the athletic stadium. Academic buildings and parking areas are located to the east. A wooded area, North Loop Road, and onsite campus housing are located to the south; and North Loop Road, a groundwater recharge basin, Route 25A (North Country Road), and the LIRR tracks are located to the west.

The project site is at an elevation of approximately 107 feet above mean sea level (msl) and is essentially level. The top of the existing stack is at an elevation of 218 feet above msl, and the top of the existing Nissequoque Cogen Partners (NCP) facility is at an elevation of 184 feet above msl. The top of the new stack would be at an elevation of 232 feet above msl, and the new building would be at an elevation of 189 feet above msl. The elevation of the new structures would be similar to the existing NCP facility elevations, although the new stack would be approximately 24 feet higher than the existing stack.

Elevations within one mile of the project site range from approximately 100 to approximately 230 feet msl. The elevation at the northern portion of the one-mile radius is approximately 100 feet msl and at the southeastern portion of the one-mile radius, the elevation is approximately 230 feet msl.

The proposed project is consistent with the existing land use and would blend in with the existing NCP facility, the SUNY west steam plant, and the SUNY Central Stores Warehouse. Therefore, the proposed facility would not have any significant visual impacts on the SUNY Stony Brook campus.

Visibility of the project site off campus to the north, south, and east is generally limited due to topography, vegetation, and existing structures. The most prominent off campus views of the proposed facility would be from the west. Existing views from the west contain portions the existing physical plant services complex. The proposed facility would be consistent in color, scale, and size with the existing complex, and therefore, off campus views to the west would be similar to existing conditions. Additionally, the proposed project would not be visible from the five S/NR listed properties within the one-mile of the project site due to topography and existing vegetation. Therefore, the proposed facility would not have a significant adverse visual impact.

During cold weather months, when the facility is operating in a combined cycle mode, water vapor plumes emitted from the CT stack and cooling tower may be visible at various times. Due to the height of the stack and high exhaust velocities, the plume would occur relatively high above ground and would therefore not cause or contribute to any ground fogging effects. Therefore, there would be no significant adverse visual impacts expected due to the steam plume from the CT stack.

2.5 Socioeconomic and Environmental Justice

The focus of an environmental justice analysis is the determination of whether the construction and operation of a proposed facility would have both adverse and disproportional impacts on an environmental justice community.

The first step in the analysis is to determine whether the proposed project is in or near a low-income and/or minority community. Based on a review of the census data for the study area, a minority and a low-income community was identified in one census tract within the one-mile study area.

Once the presence of a low-income or minority community has been documented, New York State Department of Environmental Conservation (NYSDEC) and Office of Environmental Justice in Environmental Protection Agency (EPA) guidance on environmental justice define two steps to determine if potential environmental impacts are likely to adversely affect communities of concern. The steps are to identify potential environmental impacts and to determine whether impacts are likely to adversely affect a minority or low-income community. The proposed Calpine Stony Brook Energy Center is not expected to have any significant adverse impacts on the surrounding community. Air quality analysis results show that the emissions from the proposed Calpine Stony Brook Energy Center would result in pollutant concentrations that would be well below applicable air quality standards.

Therefore, although a minority and low-income community was identified within the vicinity of the proposed project, an evaluation of the maximum air emission impacts from the proposed project has not identified any significant adverse impacts on a short-term or cumulative basis to low-income or minority populations. In accordance with the environmental justice objectives defined by NYSDEC and EPA, there would be no disproportionate impacts on minority populations near the proposed facility.

2.6 Traffic and Transportation

The proposed facility would not adversely impact existing traffic conditions in the vicinity of the proposed project. The proposed Calpine Stony Brook Energy Center Project would generate a small number of vehicle trips for operations and maintenance staff, and deliveries of aqueous ammonia. During normal operation, the proposed facility would generate a maximum of 4 vehicle trips in any hour. Based on the small number of trips generated by the proposed project, the existing volume of traffic, and the satisfactory functioning of the roads, the proposed project would not have a significant adverse impact on traffic.

2.7 Air Quality

2.7.1. Introduction

The proposed Calpine Stony Brook Energy Center would be limited to a net output of 79.9 MW to the electric grid. For Clean Air Act (CAA) permitting purposes, the proposed facility would be a modification of an existing major source of NOx and VOC located in a severe ozone nonattainment area. Therefore, the Nonattainment New Source Review (NNSR) provisions contained in Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 231-2 would apply to the project.

Air emissions from Phase I would be below the major source modification significance thresholds in the federal Prevention of Significant Deterioration (PSD) regulations at Title 40 of the Code of Federal Regulations (40 CFR) Subpart 52.21. Phase II of the proposed project would trigger PSD requirements since the potential PM_{10} emissions would exceed the applicable significant emission rate (15 tons per year) set forth in 40 CFR 52.21(b)(23)(i). The proposed project's emissions of all other regulated pollutants would be below the applicable significant emission rates.

2.7.2. Project Design

The proposed facility would be constructed in two phases. Phase I would consist of a new GE LM6000 PC combustion turbine (CT) that would burn natural gas. In Phase II, the new CT would be a converted to combined-cycle facility. Phase II would consist of the construction of a once through steam generator (OTSG) with duct burners, a steam turbine generator (STG), and a condenser with an associated two cell cooling tower. The CT and duct burners would burn natural gas exclusively. Upon completion of Phase II-A, the proposed facility could operate in a combined-cycle mode, utilizing the waste heat from the combustion turbine to generate additional electricity in the steam turbine unit. Phase II-B would incorporate a steam interconnection that would allow excess steam from the NCP facility that would otherwise be vented to the atmosphere to be transferred to the proposed facility's steam turbine in place of steam that would otherwise be generated by the proposed facility's duct burners.

The new CT in Phase I would include water injection, a CO catalyst, and a selective catalytic reduction (SCR) unit. Water injection and SCR would be used to control nitrogen oxide (NO_x) emissions to 2.5 parts per million (ppm). Carbon monoxide (CO) and volatile organic compound (VOC) emissions would be minimized through the use of good combustion practices and would be further controlled through the use of an oxidization catalyst, which would reduce CO by 90 percent and VOC emissions by 80 percent.. Sulfur dioxide (SO_2) and particulate matter (PM) and particulate matter having a diameter less than 10 microns (PM_{10}) would be minimized through the use of natural gas as a fuel.

The combined-cycle (Phase II) mode of operation would utilize the same pollution control equipment as the simple-cycle (Phase I) Phase of Project. The SCR system would limit the NOx emissions from the CT plus duct burner to the same emission concentration as the Phase I mode. The oxidation catalyst would reduce CO emissions by 90 percent and VOC emissions by 80 percent.

The proposed cooling tower would incorporate drift eliminators to limit cooling tower drift losses.

2.7.3. *Facility Emissions*

The maximum annual project emissions are listed in Tables ES-1 and ES-2 for Phase I and Phase II, respectively. These tables also list the major source thresholds and the net emission increases of all regulated pollutants.

Table ES-1: Potential Emissions and Major Source Thresholds – Phase I

Pollutant[a]	PSD Major (TPY)[b]	NNSR Major (TPY)[c]	MACT Major (TPY)	Existing Actual (TPY)[d]	Existing Potential (TPY)	Modification Potential (TPY)[e]	PSD Significant Emission Rate (TPY)
CO	100	-	-	80.62	249.90	17.34	100
NO_x/NO_2[f]	100	25	-	135.78	249.90	17.36	40
SO_2	100	-	-	5.46	14.32	2.31	40
PM	100	-	-	9.82	32.69	13.49	25
$PM_{10}/PM_{2.5}$	100	-	-	9.82	32.69	13.49	15
VOC[f]	-	25	-	16.28	76.87	3.61	40
Individual HAP[g]	-	-	10	-	-	0.54	-
Total HAPs	-	-	25	-	-	1.01	-
Ammonia	100	-	-	-	-	22.22	-
H_2SO_4	100	-	-	-	-	2.19	7

Notes:

(a) Regulated substances not emitted by the proposed new unit have not been included in the table.
(b) PSD major source threshold not listed for criteria pollutants for which area is classified as nonattainment or for HAPs.
(c) NNSR major source threshold listed only for nonattainment pollutants or their precursors.
(d) Average of 1999 and 2000 emissions. Does not include duct burner.
(e) Potential emissions are based on an estimated 7,280 hours of natural gas firing.
(f) NO_x and VOC are precursor pollutants for ozone; NO_2 is a criteria pollutant.
(g) Individual HAP with greatest potential emissions is formaldehyde.

2.7.4. *Pollutant Concentrations*

The air quality impacts due to emissions of criteria pollutants (i.e., those pollutants of concern which include, PM_{10}, SO_2, NO_2, and CO) were assessed using state-of-the-art air dispersion simulation models recommended by EPA. The dispersion modeling for the facility was performed consistent with the procedures found in EPA documents. For screening modeling, the analysis utilized the EPA SCREEN3 and Industrial SourceComplex-Short Term (ISCST3) models with the 54 discrete combinations of wind speeds and stability classes for simple terrain and the stack-top wind speed of 2.5 meters per second with stability Class F (stable conditions) in accordance with standard modeling guidance for complex terrain. For Phase II of the project, modeling of NO2 and PM10 was performed utilizing the ISCST3 model with 5 years of meteorological data (from Long Island MacArthur Airport, in Islip, NY with upper air sounding data from Atlantic City, New Jersey and Brookhaven National Labs, Upton, NY). The modeling

Table ES-2: Potential Emissions and Major Source Thresholds – Phase II

Pollutant[a]	PSD Major (TPY)[b]	NNSR Major (TPY)[c]	MACT Major (TPY)	Existing Actual (TPY)[d]	Existing Potential (TPY)	Modification Potential (TPY)[e]	PSD Significant Emission Rate (TPY)
CO	100	-	-	80.62	249.90	33.00	100
NO_x/NO_2[f]	100	25	-	135.78	249.90	32.18	40
SO_2	100	-	-	5.46	14.32	4.61	40
PM	100	-	-	9.82	32.69	38.34	25
$PM_{10}/PM_{2.5}$	100	-	-	9.82	32.69	38.34	15
VOC[f]	-	25	-	16.28	76.87	9.34	40
Individual HAP[g]	-	-	10	-	-	1.07	-
Total HAPs	-	-	25	-	-	2.02	-
Ammonia	100	-	-	-	-	44.16	-
H_2SO_4	100	-	-	-	-	4.38	7

Notes:

(a) Regulated substances not emitted by the proposed new unit have not been included in the table.
(b) PSD major source threshold not listed for criteria pollutants for which area is classified as nonattainment or for HAPs.
(c) NNSR major source threshold listed only for nonattainment pollutants or their precursors.
(d) Average of 1999 and 2000 emissions. Does not include duct burner.
(e) Potential emissions are based on 8,760 hours of natural gas firing.
(f) NO_x and VOC are precursor pollutants for ozone; NO_2 is a criteria pollutant.
(g) Individual HAP with greatest potential emissions is formaldehyde.

analyses utilized rural dispersion parameters, and a catersian grids of receptors going out to 20 kilometers with additional sensitive receptors out to 2 kilometers. To obtain total concentrations for comparison to Ambient Air Quality Standards, the highest representative measured background values obtained using 3 years of recent data from nearby NYSDEC monitoring stations was combined with the highest model predicted value.

Nine operational load scenarios were examined for the CT to determine if under any likely operating loads and ambient temperature the air pollutant emissions from the proposed facility would result in concentrations which exceed significant impact levels (SILs) and to determine if emissions from the proposed facility, combined with highest representative measured background levels would result in exceedances of Ambient Air Quality Standards. The results of this analysis are shown in Tables ES-3 and ES-4 for Phase I and Phase II, respectively.

This comprehensive modeling analysis determined that the facility's emissions would not result in air quality concentrations that exceed the recognized SILs. Emissions from the proposed facility would not result in significant air quality concentrations. Additionally, the maximum total concentrations resulting from emissions from the proposed facility added to the highest representative background concentrations would be below applicable NAAQS.

Table ES-3: Phase I Maximum Pollutant Concentrations

Pollutant	Averaging Period	Significant Impact Level (ug/m^3)	PSD Class II Increment (ug/m^3)	Maximum Modeled Concentration Due to Facility Alone (ug/m^3)	Background Concentration (ug/m^3)	Maximum Total Concentration (ug/m^3)	NAAQS (ug/m^3)
CO	1-hour	2,000	—	5.08	7,099	7,104	40,000
	8-hour	500	—	3.56	5,153	5,157	10,000
SO_2	3-hour	25	512	0.381	149.3	150	1,300
	24-hour	5	91	0.170	73.4	74	365
	Annual	1	20	0.0339	18.3	18	80
PM_{10}	24-hour	5	30	1.47	41.0	42	150
	Annual	1	17	0.293	17.0	17	50
NO_2	Annual	1	25	0.221	47.0	47	100

Notes:
[a] All maximum impacts for Phase I obtained at simple terrain receptors via screening level modeling.

Table ES-4: Phase II Maximum Pollutant Concentrations

Pollutant	Averaging Period	Significant Impact Level (ug/m^3)	PSD Class II Increment (ug/m^3)	Maximum Modeled Concentration Due to Facility Alone (ug/m^3)	Background Concentration (ug/m^3)	Maximum Total Concentration (ug/m^3)	NAAQS (ug/m^3)
CO	1-hour	2,000	—	17.5	7,099	7,107	40,000
	8-hour	500	—	12.2	5,153	5,165	10,000
SO_2	3-hour	25	512	1.86	149.3	151	1,300
	24-hour	5	91	0.826	73.4	74	365
	Annual	1	20	0.165	18.3	18	80
PM_{10}	24-hour	5	30	3.40[a]	41.0	44	150
	Annual	1	17	0.348[b]	17.0	17	50
NO_2	Annual	1	25	0.258[b]	47.0	47	100

Notes:
[a] Highest second-high value obtained from 5 years of refined modeling
[b] Maximum impact predicted via 5 years of refined modeling

Consequently, the proposed facility would not have a significant air quality impact or exceed the applicable NAAQS.

2.7.5. Accidental Ammonia Release

Aqueous ammonia as proposed for use in the SCR at the site, stored on-site in two 8,000 gallon steel storage tanks, as a less than 20 percent ammonia-water solution. Storage would be in a state-of-the-art tank system with leak detection and fully diked impermeable containment. Ammonia is highly water-soluble and as such is easier to handle for use in the SCR. Because ammonia is highly soluble, it is less available to rapid evaporation and release to the air than more volatile chemicals.

The proposed ammonia tank is not subject to EPA's Risk Management Program for hazardous materials; however, a worst-case accidental release analysis was conducted to alleviate any potential concerns from the community in the very unlikely event of a spill or leak.

To predict the potential worst-case impact distance, the EPA-approved DEGADIS model was used. A worst-case release scenario was defined as a rupture of one of the 8,000 gallon tanks containing a 19 percent aqueous ammonia solution. Consistent with the proposed design, the analysis assumed that the released liquid would be contained within the impervious berm containing layers of closely packed plastic spheres. The release was assumed to occur under conditions which would result in the maximum downwind extent of a particular concentration level in the event of an accidental release.

To predict the worst-case consequence of the ammonia release, the DEGADIS model was used to estimate the distance to the ammonia toxic endpoint of 150 ppm. The toxic endpoint value of 150 ppm is the American Industrial Hygiene Association Emergency Response Guideline Level 2 (EPRG-2). The value represents the maximum airborne concentration below which nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious health effects.

The analysis of this worst-case release scenario showed that concentrations exceeding the ERPG-2 value of 150 ppm for ammonia established by the American Industrial Hygiene Association would not extend downwind to distances of more than 244 feet. There are no residences, dormitories, classrooms, or other routine public gathering places within this radius of the proposed ammonia tanks. Therefore, the defined worst-case accidental release scenario would not result in any adverse health effects due to ammonia, and even with this conservative approach, no significant impacts would occur.

2.7.6. $PM_{2.5}$ Impact

An assessment was made of the potential effects of fine particulates ($PM_{2.5}$) on public health and welfare. The term $PM_{2.5}$ refers to the particle size range equivalent to 2.5 micrometers and smaller. Particles within this range are considered "inhalable particulates." The assessment examined the basis of the proposed EPA $PM_{2.5}$ standards (i.e., 24-hour $PM_{2.5}$ concentration of 65 $\mu g/m^3$ and annual $PM_{2.5}$ concentration of 15 $\mu g/m^3$), how it relates to protecting public health, and potential health effects of emissions of $PM_{2.5}$ from the Calpine Stony Brook Energy Center on the nearby community.

For purposes of this assessment it was assumed that the $PM_{2.5}$ emissions from the proposed facility would be equivalent to the PM_{10} emissions (i.e. all particulate emissions are $PM_{2.5}$). This is a conservative assumption since $PM_{2.5}$ represents only a portion of the total particulates emitted. While there is not sufficient monitored data for the project area and no approved EPA model for definitively assessing compliance with standards, based upon the assumption that 100 percent of PM_{10} emissions are $PM_{2.5}$ and using the PM_{10} air quality modeling results, the maximum 24-hour concentration for $PM_{2.5}$ would be 1.47 $\mu g/m^3$ in Phase I and 4.37 $\mu g/m^3$ in Phase II. If these values are added to the background value of 32 $\mu g/m^3$, the maximum total 24-hour concentration would be 33.5 $\mu g/m^3$ and

36.4 $\mu g/m^3$ for Phase I and II, respectively, both which would well below the 24-hour $PM_{2.5}$ ambient standard. Similarly, the annual concentration of 0.29 $\mu g/m^3$ in Phase I and 0.35 $\mu g/m^3$ in Phase II may be added to the background value of 12.3 $\mu g/m^3$. The total of 12.6 $\mu g/m^3$ and 12.65 $\mu g/m^3$ for Phase I and II, respectively are both below the annual $PM_{2.5}$ standard.

In addition to the primary $PM_{2.5}$ that may be emitted by the proposed facility, NO_x, SO_2 and ammonia are most likely to affect the formation of secondary particles. The reactions of these compounds are quite slow and may take several hours to many days, the rates depending on many factors such as background concentrations of trace-level and catalytic species, sunlight, temperature, relative humidity, and others. As such, these secondary particulates will not affect or contribute to the maximum air quality concentrations of $PM_{2.5}$ particulate resulting from the primary emissions.

The slow reaction times cause the plume to be very widely dispersed. Where dispersion has not diluted the emissions greatly, very little of the NO_x, SO_2 and ammonia would be converted to particles because of the time required for the transformation. Far from the facility where more of these gases would have been transformed, physical dispersion of the emissions would have diluted the impact to such an extent that it would be insignificant relative to background levels. As such, the Facility is expected to have no significant impact as a result of secondary fine particulates.

In conclusion, the proposed Facility would contribute only a small amount to both the annual and the short-term concentrations of $PM_{2.5}$, and these contributions are not expected to significantly effect $PM_{2.5}$ concentrations. Emissions of $PM_{2.5}$ from the proposed facility would not significantly affect compliance with $PM_{2.5}$ standards. These standards are set to protect the public health with an adequate margin of safety. Therefore, the proposed facility would not be expected to result in any significant adverse $PM_{2.5}$ health effects.

2.7.7. Climate Change

The project's impact on climate change due to emissions of greenhouse or climate change gases (GHGs) was assessed. GHGs contribute to climate change by increasing the ability of the atmosphere to trap heat. The principal GHGs are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). To express emissions of the different gases in a comparable way, a weighing factor called the Global Warming Potential (GWP) is often used, which relates the ability of each greenhouse gas to trap heat in the atmosphere to a single gas (CO_2).

The proposed project would fire natural gas. The greatest proportion of the potential GHG emissions from the project would be as CO_2 from the combustion process. Trace amounts of CH_4 and N_2O would also be emitted, however, emissions of these compounds are considered negligible when compared to the total CO_2 emissions, even taking into consideration their GWP, and are therefore not considered significant to the climate change issues.

As a conservative estimate, maximum CO_2 emissions were estimated to be approximately 351 million pounds per year, or 0.159 Tg CO_2 Eq. per year in Phase I. In Phase II, the potential CO2 emissions from the proposed project would be approximately 702 million pounds per year, or 0.318 Tg CO_2 Eq. per year. To assess the proposed project impact on climate change, the project's maximum GWP was compared to state, national, and global estimates of man-made CO_2 emissions. The worst-case annual emissions from the proposed project would be approximately 0.08 percent of the total New York CO_2 inventory. For Phase II, the annual emissions from the proposed project would be approximately 0.16 percent of the total New York CO_2 inventory. On a national scale, the proposed project would contribute only approximately 0.0027 percent to the total national emissions inventory of CO_2 in Phase I and approximately 0.0054 percent in Phase II. Finally, the proposed emissions of CO_2 from the project would be 0.00071 percent (full load basis) of the total annual global emission rate in Phase I and approximately 0.0014 percent in Phase II.

In conclusion, the operation of the proposed facility would result in a negligible contribution to the state, national and global inventories of CO_2 emissions, and therefore the impacts to general public health from project-related operations would be insignificant.

2.7.8. Cumulative Air Impact Assessment

a. Introduction

Potential cumulative impacts due to the six new combustion turbine projects that were constructed for LIPA for the Summer of 2002 (i.e., facilities at Shoreham, Edgewood, Glenwood, Port Jefferson, Bethpage, and Bayswater) and five new combustion turbine projects that LIPA has proposed for the summer of 2003 (i.e., facilities to be located in Jamaica Bay, Freeport, Greenport, North Bellport, and in the facility analyzed in this environmental assessment, Stony Brook).

In addition, an analysis was prepared to examine the cumulative air impacts of the proposed project, the existing NCP Facility, other nearby emission sources at SUNY Stony Brook and beyond.

b. Cumulative Impact Assessment of LIPA 2002/2003 Facilities

Cumulative effects of the LIPA 2002/2003 facilities on localized air quality were addressed by 1) examination of the relative locations of the projects, and the extent of the individual project concentrations downwind; and, 2) the distribution of overlapping project air quality impacts relative to the prevailing winds.

With regard to the first item, the LIPA 2002/2003 facilities are widely spaced throughout Nassau, Suffolk, and Queens Counties. This distribution of projects spreads the relatively low air emissions from each facility through a wide geographical area. Each of the facilities has individually demonstrated through air quality dispersion modeling of potential facility emissions, to have insignificant air quality impacts (i.e., maximum concentrations are below the SILs). The maximum concentrations for each facility would occur very close to the combustion turbines for each facility. The concentrations continue to decrease with distance from the sources, such that at the distance to the next adjacent source, the concentrations would be a scant fraction of the SIL and nearly immeasurable.

With regard to the second item, it can be concluded that no significant cumulative interaction of the facilities would occur based upon an examination of the prevailing wind directions.

The modeling results including Phase I and Phase II and comparison to the standards are presented in Table ES-5 and Table ES-6. As shown in the table, the combined air quality results indicate that the total concentrations (i.e., the cumulative effect of the modeled LIPA 2002/2003 facilities and worst-case background levels) would not exceed the ambient air quality standards. Therefore, the cumulative effect would not produce significant air quality impacts.

Table ES-5: Cumulative Air Quality Impacts of LIPA 2002/2003 Facilities Including Phase I

Pollutant	Averaging Period	Maximum Modeled Concentration (ug/m^3)	Background Concentration (ug/m^3)	Total Concentration (ug/m^3)	NAAQS (ug/m^3)
CO	1-hour	86.0	7,099	7,185.0	40,000
	8-hour	21.2	5,153	5,174.2	10,000
SO_2	3-hour	3.4	149.3	152.7	1,300
	24-hour	1.1	73.4	74.5	365
	annual	0.1	18.3	18.4	80
PM_{10}	24-hr	1.0	41	42.0	150
	annual	0.1	17	17.1	50
NO_2	annual	0.10	47	47.10	100

In sum, because the individual impacts of each facility are so small and the facilities are distributed geographically, there would be no significant cumulative environment impact from simultaneous operation of all LIPA 2002/2003 facilities.

c. Cumulative Air Impact Assessment of Project and Nearby Emission Sources

Cumulative air quality impact analyses were performed to obtain total concentration predictions for the combined emissions of the proposed project and several existing nearby sources: the NCP cogeneration plant, the East and West boiler plants at SUNY Stony Brook, and Keyspan's Port Jefferson generating station, which is located approximately 6 km to the east. Phase II of the proposed project was modeled in the cumulative analysis, since prior modeling had demonstrated that the maximum impacts of the project alone were predicted to occur during Phase II.

The cumulative impact modeling analysis was performed based on the conservative assumption that all the aforementioned nearby sources operate simultaneously at their maximum rated capacities. This assumption is extremely conservative with regard to the two SUNY Stony Brook boiler plants, which operate only when the NCP cogeneration plant is out of service.

Table ES-6: Cumulative Air Quality Impacts of LIPA 2002/2003 Facilities Including Phase II

Pollutant	Averaging Period	Maximum Modeled Concentration (ug/m^3)	Background Concentration (ug/m^3)	Total Concentration (ug/m^3)	NAAQS (ug/m^3)
CO	1-hour	86.0	7,099	7,185.0	40,000
	8-hour	21.2	5,153	5,174.2	10,000
SO_2	3-hour	3.4	149.3	152.7	1,300
	24-hour	1.1	73.4	74.5	365
	annual	0.1	18.3	18.4	80
PM_{10}	24-hr	1.7	41	42.7	150
	annual	0.2	17	17.2	50
NO_2	annual	0.15	47	47.15	100

The modeling results of the cumulative impact analysis are presented in Table ES-7. As shown in the table, the total predicted concentrations attributable to the combined emissions of the proposed project and aforementioned nearby sources, including measured background concentrations, are well below the NAAQS.

Table ES-7: Cumulative Air Quality Impacts of Proposed Project and Nearby Sources

Pollutant	Averaging Period	Maximum Modeled Concentration (ug/m^3)	Maximum Concentration Location		Background Concentration (ug/m^3)	Total Concentration (ug/m^3)	NAAQS (ug/m^3)
			UTM Easting (m)	UTM Northing (m)			
CO	1-Hour	131	657,647	4,530,945	7,099	7,230	40,000
	8-Hour	42.4	657,357	4,530,755	5,153	5,195	10,000
SO_2	3-Hour	368	657,357	4,530,755	149.3	518	1,300
	24-Hour	130	657,367	4,530,805	73.4	204	365
	Annual	8.03	657,367	4,530,805	18.3	26	80
PM_{10}	24-Hour	44.8	657,367	4,530,805	41.0	86	150
	Annual	2.67	657,367	4,530,805	17	20	50
NO_2	Annual	12.2	657,367	4,530,805	47.0	59.2	100

2.7.9. Other Potential Impacts

The proposed project has the potential for impacts due to: (1) the formation of visible water vapor plumes from emissions from the CT stack; and (2) plume fogging, rime icing, the formation of elevated visible plumes, and mineral (salt) deposition from operation of the proposed cooling tower in Phase II.

a. CT Stack Visible Water Vapor Plumes

Visible steam plumes would be unlikely to occur during Phase I; however they may occur during Phase II when operating in a combined cycle mode due to the lower stack exit temperatures. Consequently, the potential frequency and extent of visible plumes resulting from steam condensation during Phase II of the project was conservatively assessed as a worst case using a post-processor to EPA's ISCST model.

The results indicate that during Phase II when operating in a combined cycle mode, there would be 13.5 percent of the daylight hours, excluding hours of inclement weather (rain, snow, or fog), when the plume from the CT stack would be visible due to water vapor condensation. Visible plumes would occur principally in winter, during periods with low ambient temperatures. The plume would most likely occur during the morning hours (around dawn), and would be light and wispy in character, and is expected to be visually intrusive. Due to the height of the stack and high exhaust velocities, the plume would occur relatively high above ground level and would therefore not cause or contribute to any ground fogging effects. In summary, there would be no significant adverse visual impacts expected due to the steam plume from the CT stack.

b. Cooling Tower Assessment

Phase II of the project would include a two cell cooling tower. Potential cooling tower impacts consist of plume fogging, rime icing, the formation of elevated visible plumes, and mineral (salt) deposition. To evaluate these effects, a cooling tower impact assessment was conducted.

The results indicate that the cooling tower would cause a minimal number of hours per year of ground fogging (approximately 9 hours per year) or icing (approximately 1 hour per year). The analysis showed that maximum levels of salt deposition would be negligible and well below levels that would pose any risk to the local environment or to switchyards, and would not occur beyond the SUNY physical plant services complex. The analysis results suggest that visible plumes would occur with some regularity from the cooling tower and that these plumes would typically not extend more than a few hundred feet in any direction. The vast majority of the time, the cooling tower plume would be contained within the SUNY physical plant services complex, and not occur at other areas of the SUNY campus or off-site locations. In summary, the proposed cooling tower is not expected to result in any significant adverse environmental impacts.

2.8 Noise

The noise assessment of the proposed Calpine Stony Brook Energy Center Project consisted of two parts: 1) an ambient noise monitoring program in the vicinity of the project site in order to characterize the existing noise environment; and 2) a noise modeling/impact evaluation of the project. The noise impact evaluation consisted of performing computer noise modeling of the major noise producing equipment and determining impacts based upon the change in one-hour equivalent noise levels ($L_{eq(1)}$). An increase in noise levels of more than 6 dBA was considered a significant noise impact. In addition, an assessment was performed to evaluate consistency of the proposed project with the Town of Brookhaven noise code.

Six receptor sites were selected for analysis. These receptor sites included nearby residences where the proposed facility might have a significant impact. Short-term (20 minute) noise level readings were collected during daytime and early morning hours for a 2-day, 2-night duration. These measured noise levels were used to determine the quietest hours of the day and night, and thus the time period when the proposed facility would have the greatest potential for significant impacts.

A computer noise model was utilized which calculated the project noise by summing the contributions from each of the major noise sources at the proposed facility. Noise level data for most of the major facility noise sources were obtained from equipment vendors. In cases where these data were not available, octave band spectra from comparable facilities was used in the analysis.

The proposed facility has been designed to incorporate noise attenuation measures to reduce potential project impacts. These measures include: combustion turbine air-intake silencer; OTSG stack silencer; turbine and generator compartment ventilation fan silencers; steam-vent silencers; compressor bleed vent silencer; acoustical barriers enclosing gas compressor skid; low-noise generator step-up transformed; and transmission loss generation building walls.

Model results are presented in Table ES-8. Table ES-8 shows the calculated noise from the proposed facility alone, the measured ambient late night noise, the projected future total late night noise with the proposed facility (i.e., the sum of the facility and existing ambient noise levels), and the calculated maximum increase in noise due to the proposed facility (i.e., the difference between the future total noise with the proposed facility and existing late night noise levels). Noise levels due to operation of the proposed facility (alone) are expected to range from 42 to 51 dBA at the nearest sensitive receptors, when the proposed noise controls are incorporated into the design and would be in conformance with the requirements of the Town of Brookhaven noise ordinance. For purposes of this impact assessment, at all of the receptor sites, even during the quietest hour of the night, the maximum increase in noise levels would be less than the 6 dBA impact threshold. Therefore, noise from the proposed facility would not result in any significant adverse impacts.

Table ES-8: Noise Levels With Operation of the Proposed Calpine Stony Brook Energy Center

Receptor Site	$L_{eq(1)}$			
	Lowest Existing Noise Level	Generating Facility Only	Total Noise Level With Generating Facility	Project Increase
Location 1	50	45	51	1
Location 2	45	43	47	2
Location 3	49	49	52	3
Location 4	38	42	43	5
Location 5	54	50	55	1
Location 6	50	45	51	1

Notes: All values in dBA.

2.9 Infrastructure

2.9.1. Water Supply

Water would be required for several functions associated with the safe, clean, and efficient operation of the proposed expansion project. Following the addition of a new combustion turbine during Phase I, additional water would be used for air emissions control (NO_x water injection), SPRay INTercooling (SPRINT water injection), combustion turbine inlet air cooling, and general facility maintenance (i.e., compressor cleaning, plant service water, etc.). During Phase II, additional water would be required for the once through steam generator (OTSG), and to satisfy cooling tower makeup requirements. In the unlikely event of a fire, water would also be used to extinguish its fire.

Process water makeup requirements for Phase I are expected to range between 60 to 70 gallons per minute (gpm) (i.e., 86,400 to 100,800 gpd). Following completion of Phase II, process makeup requirements increase to satisfy OTSG and cooling tower demands. Cooling tower makeup requirements are expected to range from 400 gpm and 500 gpm (i.e., 576,000 to 720,000 gpd) during summer operating conditions. Peak instantaneous demands are expected to total approximately 600 gpm. Cooling tower makeup is expected to be less than 300 gpm during typical winter operating conditions. Assuming the facility operates at full output for 24 hours, about 100,800 gallons per day (gpd) of process water would be consumed in Phase I and about 720,000 gpd in Phase II.

To minimize total water demands and wastewater discharge requirements, recycle/reuse of internally generated process waste streams would also be employed. Water from OTSG sample drains and floor drains at the facility would be recycled and reused in the facility's cooling tower. The net water savings through internal recycle/reuse (as well as the reduction in wastewater generated) is estimated to total nearly 19,000 gpd under typical summer operating conditions.

Raw water for the existing facility is obtained from the SUNY distribution system, which is supplied by the Suffolk County Water Authority (SCWA). Based on discussions with the SCWA, adequate distribution and supply capacity for the expansion project is available for Phase II, except possibly during early morning hours in the summer season. From approximately 1:00 AM through 7:00 AM during the summer, SCWA may request that water supply withdrawals from the distribution system be limited to 200 gpm.

Supplemental demands would be satisfied through withdrawals from campus wells operated by SUNY. SUNY currently operates two campus wells to assist in satisfying physical plant water supply requirements. The capacity of these wells is 1,000 gpm. Based on preliminary discussions with SUNY, a portion of the yield from these wells would be made available to the expansion project as a supplemental makeup supply source. SCWA can supply these quantities of water without a significant adverse impact on the water supply system. In addition, the use of a portion of a SUNY well capacity would not cause a significant adverse impact.

2.9.2. Wastewater Generation

The expansion project would generate process and sanitary wastewater. Wastewater from sanitary uses, demineralizer regeneration, cooling tower blowdown and the compressor wash water would be sent to the Suffolk County Sewerage District #21 Sewage Treatment Plant (STP #21). Wastewater from boiler drains, sample drains and miscellaneous service water uses would be sent to the cooling tower basin. Water from testing of the fire fighting system would be sent to the existing stormwater recharge basin. Finally, stormwater from the secondary containment areas would be trucked off-site to a licensed disposal facility.

Much of the wastewater from the proposed project would be reused in the cooling tower or sent to an existing recharge basin for infiltration into the groundwater. These waste streams would not have a significant adverse impact on the wastewater handling systems. Approximately 3,580 gpd during Phase I and about 86,780 gpd during Phase II would be conveyed to STP #21 for treatment and disposal. This STP has a design and permitted capacity of 2,500,000 gpd and currently treats about 2,000,000 gpd. The wastewater would represent about 0.14 percent of the STP's capacity during Phase I and about 3 percent during Phase II. These volumes would not cause a significant adverse impact to STP #21 ability to properly treat and dispose of the wastewater it handles.

The facility would require authorization from the STP #21 to discharge the sanitary waste stream and process waste streams (i.e., cooling tower blowdown, neutralized regenerant wastewater, and compressor wash water) to the sewer, and would be required to comply with the Sewer Use Limits for pollutants, including specific metals, toxic organics and other parameters. In addition, the discharge of process waste streams is also regulated under Pretreatment Standards for New Sources (PSNS) for the Steam Electric Generating Point Source Category (40 CFR 423.17). The facility cannot discharge any of the EPA-listed 126 priority pollutants.

Given the low volumes of process wastewater proposed for discharge to the sanitary collection system and projected waste stream characteristics, the proposed facility would not result in a violation of applicable discharge limitations or standards and would not cause a significant adverse impact associated with the quality of the wastewater discharge.

2.9.3. Solid Waste

The project would generate small quantities of hazardous and non-hazardous wastes as a result of operation and maintenance of the facility. The process of electrical generation does not produce appreciable amounts of hazardous and non-hazardous wastes when natural gas is utilized as the primary fuel source, as compared to coal or No. 6 fuel oil.

The facility would be classified as a Small Quantity Generator (SQG) of Resource Conservation and Recovery Act (RCRA) hazardous waste (generation of greater than 100 kilograms (kg) and less than 1,000 kg in a given month). The hazardous waste generated would primarily be related to maintenance of the facility and include items such as spent aerosol cans, waste cleaning solvents, and/or waste paint. The hazardous waste generated would be disposed in compliance with all applicable laws and regulations.

Solid waste generated at the facility is related mainly to miscellaneous facility worker trash, including paper, cardboard, aluminum, and glass. A recycling program, in accordance with local solid waste vendor programs, would be implemented for these non-hazardous waste streams.

Small waste streams of off-specification used/waste oil and wastewater would be recycled off-site at licensed receiving facilities, in accordance with the solid waste regulations of the State of New York. The supplying vendor of the SCR and CO catalysts would recycle these catalysts during these maintenance periods. Overall, the quantities and types of solid waste from the proposed project would not have a significant adverse impact on the solid waste handling systems.

Natural gas demands for the proposed project are insignificant in light of available supplies and the capacity of the conveyance systems. Demands at this facility would not impact regional energy systems not would they impact or preclude services to other users. Therefore, the proposed project would not have a significant adverse impact on energy supply and delivery systems.

2.10 Contaminated Materials

During original development of the existing power generating facility, an environmental site investigation was conducted entitled *Baseline Environmental Study for the Stony Brook Cogeneration Facility, Stony Brook, New York*, dated November 22, 1993 (1993 Baseline Study). The project site was a portion of this investigation, which also includes the SUNY West Steam Plant (abutting the subject site to the south) and the SUNY East Power Plant (off East Loop Road on the SUNY Campus). No evidence of a release of oil and/or hazardous materials (OHM) from the project site was identified during this 1993 Baseline Study. However, the study did identify that soils and groundwater immediately to the west of the proposed project site were contaminated with No. 6 fuel oil from a release that occurred in 1987.

To support this project, a Phase I Environmental Site Assessment (ESA) was performed at the project site to build upon the information in the 1993 Baseline Study, as it related to the project site. The project site was inspected on two separate occasions. During both visits, the inspectors reported that the housekeeping and the OHM management were exemplary. In addition, a computerized search of pertinent Federal and State databases was performed to investigate potential adverse environmental impacts at the project site and in the surrounding vicinity that have been reported/recorded by regulatory officials. No evidence of incidents leading to environmental impacts or "contamination" was identified for the project site. In summary, no evidence of soil and groundwater contamination was identified at the project site, nor were Recognized Environmental Conditions identified for the project site.

A Health and Safety Plan would be developed and implemented prior to construction to ensure that the potential for exposure of construction workers, workers on nearby sites, SUNY Stony Brook employees and students, and others in the area to any contaminants onsite is minimized. The Health and Safety Plan would define worker safety training and monitoring procedures, personal protective equipment, air monitoring equipment, action levels, and appropriate protective measures. In addition, the construction workers would be required to comply with the existing SUNY Stony Brook health and safety programs. All material removed from the project site would be disposed in compliance with all applicable laws and regulations. If deemed necessary, remediation would be performed in compliance with all applicable regulations. With these measures, no significant adverse impacts would occur.

2.11 Soils and Geology

The soils at the site have been previously reworked and are suitable for construction activities. Bedrock and groundwater are located at depths that will not interfere with construction, that is, no groundwater dewatering, nor bedrock blasting would be required to support construction.

The seismic history of the region indicates that moderate energy earthquakes are possible. Seismic provisions are in place within the building codes for construction in this seismic environment. To meet this seismic condition, all project buildings would be built to meet or exceed the most stringent (current or proposed) seismic design provisions. The proposed project is not expected to have a significant adverse impact resulting from soils and geological conditions.

2.12 Natural Resources

2.12.1. Vegetation

Based on the site reconnaissance, no sensitive plant species were observed on the project site. Office record information regarding historical occurrence of rare and/or sensitive vegetation on the project site is pending from various agencies. Although construction of the project would result in the permanent removal of the vegetation present upon the project site, significant or unusual plant communities, populations, or individuals are not expected to be adversely affected. The plant communities present on the project site consist of scattered areas of maintained lawn and ornamental shade trees.

The project would limit the footprint of disturbance, and locate the facility within the more heavily disturbed portion of the site. Due to the extensive amount of disturbance that has occurred on the project site, important plant communities comprised of native vegetation are not present in the vicinity of the areas of development. Landscaping around the proposed development will utilize native plants to the greatest extent possible and practical.

2.12.2. Wetlands

Wetlands are not present on the project site. Although a wetland associated with the small ravine located to the south of the project site is present, no work is proposed within this wetland. Therefore, wetland regulatory programs are not applicable, and no significant adverse impacts would occur to wetland resources located in the vicinity of the project site.

2.12.3. Wildlife

Based on the site reconnaissance conducted in the early spring of 2002, there are no sensitive habitats present on the project site. Information regarding historical occurrence of rare and/or sensitive wildlife on the project site is pending. Although construction of the project would result in the permanent removal of the limited vegetation present upon the project site, significant adverse effects to significant or unusual wildlife habitats are not expected.

The entire area of the proposed project site is developed and consists of several large buildings, paved areas, and limited areas of landscaping (lawn and shade trees). No significant vegetation or plant communities are associated with the project site. Wildlife usage of the project site is expected to be minimal and restricted to species typically associated with heavily developed areas. No significant habitats or wildlife species are present on the project site, therefore, the proposed project would have no significant adverse impacts to these natural resources.

2.13 Water Resources

2.13.1. Groundwater

The project site is located at the downgradient edge of Zone I, as identified in the Suffolk County Sanitary Code, but does not appear to lie within a designated Water Supply Sensitive Area. Under Article 7 of the Suffolk County Sanitary Code, Zones I, II, III and V were identified as locations that contribute recharge water to a deep groundwater flow system. Deep groundwater flow systems are of particular significance since they supply the bulk of the water currently used across the Island. In general, they encompass the central portion of Suffolk County.

The project site also lies within a Special Groundwater Protection Area. Special Groundwater Protection Areas were identified by the Long Island Regional Planning Board and in New York State's Long Island Groundwater Management Program in a 1992 study. Within Special Groundwater Protection Areas, the study called for the development of new management programs to ensure the preservation of the existing water quality and the continued recharge of uncontaminated water to these portions of the aquifer.

Since the proposed project site falls within Suffolk County Groundwater Management Zone I, the project has been designed to meet the standards for the storage of any toxic or hazardous materials listed under Suffolk County Sanitary Code Articles 7 and 12.

The material storage tanks proposed to support the facility would be designed with state-of-the-art spill prevention, secondary containment, and leak detection/monitoring systems to prevent any accidental spill from permeating, draining, infiltrating, or otherwise escaping from the facility to groundwater before cleanup can be completed.

The unloading areas for potentially hazardous materials would also be constructed with secondary containment systems capable of collecting and preventing the migration of leaks or spills to soil or groundwater. Where appropriate, secondary containment systems would be designed with visual and audible alarms. All ancillary equipment to prevent a leak or spill would be inspected and tested monthly.

The proposed project is not expected to result in any significant adverse impacts to groundwater resources.

2.13.2. Surface Waters and Aquatic Resources

There are no surface waters or wetlands located on-site, adjacent to the site or along utility interconnection routes. There are also no surface-water drinking water supply intakes located within the project area or along utility interconnection routes. Since there are no surface waters present on or adjacent to the project site or in areas to be disturbed for interconnections, the project would not result in any significant adverse impacts to surface water resources or aquatic resources of the Suffolk County.

2.14 Stormwater Management

The existing facility has and operates using a Storm Water Pollution Prevention Plan and a Spill Prevention, Control and Countermeasure (SPCC) plan. The operators and all contractors are contractually obligated to maintain a clean work environment while onsite work is performed. Additionally, techniques would be used to prevent storm water and spill contamination.

Stormwater from the proposed facility would be managed using the existing SUNY Stony Brook system, which currently handles stormwater from the project site and the entire physical plant services complex. There are 30-inch and 12-inch stormwater mains at the project site that ultimately discharge to stormwater recharge basins located to the east of the physical plant services complex. Stormwater from these basins infiltrates to the groundwater. Stormwater quality would continue to be regulated by the State Pollutant Discharge Elimination System (SPDES) permit issued to SUNY Stony Brook. This permit ensures that the stormwater quality would not adversely affect groundwater quality.

The secondary containment, monitoring systems, and spill and overfill prevention systems at the facility would be designed, constructed, and installed in accordance with industry standards or applicable codes. The project would be designed and operated in accordance with standards established by Article 12 of the Suffolk County Sanitary Code, Toxic and Hazardous Materials Storage and Handling Controls, and 6 NYCRR 596, Hazardous Substance Bulk Storage Tanks. All piping, fittings, and connections would be fabricated, constructed, and installed in a manner that will prevent the escape of toxic materials contained therein to the ground, groundwater or surface waters of Suffolk County.

The aqueous ammonia unloading and storage area would be provided with secondary containment encompassing the unloading area, the storage tanks and transfer pump area. Storm water within the containment area would be directed to a low point sump from which it will be pumped for off-site treatment at an appropriately licensed facility. Each ammonia tank would be equipped with automated level monitoring gages, intermediate level warning indicators, as well as visual and audible high-level alarms. Leak detection devices would also be installed within the secondary containment structure.

New transformers would be provided with secondary containment. Adequate volume would be provided for storage of transformer fluid as well as storm water retention. Storm water within the containment dike would be pumped for off-site disposal at an appropriately licensed facility.

Facility operations requires limited amounts of lubricating oils and certain other industrial chemicals, which would be stored in specially designed, covered containment areas. Except for the ammonia, acid and caustic storage tanks, all new onsite chemical storage areas would be situated indoors with appropriate containment. Any solids or liquids found within containment areas would be collected for off site disposal at an appropriately licensed facility.

Implementation of the measures discussed above would prevent any significant adverse impacts.

2.15 Construction Impacts

Construction activities associated with the proposed Calpine Stony Brook Energy Center Project would include preconstruction site preparation, unit assembly and site finish, utility connections, and start-up and testing. All construction activities would take place in accordance with good construction practices, SUNY requirements, and with the requirements of the various permits for facility construction and operation.

Potential impacts have been assessed for both Phase I and Phase II construction. Except where noted, impacts and control methods are expected to be similar. As a result, this section has not been broken out into Phase I impacts assessment and control methods and Phase II impacts assessment and control methods.

2.15.1. Traffic

During construction of the proposed facility, two categories of vehicular trips would encompass the construction activity: worker trips and equipment/supply deliveries. The maximum projected peak number of construction workers employed at any one time is approximately 300 with an average of 150 construction workers. Based on the typical construction workday, it is anticipated that the majority of the construction workers would generally arrive at and depart the proposed project site prior to and after peak roadway hours. Therefore, vehicle trips associated with construction workers would be of limited duration and generally not during peak travel time periods. It is anticipated that construction workers would park their vehicles at the south P lot and be bussed to the construction site Similarly, the maximum number of trucks is estimated to be approximately 40 trucks per day during construction. Typically less truck trips would occur. Trucks would enter through the South Campus entrance per SUNY guidelines. Truck movements for materials delivery and removal would be spread throughout the day on weekdays and typically not occur during peak travel periods. Based on the amount of construction-related traffic expected, the hours when trips would occur, the limited duration of peak construction, and existing roadway traffic volumes and capacity, it is not anticipated that construction activities would result in any significant adverse traffic impacts.

2.15.2. Hazardous Materials

Soils and groundwater immediately to the west of the proposed project is known to be contaminated with No. 6 fuel oil from a release that occurred in 1987. If deemed necessary, remediation would be performed in compliance with all applicable regulations.

A Health and Safety Plan would be developed and implemented by the proposed project's general contractor prior to construction to ensure that the potential for exposure of construction workers, workers on nearby sites, SUNY Stony Brook employees and students, and others in the area to any contaminants onsite is minimized. The Health and Safety Plan would define worker safety training and monitoring procedures, personal protective equipment, air monitoring equipment, action levels, and appropriate protective measures. In addition, the construction workers would be required to comply with the existing SUNY Stony Brook health and safety programs. All material removed from the project site would be disposed in compliance with all applicable laws and regulations. Hazardous materials required during construction would be stored in designated areas and provided with secondary containment. With these measures, no significant adverse impacts would occur during construction.

2.15.3. Air Quality

Vehicle emissions can be classified into two distinct sources: criteria pollutant emissions from private and construction vehicle internal combustion engines; and fugitive dust that results from vehicle movement over paved and unpaved roads, as well as activities associated with material handling, earth moving/grading, etc.

Emissions from private vehicle emissions can occur as a result of traffic and/or added trip length that encounter roadway diversions or detours associated with the project. For the construction of the proposed project, there would be only brief road closures or diversion for utility line road crossings or receiving large equipment. Therefore, no significant air quality impacts would be expected from these sources.

Construction vehicles would emit criteria pollutants. However, impacts are expected to be minimal for several reasons. During site preparation, limited demolition would be required because the project site is relatively clear of existing structures. While there may be some grading required of the site during site preparation, it is anticipated that heavy construction activity likely would be limited to a short period. During unit assembly and site finish, impacts would be minimal since much of the equipment is prefabricated prior to arrival at the project site. In addition, construction vehicles to be used would be well maintained which would result in efficient fuel combustion and minimal criteria pollutant emissions. Moreover, the site is located approximately 1,000 feet from the nearest on-campus housing and approximately 850 feet from the nearest off-campus residence. The number of vehicles would be modest and would not cause a significant adverse impact.

Heavy construction activities would be minimal, as demolition and grading activities are not anticipated to be significant. In addition, the nearest on-campus housing (Kelly Quad) and the nearest off-campus residences are sufficiently distant from the project site such that there would be minimal impacts from fugitive dust emissions. Several measures would be employed during construction activities to ensure that dust suspension is kept low. These include: keeping construction vehicle speed low to reduce dust suspension; covering exposed stockpiles of soil and gravel to eliminate wind-driven dust suspension, or as an alternate, minimizing the height of these piles; the periodic washing of paved surfaces during dry periods as a means to suppress dust suspension; and the application of water on stockpiles and unpaved roads during dry periods as a means to suppress dust suspension.

Based on low expected incidence of heavy construction activities, the good maintenance of the construction vehicles, the use of previously stated measures to control dust suspension, and the distance of the construction area from the nearest residences, significant air quality-related construction adverse impacts associated with the proposed facility are not expected.

2.15.4. Noise

Construction equipment utilized would differ during the various construction activities and would be dependent upon the equipment utilized and operations performed. Table ES-9 shows typical noise levels for different construction activities at a distance of 50 feet from the construction site. Noise from the construction site would be attenuated by a variety of mechanisms. The most significant attenuation of the sound with distance. In general, this mechanism would result in a 6 dBA decrease in the sound level with every doubling of distance from the source. For example, the 89 dBA sound level associated with excavation and finishing would be attenuated to 63 dBA at a distance of 1,000 feet. The site is approximately 1,000 feet from the nearest on-campus housing and approximately 850 feet from the nearest off-campus residence. At these distances, noise due to excavation or finishing would be expected to result in a noise level of 63 dBA at the nearest on-campus housing and 64 dBA at the nearest off-campus residence. At times, noise from these and other construction activities would be readily noticeable and intrusive. However, these effects would occur for a limited time period, during daytime hours (i.e. between the hours of 7AM and 7PM), and during some phases of construction, noise from construction activities would not produce noticeable increases in noise levels even at those close locations.

The construction equipment would not normally be operating simultaneously, which would act to reduce the total noise level. There would be periods of time when no equipment would be operating and noise would be at or near ambient levels. The sound levels presented are those which would be experienced for people outdoors. A building (house) would provide significant attenuation for those who are indoors. Lastly, in order to reduce construction noise levels to the greatest extent possible and practical, functional mufflers would be maintained on construction equipment.

Table ES-9: Typical Site Average Noise Levels at 50 Feet by Construction Activity (dBA)

Construction Phase	Noise Level at 50 Feet (dBA)
Site Clearing	84
Excavation	89
Foundations	77
Building Assembly	84
Finishing	89

It should be noted that the Town of Brookhaven noise standard exempts construction activities, with the restriction that construction activity is only allowed between the hours of 7 AM and 6 PM on weekdays. The project is not subject to these local regulations, and construction activities at times would take place during evening hours and on Saturday. Hours of construction would be determined in consultation with SUNY Stony Brook. Therefore, no significant noise impacts due to facility construction are anticipated.

2.15.5. Erosion and Sediment Control

Stormwater management during construction activities would be performed through implementation of a site-specific erosion and sediment control plan. In accordance with NYSDEC guidelines, the erosion and sediment control plan will include both structural and non-structural components. The structural components are expected to consist of hay bale barriers/silt fencing, inlet protection for existing or newly installed catch basins, and installation of a stabilized construction entrance or other appropriate means to limit potential offsite transport of sediment. The non-structural "best management practices" would include routine inspection, dust control, cleaning and maintenance programs, instruction on the proper management, storage and handling of potentially hazardous materials, as well as identification of parties responsible for implementation and on-going maintenance programs. All temporary control measures would be maintained until disturbed areas of the site are stabilized and a permanent stormwater management system is complete and operational.

2.16 Cumulative Impacts

A cumulative impact analysis was performed to examine whether the proposed project, cumulatively with other relevant facilities (i.e., facilities built for LIPA for the Summer of 2002, and facilities proposed for LIPA for the Summer of 2003), would have the potential for causing significant adverse environmental impacts. The cumulative impact analysis considered each of the environmental categories (i.e., land use and zoning, community facilities, cultural resources, contaminated materials, traffic, air quality, noise, etc.) as analyzed above. Because of the very localized extent of each such facility's impacts, in all areas other than air quality, cumulatively the new LIPA electric generating facilities have no potential for significant impacts.

With respect to air quality, the LIPA facilities would also have only very localized effects, though other larger facilities (not part of the LIPA system) could have broader impacts. Consequently, quantified analyses were performed to assess the potential cumulative air quality impacts of the proposed project together with such facilities. The detailed cumulative analyses show that all of the maximum concentrations from stack emissions would be below the applicable air quality standards. Therefore, in terms of air quality, the proposed project would not, either individually or cumulatively, have any significant adverse environmental impacts. *

1.0 Project Description

1.1 Introduction

Calpine Stony Brook Energy Center 2, Inc., a subsidiary of the Calpine Corporation (Calpine) has proposed the construction of a state-of-the-art 79.9 megawatt (MW) natural gas-fired combined-cycle unit on property located on the State University of New York (SUNY) Stony Brook campus adjacent to an existing 47 MW cogeneration facility owned and operated by Nissequogue Cogen Partners (NCP), also a subsidiary of Calpine, in the Town of Brookhaven, Stony Brook, New York (see Figures 1-1 through 1-4).

The proposed facility will be called the Calpine Stony Brook Energy Center, and for purposes of this assessment may be referred to as the proposed facility or proposed project. The Calpine Stony Brook Energy Center would be available to provide power to the SUNY Stony Brook campus to accommodate future energy demands and would provide financial and operational benefits to SUNY Stony Brook. Until SUNY energy demands increase to the point where all or most of the energy produced at the proposed facility is needed to supply SUNY needs, the proposed facility would provide energy to the Long Island Power Authority (LIPA) grid. LIPA would purchase the power via a power purchase agreement with Calpine. As part of the financial arrangement with Calpine, SUNY would be permitted to purchase electricity and steam at a significant cost savings.

In order to meet LIPA's projected peak load demand and improve system reliability for summer 2003, the project, if approved, would be constructed in two phases. Phase I would include construction and installation of a new GE LM6000 PC combustion turbine with a nominal gross output of 47 MW. Due to internal loads required to operate the turbine, available capacity to the electric transmission system would be a nominal 45 MW. The new combustion turbine would burn only natural gas and would use selective catalytic reduction (SCR) and water injection for nitrogen oxides (NO_x) control, and an oxidation catalyst to control emissions of carbon monoxide (CO) and volatile organic compounds (VOC). A Once Through Steam Generator (OTSG) would be constructed to accommodate the air pollution control equipment, but the OTSG would not be operational until Phase II. During Phase II of the proposed project, a steam interconnection between the proposed LM6000 CT and the existing NCP facility would be built. This interconnection would not increase net output of electricity above 79.9 MW, but would eliminate the need to occasionally vent steam as is the current practice. The project schedule calls for the Phase I unit to be in operation by August 1, 2003. During the summer of 2003, the LM6000 combustion turbine would operate in simple-cycle mode.

Phase II would commence operation in 2004, and would consist of two phases. Phase II-A would consist of the activation of the OTSG, and construction of supplemental gas-fired duct burners and a steam turbine, which would increase the total output of the proposed facility to a maximum of 79.9 MW. Upon completion of Phase II-A, the proposed facility could operate in a combined-cycle mode, utilizing the waste heat from the combustion turbine to generate additional electricity in the steam turbine unit.

Phase II-B would incorporate a steam interconnection that would allow the existing NCP facility to transfer steam to the proposed facility. Currently, during periods of high electrical demand and low SUNY steam loads, the existing NCP facility occasionally generates excess steam. When this occurs, the excess steam must be vented, which is noisy, costly and a waste of energy. The Phase II-B interconnection would allow excess steam from the NCP facility to be transferred to the proposed facility's steam turbine in place of steam that would otherwise be generated by the proposed facility's duct burners. The proposed facility would eliminate the need for venting the steam to the atmosphere. Because the project would be designed to generate its maximum potential electrical output without using steam from the NCP facility, the availability of this excess steam would not increase the generating capacity of the project. The Phase II-B interconnection would not increase the net output from the project. NCP's operation is not expected to change, except that it would no longer have to vent steam to the atmosphere during periods when the demand for steam is low.

The proposed project site is an approximately 1.5 acre parcel of land, wholly within the SUNY physical plant services complex on the SUNY Stony Brook campus. The SUNY physical plant services complex is located on the western edge of the campus and is approximately 12 acres. The physical plant services complex consists of the existing NCP building and associated structures (2 acres), a brick SUNY Central Stores Warehouse with loading dock, a parking lot (proposed facility site), the SUNY West Steam Plant, the abandoned SUNY West Steam Plant cooling tower, electrical substations and a natural gas pump station.

For process and cooling water needs, the project may use two sources. The main source would be from the Suffolk County Water Authority's (SCWA) distribution system. An interconnection would be made between the proposed facility and the existing water line. A supplemental source would be water from existing wells located on the SUNY Stony Brook campus. The on-campus wells were originally developed for the West Steam Plant and are not currently being fully used. The wells have sufficient capacity to meet peak summer facility water demands.

The wastewater would be discharged into Suffolk County Sewerage District #21 Sewage Treatment Plant. The project would apply for a discharge permit with the Suffolk County Department of Public Works (SCDPW) by a modification of the existing SUNY Stony Brook discharge permit.

The electric interconnection would be to the existing switchyard located northwest of the project site, and the gas interconnection would be on-site.

The objective of this Environmental Assessment (EA) is to analyze the potential environmental impacts of the proposed Calpine Stony Brook Energy Center project in accordance with the State Environmental Quality Review Act (SEQRA), to allow for an informed determination of whether the proposed project may result in any significant environmental effects.

1.1.1. Organization of the Environmental Assessment

This EA is organized as follows:

Section 1.0, "Project Description," contains an overview of the proposed project's purpose, need and benefits; a description of the proposed project; a brief description of the proposed project site environmental conditions; a summary of the public outreach efforts conducted in support of the proposed project; a summary of the permits and approvals required; and this description of the Environmental Assessment format.

Section 2.0, "Environmental Setting and Impact Assessment," provides a discussion of specific environmental study areas (e.g. air quality, water resources, noise, cultural resources, etc.). Each environmental resource area is addressed with a discussion of existing conditions and an evaluation of potential impacts.

Appendices, including Appendix A, which contains the SEQRA Environmental Assessment Form, with Part 1 completed, follow the Environmental Settings and Impacts Chapter.

1.1.2. Purpose and Need

SUNY Stony Brook campus was built in 1962, on land donated by Ward Melville. Over the past forty years, the University has grown tremendously. The campus originally housed 9 buildings on a 480-acre site. Currently Stony Brook has 123 buildings on nearly 1,200 acres. Stony Brook is a major research university on Long Island. Excluding the state and county governments, the University is Long Island's second largest employer, with approximately 9,590 people on the campus payroll. It is the largest single-site employer in Suffolk County. During the fall of 2002, the full time undergraduate enrollment was 12,815 students. Along with graduate students, total enrollment was about 21,000 students.

The proposed Calpine Stony Brook Energy Center would be available to provide power to the SUNY Stony Brook campus to accommodate future energy demands. In particular, over the long term, the Calpine Stony Brook Energy Center would provide a secure, cost-effective supply of electricity to support the educational mandates of SUNY Stony Brook. In addition, the proposed facility would provide savings on future energy costs for the SUNY campus. Finally, the proposed project would enhance the reliability of power supply to the campus. In addition, the proposed facility would help satisfy an immediate need for additional electrical generating capacity on Long Island beginning in the summer of 2003.

In October 2002, LIPA released its Draft Long Island Energy Plan. The draft plan covers the years 2002 to 2011 and addresses a series of "multi-faceted planning options that seek to make certain that Long Island has an adequate and reasonably priced supply of electricity well into the future." LIPA has determined that there is the potential for a shortfall of approximately 200 MW during the summer of 2003 in the LIPA service area. This need for additional generating capacity on Long Island became very evident during July 2002. On July 3, 2002, during a heat wave, power demand reached a new record of 5,030 MW. On July 29, 2002, that record was broken when the demand for electricity reached 5,059 MW. The total energy usage for July 2002 exceeded that of July 2001 by 21 percent.

The Calpine Stony Brook Energy Center, in conjunction with the two new on-island projects recently announced by LIPA, FPL Jamaica Bay Project (54 MW) and Global Common Greenport (54 MW), would help LIPA to address the projected summer 2003 demands.[1] The additional energy needed to meet projected summer 2003 demands is expected to come from energy efficiency and peak demand reduction measures.

It should be noted that the Calpine Stony Brook Energy Center has been designed as a two-phase project to help meet the immediate needs of LIPA for the summer of 2003. After 2003, LIPA's projections of future energy needs on Long Island indicate that the peak demand will grow each year by approximately 100 MW between now and 2011. The peak load is expected to increase approximately 1.7 percent per year during this period.

One key feature of the proposed project would be the ability in Phase II to operate as a combined cycle facility. Combined cycle operations are more efficient than simple cycle operations because they capture waste heat from the turbine exhaust. This facility would produce electricity with very low heat rates (i.e. less fuel is required to produce the same amount of electricity) and low pollutant emissions.

1.1.3. Description of the Physical Characteristics of the Proposed Action

The proposed project located on the SUNY Stony Brook campus site is a combined-cycle facility. The project would be constructed and operated in two phases (Phase I and Phase II). The proposed facility's primary equipment components would be a natural-gas-fired General Electric LM6000 SPRay INTercooling (SPRINT) Combustion Turbine (CT) Generator with associated OTSG, duct burners, and a steam turbine generator with a maximum net export to LIPA's and/or SUNY's distribution system capped at 79.9 MW (after Phase II is operational). The project would utilize only natural gas as its fuel source. The CT would be able to operate in the range of 50 percent to 100 percent load, and be capable of multiple start-ups and shut-downs per week. The site plan for the proposed project site is included as Figure 1-5, and a brief description of the LM6000 is included in Appendix B.

The CT's efficient combustion system using water injection is a major element to emissions control. In addition, SCR and oxidation catalyst systems would be employed to further reduce NO_x, CO, and VOC emissions. Treated exhaust gas would be emitted through a stack approximately 125 feet above grade. Stack emissions would be monitored with a continuous emissions monitoring system (CEMS).

Additional on-site equipment would include an inlet air chilling system, a two-cell cooling tower, ammonia injection system for the SCR system, electric metering, step-up transformer, auxiliary transformer, station transformer and electric switchgear. A local

[1] A facility proposed by PSEG in North Bellport, which would have provided 79.9 MW of energy, has recently been cancelled.

unit control system would integrate all operating functions of the proposed facility. The project would be interconnected to LIPA's nearby electric transmission system via underground transmission lines.

a. Phase I

It is anticipated that Phase I of the project would start construction in the first quarter of 2003 and be operational by August 1, 2003. Phase I of the project would be constructed first in order to meet the immediate needs of on-island demands serviced by LIPA. Phase I of the project would operate in simple-cycle mode and consist of the following:

- CT Generator;
- SCR system;
- Ammonia storage system;
- Oxidation catalyst;
- OTSG (not to be operational, but to accommodate air pollution control systems);
- Stack;
- Control house;
- Distributed control system (DCS);
- Gas metering station;
- Water treatment systems;
- Inlet air chiller systems;
- Electrical transformers; and
- Fire protection system.

b. Phase II

Phase II of the project would begin construction shortly after Phase I of the project has commenced construction and is designed to be operational in 2004. Phase II contains two parts, Phase II-A and Phase II-B. Phase II-A includes the construction and installation of the following:

- OTSG activation;
- Gas fired duct burners;
- Steam turbine generator; and
- Two-cell cooling tower.

Upon completion of Phase II-A the facility would be able to operate in combined-cycle mode and would be able to produce 79.9 MW of electricity to the LIPA grid.

Phase II-B construction would consist of:

- Steam interconnection to the existing NCP facility to permit the proposed project to purchase and utilize steam from the NCP facility.

The steam connection between the project and the existing NCP facility would not change the net output from the project, but would reduce the amount of fuel consumed at the proposed facility, and eliminate the need to vent steam from the existing NCP facility during high electrical demand-low steam demand periods. The project output of electricity to the LIPA (or SUNY) distribution grid would be limited to no more than 79.9 MW.

c. Project Equipment Description

Combustion Turbine Generator

The proposed facility would incorporate one General Electric (GE) LM6000 CT generator with a gross electrical output of nominally 47 MW. The CT generator consists of an air compressor, combustion chamber, CT, and an electric generator. Part of the power produced in the CT is used to drive the air compressor; the remaining part drives the electric generator to produce electric power. Demineralized water would be injected into the CT to control NO_x emissions.

Ambient air enters the compressor inlet through a filtration system. Air is compressed by passing through a series of rotating and stationary compressor blades. The SPRINT water injection system enhances performance efficiency by injecting atomized water spray into the compressed inlet air. The compressed air is then passed into the burner section where fuel is fired into a number of burners that form a ring around the circumference of the CT section casing. Cooling would be used to reduce the temperature of the inlet air, thereby increasing power output.

The hot combustion gas from the burners combines with the compressed air to produce a high-pressure gas stream, which enters the turbine section. There, the gas stream passes through a second series of stationary and rotating turbine blades. Enough energy is produced in the turbine section to power the compressor and the generator.

Inlet Air Chiller

The proposed facility would be equipped with an inlet air chiller system (similar in operating principle to a refrigerator) to reduce the temperature of the incoming ambient air. The chilled air is denser and allows more power to be generated by the CT. The system consists of a small cooling system with fans and a piping network.

Air Pollution Control Systems

The proposed CT would be among the cleanest fossil fuel electric generating facilities in the United States. NO_x emissions would be less than 2.5 parts per million volume dry (ppmvd) corrected to 15 percent oxygen (O_2) through the use of natural gas fuel, water injection technology, and SCR. Water is injected into the combustor to reduce NO_x formation by reducing combustion temperature. The SCR system injects 19 percent aqueous ammonia into the CT exhaust, which then passes over a catalyst bed where the NO_x is catalytically reacted (reduced) to nitrogen and water.

The GE CT would emit certain products of incomplete combustion in the form of CO and unburned non-methane hydrocarbons (NMHC), otherwise known as volatile organic compounds (VOC). CO and VOC emissions would be controlled by an oxidation catalyst placed upstream of the SCR. Further detailed discussion on the proposed project's air pollution control system is presented in Section 2.7, "Air Quality." The air pollution control systems would be housed in the OTSG, which would be constructed, but not activated, during Phase I.

Combustion Turbine Generator/SCR/Stack

Figure 1-5 shows the general arrangement. Auxiliary equipment for the CT unit would include a CT auxiliary skid, a water injection skid, inlet air chiller system (previously described) and an aqueous ammonia injection skid. The CT air intake is located above the turbine.

Stack

The CT would discharge to a 125-foot exhaust stack. The height of the stack was established through air modeling to minimize ambient air and visual impacts. Access platforms for air testing/monitoring equipment will be provided. The stack would not require lighting pursuant to Federal Aviation Administration (FAA) air navigation guidelines.

Water Treatment Area

The water treatment area would be located as shown in Figure 1-5. Pumps, piping, tanks, and hook-ups would be provided for an anion/cation demineralization system, similar to the one already operating at the NCP facility. Raw water would come from the Suffolk County Water Authority (SCWA) distribution system, supplemented by existing wells on the SUNY Stony Brook campus. The water treatment system would produce demineralized water using an anion/cation exchange process that requires acid and caustic to regenerate the system. Demineralized water is required for boiler makeup, NO_x control, CT wash water and SPRINT injection. Processed water would be routed to the demineralized water storage tank, which would be located adjacent to the water treatment area.

Storage Tanks

Above ground storage tank systems would be located on site for storage of demineralized water and aqueous ammonia. Each of these systems is described below:

- Water Storage—A single water storage tank would be located on site for demineralized water. The demineralized water tank would store approximately 150,000 gallons of treated water.
- Acid and Caustic Storage—These chemicals are necessary to regenerate the anion/cation exchange beds of the demineralization system. The tanks would be approximately 10,000 gallons each and would be provided with secondary containment, and leak and overfill detection systems.

- Ammonia Storage—The SCR requires aqueous ammonia injection as a catalyst for NO_x emissions control. An approximately 19 percent aqueous ammonia solution would be stored in two 8,000 gallon tanks located adjacent to the water system on the southeastern portion of the project site. The tanks would be of welded steel construction. The tanks would be located within two separate concrete containment area each capable of storing 110 percent of the one tank's contents. The containment area would be filled with buoyant balls that would minimize ammonia exposure to the atmosphere in the unlikely event of a spill. Each tank would be tightness-tested before use and inspected on a regular schedule. A leak detection system would be installed. The system would have an audible alarm in the control room. The storage tanks and containment design would include provisions for overfill detection and prevention.
- Neutralization Tank—This tank would have a capacity of approximately 20,000 gallons and, similar to the tank currently in use at the NCP facility, would receive process wastewater for pH adjustment prior to discharge to the #21 STP. The tank would have secondary containment and would be monitored in the control room. The tank would also serve as a holding point where tests would be performed to ensure compliance with applicable discharge regulations.

Main and Auxiliary Transformers

There would be one main step-up transformer containing approximately 10,000 gallons of insulating oil. In addition, there would be one auxiliary transformer containing approximately 2,000 gallons of insulating oil. The oil in each transformer would be contained within the steel transformer casing. Each transformer would have secondary containment.

Electric Interconnection

The proposed facility would interconnect to LIPA's electric system on the physical plant services complex, about 800 feet from the facility interconnect point. An underground line would be constructed between the project transformers and the LIPA switchyard.

1.1.4. Timetable and Project Construction

If approved, Phase I of the project would commence construction during the first quarter of 2003 and be on-line by August 1, 2003. Phase II would commence construction during the second quarter of 2003, with operation anticipated in 2004.

1.2 Description of SUNY Stony Brook Project Site

Stony Brook is located at the geographic midpoint of Long Island, the SUNY Stony Brook campus lies about 60 miles east of Manhattan and 60 miles west of Montauk Point. The State University at Stony Brook was originally established in 1957. In 1962 the SUNY Stony Brook campus was built, on land donated by Ward Melville. Over the past forty years, the University has grown tremendously. The campus originally housed 9 buildings on a 480-acre site. Currently Stony Brook has 123 buildings on nearly 1,200 acres.

Stony Brook is a major research university on Long Island. Excluding the state and county governments, the University is Long Island's second largest employer, with approximately 9,590 people on the campus payroll. It is the largest single-site employer in Suffolk County. During the fall of 2002, the full time undergraduate enrollment was 12,815 students. Along with graduate students, total enrollment was about 21,000 students.

The 1.5-acre proposed project site is located within the physical plant complex on the west side of the SUNY Stony Brook University Campus. The proposed project site is located adjacent to the existing cogeneration facility owned and operated by NCP. An electric substation owned by LIPA abuts the site to the northwest.

Existing conditions at the proposed project site are provided in an aerial and a site photograph included as Figures 1-3 and 1-6, respectively. As illustrated in the figures, the proposed project site is currently paved and used for physical plant and NCP personnel parking. A 3-acre construction laydown area would be located just to the north of the proposed project site.

Existing development in the vicinity of the proposed project site is shown on the aerial photograph included as Figure 1-3 and on Figure 1-4. The SUNY physical plant services complex is located on the western edge of the campus and is approximately 12 acres. The physical plant services complex consists of the existing NCP building and associated structures (2 acres), a brick SUNY Central Stores Warehouse with loading dock, a parking lot (proposed project site), the abandoned SUNY west steam plant cooling tower, electrical substations and a natural gas pump station.

1.3 Public Outreach

As part of the Calpine Stony Brook Energy Center planning and development efforts, Calpine and LIPA representatives met with representatives of State, County and local governments and agencies. The intent of the outreach effort is to inform the individuals and groups of the need for, and purpose of, the planned generating facility, and to solicit and exchange information about the project.

An advisory group of SUNY personnel has been formed to participate with Calpine and LIPA on public outreach on an ongoing basis. As part of this outreach program, Calpine, LIPA, and/or SUNY will be meeting with various governmental officials, the surrounding community, environmental interest groups, residents, and other interested parties to discuss the need and design of the proposed facility, its environmental effects, and to answer questions about the proposed facility. An open house will be scheduled for early 2003 as part of this program.

1.4 Notifications, Actions, Permits and Approvals

Development and operation of the project may require or include the following federal, state and local regulatory agency notifications, actions, permits and approvals.

Federal Aviation Administration

- Determination of No Hazard to Air Navigation.

U.S. Environmental Protection Agency

- Spill Prevention Control and Countermeasure Plan.

Long Island Power Authority

- Facility power purchase agreement.
- Facility interconnection agreement.

New York State Department of Environmental Conservation

- New York State facility air permits (for construction) pursuant to 6 NYCRR Part 201-5 and 231-2.
- Prevention of Significant Deterioration permit pursuant to 40 CFR 52.21.
- Title IV acid rain permit.
- Title V operating permit pursuant to 6 NYCRR Part 201-6 (within one year from commencement of operation).
- General Permit for stormwater discharge associated with construction activities.

New York State Public Service Commission

- Certificate of Public Convenience and Necessity pursuant to Section 68 of the Public Service Law (together with an Order for Lightened Regulation, and/or financing approval pursuant to Section 69 of the Public Service Law).

State University of New York

- Amendment to Energy Sales Contract.
- Site Use Permit.
- Building Permit.
- Well Water Supply Agreement.

Suffolk County Water Authority

- Authorization to Connect to water supply system.

Suffolk County Department of Public Works

- Sewer Discharge Permit (modification of existing SUNY discharge permit).

Suffolk County Department of Health Services

- Article 7 Hydrogeologic Zones and the Special Groundwater Protection Areas.
- Article 12 Bulk Storage Tank Registration. *

2.1 Land Use and Zoning

The proposed project site is located within the Stony Brook State University of New York (SUNY) campus on property owned by the State of New York. The SUNY Stony Brook campus is located within the Town of Brookhaven, Suffolk County, New York. Within the SUNY Stony Brook campus, the project site is situated in the university physical plant services complex.

This chapter describes the proposed Stony Brook Energy Center's relationship to existing land use and zoning.

2.1.1. Existing Land Use

a. Introduction

The proposed project is located approximately 650 feet east of NYS Route 25A in Stony Brook, Town of Brookhaven, Suffolk County, New York (see Figures 1-1 and 1-2). The proposed project site is an approximately 1.5-acre parcel of land, wholly within the SUNY physical plant services complex on the approximately 1,100-acre SUNY Stony Brook campus. The SUNY physical plant services complex is located on the western edge of the campus and is approximately 12 acres.

The physical plant services complex consists of the SUNY West Steam Plant, facilities offices, the existing NCP facility (2 acres), the brick SUNY Central Stores warehouse with loading dock, a parking lot (proposed project site), the abandoned SUNY West Steam Plant cooling tower, electrical substations, and a natural gas pump station. Landscaping consists of grass, small trees and ornamental shrubs. Figure 2.1-1 provides an aerial photograph of the project site and surroundings.

The project site is a relatively level parcel of land that is paved and currently used for parking. The SUNY warehouse and gymnasium road bound the site to the north. North of the warehouse is a parking lot and an athletic track and a 7,500-seat stadium. East of the project site are buildings housing SUNY physical plant services personnel. To the south are additional physical plant services buildings and immediately west is the NCP facility. To the west is the SUNY cooling tower that is currently not in service, the University's North Loop Road, SUNY's stormwater recharge ponds, the Long Island Railroad (LIRR) and NYS Route 25A. Southwest of the project site is the SUNY West Steam Plant. Figure 1-4 is a campus map, which depicts the layout of the campus.

The existing NCP facility consists of one GE LM6000 PC gas turbine generator and one heat recovery steam generator. The NCP facility distributes steam to two delivery points for steam plants operated by SUNY. The cooling tower located within the physical plant services complex was used by the SUNY West Steam Plant, but is currently inactive.

b. Land Uses Within One-Mile Radius

To classify the surrounding community land use, a one-mile radius surrounding the proposed project site was used to focus on the specific attributes of the local communities. Figure 2.1-2 shows land uses within this one-mile study area. The majority of the one-mile radius is within the community of Stony Brook. The western edge of the one-mile radius reaches the Head of the Harbor community in the Town of Smithtown, and the eastern edge reaches the community of Setauket, in the Town of Brookhaven.

As shown in the referenced figures, land uses within a one-mile radius of the project site largely encompasses the SUNY Stony Brook campus, residential uses, and commercial development along Route 25A. North Country Road (NYS Route 25A) and the LIRR commuter rail line bisect the one-mile radius. Both the LIRR and Route 25A follow a similar path, traveling in the northeast/southwest direction.

Northeastern Quadrant

Land uses within the northeastern quadrant of the one-mile radius consist of the SUNY Stony Brook campus (athletic fields, indoor sport complexes, H Quad, G Quad, Student Health Center, Student Union, and Academic Mall), the NYS DEC office building and the Wastewater Treatment Plant. East of Nicolls Road, off campus, is a private recreational facility (Saint George's Golf and Country Club) and residential areas. Commercial establishments are located along Route 25A north of the project site.

Northwestern Quadrant

The northwestern quadrant contains part of the SUNY Stony Brook campus, the LIRR Stony Brook Station, and residential areas north and west of Route 25A. Several commercial establishments are located along Route 25A, including but not limited to real estate and insurance agencies, dry cleaners, gas stations, restaurants, and other business establishments. Two schools are located within 0.5 miles from the site. These include the North Country Learning Center on Suffolk Avenue, and the Stony Brook School on Chapman Parkway.

Southwestern Quadrant

The southwestern quadrant contains part of the SUNY Stony Brook campus, including the Schomburg Apartments, Kelly Quad, Roosevelt Quad, and Undergraduate Apartment Complexes. The Kelly Quad contains five residential quad houses (Eisenhauer, Schick, Buruch, Hamilton, and Dewey). Each residential quad houses approximately 1,000 students. The Kelly Quad also contains a Café. The Schomburg apartments house approximately 230 students, and the Roosevelt Quad (Wagner, Greeley, Keller, and Stimson) apartments house about 1,000 students. The Roosevelt Quad also contains a dining hall. Off of the SUNY Stony Brook campus and further south and west are primarily residential areas.

Southeastern Quadrant

The southeastern quadrant consists largely of the SUNY Stony Brook campus (Academic Mall, Roth Quad (Mount, Cardozo, Henry, Gershwin, Whitman and a café), Tabler Quad (Toscanini, Sanger, Dreiser, Douglass, Hand and a café), Health Sciences Center (HSC), HSC heating plant, and Marine Sciences Research Center). The SUNY Hospital and the Ashley Schiff Preserve are within the boundaries of the SUNY campus. Land uses outside the SUNY campus are mostly residential.

2.1.2. Probable Impacts of the Project

The project site is located in the physical plant complex of the SUNY campus. The existing land use conditions would not substantively change as a result of the proposed project. The area surrounding the proposed project site is developed and consists of the existing NCP facility, the SUNY West Steam Plant, and the facility management and maintenance buildings. Additionally, the project site has a natural gas pipeline connection and electrical transmission interconnect access within the 12-acre physical plant complex. Siting the proposed project within the physical plant services complex allows the project to use existing utilities, thereby minimizing the amount of land requiring disturbance. The existing NCP facility has been located in this area of campus for almost ten years and has coexisted with the residential uses located northwest of the campus. Therefore, the proposed facility would be consistent with current land use and would have no significant adverse land use impacts.

2.1.3. Zoning

Figure 2.1-3 shows zoning within the one-mile project study area. The project site is within an area zoned "B Residence 1 District" by the Town of Brookhaven. Review of the Brookhaven Zoning Map indicates that the majority of zoning and land uses within a one-mile radius of the site is residential. Southwest of the project site is an area zoned industrial. Additionally, there is an area zoned for business use along Route 25A, west of the project site.

Under Section 375(3) of the New York State Education Law, facilities constructed for state university purposes are not subject to local regulation, including zoning. SUNY facilities and facilities located on the Stony Brook Campus which are used for state university purposes are not subject to, nor required to conform to, local zoning requirements.

Section 375(3) specifically state the following: "No county, city, town or village shall have power to modify or change the plans or specifications for facilities to be constructed, acquired, reconstructed, rehabilitated or improved for state university purposes, or the construction, plumbing, heating, lighting, or other mechanical branch of work necessary to complete the work in question, nor to require that any person, firm or corporation employed on any such work shall perform such work in any other or different manner than that provided by such plans and specifications, nor to require that any such person, firm or corporation obtain any other or additional authority or permit from such county, city, town or village as a condition of doing such work, nor shall any condition whatever be imposed by any such county, city, town or village in relation to the work being done pursuant to this article, but such work shall be under the sole control of the supervising architect or engineer in accordance with the drawings, plans, specifications and contracts in relation thereto; and the doing of any such work for the fund by any person, firm or corporation in accordance with the terms of such drawings, plans, specifications or contracts shall not subject said person, firm or corporation to any liability or penalty, civil or criminal, other than as may be stated in such contracts or incidental to the proper enforcement thereof."

2.1.4. Project Compliance with Zoning

The proposed facility would be available to provide energy to the SUNY Stony Brook campus to accommodate future energy demands and would provide financial and operational benefits to SUNY Stony Brook. Consequently, based upon the State Educational Law, the proposed project would not be subject to the local zoning requirements of the Town of Brookhaven.

Although not subject to local requirements, the proposed facility would conform to local zoning requirements except the maximum height restriction of 35 feet as detailed on the Brookhaven Zoning Code Subsections 85-56 and 85-61. While it would not conform to these requirements factually and in terms of process, the proposed facility would, in terms of use, size, and function, be consistent with adjacent facilities at the SUNY Stony Brook physical plant services complex.

Review of the project for design and planning purposes would be performed through the SUNY Stony Brook Office of Facilities Design and Construction. Detailed site plans and construction specifications would be provided to the Office of Facilities Design and Construction for its review and approval prior to construction of the project. This review would ensure that the project is designed in accordance with good engineering practices, meets applicable building code standards and is compatible with existing and planned future development on the SUNY Stony Brook campus.

The proposed facility would not impact zoning districts within a one-mile radius of the project site. The project and proposed interconnections would not prevent the orderly and reasonable use of permitted or legally established uses on surrounding zoning districts. Additionally, the proposed facility and its interconnections are similar to the existing campus facilities in the immediate project area. Consequently, the proposed facility would not have a significant adverse impact on zoning. *

2.2 Community Facilities

2.2.1. Existing Community Facilities in One-Mile Radius

An inventory of community facilities (schools, hospitals, religious facilities, etc.) has been taken for a one-mile radius around the project site to assess potential impacts, if any, the proposed project will have on these facilities. The community facilities identified by this inventory are shown in Figure 2.2-1 and include:

Schools

- The State University of New York (SUNY) Stony Brook
- The North Country Learning Center is located on 100 Suffolk Avenue in Stony Brook. It is approximately 0.4 miles from the project site.
- The Stony Brook School is located on 1 Chapman Parkway and is approximately 0.4 miles north from the project site. The Stony Brook School is a Christian college preparatory co-educational boarding and day school for grades 7-12. It was founded in 1922 and is approximately 54 acres in size.
- The Montessori School North Shore is located at 218 Christian Avenue in Stony Brook. The Montessori School North Shore is approximately 0.9 miles from the project site.
- The International Christian School is located at 1266 North Country Road in Stony Brook. The International Christian School is for pre-school through 12 grades. It is located approximately 1 mile northwest of the project site.
- The All Souls Mill Pond Preschool is located at 10 Mill Pond Road, and is located about 1 mile from the project site.

Places of Worship

- Christian Science Church is located at 400 Nicolls Road in Setauket. It is approximately 0.8 miles from the project site.
- The North Shore Church of the Nazarene is located approximately 1 mile from the project site at 57 Main Street in Stony Brook.
- Stony Brook Community Methodist Church is located on 216 Christian Avenue in Stony Brook and is approximately 1 mile from the site.

Hospitals and Nursing Facilities

- The University Hospital is located on the SUNY campus. It is approximately 0.75 miles southeast of the project site, located in the Health Sciences Center complex.

Libraries

- There are no libraries located within a one-mile radius of the project site except those that are a part of the SUNY Stony Brook campus and schools listed above.

Parks and Recreational Resources

- The Saint Georges Golf and Country Club is east of the SUNY Stony Brook Campus. It is located approximately 0.7 miles from the project site.

2.2.2. Probable Impacts of the Project

With the exception of the University Hospital and University libraries, the Calpine Stony Brook Energy Center is physically separated from the identified community facilities by the SUNY Stony Brook campus property.

The construction and operation of the proposed project would not adversely impact the community facilities identified above. No more than two additional employees would be required for the operation of the proposed facility. Accordingly, the proposed project would not result in an impact regarding the additional personnel using the above referenced community facilities.

Potential visual impacts are discussed in detail in Section 2.4, "Visual Resources." The analyses found that the proposed project would not have a significant adverse visual impact.

In addition, the proposed facility would not create a significant demand for community nor public safety services such as fire, police, and ambulance service. SUNY has an Emergency Operations Center and organized an Emergency Management Team that has been trained to evaluate and respond to major emergency situations. The Incident Command System is used to protect all who study, work, live, visit or receive care at SUNY. All onsite emergencies are channeled through the onsite Campus Police. The SUNY Stony Brook University Police Department is staffed by 102 employees, which have jurisdiction over the 1,100-acre campus and its 109 buildings. The Stony Brook Volunteer Ambulance Corps (SBVAC) is a collegiate ambulance corporation that primarily serves the community and the project would not increase demand for police, fire, or ambulance services. The existing emergency plan would be modified to incorporate the proposed facility. This revised plan would be provided to emergency service agencies, and certain emergency service personnel (e.g., fire, hazardous materials, and police officers) would tour the facility in order to be familiarized with the layout and operation in order to better respond in the event of an emergency.

Any additional demand for community services would be negligible, based upon the projected addition of two employees. The proposed facility would not place a demand on the school system nor require any significant amount of community services. Therefore, the proposed project would not have a significant adverse impact on community facilities.

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2.3 Cultural Resources

This section examines the potential of the proposed facility to affect cultural resources—archaeological resources on the project site and architectural resources near the project site. The study area for archaeological resources is limited to the project site, since this is the area where any excavation or in-ground disturbance would occur for the proposed project.

The study area for architectural resources is defined as the area within a 1-mile radius of the project site in order to account for visual and contextual effects (see Figure 2.3-1). Within the study area, designated architectural resources were identified and include: National Historic Landmarks (NHL), properties listed on the State and National Registers of Historic Places (S/NR), and properties designated as local town landmarks.

2.3.1. Existing Conditions

The approximately 1.5 acre project site is located at the western corner of the SUNY Stony Brook campus. The project site is within the SUNY physical plant services complex, which comprises approximately 12 acres. The majority of the project site is a paved parking area or contains existing structures.

a. Archaeological Resources

A Phase IA archaeological investigation of the proposed project site was prepared on September 19–20, 2002.[1] The cultural resource investigations involved three tasks: (1) preliminary research, including a literature, records, and map search; (2) field investigations; and (3) reporting.

A thorough records and literature search was conducted to identify previously recorded archaeological sites and/or historic properties on or near the proposed project site. Records examined included maps and reports on file at the New York State Office of Parks, Recreation, and Historic Preservation (OPRHP) and the Suffolk County Historical Society. The Town of Brookhaven files and records were examined for pertinent information, and an effort was made to secure historic maps of the area. Repositories examined included the Town of Brookhaven Tax Assessor's Office, the Patchogue Public Library, and the Middle Country Public Library.

The results of the records and literature search indicate that there are 51-recorded archaeological sites within a one-mile radius of the project site (36 at the OPRHP and 15 at the New York State Museum). Of the 41 sites for which information was available, 30 are prehistoric and the remaining 11 are historic. These archaeological sites are listed in Table 2.3-1 and Table 2.3-2. The closest archaeological site (0487) is approximately 0.5 miles south of the project site.

Archaeological sites identified during the site file search at the OPRHP are located in close proximity to waterways; to the east along the Carmans River, and to the southeast along Bellport Bay. Within interior Long Island there is a correlation between the

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[1] Brian Thomas, TRC Environmental.

presence of freshwater and the presence of past human activity (Barber 1997; Bernstein et al. 1996). Because the project site is located within an area of outwash plain, removed from a freshwater source, the probability of extant prehistoric remains is relatively low.

Aerial photographs from 1954 to 1994 (Figures 2.3-2 through 2.3-6) show that the project site has been used for agricultural purposes as well as for part of the SUNY Stony Brook educational facility. Further construction of the SUNY Stony Brook campus included installation of underground utilities on the project site. Therefore, while archaeological resources may have once existed on the project site, it is likely that subsequent disturbances by farming and construction of the SUNY campus would have destroyed or disturbed such resources.

b. Architectural Resources

There are no architectural resources located on the project site; however, five architectural resources are located within a one-mile radius of the project site. All of these resources are listed on the S/NR. One resource, the William Sydney Mount House, also is a NHL. Descriptions of these properties and their locations in relation to the project site are provided in Table 2.3-3 and mapped on Figure 2.3-1. Additionally, there is a locally designated historic district (Stony Brook Historic District) located west of the project site. This historic district was designated by the Town of Brookhaven and is mapped on Figure 2.3-1. While these resources are within a mile of the project site, none is less than 0.57 miles away and none has a visual or contextual relationship with the site given the distance and the existing SUNY buildings, and other intervening buildings and vegetation.

2.3.2. Potential Project Impacts

a. Archaeological Resources

As described above, due to the generally disturbed nature of the project site, the likelihood that any intact archaeological sites exist on the project site is extremely low. In the unlikely event that archaeological resources are encountered during construction, measures (as outlined in an Unanticipated Discovery Plan, Appendix F) will be taken to either avoid or to catalogue and preserve any archeological resources that may be encountered. Therefore, it is not anticipated that the project would have any significant adverse impacts on historic resources.

b. Architectural Resources

Since there are no architectural resources located on the project site, no resources would be directly impacted by the construction of the proposed project. The five individual architectural resources and the Stony Brook Historic District in the study area are at least 0.57 miles away and not visually or contextually related to the proper site. Overall, it is not anticipated that the proposed project would have any visual or contextual impacts on historic resources, as the project site would not be visible from any of these resources. Therefore, there is no potential for adverse impacts on historic resources.

Table 2.3-1: OPRHP Archaeological Sites within an Approximately 1-Mile Radius of the Project Area

Site Number A10302	Temporal Affiliation	Artifacts
0021	Prehistoric, unknown	
0054	Early to transitional Archaic, Late woodland	Lamoka, Brewwerton, Wading River, Orient fishtail, Stubenville, and Levanna points
0100	Historic—Richard W. Smith Tavern and Town Pump	
0101	Historic—Old Baptist Cemetery	Gravestones
0222	Historic—Davis House, Taylor flour and feed store, and Emmett house	
0223	Historic—Ice cream saloon, drug store, and fire station	
0225	Historic—original village of Stony Brook removed 1940-42	
0226	Historic—coal yard and clam factory	No information available
0485	Archaic	Crude stone artifacts and utensils
0486	Prehistoric, unknown	Shell midden
0487	No information available	No information available
0493	Prehistoric, unknown	Quartz flakes
0495	No information available	No information available
0496	Prehistoric, unknown	Stone tools, shell
0499	Prehistoric, unknown	PPK's
0552	Prehistoric, unknown	1 projectile point base, 2 scrapers, 1 rose quartzite hammerstoen, and 18 flakes
1138	Historic—Brester Mount site	Glass, ceramic, cut nails, metal fragments, and faunal remains
1560	Historic—Abraham Woodhull house site	No information available
1561	Historic—Bales/Hawkins Homestead	No information available
1563	Transitional Archaic- Woodland	No information available
1573	No information available	No information available
1574	No information available	No information available
1575	No information available	No information available
1621	Late Woodland to Contact	Prehistoric ceramics, granite pestle, quartz debitage, wampum drills, and gunflints
1841	Prehistoric, unknown	No diagnostic artifacts, bifaces, unifaces, hamerstone, metates, and cores
2048 *	Prehistoric, unknown	1616 quartz debitage, 15 FCR, 23 quartz bifaces and biface fragments, 2 quartz unifaces, and 8 quartz cores.
2051	Prehistoric, unknown	Marine shell and quartz lithics
2052	Historic	Outline and depression of structure on surface
2053	Historic	Nails, coal, ceramic
2158 *	Prehistoric, unknown	1616 quartz debitage, 15 FCR, 23 quartz bifaces and biface fragments, 2 quartz unifaces, and 8 quartz cores.

Table 2.3-1: OPRHP Archaeological Sites within an Approximately One-Mile Radius of the Project Area (continued)

Site Number A10302	Temporal Affiliation	Artifacts
2172	Prehistoric, possibly Archaic	15 quartz debitage, 1 quartz Squibnocket point, 1 quartz biface
2188	Late Woodland, possible minor Archaic component	Bifaces, PPK's, Hammerstone, preform, FCR, 1 pottery shard
2188	Archaic-Late Woodland	Linear pattern postmolds, lithic, ceramic, and faunal assemblages
2203	Prehistoric, unknown	5 quartz debitage, 1 brown variegated chert
2205	Prehistoric, unknown	1 quartz flake
2235	Late-terminal Archaic, Woodland	2659 lithic artifacts, Levanna, Orient, Squibnocket points

Note: * Sites 2048 and 2158 are identical in their descriptions and quantity of artifacts recovered and are mapped within approximately 100 meters of each other.

Table 2.3-2: NYSM Archaeological Sites within an Approximately One-Mile Radius of the Project Site

NYSM Site Number	Temporal Affiliation	Artifacts
4875	Prehistoric, unknown	Shell midden
5557	Prehistoric, unknown	Flakes, oyster, clams, scallops
5559	No information available	No information available
5560	Prehistoric, unknown	Quartz points, some historic
5561	Prehistoric, unknown	Shell midden
5574	No information available	No information available
5578	Prehistoric, unknown	Shell midden
5579	Prehistoric, unknown	Shell midden
5580	No information available	Projectile points (unidentified)
5581	Prehistoric, unknown	Tools, ceramics
5583	No information available	No information available
705	Prehistoric, unknown	Shell midden
7177	Prehistoric, unknown	Shell midden
7178	No information available	No information available
8079	Prehistoric, unknown	Quartz basal fragment, quartz convex base PPK

2.3.3. Conclusion

Due to prior disturbance of the project site, the likelihood that any intact archaeological sites exist on the site is extremely low. In the unlikely event that archaeological resources are encountered during construction, measures (as outlined in an Unanticipated Discovery Plan, Appendix F) will be taken to either avoid or to catalogue and preserve any archeological resources that may be encountered. As a result, the proposed facility would not have any significant adverse impacts with regard to archeological resources.

There are no known architectural resources located on the project site. Five architectural resources and one locally designated historic district are located within a one-mile radius of the project site. It is not expected that the proposed project would have any physical, visual, or contextual effects on any architectural resources.

Table 2.3-3: Architectural Resources within a One-Mile Radius of the Project Site

Resource	Description	Location
Hawkins Homestead (S/NR), 165 Christian Avenue	Small Colonial shingled farmhouse built c. 1660. Later enlarged c. 1720, c. 1750 and c. 1812.	Approximately 0.88 miles north/northwest of the project site.
Nathaniel Longbotham House (S/NR), 1541 Stony Brook Road	One-and-one-half-story vernacular frame residence in half-house plan; built c. 1740; attached one-story wing built as residence late 17th or early 18th-century.	Approximately 0.96 miles south of the project site.
William Sydney Mount House (NHL, S/NR), 1559 Stony Brook Road	An early 18th-century vernacular shingled residence enlarged in the 19th-century. Longtime residence of genre painter William Sydney Mount.	Approximately 0.96 miles south of the project site.
Stony Brook Grist Mill (S/NR), Harbor Road west of Main Street	Two-and-one-half-story shingled gristmill built c. 1750; enlarged 19th and early 20th-century. Adjacent sluice, weir, dam, and millpond.	Approximately 0.96 miles west of the project site.
Former St. James Chapel (S/NR), Main Street	The church was built c. 1889 and was designed by Stanford White. Its name was changed to All Souls Episcopal Church in 1952.	Approximately 5,050 feet southwest of the project site.

*

2.4 Visual Resources

2.4.1. Introduction

The following section characterizes the area of the proposed project site, describes the visual quality of the surrounding area and potential visual resources, and evaluates the potential visual impact of the proposed facility on these resources. The potential visual impacts were assessed based on field visits to the project site and study area in August and October 2002, review of aerial photographs of the project area, and detailed visual analysis of the selected representative viewpoints.

2.4.2. Existing Environmental Setting

The project site is located in the western corner of the SUNY Stony Brook campus. The project site consists of approximately 1.5 acres of land and is wholly within the SUNY physical plant services complex, which comprises approximately 12 acres (Figures 1-1 through 1-4). The physical plant services complex consists of the existing NCP building and associated structures (2 acres), a brick SUNY central stores warehouse with loading dock, a parking lot (proposed project site), an inactive cooling tower, an electrical substation, and a natural gas pump station. Landscaping consists of grass, small trees, and ornamental shrubs. Figure 1-3 provides an aerial photograph of the project site and surrounding area. As illustrated in the aerial photograph, the existing physical plant services complex and surrounding area is developed.

To the north of the physical plant services complex are a parking lot, athletic fields, and the athletic stadium. Academic buildings and parking areas are located to the east. A wooded area, North Loop Road, and onsite campus housing are located to the south; and North Loop Road, a groundwater recharge basin, Route 25A (North Country Road), and the LIRR tracks are located to the west.

The project site is at an elevation of approximately 107 feet above mean sea level (msl) and is essentially level. The top of the existing stack is at an elevation of 218 feet above msl, and the top of the existing Nissequoque Cogen Partners (NCP) facility is at an elevation of 184 feet above msl. The top of the new stack would be at an elevation of 232 feet above msl, and the new building would be at an elevation of 189 feet above msl. The elevation of the new structures would be similar to the existing NCP facility elevations, although the new stack would be approximately 24 feet higher than the existing stack. The project layout is presented on Figure 1-5.

Elevations within one mile of the project site range from approximately 100 to approximately 230 feet msl. The elevation at the northern portion of the one-mile radius is approximately 100 feet msl and at the southeastern portion of the one-mile radius, the elevation is approximately 230 feet msl.

Visibility of the project site off campus to the north, south, and east is generally limited due to topography, vegetation, and existing structures. The project site is visible to the west along portions of Route 25A, within the business and commercial areas and at limited residential locations west/northwest of the project site where the topography is elevated (e.g., along Suffolk Avenue and Hawkins Road).

2.4.3. Visual Resource Identification

A project site file search at the New York Office of Parks Recreation and Historic Preservation (OPRHP) was undertaken to find records of sites listed or evaluated as eligible for the State and National Register of Historic Places (S/NR). As presented in Section 2.3, "Cultural Resources," the file search concluded that there are five properties listed on the SR/NR located within a one-mile radius of the project area. Additionally, a locally designated historic district (Stony Brook Historic District) is located west of the project site. Figure 2.3-1 shows the location of the S/NR listed properties and the local historic district.

There are no National, State, or local parks located within a one-mile radius of the project site. Recreational areas include the Saint George Golf and Country Club and the athletic fields associated with each of the schools listed in Section 2.2, "Community Facilities," including those located north of the project site on the SUNY campus. The locations of these resources are indicated on Figure 2.2-1.

The nearest residential areas from the project site is approximately 600 feet to the west. The houses are located on Hawkins Road and Whitford Road off Route 25A (North Country Road). The closest campus housing is located approximately 800 feet south of the proposed project (Kelly Quad).

2.4.4. Probable Visual Impacts of the Project

Potential visual impacts of the project were assessed for the surrounding area within a one-mile radius of the project site. Representative viewpoints with the most direct views of the existing site were selected for detailed visual impact analysis and photosimulations of the project. This included both on campus and off campus viewpoints. The selected viewpoints are listed in Table 2.4-1 and their locations are shown on Figure 2.4-1. Photographs from each viewpoint are presented as Figures 2.4-2A through 2.4-6A. The corresponding photosimulations of the proposed facility are presented as Figures 2.4-2B through 2.4-6B.

In addition, line-of-sight analyses were conducted for the five S/NR listed properties within the one-mile of the project site. The line-of-sight analyses show that the project will not be visible from these locations due to topography and existing vegetation. Figures 2.4-7 through 2.4-11 provides the line of sight printouts.

a. Methodology

<u>Photographic Simulations</u>

Photographic simulations of the proposed facility were developed for the five selected viewpoints. Computerized perspective views rely on a three dimensional model of the project, positioning the viewer at the appropriate viewpoint, and a specified field of view equal to that of the lens used to take the actual photographs. These perspective views are then superimposed on the photographs to present a photosimulation of the view.

Table 2.4-1: Selected Viewpoints

Viewpoint Location	Compass Direction From Project Site
On-Campus Locations	
1. Math Tower	East of project site
2. Kelly Quad Dormitories	Southwest of project site
3. Athletic Fields	Northeast of project site
Off-Campus Locations	
4. North Country Learning Center on Suffolk Ave, off of Maple Ave	Northwest of project site
5. Residences (47) on Hawkins Road	Southwest of project site

The major steps are summarized below:

- Photographs were taken at all of the selected viewpoints using a Nikon 8008 35 millimeter (mm) body. A 24-50 mm lens was used at 35 mm and 50 mm focal lengths. The photographs using the 50 mm focal lengths are presented in this study.
- Global Positioning System (GPS) data of the selected viewpoint positions were captured by TRC's GIS Analyst. The GPS Unit used was a Sub Meter accurate Trimble Pro XRS. The XRS has a horizontal accuracy of 0.5 meters and a vertical accuracy of approximately 1.0 meter depending on PDOP levels.
- Data were compiled from various sources including Aerial Photography, USGS Digital Elevation Models, and the GPS survey data.
- Visual Renderings and viewpoint distance algorithms where accomplished using AutoDesk Studio VIZ 4.

The integration of both geo-referenced data and GPS location information was used to provide specific coordinates to calculate the distance between the viewpoint locations and the project site, and allow the simulated project to be correctly scaled. The survey location of the existing stack was used to help determine the correct horizontal and vertical position of the project.

Line of Sight Cross Sections

The potential visual impacts on the S/NR listed properties were conservatively estimated using values calculated from a line of sight profile. The line-of-sight graph profile was created by Arc\INFO (registered trademark of Environmental Systems Research Incorporated, Redlands California) by supplying the software with distance and frictional values such as elevation and surface obstructions. A conservative vegetation height of 18 ft was used in this study. Vegetation was measured off of the 2000 aerial photograph (Figure 2.4-1).

b. Results

On-Campus Visual Impacts

The proposed facility would not have any significant visual impacts on the SUNY Stony Brook campus. The facility would blend in with the existing NCP facility, the SUNY West Steam Plant and physical plant buildings. Figure 1-4 shows the existing site features in relation to the locations of the proposed facility structures and features. As shown by this figure, the proposed facility is entirely within existing site features.

- Math Tower—The Math Tower is located east of the project site. Figure 2.4-2A provides a photograph from this viewpoint toward the project site. From the Math Tower there are direct views of the existing NCP facility and stack. Figure 2.4-2B shows the photosimulation of the proposed facility superimposed in the same photograph. From this viewpoint, the facility is located in front of the existing NCP facility. The view, however, is not significantly different from the existing view of the NCP facility. The height of the new facility building is similar to the existing NCP facility building. The new stack is taller than the existing stack. However, the proposed facility blends in with the existing NCP facility structures in scale and size.
- Kelly Quad Dormitories—The proposed facility is located northeast of the Kelly Quad Dormitories. There is a wooded area between the closest dormitory and North Loop Road. North Loop Road partially screens views of the existing physical plant services complex from the closest dormitory. Figure 2.4-3A shows a photograph from the Kelly Quad area and woods separating the dormitories from North Loop Road. From this open vantage point, there is a partial view of the existing NCP facility, existing stack, and the existing cooling tower. Figure 2.4-3B shows the photosimulation of the proposed facility superimposed in the same photograph. As shown on this figure, there is only a very slight view of the proposed facility. This view is barely noticeable. Thus, views from this vantage point will be consistent with the existing conditions.
- Athletic Fields—The SUNY Stony Brook athletic fields are located northeast of the project site. A SUNY Physical Plant building (Central Stores Warehouse) is located between the athletic fields and the project site. Figure 2.4-4A shows a photograph of the existing project site from the parking lot adjacent to the athletic fields. As shown in this photograph, the existing NCP facility and NCP stack are visible behind this building. Figure 2.4-4B shows the photosimulation of the proposed facility superimposed in this photograph. The project building and stack are visible from this vantage point. The height of the new facility building is similar to the existing NCP facility building. The new stack is taller than the existing stack. However, the project blends in with the existing NCP facility structures.

Off-Campus Visual Impacts

The most prominent off campus views of the proposed facility would be from the west. Existing views from the west contain portions the existing physical plant services complex. The proposed facility would be consistent in color, scale, and size with the existing complex, and therefore, off campus views to the west would be similar to existing conditions.

- North Country Learning Center—The North Country Learning Center is located northwest of the project site on Suffolk Avenue. Suffolk Avenue is located west of the LIRR tracks and Route 25A (North Country Road). Between North Country Road and Suffolk Avenue are wooded properties that buffer the residences from the businesses along Route 25A.

  Figure 2.4-5A shows a photograph of the existing project site from North Country Learning Center. As shown in this photograph, the existing NCP facility and stack are partially visible through the trees. Figure 2.4-5B shows the photosimulation of the proposed facility superimposed in this photograph. The project stack is partially visible from this viewpoint, but the project building is behind the existing buildings and stack, and is not noticeable from this viewpoint.

- Hawkins Road—Hawkins Road is a residential street located southwest of the project site. Hawkins Road is located in a residential neighborhood consisting of Whitford Road, Davis Court, Smith Court, Beacon Hill Drive, and Lotowana Lane.

  Figure 2.4-6A shows a photograph of the existing site from Hawkins Road. As shown in the photograph, existing views from Hawkins Road toward the project site (looking northeast) consists of the existing NCP facility and stack, and other SUNY Stony Brook campus buildings. Figure 2.4-6B shows the photosimulation of the proposed facility superimposed in this photograph. A portion of the project building and stack will be visible from this viewpoint, but would blend in with the existing buildings and stack, and therefore, would not be a significant visual impact from this vantage point.

2.4.5. Visual Effects of Water Vapor Plumes from the Stack and Cooling Tower

The results of a detailed analysis of the effects of water vapor emitted from the CT stack and cooling tower are presented in Section 2.7.11, "Other Potential Impacts." During cold weather months, when the facility is operating in a combined cycle mode, water vapor plumes may be visible at various times. Due to the height of the stack and high exhaust velocities, the plume would occur relatively high above ground level and would therefore not cause or contribute to any ground fogging effects. In summary, there would be no significant adverse visual impacts expected due to the steam plume from the CT stack.

2.4.6. Conclusion

The proposed facility design would be compatible with the existing site uses and would minimize visual impacts on the local community. Off-campus views of the proposed facility would be generally consistent with the views of the existing physical plant complex. The water vapor plumes that would occasionally come from the stack and the cooling tower would also not have significant adverse visual impacts. Overall, the proposed facility would not have a significant adverse visual impact. *

Figure 2.4-7
S/NR Properties
Line of Sight Profile from Vantage Point to Center Stack
Nathaniel Longbotham House

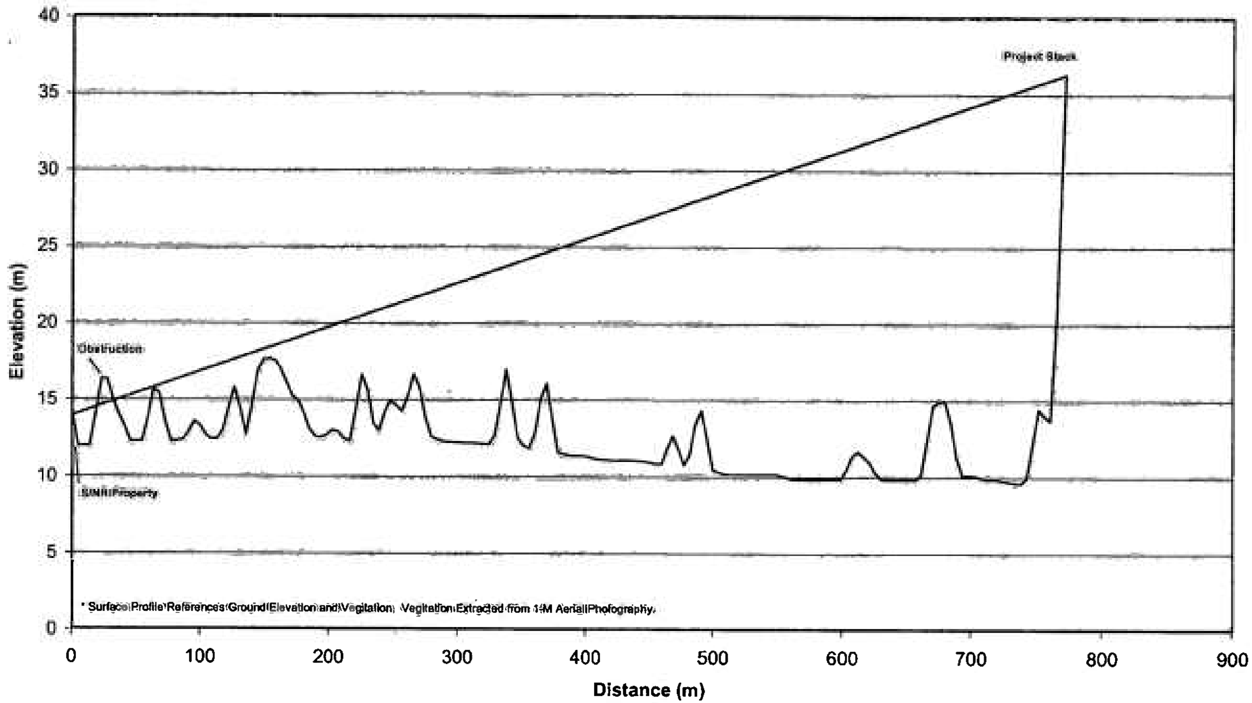


Figure 2.4-8
S/NR Properties
Line of Sight Profile from Vantage Point to Center Stack
William Sydney Mount House

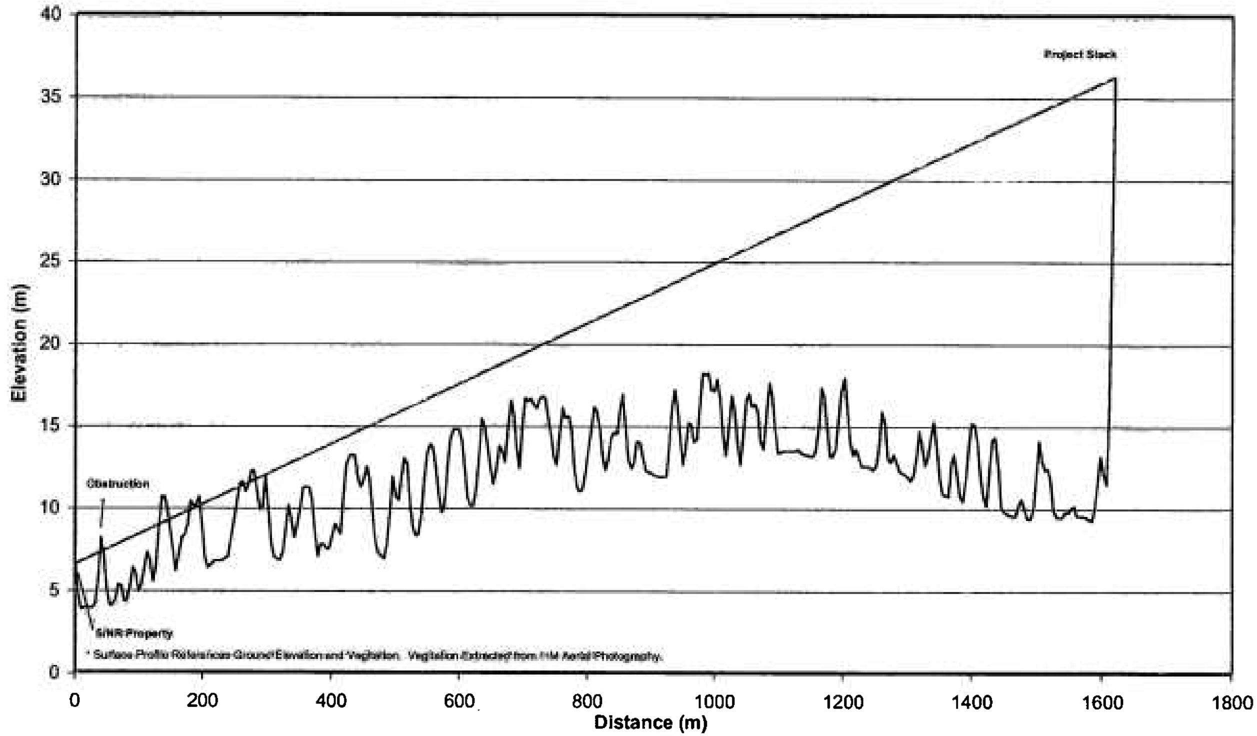


Figure 2.4-9
S/NR Properties
Line of Sight Profile from Vantage Point to Center Stack
Stony Brook Grist Mill

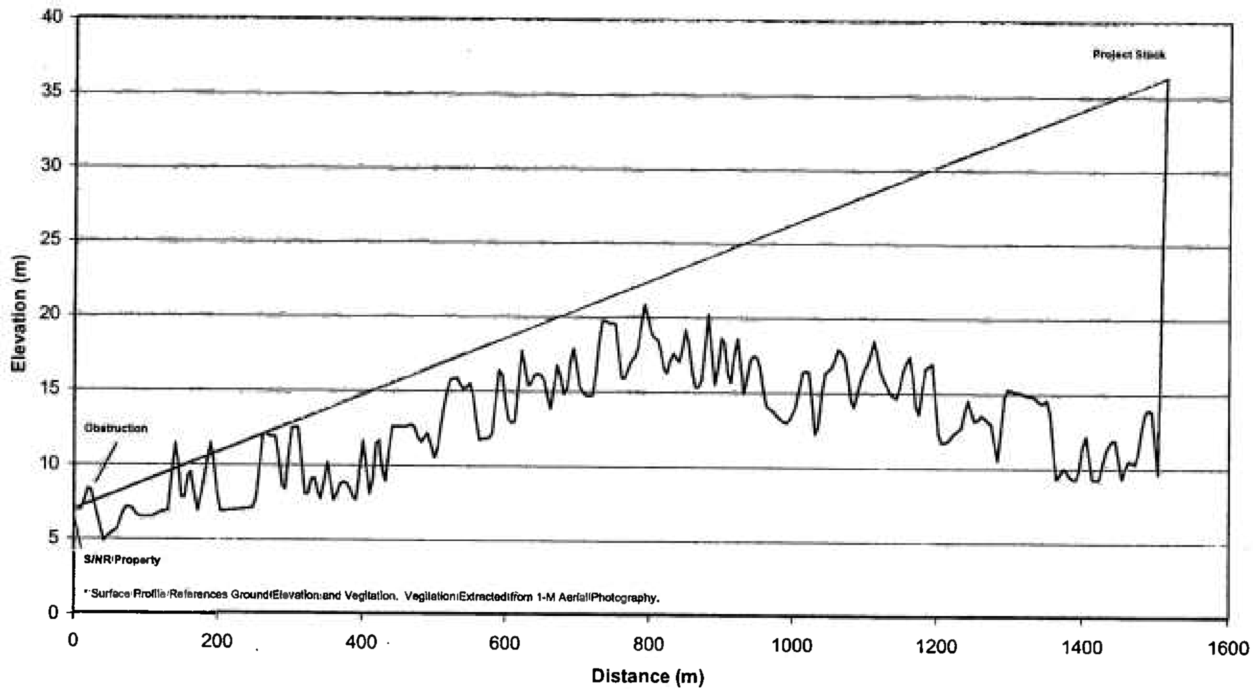


Figure 2.4-10
S/NR Properties
Line of Sight Profile from Vantage Point to Center Stack
Hawkins Homestead

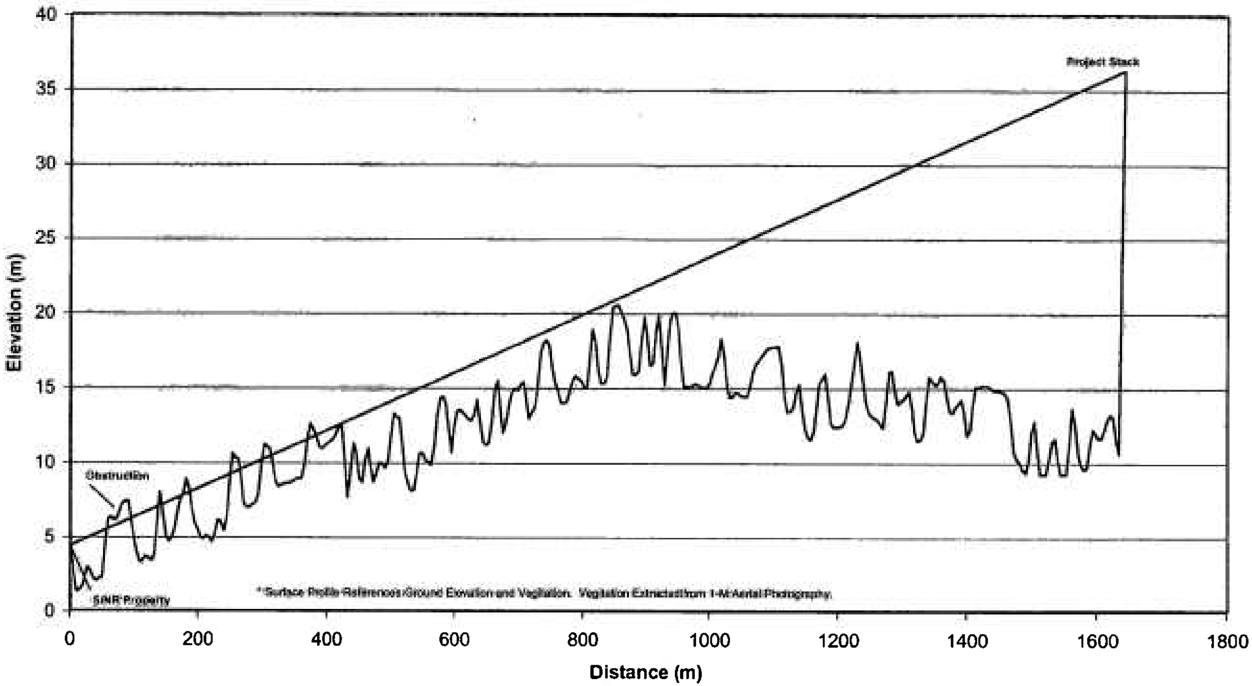
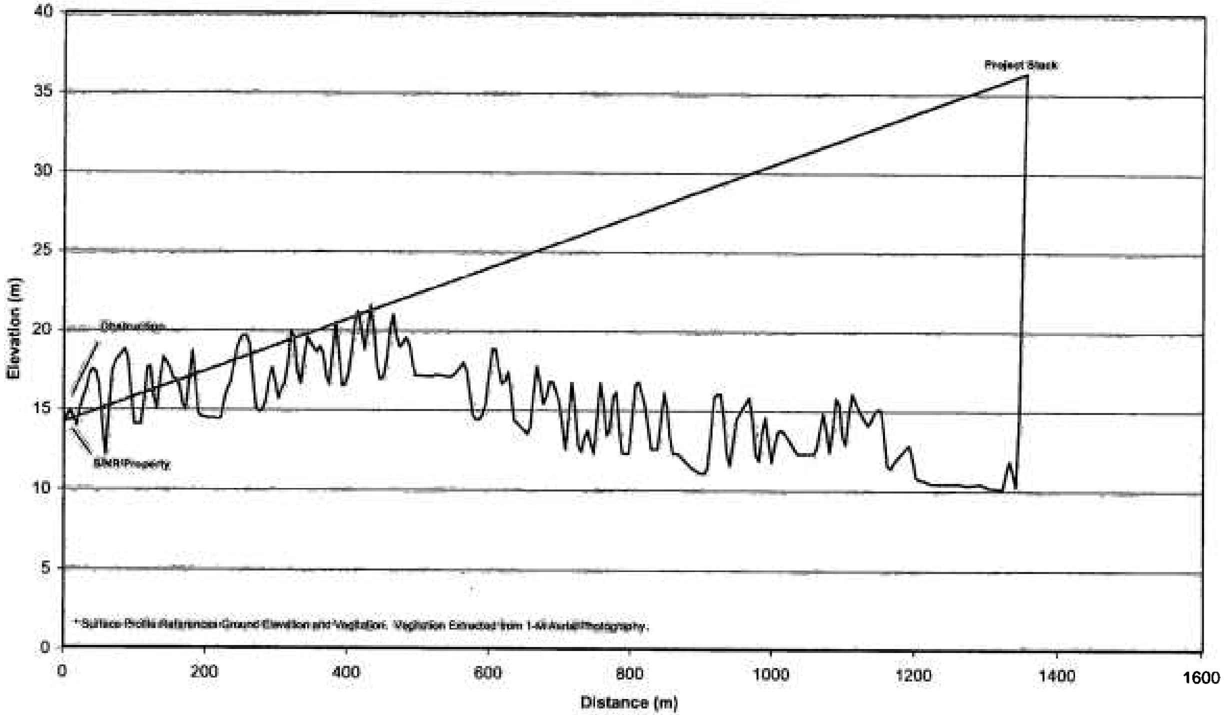


Figure 2.4-11
S/NR Properties
Line of Sight Profile from Vantage Point to Center Stack
Saint James Chapel



2.5 Socioeconomic and Environmental Justice

2.5.1. Introduction

This section of the environmental assessment contains an environmental justice (EJ) analysis to determine whether the construction and operation of the proposed project would have a significant adverse effect on an "environmental justice community."

As part of the EJ analysis, socioeconomic characteristics of the proposed project area have been examined to determine whether the Calpine Stony Brook Energy Center would disproportionately impact any minority or low-income population. The analysis examines where air pollutant emissions from the proposed project would produce air quality concentrations that would potentially adversely impact minority or low-income population subgroups given their location relative to the proposed project site.

2.5.2. Federal Guidance

The Office of Environmental Justice in Environmental Protection Agency (EPA) Headquarters defines Environmental Justice as the following:

> *Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including a racial, ethnic, or socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies.*

The concept of performing an EJ analysis for the proposed project is related to the establishment of Executive Order 12898, entitled "Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations" (February 11, 1994). The order requires federal agencies to consider disproportionate adverse human health and environmental impacts on minority and low-income populations. The methodology used in preparing this analysis is based upon federal guidance documents prepared by EPA for use in preparing a National Environmental Policy Act (NEPA) environmental justice analysis.

The focus of an environmental justice analysis is the determination of whether the construction and operation of a proposed facility would have both adverse and disproportionate impacts on an environmental justice community. The "Interim Environmental Justice Policy" (EPA Region 2 2000) (Interim Policy) provides guidance in making this determination as follows:

> *Evaluating Adverse Burden. There is no established methodology for evaluating cumulative risk and there are uncertainties associated with assessing environmental burden. In any event, when an acknowledged*

> *health standard for the burden in question is exceeded, the Region will consider the burden to be adverse unless otherwise indicated by supportive data.*

The glossary that is included in the Interim Policy defines adverse environmental burden as:

> *Adverse Environmental Burden. When there is an acknowledged health or welfare standard for the burden in question, the burden is adverse when it exceeds that standard. When there is no standard, the decision is based on site-specific analysis.*

Air quality modeling prepared as part of this environmental assessment shows that pollutant concentrations due to emissions from the proposed facility would produce concentrations that are below EPA developed significant impact levels (SILs) and that maximum modeling total concentrations for the applicable pollutants would not exceed National Ambient Air Quality Standards (NAAQS). Thus, based on the Interim Policy criteria, the impact of the proposed project could not be considered adverse. Notwithstanding the fact that the impact of the proposed facility would not be "adverse," an analysis was conducted to determine whether minority or low-income populations would be subject to a disproportionate environmental burden.

2.5.3. New York State Guidance

In response to the concerns raised on environmental justice, New York State Department of Environmental Conservation (NYSDEC) on October 4, 1999, announced a new program to address environmental justice concerns and ensure community participation in the state's environmental permitting process.

On January 2, 2002, NYSDEC published "Recommendations for the New York State Department of Environmental Conservation Environmental Justice Program." This report sets forth recommendations for how environmental justice can be incorporated into permit review, SEQR procedures, and some components of NYSDEC's enforcement, public participation, and grants programs. The report and public comment generated from the report will serve as the basis for a future NYSDEC policy related to environmental justice. The January 2002 report recommends that the NYSDEC environmental justice screening process utilize the methodology employed by EPA Region 2 in its Interim Environmental Justice Policy (Interim Policy).

On August 7, 2002, the NYSDEC issued a Draft Policy on Environmental Justice concerns in New York State. The Draft NYSDEC policy is applicable to projects under NYSDEC review. The purpose of the Draft NYSDEC policy is to determine whether or not there is the potential for environmental impacts related to the project that are "likely to adversely affect a minority community or low income community." The NYSDEC policy has similar thresholds to the EPA policy for determining whether a substantially higher percentage of minority or low-income communities exist within an area than average. If during the screening process, a project is determined to be located in an area with a substantial percentage of minority or low-income populations and the project is likely to have an adverse impact, then under the Draft NYSDEC Policy, the project becomes subject to a requirement for an enhanced public participation plan.

The proposed project requires NYSDEC permit approval. As stated, the methodology used in preparing this analysis is based upon federal guidance documents written by EPA, Region 2 for use in preparing an environmental justice analysis. In addition, the August 7, 2002 Draft Policy issued by NYSDEC has been used as a guideline in completing this analysis and addressed where appropriate.

2.5.4. Site Location

The site for the proposed facility is shown in Figure 1-2. The proposed facility ultimately would produce a 79.9 megawatt (MW) natural gas fired combined-cycle electrical generating facility at the State University of New York (SUNY) at Stony Brook, in the Town of Brookhaven, New York. The proposed facility would be constructed adjacent to the existing Nissequoque Cogen Partners (NCP) facility on an already developed site. The site is located on the western campus perimeter bordered by a SUNY Central Stores Warehouse and Gymnasium Road to the north, SUNY Facilities Management and Maintenance Buildings and Center Drive to the east, the SUNY Physical Plant and parking to the south and the NCP facility, Cooling Tower and North Loop Road to the west. The proposed facility would generate electricity for use by SUNY and the Long Island Power Authority (LIPA) service area. Construction would take place in two phases. The first phase (Phase I) would be the construction of a simple cycle gas fired combustion turbine with an output to the grid of approximately 44 MW, to be operational by the August 1, 2003. The second phase (Phase II) would be the activation of the OTSG, and construction of the duct burners and steam turbine generator, which would become operational by the second quarter of 2004.

2.5.5. Methodology

A socioeconomic analysis was conducted, based on minority population and poverty rate statistics. These were the principal indicators used to identify the presence of any Communities of Concern (COC). Minority population statistics were obtained from the Bureau of the Census (2000) data. The 2000 Census provides data for smaller geographic areas, such as census tracts, allowing communities with high minority sub-populations to be identified. To obtain the total minority population for a census tract, the "not Hispanic or Latino, white alone" population was subtracted from the total population. It should be noted that, using this methodology, any individual identified as "other race" or "two or more races" is considered a member of a minority. Income and poverty rate data at the census tract level were readily available from the 1990 Census, but are not available for the 2000 Census as of the time of printing. Low-income population includes all persons with an income that is less than the poverty level.

To identify any EJ COC, minority population and poverty rate data were reviewed. Data were obtained for the entire study area (see Figure 2.5-1). A total of six census tracts, located within one mile of the project site, were included in the screening analysis area.

In completing the analysis, minority and income status were compared to NYSDEC's and EPA's Region 2 statewide percentage thresholds for minority populations and low-income populations. The six census tracts within the screening analysis area were compared to both parameters, the statewide percentage thresholds for minority populations and for low-income populations.

However, there is a special complexity to one of the census tracts. Tract 1508.07, comprising the SUNY Campus itself, constitutes an institutional land use with a temporary resident population of significantly changing demographic characteristics, student incomes, and different residence and academic study (air exposure) locations even for the same students in consecutive years. The minority and income data captured by the 1990 census includes students that live on campus, but not those students that live off-campus, but attend classes at SUNY Stony Brook. Also, professors that do not live within the census block would not be included. This is a similar to a workplace situation where the workers are not included in the census count.

2.5.6. Statistical Reference Area

To analyze the demographic data, the statistical cluster analysis approach was applied using Census block group data. The block group represents the resolution of least-size where the most important data sets are readily available (i.e., both for population and income). Data were evaluated on a state-specific basis. The following Census Bureau definitions for urban and rural were utilized:

- Urban: All territory, population, and housing units located in urbanized areas (UA) and in places of 2,500 or more inhabitants outside of UAs. An urbanized area is a continuously built-up area with a population of 50,000 or more.
- Rural: Territory, population, and housing units that the Census Bureau does not classify as urban are classified as rural. Since all census tracts considered have more than 2,500 inhabitants, the area is considered urban.

2.5.7. Analysis of Minority Status

Based on NYSDEC's and EPA Region 2's statewide percentage thresholds for minority populations, the threshold for urban areas in New York State is 48.5 percent. According to this guideline for comparison of percentages of minority populations to statistical reference area thresholds, one out of the six census tracts within the screening analysis area, the SUNY campus, was treated as if it were a COC. Tract 1508.07, comprising the SUNY Stony Brook campus itself, reported in the 2000 census a minority percentage of approximately 65 percent as compared to the threshold for New York State at 48.5 percent. This tract also reported a higher minority population percentage in 2000 than New York State and Suffolk County. All census tracts are listed in Table 2.5-1. The location of each selected census tracts is shown in Figure 2.5-1.

Although below the NYSDEC and EPA Region 2 threshold, on average the study area has a higher minority population percentage than the statistical reference areas of New

Table 2.5-1 2000 Population, Density and Race Data for COC Tracts

Census Tract	Total Persons	Population Density	Total Minority	Minority Percentage	White	African-American	Am. Ind./ Alaska	Asian	Hawaii/ Pacific	Some Other	Two or More	Hisp./Latino (All Races)
State of New York	18,976,457		3,233,699	17.04%	12,893,689	3,014,385	82,461	1,044,976	8,818	1,341,946	590,182	2,867,583
Suffolk County	1,419,369		167,889	11.83%	1,200,755	98,553	3,807	34,711	484	51,875	29,184	149,411
1580.02	6,374		565	8.86%	5,915	70	8	246	0	49	86	152
1580.05	9,086		1,673	18.14%	7,654	128	12	1,139	4	48	101	301
1580.06	6,822		920	13.49%	6,076	135	4	508	3	17	79	207
1580.07	**7,234**		**4,689**	**64.81%**	**2,739**	**1,183**	**14**	**2,667**	**4**	**373**	**254**	**691**
1350.05	2,990		202	5.50%	2,877	20	0	62	0	0	31	65
1350.04	3,674		168	5.62%	3,571	16	2	54	1	16	14	113
Project Area Totals	36,180		8,217	22.71%	28,832	1,552	40	4,676	12	503	565	1,529

Source: Bureau of the Census. 2000; Table P4 – Race, Combination of Two Races, and Not Hispanic or Latino: 2000 and P9 – Hispanic or Latino by Type: 2000.
Census Tracts in bold numeration exceed threshold.

York State and Suffolk County (see Table 2.5-1). Asians and African-Americans are the principal minority groups in the reference areas (12.92 percent and 4.29 percent of the total population, respectively, compared to 5.51 percent and 15.88 percent for the State of New York and 2.45 percent and 6.94 percent for Suffolk County). In the screening analysis, individuals identifying themselves as Hispanic/Latino (All Races) account for 4.23 percent of the total population and those identifying themselves as "some other race" account for 1.39 percent of the total population in the screening analysis area.

When the total minority percentage in each tract is compared to the two statistical reference areas (New York State and Suffolk County), Tracts 1580.07, 1580.06, and 1580.05 exhibit a higher percentage in at least one of those areas. Tracts 1580.07 and 1580.05 had a higher percentage of minority status as compared to both the State of New York and Suffolk County (Table 2.5-1). Tract 1580.06 reported a higher minority status in 2000 as compared to Suffolk County, but a lower percentage when compared to the State of New York. However, in summary, only 1580.07 was selected as a potential COC as it was the only tract to exceed the established NYSDEC's and EPA Region 2's statewide percentage threshold for minority populations.

2.5.8. Analysis of Income Status

Based on NYSDEC's and EPA Region 2's statewide percentage thresholds for low-income populations, the threshold for New York State is 24.8 percent. According to this guideline for comparison of percentages of low-income populations, only one of the six census tracts in the study area exceeded the threshold. The percentage of persons within Tract 1508.07 below the poverty level was reported to be 46.5 and this tract was analyzed further. However, these income data for a student population likely do not reflect parental income and support.

Table 2.5-2 below outlines the percentages of persons below the poverty level for the screening analysis area, Suffolk County and New York State. Additionally, this same census tract, 1580.07, is the only tract within the screening analysis area that reported a higher percentage of persons below the poverty level when compared to Suffolk County and New York State.

2.5.9. Evaluation of Project Impacts in the SUNY Campus Census Tract

The following section presents a discussion of the results of the evaluation of the proposed facility's air quality impacts in the SUNY campus census tract. Results of the modeling analyses are depicted with isopleths (lines of constant concentration) of modeled ground-level concentrations of sulfur dioxide (SO_2,) carbon monoxide (CO), particulate mater smaller than 10 microns (PM_{10}), and nitrogen dioxide (NO_2) from the operation of the proposed facility (plus background concentrations) with and without existing nearby sources. The values in the isopleths include maximum short-term and annual modeled concentrations, which were added to the highest, second-highest short-term and maximum annual monitored background concentrations from the latest available three years of NYSDEC ambient air quality monitoring data.

Table 2.5-2: Percentage of Persons Below the Poverty Level, 1989

Census Tract	Persons in Poverty	Percent of Persons Below Poverty Level
State of New York		13.03
Suffolk County		4.75
1580.02	189	3.0
1580.05	139	2.0
1580.06	138	1.9
1580.07	**323**	**46.5**
1350.04	64	2.2
1350.05	57	1.9

Note: Census Tracts in bold numeration exceed threshold.
Source: Bureau of the Census (1990 and 2000 Census).

Table 2.5-3 presents the results of air quality modeling of the proposed Calpine Stony Brook Energy Center without and with the existing nearby sources and the addition of measured background concentrations, and compares the results to the NAAQS. The values in the table clearly show that even when the maximum proposed project and existing nearby source impacts are added to maximum measured ambient background concentrations, the resulting air quality levels would be well below the NAAQS.

Table 2.5-3 Environmental Justice Cumulative Modeling Maximum Modeled Concentrations

Pollutant	Averaging Period	NAAQS (μg/m³)	Background Concentration (μg/m³)	Maximum Proposed Project Concentration[a] (μg/m³)	Maximum Modeled Ground-Level Concentration[a] (μg/m³)	Total Ground-Level Concentration[b] (μg/m³)
CO	1-Hour	40,000	7,099	12.4	131	7,230
	8-Hour	10,000	5,153	5.65	42.4	5,195
SO_2	3-Hour	1,300	149.3	0.974	368	518
	24-Hour	365	73.4	0.389	130	204
	Annual	80	18.3	0.0324	8.03	26
PM-10	24-Hour	150	41.0	3.40	44.8	86
	Annual	50	17.0	0.348	2.67	20
NO_2	Annual	100	47.0	0.258	12.2	59.2

Notes:

a Maximum modeled concentrations reflect the highest second highest short term (1-, 3-, 8-, 24-hour) and maximum annual modeled concentrations.

b Total concentration = background concentration + maximum modeled (i.e., ground-level) concentration.

Table 2.5-4 provides a summary of some of the proposed facility's predicted maximum air quality impacts at receptors located at each student dormitory or apartment building on the SUNY Stony Brook campus. Specifically, the table presents the predicted maximum annual average impacts for SO_2, NO_2 and PM_{10}, and the predicted highest

Table 2.5-4: Air Quality Impacts at SUNY Dormitory Receptors

(Dorm Name)	Location		Maximum Predicted Concentrations ($\mu g/m^3$)							
	UTM (E) (m)	UTM (N) (m)	CO		SO_2			PM_{10}		NO_2
			1-Hour *	8-Hour *	3-Hour*	24-Hour*	Annual	24-Hour*	Annual	Annual
Hand	657,750	4,530,223	4.40	1.97	0.324	0.136	0.0113	1.20	0.0996	0.0735
Douglass	657,728	4,530,142	3.97	1.74	0.307	0.125	0.0107	1.12	0.0938	0.0693
Dreiser	657,656	4,530,111	3.69	1.79	0.271	0.106	8.62E-03	0.936	0.0758	0.0560
Sanger	657,578	4,530,204	5.12	2.21	0.390	0.117	0.0102	1.03	0.0897	0.0664
Toscanini	657,623	4,530,271	6.17	2.66	0.414	0.144	0.0128	1.27	0.112	0.0831
Stimson	657,494	4,530,459	4.89	1.42	0.288	0.0840	5.97E-03	0.734	0.0524	0.0388
Keller	657,382	4,530,415	5.35	2.48	0.325	0.157	6.33E-03	1.39	0.0558	0.0412
Greeley	657,352	4,530,474	5.03	2.33	0.335	0.158	6.23E-03	1.40	0.0549	0.0405
Wagner	657,399	4,530,526	6.16	2.77	0.407	0.197	7.39E-03	1.75	0.0651	0.0481
Dewey	657,320	4,530,605	6.33	2.25	0.419	0.165	7.24E-03	1.46	0.0635	0.0471
Baruch	657,294	4,530,687	7.39	2.89	0.442	0.164	8.85E-03	1.44	0.0776	0.0576
Eisenhower	657,308	4,530,764	5.73	2.94	0.460	0.131	7.32E-03	1.14	0.0642	0.0476
Schick	657,352	4,530,744	7.81	2.97	0.456	0.175	9.22E-03	1.53	0.0808	0.0600
Hamilton	657,388	4,530,677	8.55	3.74	0.535	0.227	0.0105	1.98	0.0920	0.0682
Mount	657,899	4,530,444	3.52	1.49	0.236	0.086	7.41E-03	0.769	0.0661	0.0482
Hendrix	658,015	4,530,468	4.20	1.78	0.270	0.105	0.0108	0.938	0.0963	0.0702
Gershwin	658,073	4,530,413	3.25	1.27	0.221	0.0774	8.35E-03	0.691	0.0745	0.0543
Whitman	658,034	4,530,350	4.30	1.59	0.259	0.0887	8.79E-03	0.793	0.0780	0.0572
Cardozo	657,874	4,530,361	4.04	1.45	0.283	0.0929	8.69E-03	0.833	0.0774	0.0565
Gray	658,158	4,531,092	2.41	0.698	0.138	0.0326	2.50E-03	0.292	0.0223	0.0163
Ammann	658,172	4,531,182	2.61	0.544	0.119	0.0383	3.28E-03	0.338	0.0291	0.0213
Oneill	658,270	4,531,197	2.72	0.616	0.139	0.0410	3.63E-03	0.363	0.0322	0.0236
Irving	658,252	4,531,090	2.59	0.639	0.136	0.0334	2.62E-03	0.301	0.0233	0.0170
James	658,191	4,531,302	2.97	1.05	0.224	0.0674	7.44E-03	0.602	0.0662	0.0484
Langmuir	658,204	4,531,377	2.58	1.12	0.185	0.0591	7.41E-03	0.526	0.0659	0.0482
Benedict	658,324	4,531,285	2.46	0.818	0.164	0.0576	5.65E-03	0.507	0.0500	0.0367
Undergrad Apartments	657,216	4,530,491	3.90	1.57	0.356	0.105	4.66E-03	0.926	0.0409	0.0303
Apartment A	657,155	4,530,588	3.33	1.05	0.268	0.0656	3.51E-03	0.577	0.0308	0.0228
Apartment B	657,216	4,530,653	4.50	1.56	0.359	0.0956	4.91E-03	0.840	0.0431	0.0320
SIL			2,000	500	25	5	1	5	1	1
NAAQS			40,000	10,000	1,300	365	80	150	50	100

second-high short-term average impacts for SO_2, NO_2, PM_{10} and CO. The impacts shown in Table 2.5-4 are the specified maximum values predicted using the ISCST3 model and all five years of meteorological data (1991-1995) recorded at MacArthur Airport in Islip, New York. The modeling analyses summarized in Table 2.5-4 were limited to the operating scenario that produced the maximum impacts for each pollutant.

For reference, Table 2.5-4 also lists the SILs and NAAQS for each modeled air pollutant and averaging period. The SILs define a set of maximum concentrations that are deemed insignificant by EPA and NYSDEC. (Note that although the table presents the highest second-high short-term average impacts, maximum impacts are used to determine insignificance. Typically, maximum and highest second-high impacts are of comparable magnitude.) The NAAQS are the concentration limits established to protect the public health and welfare.

The table shows that the predicted maximum annual and highest second-high air quality impacts of the proposed facility are well below both the SILs and NAAQS at all the dormitory and apartment receptors. In addition, it has been demonstrated elsewhere herein that the predicted maximum air quality impacts of the proposed facility are all well below the SILs at all locations. Therefore, the proposed facility would have not have a disproportionate impact from air emissions on any minority or low income population.

a. SO_2 Concentrations within the SUNY Campus Census Tract

Figures 2.5-2A through 2.5-4A depict isopleths of 3-hour, 24-hour, and annual SO_2 concentrations, respectively, in and around the SUNY campus census tract attributable to the proposed facility plus the measured background concentrations, and Figures 2.5-2B through 2.5-4B depict the total concentrations attributable to the proposed facility, the existing nearby sources and the measured background concentrations. For example, Figure 2.5-2A presents the modeled 3-hour average SO_2 concentrations for the proposed facility alone (plus background). The figure shows that modeled SO_2 impacts (plus background) range from approximately 149.45 to 145.9 micrograms per cubic meter ($\mu g/m^3$) with an isopleth increment of 0.15 $\mu g/m^3$. The maximum modeled impacts of the proposed project occur in a comma-shaped area that is oriented southwest to northeast, just to the east of the proposed facility site. As shown on Table 2.5-3, the background 3-hour average concentration of SO_2 is 149.3 $\mu g/m^3$. The results are well below the NAAQS of 1,300 $\mu g/m^3$.

Figure 2.5-3A shows the modeled 24-hour average SO_2 concentrations for the proposed facility alone (plus background), which range from approximately 73.46 to 73.68 $\mu g/m^3$, with an isopleth interval of 0.08 $\mu g/m^3$. The maximum modeled impacts occur in a crescent-shaped area, also oriented southwest to northeast, slightly to the east of the proposed facility site. Modeled annual SO_2 concentrations (plus background) as presented in Figure 2.5-4a range from 18.307 to 18.321 $\mu g/m^3$ for the proposed facility alone (plus background), with an isopleth increment of 0.007 $\mu g/m^3$. The maximum modeled impacts occur in an oval-shaped area, oriented south to north and just east of the proposed facility site. As shown on Table 2.5-3, the background 24-hour and annual average concentrations of SO_2 are 73.4 $\mu g/m^3$ and 18.3 $\mu g/m^3$, respectively. The modeling results are well below the 24-hour and annual average SO_2 NAAQS of 365 $\mu g/m^3$ and 80 $\mu g/m^3$, respectively.

b. CO Concentrations within the SUNY Campus Census Tract

Figures 2.5-5a and 2.5-6a depict isopleths of 1-hour and 8-hour average CO concentrations, respectively, in and around the SUNY campus census tract attributable to the proposed facility plus the measured background concentrations, and Figures 2.5-5B and 2.5-6B depict the total concentrations attributable to the proposed facility, the existing nearby sources and the measured background concentrations.

c. PM_{10} and $PM_{2.5}$ Concentrations within the SUNY Campus Census Tract

Figures 2.5-7 and 2.5-8 present isopleths of 24-hour and annual PM_{10} concentrations, respectively, in and around the SUNY campus census tract. Figures 2.5-7a and 2.5-8a depict the concentrations attributable to the proposed facility plus the measured background concentrations, and Figures 2.5-7b and 2.5-8b depict the total concentrations attributable to the proposed facility, the existing nearby sources and the measured background concentrations. In addition, an analysis of $PM_{2.5}$ concentrations in and around the SUNY campus is fully addressed in Section 2.7.9 and concluded that the proposed project would not have a significant adverse impact from $PM_{2.5}$ emissions and would not cause an exceedance of the $PM_{2.5}$ NAAQS.

d. NO_2 Concentrations within the SUNY Campus Census Tract

Figure 2.5-9 presents isopleths of annual NO_2 concentrations. Figure 2.5-9a depicts the concentrations attributable to the proposed facility plus the measured background concentrations, and Figure 2.5-9b depicts the total concentrations attributable to the proposed facility, the existing nearby sources and the measured background concentrations. As was the case with the maximum modeled annual average SO_2 impacts of the proposed facility, the maximum modeled annual average NO_2 impacts of the proposed facility occur in an oval-shaped area, oriented south to north just to the east of the proposed facility site. The figure incorporates a background concentration of 47.0 $\mu g/m^3$ and displays concentrations ranging from 47.08 to 47.16 $\mu g/m^3$, with an isopleth interval of 0.04 $\mu g/m^3$. The maximum predicted NO_2 concentrations are well below the NAAQS of 100 $\mu g/m^3$.

Although the maximum concentrations depicted in the isopleth maps that present the results of the cumulative modeling analyses are larger than those shown in the isopleth maps for the proposed facility alone, all the maximum predicted total concentrations attributable to the proposed facility, the existing nearby sources and the measured background concentrations are well below the NAAQS.

2.5.10. Evaluation of Toxic Release Inventory (TRI) Facilities

A database review was conducted utilizing the web site of EPA's Toxic Release Inventory (TRI) Community Right to Know – TRI Explorer 2000 Data Release. A database search was preformed to obtain detailed descriptions of the 2000 TRI data (updated as of January 23, 2002) available for facilities located in Suffolk County, New York. The TRI database provides the yearly emissions/release data for the following media: air emissions, releases to surface water, land, underground injection, and off-site disposal. The database search provides a list of all facilities in Suffolk County that have at some time in the past submitted TRI reports. As a consequence, facilities can be listed in the database search that may not have reports for 2000. For the purposes of this study, only the facilities with 2000 data were utilized.

The TRI data indicates that twenty-nine facilities within Suffolk County submitted TRI Form R reports in 2000. Of these twenty-nine facilities, none were located within the SUNY Campus census tract. Three additional TRI reporting facilities located within Suffolk County were identified in the TRI data search. These three facilities submitted Form A (TRI Short Form) reports in 2000. These facilities were also not located within the SUNY campus census tract.

The 2000 TRI data for the facilities in Suffolk County indicated a total of 1,046,450 pounds of air emissions reported.

No facilities were located within the SUNY campus census tract and subsequently 0 percent of the total emissions from Suffolk County occur within the SUNY campus census tract. Therefore, no disproportionate burden on minority or low income populations exists in this area.

2.5.11. Conclusion with Respect to Environmental Justice

The study area is characterized by a wide range of income levels and minority groups. According to the 1990 Census, higher incomes within the screening analysis area occur in census tracts 1350.04 and 1580.02 to the southwest and north/northeast of the project site respectively. Lower incomes are found in census tract 1580.07, which encompasses the SUNY Stony Brook Campus and 1350.05 located southwest of the project site. Minority representation is quite variable across the screening analysis area, with large differences between census tracts (5.50 percent to 64.81 percent).

The above analysis shows that one of the tracts exceeds NYSDEC and EPA Region 2 thresholds for minority and low-income representation. Some of these areas also exceed the minority and/or low-income representation of the reference areas (either New York State or Suffolk County). Therefore, cumulative analysis of environmental load has been conducted. The analysis demonstrates that cumulative impacts do not cause violations of the NAAQS within the study area, and therefore are not adverse. Furthermore, regarding pollutants and averaging times for which the maximum cumulative impact locations fall within the campus, the project's portion of such impacts is negligible. Thus, the analysis demonstrates that neither an adverse nor a disproportionate impact is borne as a result of the proposed facility, considered cumulatively with other major sources.

2.5.12. Enhanced Public Participation Plan

The Draft NYSDEC Policy issued on August 7, 2002 states, that if a project is determined to be located in an area with a substantially higher percentage of minority or low-income populations and the project is likely to have an adverse impact, then the project is subject to a requirement for an "enhanced public participation plan." The above analysis demonstrates that the proposed facility would not have an adverse impact on the surrounding project area. As a result, the proposed facility would be not subject to an enhanced public participation plan. Nevertheless, the project would have a public outreach program, which is described in Section 1.3. *

2.6 Traffic and Transportation

2.6.1. Introduction

Field observations were conducted to determine the existing base traffic conditions in the vicinity of the proposed facility to be located on the SUNY Stony Brook Campus in the Town of Brookhaven, New York.

In order to assess traffic impacts from the project, a review of the traffic to be generated by the proposed facility and existing conditions were reviewed.

2.6.2. Existing Roadways

The following are brief descriptions of the roadways in the vicinity of the proposed facility (see Figure 2.6-1):

- Nicolls Road (Suffolk County Route 97)—Nicolls Road is a two lane per direction roadway with turning lanes at key intersections and contains a landscaped median. Nicolls Road travels in a north-south direction from Montauk Highway to Route 25A. Nicolls Road has a posted speed limit of 55 mph and is under the jurisdiction of the Suffolk County Department of Transportation.
- Route 25A (North Country Road)—In the vicinity of the site, Route 25A is a one lane per direction roadway traveling in an east-west direction with turning lanes and signalization at key intersections. Route 25A has a posted speed limit varying from 35-45 mph within the vicinity of the project site. Route 25A is under the jurisdiction of the New York State Department of Transportation (NYSDOT).
- Route 347 (Nesconset Highway)—Route 347 is a two lane per direction roadway with turning lanes and signalization at key intersections. Route 347 also has a landscaped median. Route 347 travels in an east-west direction from Veterans Memorial Highway to Route 25A. Route 347 has a posted speed limit of 55 mph and is under the jurisdiction of the NYSDOT.
- Stony Brook Road—Stony Brook Road is a one lane per direction roadway traveling in a north-south direction from Pond Path Drive to Route 25A. Stony Brook Road has a posted speed limit varying from 25-30 mph within the vicinity of the project site. To the north of the campus access, Stony Brook Road is a winding roadway. Stony Brook Road is under the jurisdiction of the Town of Brookhaven.

2.6.3. Site Access/Roadway Volumes

The SUNY Stony Brook campus can be accessed from both the north and the south. The north entrance to the campus is via North Entrance Drive/North Loop Road. The south entrance to the campus is from either Nicolls Road or Stony Brook Road to South Drive. Access to the project site would be predominantly via an existing driveway located along North Entrance Drive/North Loop Road on the SUNY Stony Brook campus.

Vehicles arriving to the site would most likely travel along the Long Island Expressway (LIE, I-495) to Nicolls Road (Interchange 62) to the southern entrance of the SUNY

Stony Brook Campus. A review of the traffic volumes along Nicolls Road between Route 347 and Route 25A obtained from the Suffolk County Department of Public Works indicates the estimated average annual daily traffic is 32,200 vehicles per day. Table 2.6-1 summarizes the traffic volumes along this stretch of Nicolls Road on an hourly basis.

Table 2.6-1: Nicolls Road Traffic Volumes

Hour	Northbound	Southbound
	AM	
12–1	116	228
1–2	64	86
2-3	39	56
3-4	32	41
4-5	69	35
5-6	231	92
6-7	767	329
7-8	1415	733
8-9	1967	778
9-10	1451	757
10-11	1000	815
11-12	925	937
	PM	
12-1	873	1053
1–2	907	1061
2-3	1188	1169
3-4	1105	1577
4-5	1063	1600
5-6	989	1470
6-7	1025	1201
7-8	793	1013
8-9	548	955
9-10	449	801
10-11	429	430
11-12	228	373
TOTALS	17,673	17,590

Based upon information obtained from the New York State Department of Transportation in their New York State 2001 Highway Sufficiency Ratings book, the traffic volume on Route 25A in the vicinity of Nicolls Road is 23,000 vehicles per day total traveling in both directions, and contains approximately 3 percent trucks.

2.6.4. Trip Generation

The proposed facility would generate a small number of vehicle trips. The project may require two additional employees. There would be no oil truck deliveries, as the facility would only use natural gas from an existing 12-inch pipeline. Additional material deliveries to the project site arising from the operation of the proposed project would be limited to deliveries of aqueous ammonia (less than 20 percent concentration), acid, and caustic. This material would be delivered to the proposed facility by a tanker truck on an approximate weekly basis. Periodic maintenance would require some additional worker and equipment delivery trips. However, the maximum number of trips even for this infrequent event would be less than 4 vehicle trips in any hour.

2.6.5. Probable Impacts of the Project

Based on the small number of trips generated by the proposed project, the existing volume of traffic, and the satisfactory functioning of the roads, the proposed project would not have a significant adverse impact on traffic. *

2.7 Air Quality

This analysis examines the air quality effects of the proposed Calpine Stony Brook Energy Center.

2.7.1. Permitting Requirements

The proposed facility would be limited to a net output of 79.9 MW to the electric grid. For Clean Air Act (CAA) permitting purposes, the proposed facility would be a modification of an existing major source located in a severe ozone nonattainment area. The existing NCP Facility's maximum potential emissions of oxides of nitrogen (NO_x) and volatile organic compounds (VOC) exceed the 25 tons per year major source threshold for these ozone precursors. The project's potential emissions of NO_x exceed the 25 tons per year major source threshold, and, when recent source modifications at the existing NCP Facility that are considered contemporaneous are taken into account, the net emission increases of both NO_x and VOC exceed the significant net emission increase thresholds of 25 tons per year. Therefore, since the proposed project would be a major modification of an existing major source of NO_x and VOC, the Nonattainment New Source Review (NNSR) provisions contained in Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 231-2 would apply to the project. These provisions include Lowest Achievable Emission Rate (LAER) and emission offsets for NO_x and VOC.

Air emissions from Phase I will be below the major source modification significance thresholds in the federal Prevention of Significant Deterioration (PSD) regulations at Title 40 of the Code of Federal Regulations (40 CFR) Subpart 52.21. A proposed modification triggers PSD permitting requirements if the potential emission increase of a regulated pollutant is significant. However, the project's potential emissions in Phase I would be below the applicable significant emission rates defined at 40 CFR 52.21(b)(23)(i). Therefore, Phase I would be a minor modification and not subject to PSD.

Phase II of the proposed project would trigger PSD requirements since the potential PM_{10} emissions would exceed the applicable significant emission rate (15 tons per year) set forth in 40 CFR 52.21(b)(23)(i). The proposed project's emissions of all other regulated pollutants would be below the applicable significant emission rates. Therefore, PSD permitting requirements would be triggered only for PM_{10}.

2.7.2. Project Design

The proposed facility would be constructed in two phases. Phase I would entail the construction and operation of a new simple-cycle GE LM6000 Sprint combustion turbine (CT) rated at a nominal 47 MW (less parasitic losses) at ISO conditions. It is anticipated to begin operation in the summer of 2003. Phase II would begin operation in 2004 and in Phase II, the new CT would be a converted to combined-cycle facility. Phase II would entail the construction of a once through steam generator (OTSG) with duct burners, a steam turbine generator (STG), and a condenser with an associated two cell cooling tower. The CT and duct burners would burn natural gas exclusively. Upon completion of

Phase II-A, the proposed facility could operate in a combined-cycle mode, utilizing the waste heat from the combustion turbine to generate additional electricity in the steam turbine unit. Phase II-B would incorporate a steam interconnection that would allow excess steam from the NCP facility that would otherwise be vented to the atmosphere to be transferred to the proposed facility's steam turbine in place of steam that would otherwise be generated by the proposed facility's duct burners. The Phase II-B interconnection would not increase the net output from the project. It would improve the efficiency of the operation and decrease the fuel consumption of the proposed facility.

a. Phase I Emission Controls

Water injection would be used to control NO_x concentrations in the exhaust gases from the CT. Post combustion controls would include selective catalytic reduction (SCR) to control NO_x and an oxidation catalyst. An oxidation catalyst would be used to control emissions of carbon monoxide (CO). The oxidation catalyst would reduce CO by 90 percent and volatile organic compound (VOC) emissions by 80 percent.

The CT emits sulfur dioxide (SO_2) due to oxidation of the sulfur compounds in the fuel and particulate matter (PM) due to soot formation. The use of clean fuel (natural gas) would minimize emissions of SO_2 and PM.

b. Phase II Emission Controls

The combined-cycle (Phase II) mode of operation would utilize the same pollution control equipment as the simple-cycle (Phase I) Phase of Project. The SCR system would limit the NO_x emissions from the CT plus duct burner to the same emission concentration as the Phase I mode. The oxidation catalyst would reduce CO emissions by 90 percent and VOC emissions by 80 percent.

The proposed cooling tower would incorporate drift eliminators to limit cooling tower drift losses.

2.7.3. Emission Quantities and Stack Parameters

Air emissions from the proposed facility are primarily products of combustion of natural gas in the CT and the duct burners. Pollutants regulated under federal and state programs include NO_x, CO, SO_2, VOC, PM, sulfuric acid mist (H_2SO_4), and hazardous air pollutants (HAPs). PM can be subdivided into PM_{10} (PM with an aerodynamic diameter less than or equal to 10 microns) and $PM_{2.5}$ (PM with an aerodynamic diameter less than or equal to 2.5 microns).

Emissions from combustion turbines vary with turbine load and ambient temperature. Emission rates for the LM6000 Sprint CT were obtained from vendor data or otherwise calculated for nine discrete combinations of three ambient temperatures (-10° F, 59°, and 110° F) and three turbine loads (100 percent, 75 percent, and 50 percent). The resulting combinations fully cover the range of expected operating conditions.

The key assumptions in the emission calculations for the Phase I (simple-cycle) project are as follows:

- The CT fires natural gas exclusively.
- The CT operates an estimated 7,280 hours per year
- The SCR system limits the NO_x emissions from the CT to no greater than 2.5 parts per million by volume, dry (ppmvd) at 15 percent oxygen.
- Ammonia slip is 10 ppmvd at 15 percent oxygen.
- The oxidation catalyst reduces CO emissions by 90 percent.
- The oxidation catalyst reduces VOC emissions by 80 percent.
- The SO_2 emissions are calculated assuming that 100 percent of the sulfur in the fuel is emitted as SO_2.
- SO_2 conversion to SO_3 and to H_2SO_4 (for the purposes of estimating H_2SO_4) varies with operating conditions based on data from an oxidation catalyst vendor.
- SO_2 conversion to SO_3 and to ammonium sulfate salts (as PM) varies with operating conditions based on data from an oxidation catalyst vendor.
- Both filterable and condensable particles are included in the PM emission rates

The key assumptions in the emissions calculations for the Phase II (combined-cycle) project are the same as for the Phase I (simple-cycle) configuration except for the following additions:

- The project includes duct burner(s) with a total firing rate of 300 MMBtu/hr, HHV
- The CT and duct burners operate up to 8,760 hours per year
- The uncontrolled duct burner emission factors are as follows:

  —NO_x - 0.08 lb/MMBtu, HHV

  —CO - 0.1 lb/MMBtu, HHV

  —VOC - 0.02 lb/MMBtu, HHV

  —$PM/PM_{10}/PM_{2.5}$ - 0.015 lb/MMBtu, HHV
- The cooling tower operates up to 8,760 hours per year
- The cooling tower operating parameters are as follows:

  —Coolant water flow – 24,000 gallons per minute

  —Coolant water total dissolved solids – 1,300 ppm

  —Cooling tower drift – 0.0005 percent

Estimated maximum project emissions for Phase I and Phase II are summarized in Tables 2.7-1 and 2.7-2, respectively. Emissions are presented for winter (extreme low ambient temperature, -10°F), spring/fall (typical temperature, 59°F), and summer (extreme high temperature, 110°F) seasons. In Phase I, the CT is assumed to operate at full load for an estimated 7,280 hours per year. In Phase II, the CT, duct burners, and cooling tower are assumed to operate at full load for 8,760 hours per year. Emissions associated with startup and shutdown activities have also been incorporated in the estimated annual project emissions.

Table 2.7-1: Project Emissions—Phase I

Pollutant	Maximum Emissions(1) Natural Gas Firing		Estimated Annual Project Emissions(2) (tons/year)
	ppm	pounds/hour	
Nitrogen Oxides	2.5	4.27	17.36
Carbon Monoxide	7.7	7.70	17.34
Volatile Organic Compounds	3.0	1.60	3.61
Sulfur Dioxide	NA	0.66	2.31
PM	N/A	3.85	13.49
$PM_{10}/PM_{2.5}$	N/A	3.85	13.49
Sulfuric Acid Mist	N/A	0.72	2.19
Ammonia	10.0	6.33	22.22
Total HAPs	N/A	N/A	1.01
Individual HAP(3)	N/A	0.15	0.54

Notes:

(1) ppm refers to ppmvd @ 15 percent O_2

(2) Annual emissions for each pollutant based on an estimated 7,280 hours per year operation of LM6000 at full load with operation distributed equally throughout the year.

(3) Individual HAP with maximum emissions is formaldehyde.

The maximum annual project emissions are listed in Tables 2.7-3 and 2.7-4 for Phase I and Phase II, respectively. These tables also list the major source thresholds and the net emission increases of NO_x and VOC, which take into account recent source modifications at NCP that are considered contemporaneous.

2.7.4. Attainment Status and Compliance with Air Quality Standards

EPA has established National Ambient Air Quality Standards (NAAQS) for seven substances, referred to as criteria pollutants, for the protection of public health and welfare. These criteria pollutants are SO_2, PM_{10}, $PM_{2.5}$, nitrogen dioxide (NO_2), CO, ozone (O_3), and lead (Pb). EPA has set both primary and secondary NAAQS. The results of clinical and epidemiological studies established the primary NAAQS to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. The secondary NAAQS protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings. EPA has established both short-term and long-term standards. The NAAQS are included in Table 2.7-5.

Table 2.7-2: Project Emissions—Phase II

Pollutant	Maximum Emissions(1) Natural Gas Firing ppm	Maximum Emissions(1) Natural Gas Firing pounds/hour	Estimated Annual Project Emissions(2) (tons/year)
Nitrogen Oxides	2.5	6.96	32.18
Carbon Monoxide	7.6	10.70	33.00
Volatile Organic Compounds	3.0	2.80	9.34
Sulfur Dioxide	N/A	1.08	4.61
PM	N/A	8.89	38.34(4)
$PM_{10}/PM_{2.5}$	N/A	8.89	38.34(4)
Sulfuric Acid Mist	N/A	1.19	4.38
Ammonia	N/A	10.30	44.16
Total HAPs	N/A	N/A	2.02
Individual HAP(3)	N/A	0.15	1.07

Notes:

(1) ppm refers to ppmvd @ 15 percent O_2

(2) Annual emissions for each pollutant based on 8760 hours per year operation of LM6000 at load that yields maximum emissions for each season. Duct burners assumed to operate for 8760 hours per year at maximum firing rate.

(3) Individual HAP with highest emission rate is formaldehyde.

(4) Estimated annual emissions of PM, PM_{10}, and $PM_{2.5}$ from Phase II include contribution from cooling tower. Cooling tower assumed to operate for 8760 hours per year at maximum emission rate.

Table 2.7-3: Potential Emissions and Major Source Thresholds—Phase I

Pollutant(a)	PSD Major (TPY)(b)	NNSR Major (TPY)(c)	MACT Major (TPY)	Existing Actual (TPY)(d)	Existing Potential (TPY)	Modification Potential (TPY)(e)	PSD Significant Emission Rate (TPY)
CO	100	-	-	80.62	249.90	17.34	100
NO_x/NO_2(f)	100	25	-	135.78	249.90	17.36	40
SO_2	100	-	-	5.46	14.32	2.31	40
PM	100	-	-	9.82	32.69	13.49	25
$PM_{10}/PM_{2.5}$	100	-	-	9.82	32.69	13.49	15
VOC(f)	-	25	-	16.28	76.87	3.61	40
Individual HAP(g)	-	-	10	-	-	0.54	-
Total HAPs	-	-	25	-	-	1.01	-
Ammonia	100	-	-	-	-	22.22	-
H_2SO_4	100	-	-	-	5.04	2.19	7

Notes:

(a) Regulated substances not emitted by the proposed new unit have not been included in the table.
(b) PSD major source threshold not listed for criteria pollutants for which area is classified as nonattainment or for HAPs.
(c) NNSR major source threshold listed only for nonattainment pollutants or their precursors.
(d) Average of 1999 and 2000 emissions. Does not include duct burner.
(e) Potential emissions are based on an estimated 7,280 hours of natural gas firing.
(f) NO_x and VOC are precursor pollutants for ozone; NO_2 is a criteria pollutant.
(g) Individual HAP with greatest potential emissions is formaldehyde.

Table 2.7-4: Potential Emissions and Major Source Thresholds—Phase II

Pollutant[a]	PSD Major (TPY)[b]	NNSR Major (TPY)[c]	MACT Major (TPY)	Existing Actual (TPY)[d]	Existing Potential (TPY)	Modification Potential (TPY)[e]	PSD Significant Emission Rate (TPY)
CO	100	-	-	80.62	249.90	33.00	100
NO_x/NO_2[f]	100	25	-	135.78	249.90	32.18	40
SO_2	100	-	-	5.46	14.32	4.61	40
PM	100	-	-	9.82	32.69	38.34	25
$PM_{10}/PM_{2.5}$	100	-	-	9.82	32.69	38.34	15
VOC[f]	-	25	-	16.28	76.87	9.34	40
Individual HAP[g]	-	-	10	-	-	1.07	-
Total HAPs	-	-	25	-	-	2.02	-
Ammonia	100	-	-	-	-	44.16	-
H_2SO_4	100	-	-	-	5.04	4.38	7

Notes:

(a) Regulated substances not emitted by the proposed new unit have not been included in the table.

(b) PSD major source threshold not listed for criteria pollutants for which area is classified as nonattainment or for HAPs.

(c) NNSR major source threshold listed only for nonattainment pollutants or their precursors.

(d) Average of 1999 and 2000 emissions. Does not include duct burner.

(e) Potential emissions are based on 8,760 hours of natural gas firing.

(f) NO_x and VOC are precursor pollutants for ozone; NO_2 is a criteria pollutant.

(g) Individual HAP with greatest potential emissions is formaldehyde.

The NYSDEC has established New York Ambient Air Quality Standards (NYAAQS) that are generally consistent with the NAAQS. In addition, NYSDEC has set NYAAQS for other pollutants, including photochemical oxidants, gaseous fluoride, beryllium, and hydrogen sulfide. The NYAAQS are also included in Table 2.7-5.

The proposed project is located in an area currently designated as attainment or unclassifiable for SO_2, CO, NO_2, and PM_{10}. Therefore, for these pollutants, the proposed project is required to demonstrate compliance with the NYAAQS and NAAQS shown in Table 2.7-5. The area is designated as severe nonattainment for ozone. Projects that increase emissions by more than 25 tons/year of NO_x or VOC in severe non-attainment areas for ozone are subject to Nonattainment New Source Review (NNSR) requirements for these pollutants. The proposed project would be subject to NNSR requirements for NO_x and VOC, including LAER and emission offsets.

A source is a major source of hazardous air pollutants (HAPs) if its potential to emit all HAPs exceeds 25 tons per year or if its potential to emit any single HAP exceeds 10 tons per year. The proposed facility will have HAP emissions below major source thresholds. Therefore, requirements for Maximum Achievable Control Technology (MACT) will not apply to the project.

Table 2.7-5: National and New York Ambient Air Quality Standards

Pollutant	Averaging Period	NAAQS ($\mu g/m^3$)	NYAAQS ($\mu g/m^3$)
Sulfur Dioxide (SO_2)	3-Hour	1,300[a]	1,300[a]
	24-Hour	365[a]	365[a]
	Annual	80[b]	80[b]
Nitrogen Dioxide (NO_2)	Annual	100[b]	100[b]
Particulate (PM_{10})	24-Hour	150[c]	150[c]
	Annual	50[d]	50[d]
Particulate ($PM_{2.5}$)	24-Hour	65[e]	N/A
	Annual	15[b,f]	N/A
Carbon Monoxide (CO)	1-Hour	40,000[a]	40,000[a]
	8-Hour	10,000[a]	10,000[a]
Ozone (O_3)	1-Hour	235[g]	160[a]
	8-Hour	157[h]	N/A
Lead (Pb)	Quarterly	1.5[b]	N/A
Photochemical Oxidants	1-Hour	N/A	160[a]
Gaseous Fluorides (as F)	12-Hour	N/A	3.7[b]
	24-Hour	N/A	2.85[b]
	1-Week	N/A	1.65[b]
	1-Month	N/A	0.8[b]
Beryllium	1-Month	N/A	0.01[b]
Hydrogen Sulfide[i]	1-Hour	N/A	14[b]

Notes:
(a) Not to be exceeded more than once per year
(b) Not to be exceeded
(c) Fourth highest concentration over a three year period
(d) Average of three annual average concentrations
(e) 98th percentile averaged over three years
(f) Spatially averaged over designated monitors
(g) Not to be exceeded more than once per year on average
(h) 3 year average of annual 4th highest concentration
(i) Pollutant would not be emitted from the proposed project
N/A = Not applicable
Source: 40 CFR 50; 6 NYCRR 257; 40 CFR 52; and EPA, 1990[1]

2.7.5. Air Quality Impact Analysis

The air quality impacts of emissions from the proposed facility were assessed using state-of-the-art air dispersion simulation models recommended by EPA. The dispersion modeling for the proposed project was performed consistent with the procedures found in EPA documents[2],[3],[4]. Project representatives have met to discuss modeling requirements

[1] EPA (1990). "New Source Review Workshop Manual (Draft)", Office of Air Quality Planning and Standards, Research Triangle Park, NC.
[2] EPA (1999). Guideline on Air Quality Models (Revised). EPA-450/2-78-027R.

with NYSDEC modeling staff, and a modeling protocol that describes project-specific modeling issues in greater detail has been submitted to NYSDEC.

a. Land Use Analysis

A land use classification analysis was performed to determine whether urban or rural dispersion parameters should be used in quantifying ground-level concentrations. The analysis conformed to the procedures referenced in the EPA Guidelines on Air Quality Models.[5] The selected procedure is based on "Correlation of Land Use and Cover with Meteorological Anomalies" (August H. Auer, Jr., Journal of Applied Meteorology, Vol. 17, 1978) and involves determining the percentages of various industrial, commercial, residential, and agricultural/natural land use categories within a 3 km radius circle centered on the proposed site. The recommended procedure specifies that urban dispersion coefficients be used if more than 50 percent of the area within a 3 km radius falls into specific industrial, commercial, and compact residential categories; otherwise, rural dispersion coefficients should be used.

An evaluation of land use around the proposed project site indicates that approximately 65 percent of the area within three kilometers of the site falls into rural land use categories. Therefore, rural dispersion coefficients were used in the modeling analysis.

b. Good Engineering Practice Stack Height

A Good Engineering Practice (GEP) stack height analysis considering existing and proposed buildings and structures at and near the project site was conducted in accordance with EPA guidance.[6]

GEP formula height (H_{GEP}) is calculated in the following manner:

$$H_{GEP} = H_B + 1.5L$$

where:

H_B = the height of adjacent or nearby structure, and

L = the lesser dimension (height or projected width of the adjacent or nearby structure)

Building parameters (building heights and projected widths as a function of wind direction sector) were determined through the use of the EPA Building Profile Input Program (BPIP).

For the proposed stack locations and equipment layout, the controlling structure (i.e., the structure that yields the highest associated GEP formula height) corresponds to the proposed CT building. This structure has a roof height of approximately 77 feet above local grade, and its projected width exceeds its height for wind directions for which the

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[3] EPA (1992). Screening Procedures for Estimating the Air Quality Impact of Stationary Sources (Revised).
[4] EPA (1990). New Source Review Workshop Manual (Draft).
[5] Op Cit. EPA (1999).
[6] EPA (1995). Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations. EPA-450/4-80-023R.

proposed stack is downwind and within the range of influence of the structure. The GEP formula for squat structures reduces to 2.5 times the structure height, and the maximum GEP formula height associated with this structure is 192.5 feet.

The proposed stack height of 125 feet (38.1 meters) above local grade is less than the GEP formula height. Therefore, in accordance with EPA guidance, the dispersion modeling analyses conducted for the project account for the potential for building wake effects on stack emissions. The proposed stack height is high enough that stack emissions would not be subject to building cavity effects.

The proposed cooling tower stack height in Phase II is also less than the GEP formula height. The proposed height is also short enough that the cooling tower emissions could be subject to building cavity effects. Therefore, the dispersion modeling conducted for Phase II of the project also accounted for the potential for building wake and cavity effects on cooling tower emissions. The cavity analysis was conducted using screening techniques referenced in NYSDEC guidance.[7]

c. Stack and Emission Parameters

Emissions from combustion turbines vary with turbine load and ambient temperature. Emission rates for the LM6000 Sprint CT were obtained from vendor data or otherwise calculated for nine discrete combinations of three ambient temperatures (-10° F, 59° F, and 110° F) and three turbine loads (100 percent, 75 percent, and 50 percent). The resulting combinations fully cover the range of expected operating conditions. Phase II emissions from the duct burners were calculated assuming firing at a rate of 300 MMBtu/hr (HHV) for the full load cases.

Short-term emission rates and stack parameters for the proposed combustion sources are summarized in Tables 2.7-6 and 2.7-7 for Phase I and Phase II, respectively.

Emissions from the proposed two-cell cooling tower were calculated based on vendor data, a maximum water flow rate through the tower (24,000 gallons per minute), a maximum total dissolved solids (TDS) level in the cooling tower water (1300 ppm), and the use of drift eliminators to achieve a drift rate of no greater than 0.0005 percent of the circulating water flow through the tower. Stack parameters and emission rates for the proposed cooling tower are summarized in Table 2.7-8.

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[7] Air Guide 26. NYSDEC Guidelines on Modeling Procedures for Source Impact Analyses. Revised 12/9/96.

Table 2.7-6: Operating Conditions for Modeling the New LM6000 CTG Calpine Stony Brook Electric Generating Station - Phase I

Operating Scenarios			Combustion Turbine					Exhaust Gas	
			Emission Rate (g/s)						
Case	Ambient Temp. (°F)	Turbine Load (%)	SO_2	NO_x	PM_{10}	CO	Pb	Exit Temp (°K)	Exit Velocity (m/s)
LOW100	-10	100	0.079	0.514	0.424	0.970	neg	645	32.7
LOW75	-10	75	0.062	0.401	0.402	0.743	neg	626	27.3
LOW50	-10	50	0.046	0.299	0.392	0.491	neg	611	22.3
MID100	59	100	0.083	0.538	0.485	0.315	neg	714	33.4
MID75	59	75	0.064	0.415	0.438	0.202	neg	684	28.6
MID50	59	50	0.047	0.307	0.427	0.139	neg	689	22.7
HIGH100	110	100	0.075	0.488	0.475	0.113	neg	716	31.2
HIGH75	110	75	0.058	0.378	0.448	0.063	neg	710	26.8
HIGH50	110	50	0.044	0.283	0.431	0.050	neg	709	21.6

Notes:
(1) Stack height = 125 ft above local ground level
(2) Stack base elevation = 112 feet above mean sea level
(3) Stack inside exit effective diameter = 10.74 feet
neg = negligible

Table 2.7-7: Operating Conditions for Modeling the New LM6000 CTG and Duct Burner

Calpine Stony Brook Electric Generating Station - Phase II									
Operating Scenarios			Combustion Turbine					Exhaust Gas	
			Emission Rate (g/s)						
Case	Ambient Temp. (°F)	Turbine Load (%)	SO_2	NO_x	PM_{10}	CO	Pb	Exit Temp (°K)	Exit Velocity (m/s)
LOW100	-10	100	0.132	0.852	1.021	1.348	neg	355	18.4
LOW75	-10	75	0.062	0.401	0.402	0.743	neg	344	15.0
LOW50	-10	50	0.046	0.299	0.392	0.491	neg	344	12.5
MID100	59	100	0.135	0.877	1.120	0.693	neg	355	17.0
MID75	59	75	0.064	0.415	0.438	0.202	neg	344	14.4
MID50	59	50	0.047	0.307	0.427	0.139	neg	344	11.3
HIGH100	110	100	0.127	0.826	1.110	0.491	neg	355	15.8
HIGH75	110	75	0.058	0.378	0.448	0.063	neg	344	13.0
HIGH50	110	50	0.044	0.283	0.431	0.050	neg	344	10.5

Notes:
(1) Stack height = 125 ft above local ground level
(2) Stack base elevation = 112 feet above mean sea level
(3) Stack inside exit effective diameter = 10.74 feet
neg = negligible

Table 2.7-8: Operating Conditions for Modeling the Cooling Tower Calpine Stony Brook Electric Generating Station - Phase II

Parameter	Value
Exhaust Temperature	90 °F
	305 °K
Exhaust Flow	2.50 x 10^6 ACFM
Number of Stacks	2
Stack Inner Diameter	7.92 meter
Stack Velocity	12.0 meter/second
PM_{10} Emission Rate	0.10 gram/second (both stacks)
	0.05 gram/second (single stacks)
Top of Fan Deck	37 feet
Top of Fan	47 feet

d. Dispersion Modeling Analyses

Modeling for the proposed project was conducted in accordance with guidance in NYSDEC Air Guide 26 and EPA's Guideline on Air Quality Models. Screening level modeling was conducted initially and was followed by refined level modeling, where necessary, to demonstrate insignificant project impacts.

Screening level modeling was conducted using the EPA Industrial Source Complex Short Term Model (ISCST3) for simple terrain receptors and the EPA SCREEN3 model for complex terrain receptors. Recommended sets of screening meteorological conditions were used in the screening analyses to determine maximum predicted pollutant concentrations from project emissions at model receptor locations. The height and projected building width of the controlling structure was used in the screening analyses, regardless of direction. A separate screening level modeling analysis for potential building cavity impacts from the cooling tower was conducted using the SCREEN3 model.

Refined level modeling was also conducted using ISCST3 with a five-year meteorological database representative of conditions at the proposed project site to determine maximum predicted source impacts over an extensive grid of model receptors. Building parameters were varied with direction as appropriate in the refined modeling analyses. Refined modeling was conducted only to determine NO_2 and PM_{10} impacts in simple terrain for Phase II of the project. Screening modeling was sufficient to demonstrate insignificant impacts in Phase I of the project in simple and complex terrain; in Phase II of the project in complex terrain; and in Phase II of the project in simple terrain for pollutants other than NO_2 and PM_{10}. In addition, the screening analysis of potential building cavity impacts from the proposed cooling tower demonstrated insignificant impacts.

ISCST3 is a steady-state Gaussian plume model and is well suited for predicting impacts from complicated industrial sources. It incorporates algorithms that account for plume rise and dispersion, the effects of terrain, and building downwash. ISCST3 has been designated by the EPA as a "preferred" model for use in rural or urban areas, flat or rolling terrain, transport distances less than 50 km, and one hour to annual averaging times.[8]

SCREEN3 is a single-source, steady-state Gaussian plume model that is well suited for predicted maximum impacts from a wide variety of sources. It contains algorithms for building wake and cavity effects as well as algorithms from the EPA VALLEY model for estimating impacts in complex terrain. SCREEN3 uses sets of representative hourly meteorological conditions for estimating maximum predicted 1-hour impacts. Concentrations for longer averaging periods are obtained through use of recommended scaling factors. The VALLEY model algorithms in SCREEN3 yield 24-hour concentrations directly in complex terrain.

The modeling analyses used the most recent versions of the ISCST3 model (version 02035) and SCREEN3 (Version 96043). The regulatory default option was selected for the ISCST3 model to ensure that appropriate model options recommended by EPA and NYSDEC were used. In accordance with NYSDEC requirements for analyses using off-site meteorological data, the terrain keyword option was set to specify use of the simple terrain algorithms within the model.

e. Meteorological Data

The simple terrain screening analyses using ISCST3 used the 54 discrete combinations of wind speeds and stability classes that are included in the SCREEN3 model. The complex terrain screening analyses with SCREEN3 used a stack-top wind speed of 2.5 meters per second with stability Class F (stable conditions) in accordance with standard modeling guidance for complex terrain screening.

Refined modeling for the proposed project used the five most recent calendar years of representative meteorological data collected prior to the implementation of the Automated Surface Observing System (ASOS) in May of 1996. Surface meteorological data collected at MacArthur Airport in Islip, New York are considered representative of wind, temperature, and stability conditions at the proposed project site. Therefore, surface level meteorological data for the period (1991-1995) from Islip were used in the refined modeling analysis.

Concurrent mixing height data were used from the nearest coastal observing sites collecting upper air data. For the period (1991 – August, 1994), upper air and surface data from Atlantic City, New Jersey were used to calculate mixing heights. Upper air data from Brookhaven National Lab in Upton, New York were used in conjunction with MacArthur Airport surface observations to determine mixing heights from September, 1994 through the end of 1995. Surface and upper air data were processed using the EPA Meteorological Processor for Regulatory Models (MPRM).

Meteorological data used in refined modeling analyses should be representative of conditions around the modeled source, should be reliable, and should satisfy PSD quality assurance requirements as identified in the EPA On-Site Meteorological Program

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[8] Op Cit. EPA (1999).

Guidance for Regulatory Modeling Applications.[9] EPA's Guideline on Air Quality Models[10] requires the use of five years of meteorological data if the data are off-site, provided the data is determined to be both spatially and temporally representative.

MacArthur Airport is located approximately 13 kilometers (8 miles) to the south of the proposed project site. The airport and the proposed project site are both in relatively rural settings with relatively flat terrain, and there are no significant intervening terrain features that would influence wind speed and direction patterns. Therefore, the data from McArthur Airport are considered spatially representative for the proposed site. The five-year database satisfies requirements for reliability, completeness, and record length. The data have been collected relatively recently during a period in which no significant changes in climate or wind patterns have occurred. Therefore, the data are also considered temporally representative of current conditions.

f. Receptors

A comprehensive receptor grid was developed for the study area around the proposed project. A receptor is a geographical location at which the air quality model calculates a pollutant concentration, and the grid is the collection of all receptors used in the analysis.

The screening modeling made use of receptors centered on the proposed stack and spaced at 100 meter intervals from 100 meters to 2 kilometers (km), at 500 meter intervals from 2 km to 5 km, and at 1 km intervals from 5 km to 20 km. The receptor elevation at each distance was conservatively determined as the highest elevation occurring in any direction within an annulus centered on the proposed stack and with inner and outer diameters extending one-half the distance to the adjacent receptor distance on either side of the ring (i.e., inward and outward).

The refined receptor grid consists of a series of nested Cartesian sub-grids centered on the proposed project site and covering an area of 20 km by 20 km. The inner receptor sub-grid covers an area of 4 km by 4 km and uses a receptor spacing of 100 meters. The middle receptor sub-grid extends out over an area of 10 km by 10 km and uses a receptor spacing of 500 meters. The outer receptor sub-grid extends out over an area of 20 km by 20 km and uses a receptor spacing of 1000 meters. The grid was later refined to incorporate a receptor spacing of no greater than 70 meters near those areas where the maximum impacts were predicted.

Receptor elevations in the refined modeling analyses were conservatively specified as the highest elevation within an area extending halfway to the nearest receptor in all directions. Receptor elevations were determined from U.S. Geological Survey (USGS) Digital Elevation Model (DEM) three arc-second (high-resolution) data.

Refined modeling was also performed for a set of elevated receptors on buildings located within 2 km of the project. These elevated receptors were limited to locations that were accessible to the public. These elevated receptors on buildings were treated as "flagpole" receptors.

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[9] EPA (1995). On-Site Meteorological Program Guidance for Regulatory Modeling Applications.
[10] Op Cit. EPA (1999).

g. **Background Air Quality**

NYSDEC maintains a network of ambient air quality monitors to determine existing ambient pollutant concentrations throughout the State. Air quality data summaries available from NYSDEC and EPA were reviewed for the three most recent years (1999, 2000, and 2001) for the nearest monitoring sites. The monitoring sites considered encompassed the Eisenhower Park monitor (SO_2, PM_{10}, $PM_{2.5}$. NO_2, and CO) the Holtsville monitor (SO_2, NO_2, and CO), and the Babylon monitor (SO_2). The available monitoring sites are located in or closer to more urban areas and would be expected to record higher concentrations than are likely to occur in Stony Brook. For each pollutant, the maximum long-term (annual) and highest second-high short-term ambient concentrations were selected and were conservatively used to represent background. The selected background concentrations are listed below. A more complete review of $PM_{2.5}$ background levels is provided in a subsequent section.

- Sulfur Dioxide (SO_2)

  —SO_2 annual average = 0.007 ppm (18.3 μg/m^3), (Babylon, 1999)

  —SO_2 24-hour second high = 0.028 ppm (73.4 μg/m^3), (Eisenhower Park, 1999)

  —SO_2 3-hour second high = 0.057 ppm (149.3 μg/m^3), (Eisenhower Park, 2000)

- Nitrogen Dioxide (NO_2)

  —NO_2 annual average = 0.025 ppm (47.0 μg/m^3) (Eisenhower Park, 1999)

- Particulate Matter (PM_{10})

  —PM_{10} 24-hour second high = 41 μg/m^3 (Eisenhower Park, 2001)

  —PM_{10} annual average = 17 μg/m^3 (Eisenhower Park, 2001)

- Particulate Matter ($PM_{2.5}$)

  —$PM_{2.5}$ 24-hour 98th percentile, 3-year average = 32 μg/m^3 (Babylon MAM, July 2000 – June 2002)

  —$PM_{2.5}$ annual average over three years = 12.3 μg/m^3 (four site average, July 2000 – June 2002)

- Carbon Monoxide (CO)

  —CO 1-hour second high = 6.2 ppm (7,099 μg/m^3), (Eisenhower Park, 1999)

  —CO 8-hour second high = 4.5 ppm (5,153 μg/m^3), (Eisenhower Park, 1999)

2.7.6. Air Quality Analysis Results

Air quality modeling was conducted for each phase of the proposed project for nine different operational cases representing combinations of three turbine load levels between 50 percent and 100 percent and three ambient temperatures covering the range of expected operations.

The highest concentrations at each receptor were determined for each pollutant and applicable averaging period and compared to the significant impact levels (SILs) defined by EPA. The maximum concentrations predicted for each pollutant and averaging period are summarized in Table 2.7-9 and Table 2.7-10 for Phase I and Phase II, respectively. Refined modeling results are listed for those cases for which refined modeling was performed. The refined modeling results in the main body of Table 2.7-10 do not include impacts at the elevated receptors on nearby buildings; these impacts, if higher, are noted in a table footnote.

Table 2.7-9: Modeling Results – Phase I

Pollutant	Averaging Period	Significant Impact Level (ug/m^3)	PSD Class II Increment (ug/m^3)	NAAQS (ug/m^3)	Maximum Modeled Concentration[a] (ug/m^3)
CO	1-hour	2,000	-	40,000	5.08
	8-hour	500	-	10,000	3.56
SO_2	3-hour	25	512	1,300	0.381
	24-hour	5	91	365	0.170
	annual	1	20	80	0.0339
PM_{10}	24-hr	5	30	150	1.47
	annual	1	17	50	0.293
NO_2	annual	1	25	100	0.221

Note:

All maximum impacts for Phase I obtained at simple terrain receptors via screening level modeling.

Table 2.7-10: Modeling Results – Phase II

Pollutant	Averaging Period	Significant Impact Level (ug/m^3)	PSD Class II Increment (ug/m^3)	NAAQS (ug/m^3)	Maximum Modeled Concentration[a] (ug/m^3)
CO	1-hour	2,000	-	40,000	17.5
	8-hour	500	-	10,000	12.2
SO_2	3-hour	25	512	1,300	1.86
	24-hour	5	91	365	0.826
	annual	1	20	80	0.165
PM_{10}	24-hr	5	30	150	3.40[b,c,d,e]
	annual	1	17	50	0.348[b,f]
NO_2	annual	1	25	100	0.258[b,g]

Notes:

(a) Maximum impacts obtained at simple terrain receptors via screening level modeling unless otherwise noted.
(b) Impact determined via 5 years of refined modeling.
(c) Highest second-high value; maximum value over 5 years was 4.31 ug/m^3.
(d) At elevated receptors on nearby buildings, maximum 24-hour impact over 5 years was 4.37 ug/m^3.
(e) At elevated receptors on nearby buildings, highest second-high 24-hour impact over 5 years was 3.97 ug/m^3.
(f) At elevated receptors on nearby buildings, maximum annual impact over 5 years was 0.323 ug/m^3.
(g) At elevated receptors on nearby buildings, maximum annual impact over 5 years was 0.228 ug/m^3.

The results demonstrate that the maximum predicted impacts of all criteria air pollutants are below defined SILs for all modeled operational cases and also well below the listed Class II PSD increments and the NAAQS. The modeling demonstrates that the maximum predicted ground-level impacts of project emissions are insignificant.

Finally, the maximum predicted ground-level impacts due to emissions from the proposed project are added to the highest representative background concentrations to determine maximum concentrations for comparison with NAAQS. The results presented in Tables 2.7-11 and 2.7-12 demonstrate compliance with NAAQS for Phase I and Phase II, respectively. Predicted concentrations at elevated receptors on nearby buildings also show compliance with NAAQS.

Based upon these modeling results it can be concluded that the proposed project would not have a significant adverse air quality impact with regard to all criteria air pollutants.

2.7.7. Assessment of Accidental Ammonia Release

Aqueous ammonia would be used as the reducing agent in the proposed project's SCR system for controlling NO_x emissions from the CT and duct burners. The NO_x reduction achieved by the SCR system is affected by the ratio of ammonia (NH3) to NO_x. Because of the need for a constant supply, aqueous ammonia (a mixture containing less than 20 percent by weight ammonia in water) would be stored on-site in two 8,000 gallon steel storage tanks, which would be functionally independent of one another. The tanks would be located outdoors and each would be surrounded by a separate impervious berm, 20 feet long, 16 feet wide, and 11 feet high, filled with two layers of closely packed plastic spheres. In the event of an accidental release, the plastic spheres would float on top of the spilled liquid, reducing the exposed liquid surface area, which reduces the evaporation rate.

Due to the dilute concentration of the aqueous ammonia that would be used (less than 20 percent) the proposed project's ammonia solution is not subject to the Risk Management Program for hazardous materials (40 CFR Part 68). However, to assess potential impacts on the health and safety of the community surrounding the proposed project, the potential for impacts resulting from a worst-case ammonia release scenario has been assessed. A summary of this assessment is presented below.

A determination of the potential for an off-site impact from an accidental worst-case ammonia release scenario was conducted using emission estimates based on EPA's Risk Management Program Guidance for Offsite Consequence Analysis (EPA, April 1999) developed by EPA as part of the 1990 CAAA Title III Risk Management Program.

To predict the potential worst-case impact distance, the EPA-approved DEGADIS model was used. A worst-case release scenario was defined as a rupture of one of the 8,000 gallon tanks containing a 19 percent aqueous ammonia solution. Consistent with the proposed design, the analysis assumed that the released liquid would be contained within the impervious berm containing layers of closely packed plastic spheres. The release was assumed to occur under very stable (Class F) atmospheric conditions with an ambient temperature of 85° F, representative of the highest nighttime temperature that could occur at Islip. Stability class F conditions occur only at night and are the conditions that would

Table 2.7-11 Air Quality Compliance Demonstration – Phase I

Pollutant	Averaging Period	Significant Impact Level (ug/m^3)	PSD Class II Increment (ug/m^3)	Maximum Modeled Concentration (ug/m^3)	Maximum Concentration Location		Background Concentration (ug/m^3)	Total Concentration (ug/m^3)	NAAQS (ug/m^3)
					UTM Easting (m)	UTM Northing (m)			
CO	1-hour	2,000	-	5.08	100[(a)]	N/A	7,099	7,104	40,000
	8-hour	500	-	3.56	100[(a)]	N/A	5,153	5,157	10,000
SO_2	3-hour	25	512	0.381	100[(a)]	N/A	149.3	150	1,300
	24-hour	5	91	0.170	100[(a)]	N/A	73.4	74	365
	annual	1	20	0.0339	100[(a)]	N/A	18.3	18	80
PM_{10}	24-hr	5	30	1.47	100[(a)]	N/A	41.0	42	150
	annual	1	17	0.293	100[(a)]	N/A	17.0	17	50
NO_2	annual	1	25	0.221	100[(a)]	N/A	47.0	47	100

Notes:

(a) Maximum impact predicted via screening modeling at receptor 100 meters downwind of CT stack.

Table 2.7-12 Air Quality Compliance Demonstration – Phase II

Pollutant	Averaging Period	Significant Impact Level (ug/m³)	PSD Class II Increment (ug/m³)	Maximum Modeled Concentration (ug/m³)	Maximum Concentration Location: UTM Easting (m)	Maximum Concentration Location: UTM Northing (m)	Background Concentration (ug/m³)	Total Concentration (ug/m³)	NAAQS (ug/m³)
CO	1-hour	2,000	-	17.5	100[a]	N/A	7,099	7,017	40,000
	8-hour	500	-	12.2	100[a]	N/A	5,153	5,165	10,000
SO_2	3-hour	25	512	1.86	100[a]	N/A	149.3	151	1,300
	24-hour	5	91	0.826	100[a]	N/A	73.4	74	365
	annual	1	20	0.165	100[a]	N/A	18.3	18	80
PM_{10}	24-hr	5	30	3.40[c]	657,657	4,531,055	41.0	44	150
	annual	1	17	0.348[b]	657,657	4,531,055	17.0	17	50
NO_2	annual	1	25	0.258[b]	657,657	4,531,055	47.0	47	100

Notes:

Maximum impact predicted via screening modeling at receptor 100 meters downwind of CT stack.
Maximum impact predicted via 5 years of refined modeling.
Highest second-high value obtained from 5 years of refined modeling.

yield the maximum downwind extent of a particular concentration level in the event of an accidental release. The turbulence associated with less stable atmospheric conditions would greatly reduce the ammonia concentrations at any downwind distance.

The analysis of this worst-case release scenario showed that concentrations exceeding the Emergency Response Planning Guideline, Level 2 (ERPG-2) value of 150 ppm for ammonia established by the American Industrial Hygiene Association would not extend downwind to distances of more than 244 feet. The ERPG-2 is the maximum airborne concentration below which it is believed nearly all individuals could be exposed up to one hour without experiencing or developing irreversible or other serious health effects that could impair their abilities to take protective action. There are no residences, dormitories, classrooms, or other routine public gathering places within this radius of the proposed ammonia tanks. Therefore, in the unlikely event of an accidental ammonia release even under these worst-case conditions, concentrations of potential concern would not extend to areas where people would likely be exposed.

2.7.8. Analysis of Potential Air Quality and Health Effects of Project-Related $PM_{2.5}$

a. Introduction and Overview

As discussed above, potential effects on air quality in the areas surrounding the proposed project were assessed through air quality modeling for SO_2, CO, NO_2, and PM_{10}. This section analyzes potential effects on air quality and public health from $PM_{2.5}$[11] emissions as a result of operation of the proposed project. $PM_{2.5}$ refers to not a single pollutant, but instead to an array of fine inhalable materials. There are, for example, thousands of forms of natural ambient $PM_{2.5}$ and perhaps as many forms of man-made $PM_{2.5}$. While all the disparate forms of $PM_{2.5}$ can be inhaled, their toxicologic properties can differ dramatically. Some particulate matter (PM) is emitted directly to the atmosphere (i.e., primary PM), while other types of particulate matter are formed in the atmosphere through various chemical reactions and physical transformations (i.e., secondary PM). The secondary formation of $PM_{2.5}$ is one determinant of ambient air quality and is, thus far, extremely difficult to model.

The major constituents of $PM_{2.5}$ are typically sulfates, nitrates, organic carbon, elemental carbon (soot), ammonium, and metallic elements (not including sulfur). Secondary sulfates and nitrates are formed from their precursor gaseous pollutants, SO_2 and NO_x at some distance from the source due to the time needed for the chemical conversion within the atmosphere. Elemental carbon and metallic elements are primary components, while organic carbon can be either emitted directly from a source or formed as a secondary pollutant in the atmosphere. Due to the influence of these "secondary" pollutants from distant or regional sources, regional ambient levels of $PM_{2.5}$ are typically more evenly distributed than their related class of pollutants— PM_{10}, which is more highly influenced by local sources. The expected composition of regional $PM_{2.5}$ is shown in Table 2.7-13.

[11] $PM_{2.5}$ refers to particles with an aerodynamic diameter equal to or less than 2.5 microns and is a subset of PM_{10}.

Table 2.7-13: $PM_{2.5}$ Component Contribution

Pollutant Component	Botanical Gardens, Bronx, NY (%)	Queens College, Queens, NY (%)
Sulfate	31	33
Organic Carbon	31	30
Ammonium	14	14
Nitrate	11	12
Elemental Carbon	8	6
Metallic Elements (minus Sulfur)	5	5

Source: NYSDEC, Report to the Examiners on Consolidated Edison's East River Article X Project, Case No. 99-F-1314, February 2002.

Data from the Botanical Gardens in the Bronx, NY, and Queens College in Queens, NY, indicate that the greatest contributors to ambient $PM_{2.5}$ concentrations are sulfates, and organic carbon (approximately two thirds of the total $PM_{2.5}$ mass). Additional studies confirming the contribution of long-range transport to ambient $PM_{2.5}$ levels compare the data from New York City monitors to monitors from a remote site within the state, downwind from other states. These data show that high levels of sulfate and other pollutants come into New York State from areas to the west and south of New York. The data also indicate that urban sites are more likely to experience increased nitrate and carbon levels than rural sites.[12]

Although the issue of health effects due to $PM_{2.5}$ is complex, several basic facts lead to the conclusion that, as discussed below, $PM_{2.5}$ impacts from this proposed project would be negligible. First, the CT and duct burners involved are highly efficient and operate on the cleanest of fossil fuels, natural gas. Accordingly, emissions of primary particulate matter from both phases of the project are very small per kilowatt-hour of electricity generated. Moreover, the near absence of sulfur in the natural gas means that the amount of secondary, sulfate-based $PM_{2.5}$ from this project would be essentially nil.

Second, the specific types and amount of $PM_{2.5}$ associated with combustion of natural gas are not known to adversely impact health, and are expected to be benign at the concentrations that would be in ambient air with the operation of the turbine.

This chapter discusses the yet-to-be implemented standard for acceptable levels of $PM_{2.5}$ in ambient air adopted by the EPA. The analytical framework for the analysis of $PM_{2.5}$ impacts from this proposed project, the results of the $PM_{2.5}$ air quality modeling, a discussion of secondary $PM_{2.5}$ information on the composition of various forms of $PM_{2.5}$, and the potential public health effects associated with the types and levels of ambient $PM_{2.5}$ from this proposed project are also discussed. Finally, the estimated increments to $PM_{2.5}$ levels resulting from the proposed project are compared with current levels of $PM_{2.5}$ in ambient air in Long Island.

[12] NYSDEC, Report to the Examiners on Consolidated Edison's East River Article X Project, Case No. 99-F-1314, February, 2002.

b. The National Ambient Air Quality Standard for $PM_{2.5}$

Section 108 of the Clean Air Act (CAA) directs the EPA to identify criteria pollutants that may reasonably be anticipated to endanger public health and welfare. Section 109 of the CAA requires the EPA to establish NAAQS and periodically revise them for such criteria pollutants. Primary NAAQS are mandated to protect public health with an adequate margin of safety. In setting the NAAQS, EPA must account for uncertainties associated with inconclusive scientific and technical information and potential hazards not yet identified, and the standard must be adequate to protect the health of any sensitive group of the population. Secondary NAAQS are defined as standards that are necessary to prevent adverse impacts on public welfare such as impacts to crops, soils, water, vegetation, wildlife, weather, visibility, and climate.

Beginning in 1994, EPA conducted its five-year review of the NAAQS for particulate matter, which included an in-depth examination of epidemiologic and toxicologic studies. EPA also held public meetings across the nation and received over 50,000 oral and written comments regarding these studies, particularly as to whether $PM_{2.5}$ is correlated with adverse health effects, and at what ambient air concentrations of $PM_{2.5}$ these correlations hold. The studies are summarized in EPA's Criteria Document for Particulates, Chapters 10-13 (1996); EPA's Staff Papers on Particulates, particularly Chapter V;[13] and EPA's proposed NAAQS for particulates, found in the December 13, 1996 Federal Register at page 65638. Based on this extensive analysis, in June of 1997, EPA revised its NAAQS for particulate matter and adopted a new standard for $PM_{2.5}$ consisting of both a long-term (annual) limit of 15 micrograms per cubic meter ($\mu g/m^3$) and a short-term (24-hour) limit of 65 $\mu g/m^3$.[14]

The new standard was immediately challenged in court by a number of industry groups, and, in May 1999, the U.S. Court of Appeals for the District of Columbia in American Trucking Assoc., Inc. v. EPA, 175 F.3d 1027 (D.C. Cir. 1999) vacated the new standard and instructed EPA to revisit the matter. In February 2000, the U.S. Supreme Court overturned the Court of Appeals decision and remanded the case to EPA and the lower court.[15] A separate decision on March 26, 2002 rejected the remaining claims that EPA's decision was arbitrary and capricious and not supported by the evidence. EPA has not yet implemented the new $PM_{2.5}$ standard and, as discussed below, implementation is not expected to occur until 2005 (at the earliest) because of the absence of background data and modeling techniques.

Although the new $PM_{2.5}$ standards were subject to litigation, $PM_{2.5}$ monitoring stations were installed across the nation in the late 1990's. Ambient $PM_{2.5}$ concentrations are measured on a 24-hour basis by determining the amount of particulate matter deposited on a filter that has had a known volume of airflow through it in that 24-hour period. EPA recommends sampling occur every third day, with approximately 120 samples per year.

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[13] Many of the studies are found on EPA's web page at http://www.epa.gov/ttn/oarpg/t1sp.html. EPA's second and third external review draft of the PM criteria document are available on EPA's website as well.

[14] 62 Federal Register 38652 (July 18, 1997).

[15] Whitman v. American Trucking Assoc., Inc., #531 U.S. 457 (2001).

For a given area, the annual standard would be met if the three-year average of the annual arithmetic mean of the 24-hour concentrations does not exceed 15.0 μg/m^3. The monitored concentrations could be from a single monitor or from a spatial average of several population-oriented monitors. Annual averages are based on the averaging of quarterly averages, each of which must have valid observations for 75 percent of the potential samples; annual averages are rounded to the nearest 0.1 μg/m^3. To comply with the 24-hour standard, the three-year average of the annual 98th percentile measurement cannot exceed 65 μg/m^3 at each monitor in an area. The 98th percentile measurement for each year is the measured 24-hour concentration that is equal to or greater than 98 percent of the year's measurements. The determination of the 98th percentile concentration is a function of the number of samples obtained in that year. For example, if valid, quality assured measurements are recorded every third day for a year and the measurements were placed in order (lowest to highest), the 118th value (120 x 0.98 = 117.6, is rounded up to 118) is taken as the 98th percentile.[16] For evaluation of the 24-hour standard, measured values are rounded to the nearest μg/m^3. Note that in this example, the 98th percentile is also equivalent to the third highest value.

c. Current Status of $PM_{2.5}$ Regulations

Even when the new $PM_{2.5}$ standard was first enacted in 1997, EPA did not intend to implement the standards until 2005. Several stages of sampling, analysis, and planning must be completed as part of the full implementation program. First, EPA requires the states to measure and compile three years of ambient monitoring data in order to determine which areas are in compliance with the new standard. Second, the chemical composition of $PM_{2.5}$ for areas not meeting the standard must be determined in order to evaluate possible control strategies for non-attainment areas. Third, the states then have three years to develop regulations to control $PM_{2.5}$ emissions and their precursors in nonattainment areas, after which EPA must then approve these regulations for incorporation into the State Implementation Plan (SIP). Finally, EPA must develop modeling methods and emission factors to enable individual facilities to estimate $PM_{2.5}$ emission impacts from new projects, to compare the predicted increases relative to the new standards, and to determine the effects of such increases relative to the NAAQS.

Given the lack of background data on $PM_{2.5}$ and the difficulties associated with modeling it, EPA has recommended for permitting purposes that facilities continue to examine PM_{10} emissions from proposed projects because any analysis of PM_{10} will necessarily include an examination of $PM_{2.5}$. Since $PM_{2.5}$ is a subset of PM_{10}, controlling emissions of PM_{10} will generally afford control of $PM_{2.5}$ emissions as well.[17]

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[16] Methods for calculating annual average and 98th percentile concentrations are given in the Code of Federal Regulations at 40 CFR Part 50, Appendix N.

[17] Memorandum by John Seitz, Director of EPA's Office of Air Quality Planning and Standards, October 21, 1997. See also, September 19, 2000 letter by Jeanne M. Fox, EPA Region 2 Regional Administrator, (suggesting that a qualitative discussion of increased bus and truck traffic is an appropriate analysis of $PM_{2.5}$ for a new highway project because quantitative modeling tools are not currently available for examining $PM_{2.5}$ emissions from mobile sources or point sources); January 7, 2002 letter by George

d. Analytical Framework For Incremental $PM_{2.5}$ Estimation

Emission Estimates

The first step in determining the impacts of the proposed project on $PM_{2.5}$ ambient concentrations is to determine the $PM_{2.5}$ emissions rates from the proposed CT and duct burners. The ratio of $PM_{2.5}$ to PM_{10} for an electric generating facility varies depending on the type of fuels used. While particulate emission rates for natural gas are quite low, the size distribution of such particulates may be almost entirely in the $PM_{2.5}$ range.[18] Thus, for analysis purposes, this EA assumes that all PM_{10} emissions are $PM_{2.5}$ emissions. Tables 2.7-1 and 2.7-2 present the emission rates for PM_{10}, NO_x and SO_2 (which are precursors to the formation of secondary $PM_{2.5}$) for Phases I and II, respectively, of the project.

e. Modeling Methodology

The second step in determining the potential impact of $PM_{2.5}$ emissions from the proposed project on ambient air is to conduct air quality modeling analyses in accordance with the modeling protocol submitted to NYSDEC. Air quality impacts from $PM_{2.5}$ emissions from the proposed project were evaluated using the same procedures described earlier in this section for the other pollutants of concern.

The concentrations of $PM_{2.5}$ at the maximum impacted receptor point were based on the maximum anticipated emission rates. The highest NO_x concentration was examined, since NO_x is a precursor to the formation of secondary $PM_{2.5}$. SO_2 is the most significant precursor to the formation of ambient secondary $PM_{2.5}$ in the Eastern portion of the United States. By burning natural gas, the proposed project would emit less than 3 tons per year of SO_2 in Phase I and less than 5 tons per year of SO_2 in Phase II; thus, the impacts would be very small.

f. Potential Project-Related $PM_{2.5}$ Impacts

Potential Maximum Increases in $PM_{2.5}$ Concentrations

Table 2.7-14 presents the results of the modeled ambient pollutant concentrations for the maximum 24-hour and annual averages for $PM_{2.5}$, the maximum 3-hour, 24-hour and annual averages for SO_2, and the maximum annual average for NO_x due to emissions from the proposed project. The maximum estimated 24-hour and annual $PM_{2.5}$ levels are small relative to the respective measured background concentrations. A comparison between the combined $PM_{2.5}$ increments due to the proposed project and background $PM_{2.5}$ concentrations is provided later in this chapter. Annual NO_x and SO_2 values are presented to support the qualitative secondary $PM_{2.5}$ analysis below.

Pavlou, Director, EPA Region 2, Division of Environmental Planning and Protection, to Carl Johnson, Deputy Commissioner, NYSDEC.

[18] *Compilation of Air Pollutant Emission Factors* AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources (AP-42). Environmental Protection Agency, Office of Air Quality Planning and Standards, (2001), Research Triangle Park, NC: Available on-line at http://www.epa.gov/ttn/chief/ap42/index.html

Table 2.7-14: Maximum Modeled Pollutant Concentrations (ug/m^3)

Pollutant – Averaging Time	Project Impact – Phase I	Project Impact – Phase II
NO_2 – Annual	0.221	0.258
SO_2 – 3-Hour	0.381	1.86
SO_2 – 24-Hour	0.170	0.826
SO_2 – Annual	0.0339	0.165
$PM_{2.5}$ – 24-Hour	1.47	4.37
$PM_{2.5}$ – Annual	0.293	0.348

The maximum modeled concentrations shown in Table 2.7-14 are the highest predicted concentrations at single points in the vicinity of the proposed project. The highest 24-hour $PM_{2.5}$ concentration is 4.37 μg/m^3 in Phase II. This represents approximately 6.7 percent of EPA's 24-hour $PM_{2.5}$ standard of 65 μg/m^3 and would, even when added to background concentrations, be well below the standard. The highest annual $PM_{2.5}$ concentration is 0.348 μg/m^3 in Phase II. This represents approximately 2.3 percent of EPA's annual $PM_{2.5}$ standard of 15 μg/m^3 and would have a negligible effect on ambient $PM_{2.5}$ concentrations.

These predicted local $PM_{2.5}$ increments are far too conservative to be good indicators of ambient levels that the public may be exposed to on a continuous basis for the purposes of assessing potential public health risk. The modeling of maximum predicted concentrations is typically used to determine compliance with the NAAQS and SILs in the permitting process. As such, the modeled concentration represents conservative upper bound levels that the local population might experience. Although EPA has not yet determined SILs for $PM_{2.5}$ to be used in any future modeling analyses, the concentrations resulting from the proposed project are well below the recognized PM_{10} SILs.

g. Current Levels of $PM_{2.5}$ in Ambient Air

NYSDEC began monitoring ambient levels of $PM_{2.5}$ at locations in Long Island in July 1999. Typically, the results of that monitoring become available for use approximately six months after the monitoring period. Currently, $PM_{2.5}$ data are available through the second quarter of 2002.

While the monitoring program has not been in effect for enough time to yield enough data to adequately establish the $PM_{2.5}$ background levels, there are initial monitoring data that may be used to characterize the possible background levels within the community around the proposed project. The nearest $PM_{2.5}$ monitor to the proposed project is the Babylon MAM monitor in Babylon, New York (approximately 19 miles from the project site). This monitor has been in operation since July, 1999. In addition, other $PM_{2.5}$ monitoring sites have been operation in NYSDEC Region 1 (Nassau and Suffolk Counties) for varying lengths of time. These data (through July, 2002) are available on NYSDEC's website.

The annual $PM_{2.5}$ standard requires the calculation of a 3-year, spatially-averaged concentration based on three annual mean concentrations, each of which is based on the average of four quarterly mean concentrations (i.e., 12 valid quarters of data are required). Some of the early quarters of data from the Babylon MAM monitor and from other monitors do not meet the 75 percent data completeness requirement. Therefore, the eight most recent available quarters of $PM_{2.5}$ monitoring data (from July, 2000 through June, 2002) from all stations in NYSDEC Region 1 have been analyzed to yield annual averages for two years, where the first year was taken as July 2000 through June 2001 and the second year as July 2001 through June 2002. The data for each quarter at each of the following monitoring stations satisfy the 75 percent data completeness requirement: Lawrence High School (Hempstead); Briarcliffe College (Bethpage); East Hills School (Roslyn); and Babylon MAM (Babylon). Based on these eight quarters of monitoring data, an annual spatially-averaged $PM_{2.5}$ concentration of 12.3 $\mu g/m^3$ was calculated. This is below the annual standard of 15 $\mu g/m^3$.

The 24-hour $PM_{2.5}$ standard requires the 98th percentile monitored concentration value in each of three years of monitoring data. The 98th percentile values in each of the three years are then averaged to determine a value that is compared to the ambient standard. Use of the most recent eight quarters (two years) of available data from the Babylon monitor and comparable calculation techniques yields a 24-hour $PM_{2.5}$ value of 32 $\mu g/m^3$. This is well below the 24-hour ambient standard of 65 $\mu g/m^3$.

Although the record length of suitable $PM_{2.5}$ monitoring on Long Island is not sufficient to meet requirements for establishing the eventual attainment status of the area with respect to $PM_{2.5}$, the available data show $PM_{2.5}$ levels below those of the associated ambient standards.

The potential impacts of $PM_{2.5}$ emissions from the proposed project were conservatively estimated. Little information is available regarding the particle size distribution from combustion turbine generators. Therefore, it was assumed that all of the particulate emissions from the proposed new sources would be $PM_{2.5}$. This is a conservative assumption, since not all of the particulate emissions from the proposed equipment would be $PM_{2.5}$.

The air quality modeling analysis was also conservative in the sense that it assumed that all the proposed new equipment could operate for the full year (8,760) hours at the operating load that would yield maximum ambient impacts.

The air quality modeling analysis has determined that the maximum 24-hour impact for the proposed project for $PM_{2.5}$ in Phase I would be 1.47 $\mu g/m^3$, while the annual PM_{10} impact would be 0.29 $\mu g/m^3$. In Phase II, the corresponding maximum impacts would be 4.37 $\mu g/m^3$ and 0.35 $\mu g/m^3$ for 24-hour and annual averaging times, respectively.

In order to relate the modeled concentrations to the standard, the 24-hour concentration of 1.47 $\mu g/m^3$ in Phase I and 4.37 $\mu g/m^3$ in Phase II may be added to the background value of 32 $\mu g/m^3$, with the totals compared to the standard. The resultant total 24-hour values of 33.5 $\mu g/m^3$ and 36.4 $\mu g/m^3$ for Phase I and II, respectively are both well below the 24-hour $PM_{2.5}$ ambient standard of 65 $\mu g/m^3$. Similarly, the annual concentration of 0.29 $\mu g/m^3$ in Phase I and 0.35 $\mu g/m^3$ in Phase II may be added to the background value of

12.3 $\mu g/m^3$.[19] The total of 12.6 $\mu g/m^3$ and 12.65 $\mu g/m^3$ for Phase I and II, respectively are both below the annual $PM_{2.5}$ standard.

h. Formation of Secondary $PM_{2.5}$

As mentioned earlier, some secondary particulate matter is formed when gaseous chemicals react and condense to form non-gaseous compounds within liquid aerosols or as solid particles. Within urban eastern U.S. environments, a large portion of $PM_{2.5}$ is comprised of secondary particles, and the largest portion of this secondary particulate matter is made up of ammonium sulfate ($(NH_4)_2SO_4$). Of the chemicals to be released from the turbine, nitrogen oxides (NO_x) are most likely to affect the formation of secondary particles. Formation of secondary particles from SO_2 from natural gas is insignificant.

The modeling of secondary particle formation and dispersion is extremely complex. Due to the small size of the inputs from the proposed project, and the minor contribution expected from the formation of secondary particulate to the background $PM_{2.5}$ levels found on Long Island, it is not currently reasonable to predict that small an increment with any precision. Therefore, a qualitative description of secondary $PM_{2.5}$ impacts from the proposed project is presented below.

Three factors must be kept in mind when addressing the incremental impact of secondary particle formation caused by emissions from individual sources. First, the processes by which gases are transformed into particles depend on many factors. The chemical oxidation rates of the gases SO_2 and NO_x depend on the presence and behavior of low-level, short-lived, and highly reactive species such as hydroxyl radicals (OH), ozone (O_3), and hydrogen peroxide (H_2O_2). Among the important chemical reactions, there are homogeneous gas-phase reactions, aqueous-phase reactions, and catalyzed heterogeneous reactions. The governing atmospheric chemistry varies over both time and space. The overall conversion rates for SO_2 and NO_x emitted from a specific source depends on the background concentrations of trace-level and catalytic species, sunlight, temperature, relative humidity, and many other factors.

Second, because the overall conversion rates are generally on the order of a few percent per hour or lower, the secondary PM are formed at significant distances from the source of the gases, and well after the emissions have been physically dispersed. This effect is responsible for the regional, non-localized, nature of secondary $PM_{2.5}$ levels.

Third, only a portion of the precursor species emitted to the atmosphere is ever converted to particles. Before they form particles, the relevant gases (e.g., SO_2 and NO_x), and the intermediate compounds (e.g., H_2SO_4 and HNO_3) may be removed from the atmosphere either directly (by dry deposition) or in precipitation (by wet deposition).

Reactions involving secondary sulfate formation include gas phase conversion of SO_2 to H_2SO_4 initiated by reaction with OH radicals and aqueous-phase reactions of SO_2 with H_2O_2, O_3 or O_2. In the eastern U.S., the peak conversion rate is about 5 percent per hour

[19] The $PM_{2.5}$ monitoring data represents a monitoring record of twenty-four months. To obtain a complete data set a monitoring period of three years is required.

under more polluted conditions, but typically varies between 1 and 3 percent per hour during summer daytime conditions.

According to the National Acid Precipitation Assessment Program State of Science and Technology Report (NAPAP, 1990), the principal nitrogen oxide in anthropogenic emissions is nitric oxide (NO), which is oxidized by ozone to nitrogen dioxide (NO_2). NO_2 may then follow two different oxidation paths to become nitric acid (HNO_3). During the daytime, the conversion is primarily due to oxidation by the hydroxyl radical, the concentration of which is a function of many parameters including solar ultraviolet radiation, relative humidity, and the background concentrations of nitrogen oxides, volatile organic compounds, and carbon monoxide. Estimates for the daytime conversion rate of NO_x to HNO_3 are about 8 percent per hour in the summer and about 0.8 percent per hour in the winter. At night, the conversion pathway includes the oxidation of NO_2 by O_3 which produces the nitrate radical NO_3 and the combined form nitrogen pentoxide (N_2O_5). The reaction with ozone is the rate-limiting step, with estimated nighttime conversion rates of the same order as the daytime summer rates.

Based on how secondary PM forms, the contribution of the proposed project to $PM_{2.5}$ levels in Long Island due to secondary particle formation would be significantly less than the small effect the proposed project would have on primary $PM_{2.5}$ levels. From Tables 2.7-1 and 2.7-2, it can be seen that maximum NO_x emission rates from the CT and duct burners are roughly comparable to the primary $PM_{2.5}$ emission rates. However, under typical atmospheric conditions, only a few percent of the emitted NO_x would be converted to HNO_3, and only a portion of this would be converted to particulate matter. Where dispersion has not diluted the emissions greatly, very little of the NO_x would be converted to particles because of the time required for the transformation. Far from the project where more of the NO_x would have been transformed, physical dispersion of the emissions would have diluted the impact to such an extent that it would be insignificant relative to background levels.

i. Potential Public Health Effects

The potential for $PM_{2.5}$ to affect public health is dependent on the amount of particulate material in the atmosphere (i.e., the higher the ambient $PM_{2.5}$ concentration, the more likely that it will have an impact), and the composition of the material. The evidence cited by EPA in establishing the NAAQS for $PM_{2.5}$ is derived from observational epidemiologic studies that found, at typical ambient levels, PM concentrations are statistically correlated with increased levels of morbidity and mortality.[20] It is also

[20] Some analysts doubt that PM concentrations and these health effects are causal. Compare *Air Quality Criteria for Particulate Matter, Second External Review Draft*, EPA 600/P-99/002aB (2001). Pope, III, C. A. (2000), "Epidemiology of fine particulate air pollution and human health: Biologic mechanisms and who's at risk?" *Environ Health Perspect*, 108(4), 713-23; and Samet, J. M., Dominici, F., Curriero, F., C., Coursac, I., & Zeger. S. L. (2000), "Fine particulate air pollution and mortality in 20 U.S. cities, 1987-1994," *N Engl J Med*, 343(24), 1742-1749; with Lipfert, F.W., Perry, Jr., H. M., Miller, J. P., Baty, J. D. Wyzga, R. E., & Carmody, S. E. (2000), The Washington University-EPRI Veteran's "Cohort Mortality Study: Preliminary Results," *Inhalation Toxicology*, 12(4), 41-73; and Gamble, J. F. (1998). " $PM_{2.5}$ and

unclear what forms of PM and what physiological mechanisms are responsible for the observed health effects. However, the extent of any adverse public health effect related to an increase in PM concentrations is expected to be proportional in some way to the concentration increase—a small increase in PM concentrations can, at most, lead to a small increase in PM related public health effects. As discussed above, based on modeled results, the proposed project would not have a significant effect on ambient levels of $PM_{2.5}$.

In establishing the NAAQS for $PM_{2.5}$ in 1997, EPA conservatively assumed that moderate levels of airborne PM of any chemical, physical, or biological form might harm health, and so additional regulation was required. In setting the NAAQS, EPA was required to account for uncertainties associated with inconclusive scientific and technical information and for potential hazards not yet identified. In setting the value of the annual average NAAQS for $PM_{2.5}$, EPA found that an annual average $PM_{2.5}$ concentration of 15 $\mu g/m^3$ is below the range of data most strongly associated with both short- and long-term exposure effects. The EPA Administrator concluded that an annual NAAQS of 15 $\mu g/m^3$ "will provide an adequate margin of safety against the effects observed in the(se) epidemiological studies."[21] The annual standard is supplemented by a 24-hour standard of 65 $\mu g/m^3$ to protect against short-term exposures in areas with strong local or seasonal sources.[22]

Although the NAAQS for $PM_{2.5}$ is based on the measurement of simple particle mass concentrations (i.e., total $\mu g/m^3$), the EPA recognized the need for further research into the relationships between PM composition and PM related health effects. Indeed, a major requirement of 40 CFR Part 58, (Ambient Air Quality Surveillance for Particulate Matter, Final Rule), is the chemical speciation of $PM_{2.5}$ at fifty monitoring sites across the country. A great deal of current PM research, including studies conducted under the U.S EPA's Office of Research and Development,[23] is focused on attempting to better understand the biological, chemical, and physical characteristics of PM underlying its potentially toxic effects. A basic finding among these studies is that different forms of $PM_{2.5}$ differ substantially in their toxicologic significance.

As noted above, unlike the other ambient air pollutants regulated at the national level—carbon monoxide, nitrogen dioxide, ozone, lead, and sulfur dioxide—PM (PM_{10} or $PM_{2.5}$) is hardly a single molecule or small set of molecules, but is instead a sundry collection of complex aerosols and microscopic solids with widely varying physical, chemical, and biological properties. The vast differences among various chemical and biological forms of $PM_{2.5}$ mean that these forms also differ significantly in their toxicologic effects.

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mortality in long-term prospective cohort studies: Cause-effect or statistical associations?" *Environ. Health Perspect.*, 106, 535-549.

[21] 62 Federal Register 28652, 38676 (July 18, 1997).

[22] Although some advocates for a new $PM_{2.5}$ standard identified $PM_{2.5}$ as a "non-threshold" pollutant, and the Appellate Division in its NYPA vs. UPROSE decision agreed with this position, the EPA Administrator rejected this view when promulgating the $PM_{2.5}$ NAAQS, finding that up to 15 $\mu g/m^3$ of $PM_{2.5}$ could be present in ambient air without causing adverse health effects.

[23] EPA Office of Research and Development, Research and Development, Fiscal Years 1997-1998 Research Accomplishments, EPA 60-R-99-106.

Considerable research will be required in order to identify, quantify, and rank the myriad components of $PM_{2.5}$ in terms of their potential importance for public health. The National $PM_{2.5}$ Speciation Program,[24] established under 40 CFR Part 58 as mentioned above, will serve as only a modest, first-cut analysis, as it will provide no information on the biologic content of ambient air PM, and only limited information on some metallic, ionic, and organic constituents of ambient PM. Although chemical and toxicologic knowledge of ambient $PM_{2.5}$ is limited, current evidence, as outlined below, suggests that $PM_{2.5}$ that is rich in either biologically-active material or in various metals is significantly more harmful than $PM_{2.5}$ that has little to no biologic or metallic content.

j. Biologically Active $PM_{2.5}$ May Be Harmful

Particulate matter rich in pollen and other aero-allergens is well known to exacerbate respiratory problems, especially among people with allergic asthma and sufferers of hay fever (also called seasonal allergic rhinitis).[25] Other common forms of PM, present year-round, may aggravate respiratory problems because of their biologic content. Fine particulate matter from "ordinary" resuspended dust, for example, is a complex mixture of biologically and immunologically active materials, such as macromolecules, derived from molds, grasses, trees, cat and dog dander-epithelium, and latex rubber (Miguel et al., 1999).

k. $PM_{2.5}$ Rich in Metals May Be Harmful

Inhalation of metals of various types may harm the upper respiratory tract, lungs, and other organs.[26] Although such problems have long plagued various occupational settings, environmental scientists at EPA and elsewhere are now focusing on whether the heavy metal content of some forms of respirable PM may be responsible for correlations between ambient air PM and morbidity and mortality in studied populations. For example, EPA scientists have demonstrated that extracts of metal-rich PM cause lung inflammation in human volunteers.[27] In particular, they evaluated ambient PM collected in the late 1980's from the Utah Valley, where PM was rich in copper, zinc, lead, and nickel because of the dominance of a major steel mill in that valley. Compared with extracts of "ordinary" ambient PM (obtained when the mill was closed), the metal-rich extracts induced several signs of inflammatory injury. The investigators conclude that "metal content, and consequent oxidative stress that paralleled metal concentrations" caused the injury they observed, so that "mass may not be the most appropriate metric to use in assessing health effects after PM exposure, but rather specific components must be identified and assessed." Similar studies have been carried out in laboratory rats, with similar results reported.[28]

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[24] id.

[25] American Lung Association, 2001, http://www.lungusa.org/air/envhayfever.html.

[26] Kelleher, P.T., Pacheco, K., and Newman, L.S. (2000), Inorganic Dust Pneumonia: The Metal-Related Parenchymal Disorders, Environ. Health Perspect. 108, Supplement 4, 685-696.

[27] Ghio, A. J. and Devlin, R.B. (2001), Inflammatory Lung Injury after Bronchial Instillation of Air Pollution Particles, Am J Respir Crit Care Med 164: 704-708.

[28] Dye, J. A., Lehmann, J. R., McGee, J. K., Winsett, D. W., Ledbetter, A. D., Everitt, J. I., Ghio, A. J., &

l. $PM_{2.5}$ from Natural Gas-Fired Generators

Natural gas is well known to be the cleanest-burning fossil fuel. Airborne emissions from combustion of natural gas consist primarily of water vapor and carbon dioxide. Also emitted are low levels of nitric oxide (NO) and carbon monoxide (CO), small amounts of NO_2 and N_2O, and trace amounts of volatile organic compounds (VOC), methane, sulfur dioxide (SO_2), and particulate matter (AP42, External Combustion Sources, Section 1.4, July, 1998).

Particulate matter emitted from gas-fired generators consists primarily of organic products of incomplete combustion, and is very low in metal content (AP42, Section 3.1, April ,2000). Further, this PM contains no biological material. Small amounts of nitrates and sulfates may be present in this PM (given the gas-phase presence of nitrogen oxides and sulfur dioxide), and NO_x emissions may lead to further (but much more diffuse) formation of secondary PM, but these constituents, when present at less than 1 $\mu g/m^3$ levels in air—even at the maximally affected locations, do not appear to harm health.[29]

Many toxicologic studies have shown that concentrations of hundreds of micrograms of sulfate or nitrate per cubic meter of air are required before even minimal changes in respiratory or other function can be observed, even in asthmatic subjects or in sensitive laboratory rodents.[30]

Despite more than 1,000 studies of the potential toxicity of particulate matter of various types and from various sources (National Library of Medicine, 2001), there appears to be no published studies of the toxicity of PM specifically derived from gas-fired power plants. Possible reasons for this absence of study are the very small amounts of PM emitted to the atmosphere by such plants, and the expected low or non-toxicity of the constituents of this form of PM.

m. Conclusion

As shown above, the operation of the proposed CT and duct burners would yield impacts much less than the NAAQS levels established by EPA to protect public health and would have no more than a negligible effect on ambient air concentrations of $PM_{2.5}$. Impacts to public health from project-related $PM_{2.5}$ would be correspondingly negligible. Based on the composition of the proposed project-related $PM_{2.5}$ emissions, there is no significant public health effect associated with operation of this proposed project.

Costa, D.L. (2001), Acute pulmonary toxicity of particulate matter filter extracts in rats: Coherence with epidemiologic studies in Utah Valley Residents. EHP Supplement, 109(3), 395 - 404.

[29] Concentrations of at least 100 micrograms of sulfate or nitrate per cubic meter of air are required before even minimal changes in respiratory function can be observed, even in asthmatic subjects or in sensitive laboratory rodents. See EPA 2001 (PM Criteria Document Draft) for extended discussion and references.

[30] See EPA 2001 (PM Criteria Document Draft) for extended discussion and references.

2.7.9. Climate Change

a. Summary of the Kyoto Protocol

For more than a century scientists have known about the possibility that man-made carbon dioxide (CO_2) emissions may cause an increase in the average temperature of the atmosphere. However, widespread public concern about climate change did not exist until the late 1980s when high temperatures, predictions from general atmospheric circulation computer models, and concern about the greenhouse effect jointly attracted public attention. Recognizing the needs of policy-makers for up-to-date scientific information, the United Nations Environment Programme and the World Meteorological Organization jointly established the Intergovernmental Panel on Climate Change (IPCC) in 1988. The IPCC issued its first climate report in 1990, which called for a global treaty to address the issue. In 1989 the UN approved a resolution calling for an environmental summit, which was held in Rio de Janeiro in June 1992. At that meeting, the attending nations agreed to participate in the Framework Convention on Climate Change, an ongoing series of meetings the purpose of which was to develop agreements that reduce greenhouse gas emissions. After years of intense negotiations, the treaty known as the Kyoto Protocol was adopted in Kyoto, Japan in December 1997. The Kyoto Protocol outlined basic mechanisms to address the climate change concern, but did not provide a clear picture of the treaty's detailed requirements, or "rulebook". Further negotiations were conducted in Buenos Aries in November 1998, the Hague in November 2000, Bonn, Germany in July 2001, and finally in Marrakesh, Morocco in November 2001. The Marrakesh Accords, which contain a detailed rulebook for the Kyoto Protocol, consist of the five main elements discussed below.

Commitments

The Protocol establishes a set of legally-binding emissions targets for Annex I Parties (relatively wealthy industrialized nations, as well as the Russian Federation, the Baltic States and several Central and Eastern European States), for the six main greenhouse gases: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride (SF6). These targets represent a total cut among all Annex I Parties of at least 5 percent from 1990 (some countries have a baseline other than 1990) levels by 2008-2012.

Implementation

To meet the emissions targets, Annex I Parties that have ratified the Protocol must establish domestic policies to cut their greenhouse gas emissions. Increasing the removal of greenhouse gases by carbon sinks may offset emissions. In addition to domestic actions, Parties may also use three mechanisms – joint implementation (implementing projects in the territories of other Annex I Parties), the clean development mechanism (implementing projects in the territories of non-Annex I Parties) and emissions trading (trading emission reduction amounts from other Annex I Parties)– to gain credit for emissions reduced (or greenhouse gases removed) at lower cost abroad than at home.

Minimizing Impacts on Developing Countries

Provisions are included in the Protocol to address the specific needs and concerns of developing countries, especially those most vulnerable to the adverse effects of climate change and to the economic impact of response measures.

Accounting, Reporting and Review

The Protocol has established several safeguards including an accounting system, requirements for regular reporting by Parties, and in-depth review of reports by expert review teams.

Compliance

The Protocol has established a Compliance Committee, to assess and deal with any cases of non-compliance by participating nations.

b. United States Global Climate Change Policy

Although the U.S. has decided against participating in the Kyoto Protocol, it has established a climate change policy whereby the aims of the Protocol—the overall reduction of greenhouse gas emissions – are maintained.

In February 2002, the U.S. Department of Energy (U.S. DOE) began steps to recommend reforms to its existing voluntary greenhouse gas registry, to: (1) ensure that businesses that register voluntary reductions are not penalized under a future climate policy, and (2) give credit to companies that can show real emissions reductions.

c. New York State Climate Change Policy

The 2002 *State Energy Plan and Final Environmental Impact Statement* (Energy Plan) encompasses policies that address fairly priced, clean, and efficient energy resources. The Energy Plan directs the State to take advantage of technological developments among the most advanced uses of energy, and to participate in emerging markets for valuing and trading environmental attributes associated with energy use. Section 1.3 of the Energy Plan presents the policy recommendations for climate change related issues. Part 4.D, Promoting and Achieving a Cleaner and Healthier Environmental states that "the State should lead the nation in taking actions to reduce greenhouse gas emissions, stressing the aggressive implementation of existing, and development of new technologies and strategies that would significantly reduce emissions."

In the summer of 2001, the State announced the formation of the Greenhouse Gas Task Force, comprised of representatives from the business community, environmental organizations, State agencies, and universities, to develop policy recommendations that would be considered for incorporation into the Energy Plan. The following recommendations were adopted in the Plan.[31]

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[31] New York State Energy Research and Development Authority, 2002 State Energy Plan and Final Environmental Impact Statement, June 2002.

1. Commit to a statewide goal of reducing greenhouse gas (GHG) emissions 5 percent below 1990 levels by 2010, and 10 percent below 1990 levels by 2020.
2. Develop a GHG emission registry program for registering baseline GHG emissions and emission reductions from actions implemented at facilities.
3. Emphasize the greenhouse gas emission reduction potential, most notably of carbon dioxide (CO_2), as a criterion in developing new program initiatives in the State's public benefits programs.
4. Expand the State's efforts to improve the efficiency of electricity generation and encourage use of indigenous and renewable energy resources, including solar, wind, waste methane, geothermal, sustainable biomass, combined heat and power, clean and efficient distributed generation.
5. Adopt a specific plan to develop an indigenous bio-fuels industry in New York to produce, refine, and market transportation and other fuels from indigenous biomass resources.
6. Develop a program that allows businesses to enter into voluntary agreements to meet certain energy efficiency targets and reduce greenhouse gas emissions. To assist businesses in meeting such voluntary agreements, the State should offer technical assistance, public recognition, expedited regulatory permit review, and financial incentives, as appropriate or necessary.
7. Redirect transportation funding toward energy-efficient transportation alternatives, including public transportation, walking, and bicycling, and provide incentives to encourage greater use of related alternatives that improve transportation efficiency.
8. Include in the State transportation planning and State Environmental Quality Review Act (SEQR) related processes, consideration of CO_2 production and mitigation strategies, as appropriate.
9. Target open space funding to prevent suburban sprawl, promote Quality Communities, reduce vehicle miles traveled, and support, adopt, and enhance transportation measures that reduce energy use and pollutant emissions.
10. Support, adopt, and enhance transportation measures that reduce energy use and pollutant emissions, such as Commuter Choice, Ozone Action Days, diesel vehicle retrofits, improved traffic signal coordination with light emitting diode (LED) replacement technology, transportation system management, and other similar actions.
11. Encourage low-cost, passive building efficiency measures, such as white roofs, passive solar design, and improved foundation membranes, and incorporate such measures in the State's building construction codes. In addition, the State should support local building and development projects that include funding for open space conservation and urban forestry and that reduce the need for air-conditioning in urban "heat islands."

12. Expand research, development, and demonstration (RD&D) of energy and GHG-efficient vehicle technologies, add GHG goals to vehicle tax credits and incentives, and coordinate with other states to encourage improvements in vehicle fuel economy.
13. Working with regional and local planning organizations, analyze and quantify the energy use and air pollution emissions expected to result from transportation plans and programs.
14. Support the design and construction of energy-efficient and environmentally friendly "green buildings" through financial incentives, technical assistance, and related program initiatives.

The State will continue to evaluate the economic and environmental benefits of all the policy recommendations of the Greenhouse Gas Task Force.

d. Potential Project Emissions of Greenhouse Gases (GHG)

Greenhouse or climate change gases contribute to climate change by increasing the ability of the atmosphere to trap heat. The principal GHGs are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Because these gases differ in their ability to trap heat, one ton of CO_2 in the atmosphere has a different effect on warming than one ton of CH_4. To express emissions of the different gases in a comparable way, atmospheric chemists often use a weighing factor called the Global Warming Potential (GWP). The concept of a GWP was developed to compare the ability of each greenhouse gas to trap heat in the atmosphere relative to another gas. To be consistent with international practices and IPCC guidelines, carbon dioxide (CO_2) was chosen as the reference gas, and therefore the GWP is taken as the equivalent heat-trapping ability of one teragram (Tg, or 1 billion kilograms) of CO_2, expressed as Tg CO_2 Eq.

The proposed project would fire natural gas exclusively. The greatest proportion of the potential GHG emissions from the proposed project would be as CO_2 from the combustion process. Trace amounts of CH_4 and N_2O would also be emitted, however, emissions of these compounds are considered negligible when compared to the total CO_2 emissions, even taking into consideration their GWP, and are therefore not considered significant to the climate change issues.

During natural gas firing, CO_2 would be emitted at a rate of approximately 110 pounds of CO_2/MMBtu (AP42, Stationary Gas Turbines, Section 3.1, April, 2000). The proposed project would fire natural gas at a maximum rate of approximately 3,190 million cubic feet per year (equivalent to about 3,190,000 MMBtu/year) in Phase I and at a maximum rate of approximately 6,380 million cubic feet per year (equivalent to about 6,380,000 MMBtu/hear) in Phase II. Therefore, potential CO_2 emissions from the proposed project were calculated as approximately 351 million pounds per year, or 0.159 Tg CO_2 Eq. per year in Phase I. In Phase II, the potential CO_2 emissions from the proposed project would be approximately 702 million pounds per year, or 0.318 Tg CO_2 Eq. per year.

e. Comparison to State, National, and Global Emissions

As shown above, the proposed project could potentially emit approximately 0.159 Tg CO_2 Eq. per year in Phase I and approximately 0.318 Tg CO_2 Eq. Per year in Phase II.

The annual emission of CO_2 for the state of New York for the years 1990 through 1999 is shown in Table 2.7-15. As shown, the average annual emissions of CO_2 over the most recent five years of available data has been around 195 Tg CO_2 Eq. Therefore, based on this highly conservative analysis, the annual emissions from the proposed project in Phase I would be approximately 0.08 percent of the total New York CO_2 inventory. For Phase II, the annual emissions from the proposed project would be approximately 0.16 percent of the total New York CO_2 inventory.

Table 2.7-15: New York State – CO_2 Emissions Inventory by Sector (Tg CO_2 Eq.)

Sector	1995	1996	1997	1998	1999
New York Total	189.42	195.95	198.95	198.33	191.80
Commercial	26.55	27.65	29.59	27.68	30.62
Industrial	26.84	30.10	28.60	26.77	29.04
Residential	33.84	36.81	35.09	31.75	34.32
Transportation	62.88	65.96	6.96	66.51	67.69
Utility	39.31	35.42	39.71	45.58	30.18

Source: http://yosemite.epa.gov/oar/globalwarming.nsf/content/EmissionsStateEnergyCO2Inventories.html

The annual emission of CO_2 for the United States is presented in Table 2.7-16. As shown in this table, the annual emissions have gradually increased each year to an annual value of 5,840 Tg CO_2 Eq. On a national scale, the proposed project would contribute only approximately 0.0027 percent to the total national emissions inventory of CO_2 in Phase I and approximately 0.0054 percent in Phase II.

Table 2.7-16: United States—CO_2 Emissions Inventory for Electicity Generation (Tg CO_2 Eq.)

Sector	1995	1996	1997	198	1999	2000
U.S. Total	54305.9	5,483.7	5,568.0	5,575.1	5,665.5	5,840.0
Electricity Generation	1,989.3	2,061.2	2,137.9	2,226.4	2,246.2	2,352.5

Note: Electricity Generation includes fuel consumption by both regulated utilities and non-utilities (e.g., independent power producers, qualifying co-generators, and other small power producers).

Source: EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2000, April, 2002.

Global emissions of CO_2 in 1999 were estimated to be on the order of 22,367 Tg CO_2 Eq. (U.S. DOE, EIA, International Energy Annual 1999, February, 2001). At this scale, the proposed emissions of CO_2 from the proposed project would be approximately 0.00071 percent (full load basis) of the total annual global emission rate in Phase I and approximately 0.0014 percent in Phase II.

f. Importance of Emissions

It is difficult to quantify the importance of the emissions of the proposed project as it relates to increasing the emissions of GHG for the benefit of the common good (i.e., providing electricity). However, the emissions of this proposed project can be related to existing electrical power generating sources of GHG. In general, because of the market based economy for providing electrical power in New York State, energy generated by the proposed project would in all likelihood displace some electricity that would have been otherwise generated by less efficient facilities. The operation of these sources would result in more emissions of GHG on a per magawatt basis than the proposed project. The nature of the market driven sale of electrical energy favors higher efficiency electrical generating sources such as simple cycle and combined cycle combustion turbines.

g. Conclusion

As shown above, the operation of the proposed project would result in a negligible contribution to the state, national and global inventories of CO_2 emissions, and therefore the impacts to general public health from proposed project-related operations would correspondingly be negligible.

2.7.10. Cumulative Air Impact Assessment

a. Introduction

This section addresses potential cumulative impacts due to the six new combustion turbine projects that were constructed for LIPA for the summer of 2002 (i.e., facilities at Shoreham, Edgewood, Glenwood, Port Jefferson, Bethpage, and Bayswater) and five new combustion turbine projects that LIPA has proposed for the summer of 2003 (i.e., facilities to be located in Jamaica Bay, Freeport, Greenport, North Bellport, and in the facility analyzed in this environmental assessment, Stony Brook).

In addition, this section presents the results of an analysis that was prepared to examine the cumulative air impacts of the proposed project, the existing NCP Facility, other nearby emission sources at SUNY Stony Brook and beyond.

b. Cumulative Impact Assessment of LIPA 2002/2003 Facilities

Tables 2.7-17 and 2.7-18 present stack parameters and emissions, respectively, for the aforementioned projects. Note that different parameters and/or emissions for some sources reflect the worst case operating loads for those pollutants.

The eleven LIPA 2002/2003 projects are widely spaced throughout Nassau, Suffolk, and Queens Counties. This distribution of projects spreads the relatively low air emissions from each facility through a wide geographical area, such that no single community is generally affected by more than one project. The distribution of the projects is illustrated in Figure 2.7-1. The study area selected for air quality modeling of the eleven LIPA 2002/2003 projects includes 100-meter spaced polar receptors within 3-kilometers of each project, as well as a Cartesian grid with 2-kilometer spaced receptors which covers most of Long Island. All of the projects have individually demonstrated insignificant air quality impacts (i.e. maximum concentrations are below the Significant Impact Levels (SILs) through air quality dispersion modeling of potential facility emissions. The maximum concentrations for each facility would occur very close to the combustion turbine(s) for each project. The concentrations continue to decrease with distance from the sources, such that at the distance to the next adjacent source, the concentrations will be a scant fraction of the SIL and nearly immeasurable.

Table 2.7-17: Stack Parameters

Source	UTM Easting (m)	UTM Northing (m)	Elevation (m)	Stack Height (ft)	Exhaust Temperature (K)	Stack Velocity (m/s)	Stack Diameter (ft)
Shoreham	679,506	4,535,983	20	110	585	18.8	12
Edgewood	644,031	4,516,504	30	105	641/679[b]	25.9/17.6[b]	12
Glenwood	614,044/ 614,048[i]	4,520,752/ 4,520,727[i]	4	125	645.37/649.26[c]	38.0/37.9[c]	10
Port Jefferson	661,717	4,534,791	5	265	645.37/649.26[c]	38.0/37.9[c]	14.14[a]
Bethpage	626,708	4,511,463	37	100	654.67	18.06/15.26/21.66/13.0[g]	13.5
Bayswater	604,720	4,496,120	2	110	678/733[d]	23.76/21.36/21.65[e]	15
Jamaica Bay	604,690	4,495,964	2	110	679/721/756[f]	23.8/24.24/20.65[f]	15
Freeport	621,039	4,500,010	4	180	641/647/719[f]	33.8/34.0/33.4[f]	10.5
North Bellport	673,566	4,520,307	32	100	803.2/807.6/ 845.9/866.5[h]	24.0/23.3/19.5/18.4[h]	19
Stony Brook – Phase I	657,557	4,530,955	34	125	645/714/689[j]	32.7/33.4/22.7[j]	10.74[a]
Stony Brook – Phase II[l]	657,557	4,530,955	34	125	355	18.4/17.0/15.8[k]	10.74[a]
	657,615	4,530,951	34	47	305	12.0	26
	657,625	4,530,946	34	47	305	12.0	26
Greenport	720,299	4,553,571	10	65	657.04	44.73	10[a]

[a]Effective stack diameter.
[b]First value is used for CO, SO_2, and NO_2 modeling. Second value is used for PM-10 modeling.
[c]First value is used for CO modeling. Second value is used for SO_2, PM-10, and NO_2 modeling.
[d]First value is used for CO and SO_2 modeling. Second value is used for PM-10 and NO_2 modeling.
[e]First value is used for CO and SO_2 modeling. Second value is used for PM-10 modeling. Third value is used for NO_2 modeling.
[f]First value is used for CO modeling. Second value is used for SO_2 and NO_2 modeling. Third value is used for PM-10 modeling.
[g]First value is used for 1-hour CO and 3-hour SO_2 modeling. Second value is used for 8-hour CO and 24-hour SO_2 modeling.
Third value is used for annual SO_2 and annual NO_2 modeling. Fourth value is used for PM-10 modeling.
[h]First value is used for 1-hour CO modeling. Second value is used for 8-hour CO, 24-hour and annual SO_2, and annual NO_2 modeling.
Third value is used for 3-hour SO_2 modeling. Fourth value is used for PM-10 modeling.
[i]First value is for Unit 1; second value is for Unit 2.
[j]First value is used for CO modeling. Second value is used for SO_2 and NO_2 modeling. Third value is used for PM-10 modeling.
[k]First value is used for CO modeling. Second value is used for SO_2 modeling. Third value is used for PM-10 and NO_2 modeling.
[l]For Stony Brook – Phase II, the first source listed is the combustion turbine and the second and third sources are the two cells of the cooling tower.

Table 2.7-18 Emissions

Source ID	NO_x (g/s)	SO_2 (g/s)	PM-10 (g/s)	CO (g/s)
Shoreham[a]	1.18	1.73	1.58	1.58
Edgewood[a]	0.517	0.124	0.479	2.709
Glenwood[a]	1.91	2.38	2.17	26.77
Port Jefferson[a]	1.91	1.79	2.05	26.77
Bethpage[a]	0.49	0.09/0.06/0.12[d]	0.38/0.36[e]	0.46/0.33[f]
Bayswater[a]	0.61	0.23	0.83	2.16
Jamaica Bay[a]	0.68	3.694/1.40[b]	5.509/2.09[c]	2.186
Freeport[a]	1.92	2.82	5.10	2.709
North Bellport[a]	3.78	0.66/0.82[g]	1.26	9.95/9.70[h]
Stony Brook – Phase I[a]	0.538	0.083	0.427	0.97
Stony Brook – Phase II[a]	0.826	0.135	1.110	1.348
	-	-	0.00504	-
	-	-	0.00504	-
Greenport[i]	1.764	3.528	5.922	0.945

[a]Per turbine.
[b]First value is used for 3-hour and 24-hour SO_2 modeling. Second value is used for annual SO_2 modeling.
[c]First value is used for 24-hour PM-10 modeling. Second value is used for annual PM-10 modeling.
[d]First value is used for 3-hour SO_2 modeling. Second value is used for 24-hour SO_2 modeling. Third value is used for annual SO_2 modeling, and is scaled by 8,400 hours/8,760 hours.
[e]First value is used for 24-hour PM-10 modeling. Second value is used for annualPM-10 modeling, and is scaled by 8,400 hours/8,760 hours.
[f]First value is used for 1-hour CO modeling. Second value is used for 8-hour CO modeling.
[g]First value is used for 3-hour SO_2 modeling. Second value is used for 24-hour and annual SO_2modeling.
[h]First value is used for 1-hour CO modeling. Second value is used for 8-hour CO modeling.
[i]Two turbines.
[j]For Stony Brook – Phase II, the first source listed is the combustion turbine and the second and third sources are the two cells of the cooling tower.

A cumulative impact assessment of these sources was performed using the same modeling procedures that were used for assessing impacts of the proposed project alone, except that refined modeling was used for all pollutants and averaging periods. Maximum total concentrations were determined by adding together the modeling results and representative "worst case" background values. These values were compared to the NAAQS and NYAQS. The modeling results and comparison to the standards are presented in Tables 2.7-19 and 2.7-20 for Phase I and Phase II of the project, respectively. As shown in the tables, the combined air quality results indicate that the total concentrations (i.e., the cumulative effect of the eleven LIPA 2002/2003 projects and worst-case background levels) would not exceed the ambient air quality standards.

Table 2.7-19: Cumulative Air Quality Impacts of LIPA 2002/2003 Facilities[a,b]

Pollutant	Averaging Period	Maximum Modeled Concentration (ug/m^3)	Maximum Concentration Location UTM Easting (m)	Maximum Concentration Location UTM Northing (m)	Background Concentration (ug/m^3)	Total Concentration (ug/m^3)	NAAQS (ug/m^3)
CO	1-Hour	86.0	614,328	4,521,576	7,099	7,185.0	40,000
	8-Hour	21.2	620,100	4,517,500	5,153	5,174.2	10,000
SO_2	3-Hour	3.4	614,470	4,521,266	149.3	152.7	1,300
	24-Hour	1.1	614,944	4,518,193	73.4	74.5	365
	Annual	0.1	618,100	4,517,500	18.3	18.4	80
PM_{10}	24-Hour	1.0	614,944	4,518,193	41	42.0	150
	Annual	0.1	618,100	4,517,500	17	17.1	50
NO_2	Annual	0.10	618,100	4,517,500	47	47.10	100

[a]Maximum impacts from individual facilities may exceed the values shown in the table, since this cumulative analysis was performed primarily to determine cumulative interaction of the facilities.
[b]Includes Stony Brook Phase I.

Table 2.7-20: Cumulative Air Quality Impacts of LIPA 2002/2003 Facilities[a,b]

Pollutant	Averaging Period	Maximum Modeled Concentration (ug/m^3)	Maximum Concentration Location UTM Easting (m)	Maximum Concentration Location UTM Northing (m)	Background Concentration (ug/m^3)	Total Concentration (ug/m^3)	NAAQS (ug/m^3)
CO	1-Hour	86.0	614,328	4,521,576	7,099	7,185.0	40,000
	8-Hour	21.2	620,100	4,517,500	5,153	5,174.2	10,000
SO_2	3-Hour	3.4	614,470	4,521,266	149.3	152.7	1,300
	24-Hour	1.1	614,944	4,518,193	73.4	74.5	365
	Annual	0.1	618,100	4,517,500	18.3	18.4	80
PM_{10}	24-Hour	1.7	659,166	4,529,606	41	42.7	150
	Annual	0.2	659,166	4,529,606	17	17.2	50
NO_2	Annual	0.15	659,166	4,529,606	47	47.15	100

[a]Maximum impacts from individual facilities may exceed the values shown in the table, since this cumulative analysis was performed primarily to determine cumulative interaction of the facilities.
[b]Includes Stony Brook Phase II

Note also that the maximum combined air quality impacts are below the SILs. Therefore, the cumulative effect of all the LIPA 2002/2003 projects would not cause adverse air quality impacts.

A second demonstration supporting little or no cumulative interaction of the projects may be made by an examination of the prevailing wind directions. In order to have cumulative concentrations, the emitted plumes would need to align in the same direction. Figure 2.7-2 presents a windrose (wind direction and speed distribution) based on meteorological data obtained from Long Island MacArthur Airport in Islip. This data was used for assessing the air quality impact of several of the projects, and is recognized by NYSDEC to be representative of the meteorology of central Long Island. By comparing the distribution of winds one can discern that the prevailing directions are from the southwest and northwest directions. Southwesterly winds are more typical of summertime conditions, when the peaking units would likely be operating simultaneously. The Bethpage facility's plume may overlap slightly with Edgewood, the Bayswater/Jamaica Bay facility's plume may overlap with Freeport, and Stony Brook's plume may overlap slightly with Port Jefferson. As stated previously, any potential combination of the plumes at a distance would result in maximum concentrations well below the SILs. Therefore, there would be no adverse cumulative impact from simultaneous operation of all eleven projects.

c. Cumulative Air Impact Assessment of Project and Nearby Emission Sources

Cumulative air quality impact analyses were performed using the ISCST3 dispersion model to obtain total concentration predictions for the combined emissions of the proposed project and several existing nearby sources: the NCP cogeneration plant, the East and West boiler plants at SUNY Stony Brook, and Keyspan's Port Jefferson generating station, which is located approximately 6 km to the east. The modeling was performed using the same modeling procedures and data described earlier to determine the maximum predicted impacts from the project, except that emissions from the nearby sources were also included and refined modeling was used for all pollutants and averaging periods. Phase II of the proposed project was modeled in the cumulative analysis, since prior modeling had demonstrated that the maximum impacts of the project alone were predicted to occur during Phase II.

Tables 2.7-21 and 2.7-22 show the stack parameter and emissions data for the nearby sources that was included in the cumulative air quality impact modeling analyses. The cumulative impact modeling analysis was performed based on the conservative assumption that all the aforementioned nearby sources operate simultaneously at their maximum rated capacities. This assumption is extremely conservative with regard to the two SUNY Stony Brook boiler plants, which operate only when the NCP cogeneration plant is out of service. Over the past seven years, the two SUNY Stony Brook boiler plants have operated an average of 2.5 percent of the time each year, ranging from a maximum annual operation of 4 percent (1996) to a minimum of 1.4 percent (2002). Nonetheless, all the aforementioned sources were modeled using their maximum allowable emission rates for each pollutant and averaging period.

Table 2.7-23 provides a summary of the cumulative impacts analysis. The table lists the maximum predicted impacts of the proposed project, the maximum predicted combined impacts of the proposed project and other nearby sources, the maximum measured concentrations at representative background monitoring sites, and the maximum predicted total concentrations, including the measured background concentrations, for comparison to the NAAQS. The modeling results in Table 2.7-23 demonstrate that the total predicted concentrations attributable to the combined emissions of the proposed project and aforementioned nearby sources, including measured background concentrations, are well below the NAAQS.

Table 2.7-21: Stack Parameter Data for Nearby Sources for Cumulative Modeling Analyses

Facility	Stack Height (m)	Stack Diameter (m)	Exit Temperature (°F)	Exit Temperature (K)	Exit Velocity (m/s)	UTM (E) (m)	UTM (N) (m)	Base Elevation (m)	Building Width (m)	Building Height (m)
NCP Cogen	66.4	2.74	336	442	28.0	657,524	4,530,986	32.6	76.5 *	23.47
SUNY West Plant	25.3	1.40	401	478	21.56	657,468	4,530,934	32.0	75.38 *	23.47
SUNY East Plant 1	27.4	1.20	401	478	12.2	658,846	4,530,027	64.0	50.0*	11.6
SUNY East Plant 2	27.4	1.20	401	478	12.2	658,846	4,530,027	64.0	50.0*	11.6
SUNY East Plant 3	25.9	1.20	401	478	12.2	658,846	4,530,027	64.0	50.0*	11.6
SUNY East Plant 4	27.3	1.20	401	478	12.2	658,846	4,530,027	64.0	50.0*	11.6
Port Jefferson U1	83.8	4.53	869	738	32.4	661,733	4,534,924	4.57	-	-
Port Jefferson U2	129.5	3.12	309	427	37.2	661,733	4,534,924	4.57	-	-
Port Jefferson U3	129.5	3.12	309	427	37.2	661,733	4,534,924	4.57	-	-
Port Jefferson U4	11.6	3.56	980	800	14.0	661,733	4,534,924	4.57	-	-

* Maximum projected width.

Table 2.7-22: Emissions Data for Nearby Sources for Cumulative Modeling Analyses

Facility	CO-oil (lb/hr)	CO-gas (lb/hr)	NO_x-oil (lb/hr)	NO_x-gas (lb/hr)	SO_2-oil (lb/hr)	SO_2-gas (lb/hr)	PM_{10}-oil (lb/hr)	PM_{10}-gas (lb/hr)
NCP Cogen*	98.0	67.4	126.2	63.3	130.3	1.50	18.05	5.06
SUNY West Plant	7.67	-	69.0	-	46.0	-	16.4	-
SUNY East Plant 1	3.46	-	28.6	-	19.0	-	2.95	-
SUNY East Plant 2	3.46	-	28.6	-	19.0	-	2.95	-
SUNY East Plant 3	3.46	-	28.6	-	19.0	-	2.95	-
SUNY East Plant 4	3.46	-	28.6	-	19.0	-	2.95	-
Port Jefferson U1	33.5	-	29.2	-	26.4	-	30.2	-
Port Jefferson U2	60.95	-	2,584	-	1,856	-	169	-
Port Jefferson U3	60.95	-	2,584	-	1,856	-	169	-
Port Jefferson U4	170	-	279.3	-	48.6	-	4.9	-

* Based on 2001 Title V operating permit

Data provided for the East and West Boiler Plants based on full load, CO and PM_{10} emission rates are based on AP-42.

Table 2.7-23: Cumulative Air Quality Impacts of Proposed Project and Nearby Sources

Pollutant	Averaging Period	Maximum Proposed Project Concentration (μg/m³)	Maximum Modeled Concentration (μg/m³)	Location of Cumulative Impact		Background Concentration (μg/m³)	Total Concentration (μg/m³)	NAAQS (μg/m³)
				UTM (E) (m)	UTM (N) (m)			
CO	1-Hour	12.4	131	657,647	4,530,945	7,099	7,230	40,000
	8-Hour	5.65	42.4	657,357	4,530,755	5,153	5,195	10,000
SO_2	3-Hour	0.974	368	657,357	4,530,755	149.3	518	1,300
	24-Hour	0.389	130	657,367	4,530,805	73.4	204	365
	Annual	0.0324	8.03	657,367	4,530,805	18.3	26	80
PM_{10}	24-Hour	3.40	44.8	657,367	4,530,805	41.0	86	150
	Annual	0.348	2.67	657,367	4,530,805	17.0	20	50
NO_2	Annual	0.258	12.2	657,367	4,530,805	47.0	59.2	100

2.7.11. Other Potential Impacts

a. Introduction

The proposed project has the potential for impacts due to: (1) the formation of visible water vapor plumes from emissions from the CT stack; and (2) plume fogging, rime icing, the formation of elevated visible plumes, and mineral (salt) deposition from operation of the proposed cooling tower in Phase II.

b. CT Stack Visible Water Vapor Plumes

A major exhaust byproduct of the combined cycle turbine combustion process is water vapor. With each pound of natural gas fired, over two pounds of water vapor are formed. Additional water vapor is formed through injection of a water spray in the compressor section of the CTs. Since the exhaust gas contains appreciably more water vapor than the ambient air, an analysis was performed to determine if the exhaust plume could condense and become visible under normal atmospheric conditions. A visible plume formed under such conditions is called a mixed vapor plume. When hot humid exhaust gas is vented to a cooler humid atmosphere, the combination may be at or above the saturation level and a visible plume forms. This is similar to seeing one's breath on a cold morning. In the following visibility analysis the condensed vapor plume was considered to be visible if it occurred during conditions that would allow it to be viewed by the general public. This definition would normally exclude plumes formed at night, and during periods of bad weather (rain, snow, or fog) that obscure visibility. Although steam plumes are not regulated by EPA or NYSDEC, an analysis of the frequency of a visible plume was performed for disclosure purposes.

Visible steam plumes would be unlikely to occur during Phase I; however they may occur during Phase II when operating in a combined cycle mode due to the lower stack exit temperatures. Consequently, the potential frequency and extent of visible plumes resulting from steam condensation during Phase II of the project was conservatively assessed as a worst case using TRC's Plume Visibility Model (VISPLUME) as a post-processor to EPA's ISCST model. This model used five years of meteorological data.

The results indicate that during Phase II when operating in a combined cycle mode, there would be 13.5 percent of the daylight hours, excluding hours of inclement weather (rain, snow, or fog), when the plume from the CT stack would be visible due to water vapor condensation. Visible plumes would occur principally in winter, during periods with low ambient temperatures. The plume would most likely occur during the morning hours (around dawn), and would be light and wispy in character, and would not expected to be visually intrusive. Due to the height of the stack and high exhaust velocities, the plume would occur relatively high above ground level and would therefore not cause or contribute to any ground fogging effects. In summary, there would be no significant adverse visual impacts expected due to the steam plume from the CT stack.

c. Cooling Tower Impact Assessment

Phase II of the project would include a two cell cooling tower. Potential cooling tower impacts consist of plume fogging, rime icing, the formation of elevated visible plumes, and mineral (salt) deposition. To evaluate these effects, a cooling tower impact assessment was conducted using the Electric Power Research Institute (EPRI) Seasonal and Annual Cooling Tower Impact (SACTI) cooling tower model.

The results, based on analysis of five years of meteorological data, indicate that the cooling tower would cause a minimal number of hours per year of ground fogging (approximately 9 hours per year) or icing (approximately 1 hour per year). The analysis showed that maximum levels of salt deposition would be negligible and well below levels that would pose any risk to the local environment or to switchyards, and would not occur beyond the SUNY physical plant services complex.

The analysis results suggest that visible plumes would occur with some regularity from the cooling tower. The vast majority of the time, the cooling tower plume would be contained within the SUNY physical plant services complex, and would not occur at other areas of the SUNY campus or off-site locations. Any potential ground level fogging would not impact the campus areas beyond the SUNY physical plant services complex, or any off-site locations. Under circumstances where an extended plume may occur, the plume would be well above the ground level and would not affect visibility. In summary, the proposed cooling tower is not expected to result in any significant adverse environmental impacts.

2.7.12. Conclusion

The air quality modeling analyses indicate that the proposed project would have only minor impacts on air quality. The maximum predicted impacts of the project by itself are below SILs. The modeled concentrations of the proposed project and existing air pollutant concentrations are well below the NAAQS. The cumulative impact assessment involving the project and other nearby sources indicates that total modeled concentrations would also be well below the NAAQS. The cumulative impact analysis of eleven LIPA 2002/2003 combustion turbine projects showed that the total combined impacts of the eleven projects were below SILs and that the sum of the predicted impacts and existing air pollutant concentrations are well below the NAAQS.

The accidental ammonia release assessment demonstrated that concentrations resulting from a hypothetical worst-case release scenario would not exceed levels of concern in areas where residences, dormitories, or classrooms are found or in other areas where the public would routinely gather. Additional analyses examining the potential formation of visible plumes from the CT stack and various cooling tower impacts showed that these impacts would not be significant.

In conclusion, the proposed project would not have a significant impact on air quality. *

2.8 Noise

2.8.1. Introduction

A noise impact assessment was conducted for the proposed Calpine Stony Brook Energy Center. As discussed in the traffic section, the proposed facility would generate a small number of worker vehicle trips (i.e., a maximum of approximately 4 vehicle trips in an hour). This small number of vehicle trips would not have the potential for significantly affecting noise levels. Consequently, this analysis concentrates on examining potential impacts due to the operation of equipment at the proposed generating facility. The assessment consisted of: (1) determining existing noise levels, based upon noise monitoring, at sensitive receptors potentially impacted by noise due to the operation of equipment at the proposed facility, including residences and schools; (2) preexisting noise levels with the proposed facility operating, using computer modeling techniques, at these sensitive receptor locations; and (3) comparing projected noise levels with the proposed facility to project impact criteria (i.e., a 6 dBA increase in $L_{eq(1)}$ noise levels was considered to be a significant impact). In addition, for information purposes an analysis was performed to evaluate consistency of the proposed facility with the noise levels requirements of the Town of Brookhaven.

2.8.2. Description of Project Study Area

The proposed project site is an approximate 1.5 acre parcel of land located on the SUNY Stony Brook Campus in the Town of Brookhaven, New York (Figure 1-1 through 1-4). The project site is within the physical plant services complex.

The nearest residences to the proposed project site are on Hawkins Road, approximately 850 feet west of the site. The nearest school (North Country School) is also west of the site, approximately 1,500 feet from the project site. The elevation for these receivers, Hawkins Road residence and North Country School, is roughly 50 feet higher than base grade of the project site. Other noise sensitive receptors include on-campus SUNY dormitories located southwest (Kelly Quad) and northeast (G and H Quads) of the project site, approximately 1,000 feet and 2,000 feet respectively (see Figure 2.8-1).

2.8.3. General Information on Noise

The following section briefly reviews the most commonly used metrics for reporting and describing environmental noise levels.

a. Sound Level Meters

Noise is measured using a standardized instrument called the sound level meter. All sound level meters are equipped with small microphones that detect minute changes in atmospheric pressure caused by the vibration of air molecules. Healthy human hearing can sense pressures as low as 0.00002 Pascals (threshold of hearing) to as high as 20 Pascals (threshold of pain).[1] Since this represents an enormous dynamic range, (one

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[1] Pascal is a unit measure of pressure equivalent to approximately 0.02 lbs/ft2. One Pascal is equal to 94 dBA.

million to one) sound pressures are instead reported using a logarithmic scale, which compresses the numbers and keeps them more manageable. Once converted, they are referred to as sound pressure levels, followed by "decibels" as the unit of measure. On a logarithmic scale, the threshold of hearing becomes 0 decibels and the threshold of pain 120 decibels, respectively.

b. A-Weighted Levels

Noise can be measured using various scales, similar to reporting temperature in terms of wind chill or heat index, or humidity in terms of dew point. The latter are better indicators of perceived cold, warmth and dampness, respectively. Similarly, sound level measurements are often reported using the "A-Weighting" scale of a sound level meter. A-weighting slightly boosts high frequency sound, while reducing low frequency levels, (comparable to bass and treble controls found on most stereos) to provide a better indicator of perceived loudness. These measurements are called A-weighted levels and are reported in units of dBA. Figure 2.8-2 illustrates ranges of A-weighted levels for common noise sources.

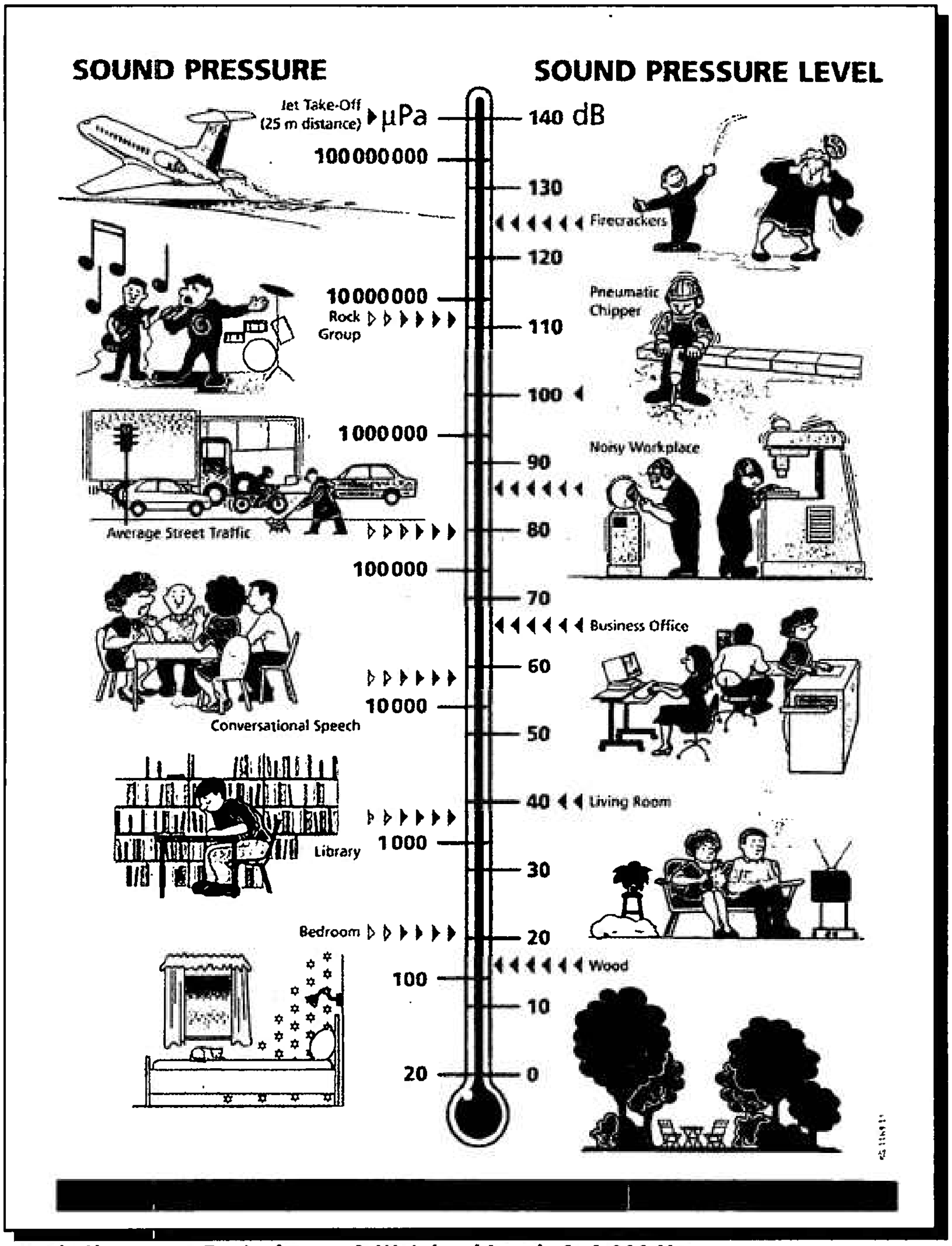
c. Percentile Levels

Environmental noise levels typically fluctuate, and as a result, percentile or "exceedance" measurements are often used to quantify them. These metrics help describe the "average" noise level as well as the range of highs to lows. Equally important, they allow us to separate loud, intrusive noises from steady state, low-level background sounds. As shown in Figure 2.8-3:

- L_{10} (L-Ten) is the level exceeded 10 percent of the time, that is, levels are higher than this value only 10 percent of the measurement time. The L_{10} typically represents the loudest and shortest duration noise events, such as car and truck passes and aircraft flyovers.
- L_{50} (L-Fifty) is the sound level exceeded 50 percent of the time. Levels will be above and below this value exactly one-half of the measurement time, and therefore the L_{50} is sometimes referred to as the "median" sound level.
- L_{90} (L-Ninety) is the sound level exceeded 90 percent of the time and is often called the background sound level. Ninety percent of the time, measured levels are higher than this value, and therefore the L_{90} represents the environment during its quietest periods.

d. Equivalent Energy Level

Noise levels may also be reported in terms of "equivalent energy levels" or L_{eq}. An L_{eq} is a hypothetical number that is "equivalent" in energy to the actual fluctuating noise for any given measurement period. As shown in Figure 2.8-3, a noise level of 50 dBA (L_{eq}) for a period of 1-minute is equivalent in energy to the fluctuating noise level for the same period, produced by the car and truck passes, which range in level from less than 30 dBA to more than 60 dBA. The L_{eq} typically falls between the L_{10} and L_{50} and is the preferred



Levels Shown are Equivalent to A-Weighted Levels At 1,000 Hertz

SOURCE: BRÜEL & KJÆR, DENMARK

TRC

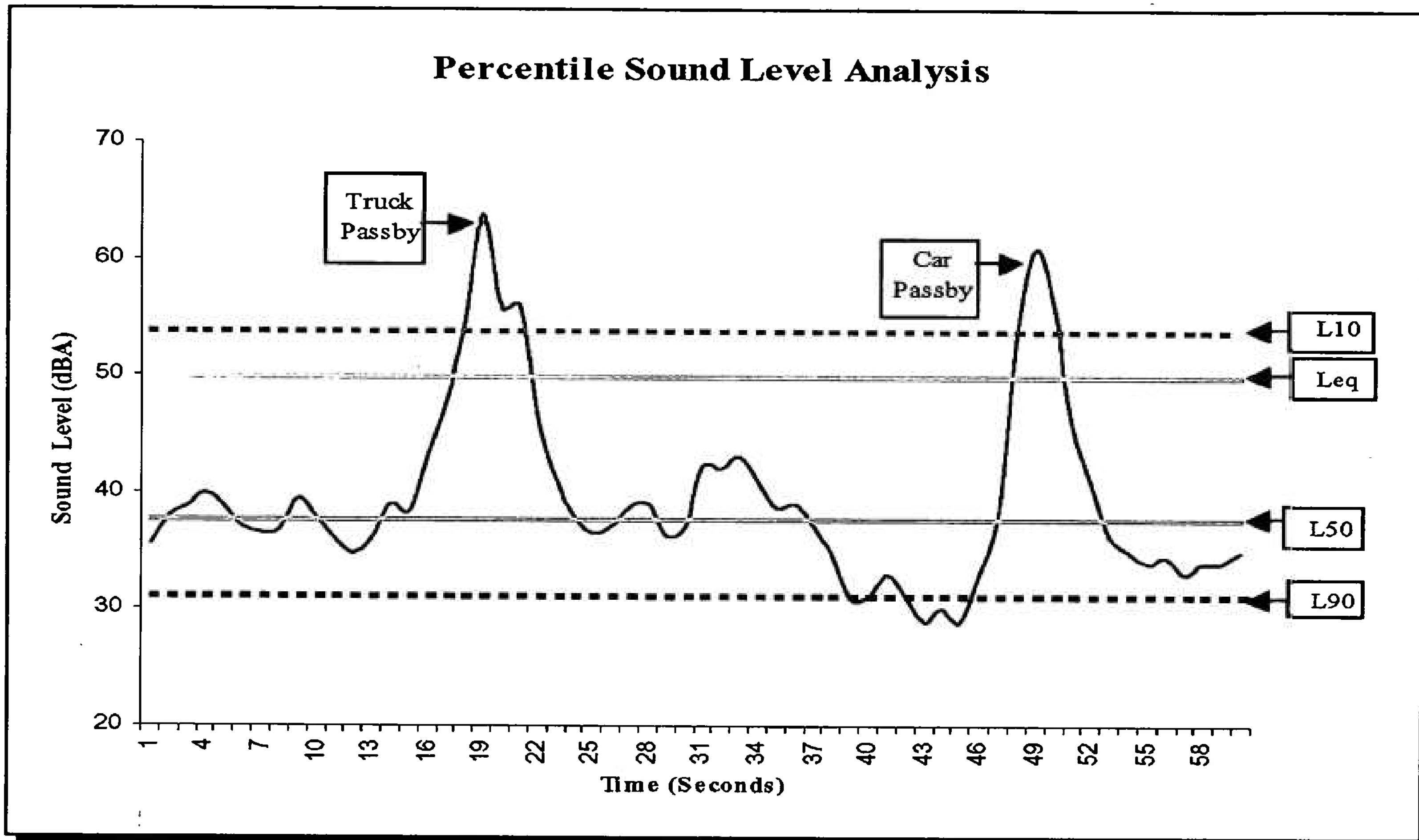
Boott Mills South
Foot of John Street
Lowell, MA 01852
978-970-5600

TYPICAL SOUND PRESSURE LEVELS

CALPINE STONY BROOK ENERGY CENTER
STONY BROOK, NEW YORK

FIGURE 2.8-2	**PROJ. NO. 34609**

Typical Sound Pressure Levels



TRC
Boott Mills South
Foot of John Street
Lowell, MA 01852
978-970-5600

EXAMPLE PERCENTILE ANALYSIS
CALPINE STONY BROOK ENERGY CENTER
STONY BROOK, NEW YORK

FIGURE 2.8-3	PROJ. NO. 34609

Example Percentile Analysis

metric of the New York State Department of Environmental Conservation (NYSDEC) for assessing environmental noise.

e. Community Response to Changes in Noise Levels

The average ability of an individual to perceive changes in noise levels is well documented (see Table 2.8-1). Generally, changes in noise levels less than 3 dBA are barely perceptible to most listeners, whereas 10 dBA changes are normally perceived as doublings (or halvings) of noise levels. These guidelines permit direct estimation of an individual's probable perception of changes in noise levels. It is also possible to characterize the effects of noise by studying the aggregate response of people in communities. The rating method used for this purpose is based on a statistical analysis of the fluctuations in noise levels in a community, and integrating the fluctuating sound energy during a known period of time, most typically during 1 hour or 24 hours. Various government and research institutions have proposed criteria that attempt to relate changes in noise levels to community response. One commonly applied criterion for estimating response is incorporated into the community response scale proposed by the International Standards Organization (ISO) of the United Nations (see Table 2.8-2). This scale relates changes in noise level to the degree of community response and permits direct estimation of the probable response of a community to a predicted change in noise level.

Table 2.8-1: Average Ability to Perceive Changes in Noise Levels

Change in Sound Pressure Level (dBA)	Human Perception of Sound
2-3	Barely perceptible
5	Readily noticeable
10	A doubling or halving of the loudness of sound
20	A "dramatic change"
40	Difference between a faintly audible sound and a very loud sound

Source: Bolt Beranek and Neuman, Inc., Fundamentals and Abatement of Highway Traffic Noise, Report No. PB-222-703. Prepared for Federal Highway Administration, June 1973.

Table 2.8-2: Community Response to Increases in Noise Levels

Change in Sound Pressure Level (dBA)	Category	Description
0	None	No observed reaction
5	Little	Sporadic complaints
10	Medium	Widespread complaints
15	Strong	Threats of community action
20	Very strong	Vigorous community action

Source: International Standards Organization, Noise Assessment with Respect to Community Responses, ISO/TC 43. (New York: United Nations, November 1969).

2.8.4. Noise Level Regulations and Impact Criteria

a. Introduction

There are a variety of noise standards and guidelines that have been promulgated by various local, state, and federal agencies. A number of these agencies' criteria are discussed below. However, none of these criteria are directly applicable to the proposed facility.

b. Town of Brookhaven

The Town of Brookhaven has a noise ordinance (Chapter 50 – Noise Control) which specifies maximum permissible noise levels generated by any facility as a function of the receiving land use and time of the day. These noise standards are shown in Table 2.8-3. Compliance is determined based upon noise levels at the property line. The proposed facility would be available to provide energy to the SUNY Stony Brook campus to accommodate future energy demands and would provide financial and operational benefits to SUNY Stony Brook. Consequently, based upon the State Educational Law it would not be subject to the local zoning requirements of the Town of Brookhaven.

Table 2.8-3: Town of Brookhaven Noise Standard

Receiving Land Use	Noise Level Limit (dBA)	
	Daytime (7 AM to 10 PM)	Nighttime (10 PM to 7 AM)
Residential	65	50
Commercial	65	65
Industrial	75	75

Construction noise is exempt from the ordinance, however, construction activities are limited to the hours of 7 am to 6 pm on weekdays (see Appendix 2.8 – Town of Brookhaven Noise Control Code).

c. News York State Department of Transportation

The New York State Department of Transportation (NYSDOT) has noise criteria that it uses for projects subject to its jurisdiction. NYSDOT has adopted the noise criteria of the Federal Highway Administration (FHWA) (23 CFR 772). These criteria have two components: "fixed" noise criteria and "relative" noise criteria.

The fixed noise criteria consist of the FHWA Noise Abatement Criteria (NAC), which are shown in Table 2.8-4. These NAC depend on task interference due to noise interruption of various activities involving speech, which vary by land use. By NYSDOT policy, substantial fixed noise impacts occur when predicted traffic-noise levels equal or exceed the applicable NAC from this table.

in cases where the most sensitive of receptors are present, and increases of more than 6 dBA may require a closer analysis of impact potential depending on existing noise levels

Table 2.8-4: FHWA Fixed Noise Criteria

Activity Category	$L_{eq(1)}$	Description of Activity
A	57 Outdoors	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 Outdoors	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 Outdoors	Developed lands, properties, or activities not included in Categories A or B above.
D	None	Undeveloped lands.
E	52 Indoors	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

and the character of surrounding land use and receptors. It goes on to say that in terms of threshold values, the addition of any noise source, in a non-industrial setting, should not raise the ambient noise level above a maximum of 65 dBA, and ambient noise levels in industrial or commercial areas may exceed 65 dBA with a high end of approximately 79 dBA. Projects that exceed these guidance levels should explore the feasibility of implementing mitigation.

d. Noise Control Act of 1972

As a result of the Noise Control Act of 1972, a document entitled *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* was published in 1974 by the Federal Environmental Protection Agency (EPA). Table 2.8-5 shows these values. These levels do not constitute enforceable federal regulations or standards. Nevertheless, the noise levels identified by EPA represent valid criteria for evaluating the effect of project noise on public health and welfare.

e. Impact Criteria

For purposes of evaluating impact of the proposed facility, the facility would have a significant impact if the project results in an increase in $L_{eq(1)}$ noise levels over future conditions without the project of 6 dBA, or more. The 6 dBA relative change criterion, is consistent with the NYCDEC guidance document recommendation. In addition, for information purposes noise from the proposed facility was evaluated for compliance with the noise limits contained in the Town of Brookhaven noise ordinance.

Table 2.8-5: Noise Levels Identified as Requisite to Protect Public Health and Welfare With an Adequate Margin of Safety

Effect	Level	Area
Hearing loss	$L_{eq(24)} \leq 70$ dB	All areas
Outdoor activity interference	$L_{dn} \leq 55$ dB	Outdoors in residential areas and annoyance and farms, other outdoor areas where people spend widely varying amounts of time, and other places in which quiet is a basis for use.
	$L_{eq(24)} \leq 55$ dB	Outdoor areas where people spend limited amounts of time, such as school yards, playgrounds, etc.
Indoor activity interference and annoyance	$L_{dn} \leq 45$ dB	Indoor residential areas
	$L_{eq(24)} \leq 45$ dB	Other indoor areas with human activities, such as schools, etc.

Source: Report No. EPA-550/9-74-004, March 1974.

2.8.5. Existing Noise Level Conditions

a. Introduction

Existing noise levels were determined based upon field measurements performed during January 13th and 14th. Short-term (20 minute) noise level readings were manually collected during daytime and early morning hours and observations of audible sources will be noted.

b. Site Selection

Aerial photographs, a USGS map and the SUNY Stony Brook campus map were reviewed, as well as field reconnaissance of the project study area was performed, in order to identify noise-sensitive receptors, such as residences, schools and other locations potentially impacted by noise from future operations. Six noise-monitoring locations were selected to provide adequate spatial representation of nearby sensitive receptors (see Figure 2.8-4 and Table 2.8-6).

c. Instrumentation

All attended sound level measurements were collected using a Brüel & Kjær Model 2260 Sound Level Meter. This meter complies with Type 1 tolerance requirements of the American National Standards Institute (ANSI) and was field calibrated before and after each measurement. The meter was calibrated with a Brüel & Kjær Model 4231 Acoustic Calibrator.

A qualified calibration laboratory and/or manufacturer has certified the equipment within the preceding 12-month period using references traceable to the National Institute of Standards and Technology.

Table 2.8-6: Proposed Noise Monitoring Locations

Receptor Site	Description
Location 1	Intersection of Cedar Street and North Country Road (Northwest of project site, Residence)
Location 2	North Country School – Suffolk Avenue (West of project site, North Country School)
Location 3	Intersection of Hawkins Road and North Country Road (Southwest of the project site, Residence)
Location 4	Smith Court (Southwest of the project site, Residence)
Location 5	Kelly Quad Dormitories – SUNY Campus (Southwest of project site, On-Campus Housing)
Location 6	H Quadrant/G Quadrant Dormitories – SUNY Campus (Northeast of project site, On-Campus Housing)

Source: Michael Theriault Acoustics, Inc.

d. Noise Monitoring Results

Ambient noise measurements collected during the measurement program are summarized in Table 2.8-7. $L_{eq(1)}$ noise levels collected during the quietest hours of the monitoring period (i.e., the early morning hours) ranged from 38 to 54 dBA (see Appendix H for complete data set from field monitoring). The measured values reflect the level of activity occurring, including the noise produced by traffic on adjacent roadways.

Table 2.8-7: Noise Monitoring Results

Receptor Site	Description	Lowest Measured Noise Level ($L_{eq(1)}$)
Location 1	Intersection of Cedar Street and North Country Road (Northwestern Residences)	50 dBA
Location 2	North Country School – Suffolk Avenue (Nearest School)	45 dBA
Location 3	Intersection of Hawkins Road and North Country Road (Nearest Residence)	49 dBA
Location 4	Smith Court (Residence)	38 dBA
Location 5	Kelly Quad Dormitories – SUNY Campus (Nearest On-Campus Housing, southwest of NCP facility)	54 dBA
Location 6	H Quadrant/G Quadrant Dormitories – SUNY Campus (Additional On-Campus Housing, northeast of NCP facility)	50 dBA

Source: Michael Theriault Acoustics, Inc.

2.8.6. Noise Level Projections With the Proposed Facility

The proposed facility will be fired exclusively with natural gas and produce a total net electrical power output of 79.9 megawatts (MW) in combined-cycle mode using a single General Electric (GE) LM6000 combustion turbine generator (CT); a once-through steam generator (OTSG), duct burners and a steam turbine generator. Auxiliary support equipment will include a gas compressor and 2-cell cooling tower.

a. Acoustical Modeling

An acoustical model of the proposed facility was developed using SoundPLAN Version 5.5 to predict noise levels at the nearest receptors.[2] Far-field levels for sources listed in Table 2.8-8 were estimated using octave band sound power level data from General Electric, in-house measurement data and industry-standard prediction algorithms.[3]

Table 2.8-8: Noise Sources Modeled

Description	Sound Power Level (dBA)
Cooling Tower	105 dBA
CTG Air Intake	88 dBA
CT Building Ventilation Louvers	87 dBA
CT Building Walls & Roof	84 dBA/surface
CT Building Ventilation Fans	88 dBA
CT Turbine Compartment Vent Fan & Motor	95 dBA
CT Generator Compartment Vent Fan & Motor	97 dBA
Condenser Building Walls & Roof	90 dBA/surface
Condenser Building Ventilation Fans	88 dBA
Gas Compressor	103 dBA
Main Step-Up Transformer	95 dBA
OTSG Stack Exhaust	98 dBA
Steam Turbine Building Walls & Roof	89 dBA/surface
Steam Turbine Building Ventilation Louvers	87 dBA
Steam Turbine Building Ventilation Fans	88 dBA

Source: Michael Theriault Acoustics, Inc.

Receiver noise levels were calculated by accounting for the reduction of sound with distance (hemispherical divergence); absorption of sound by air (air absorption); absorption and reflection of sound by the ground (ground effect); and changes in source level with direction (directivity). Sound levels were further adjusted by the transmission loss of buildings, if appropriate and for the shielding effects of buildings, equipment and site topography, to estimate far-field facility noise levels. The analysis assumed that the design of the proposed facility would include the following noise controls:

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[2] SoundPLAN® Version 5.5, Braunstein + Berndt, GmbH, Acoustical Modeling Software.
[3] Electric Power Plant Environmental Noise Guide, Edison Electric Institute, N.Y., N.Y., 1978.

- Combustion turbine air-intake silencer;
- OTSG stack silencer;
- Turbine and generator compartment ventilation fan silencers;
- Steam-vent silencers;
- Compressor bleed vent silencer;
- Acoustical barriers enclosing gas compressor skid;
- Low-noise generator step-up transformer; and
- Transmission loss generation building walls.

b. Modeling Results

As summarized in Table 2.8-9 below, noise levels due to operation of the proposed facility (alone) are expected to range from approximately 42 to 51 dBA at the nearest sensitive receptors, when the proposed noise controls are incorporated into the design. Noise level contours for the proposed facility are shown in Figure 2.8-5.

Table 2.8-9: Predicted Project Noise Levels

Receptor Site	Existing Noise Level (L_{eq})	Noise Due to Facility Alone (L_{eq})	Total Noise Level with the Proposed Facility (L_{eq})	Increase in Noise Level Due to the Proposed Facility (L_{eq})
Location 1	50 dBA	45 dBA	51 dBA	1 dBA
Location 2	45 dBA	43 dBA	47 dBA	2 dBA
Location 3	49 dBA	49 dBA	52 dBA	3 dBA
Location 4	38 dBA	42 dBA	43 dBA	5 dBA
Location 5	54 dBA	50 dBA	55 dBA	1 dBA
Location 6	50 dBA	45 dBA	51 dBA	1 dBA

Source: Michael Theriault Acoustics, Inc.

2.8.7. Noise Impact Assessment

As summarized in Table 2.8-9, the proposed facility, even during the quietest time periods of the night, would increase ambient noise levels by between 1 and 5 dBA. The increases in noise levels at all six sites would be less than 6 dBA, the project's impact criteria, and therefore the proposed project would not have a significant adverse noise impact.

Although the Town of Brookhaven noise code is not applicable to the proposed project, for information purposes the Brookhaven standards were reviewed to determine compliance. At all of the receptor sites, noise levels due to the proposed facility alone would be in compliance with the Town of Brookhaven standards.

It should be noted that a benefit of the proposed facility would be the elimination of the need to vent excess steam produced at the adjacent NCP facility when the demand for steam on the SUNY Stony Brook campus is low. With the proposed facility, surplus steam from the NCP facility will be routed to the proposed facility's steam turbine (for power generation) and then to the facility's condenser, where it would be reduced to water and remain within the heating system. As a result, steam blows from the NCP facility will no longer occur and the noise associated with the steam blows will be eliminated. This would eliminate the intrusive noise from these occasional events.

During start-up of the proposed facility some small amount of steam venting would occur. Nonetheless, all start-up vents would be equipped with silencers. While steam venting to the atmosphere is unavoidable, the noise from the venting would only occur for a short duration and would be minimal due to the vent silencers. *

2.9 Infrastructure

2.9.1. Introduction

This section addresses facility water use, wastewater generation/disposal, solid waste generation, and energy usage associated with the operation of the project.

Table 2.9-1 identifies water resource related permitting programs and/or standards applicable to the project and briefly summarizes the actions proposed to comply with each standard.

Table 2.9-1 Major Programs and Standards Pertaining to Water Resources

Program/Regulation	Lead Agency	Comments
Storm Water SPDES Permit (project Operation)	NYSDEC	The Facility site is located on the SUNY Campus, which is covered under an existing permit for storm water associated with industrial activities. A Storm Water Pollution Prevention Plan (SWPPP) covering facility operations has been implemented for the existing NCP Facility. This plan would be modified, as appropriate, to cover the expansion project.
Backflow Prevention	SUNY/SCWA/Suffolk County Department of Health Services	For any new interconnection to the SUNY potable distribution system or the SCWA potable distribution system, a backflow prevention device would be installed in accordance with SUNY, SCWA and SCDHS guidelines/requirements.
Sewer Discharge Permit/Compliance with Pretreatment Standards for New Sources (40 CFR 423.17).	SCDPW	The Facility would comply with all applicable sewer discharge requirements for the SCSD #21 STP, including Pretreatment Standards for New Sources (PSNS) contained in 40 CFR 423.17.
New York State Chemical Bulk Storage Regulations/SCDHS Article 12.	NYSDEC/SCDHS	The Facility would be designed and operated in accordance with these regulatory programs.

2.9.2. Water Supply

Water would be required for several functions associated with the safe, clean, and efficient operation of the proposed expansion project. Following the addition of a new combustion turbine during Phase I, additional water would be used for air emissions control (NO_x water injection), SPRay INTercooling (SPRINT water injection), combustion turbine inlet air cooling, and general facility maintenance (i.e., compressor cleaning, plant service water, etc.). During Phase II, additional water would be required for the once through steam generator (OTSG), and to satisfy cooling tower makeup requirements. In the unlikely event of a fire, water would also be used to extinguish its fire.

The existing cogeneration plant operated by Nissequogue Cogen Partners (NCP) has one GE LM6000 PC gas turbine/generator (GTG) and one heat recovery steam generator (HRSG). This system is capable of generating electricity and supplying up to 280,000 pounds per hour of steam to the State University of New York (SUNY) at Stony Brook for heating and cooling purposes. Steam produced in the HRSG is routed to two on-campus physical plants: the West Plant and the East Plant. Under Phase I of the proposed expansion, the project would add an additional GE LM6000 combustion turbine/generator. In Phase II, a new once through steam generator (OTSG) and a 30 megawatt (MW) steam turbine/generator set would become operational.

An OTSG provides the same function as a conventional HRSG. However, an OTSG does not have a steam drum, mud drum, or blowdown system. The absence of a blowdown system limits thermal losses and lowers feed water makeup requirements for the steam cycle. Boiler chemistry for an OTSG is maintained using conventional demineralization and polishing exchange equipment. The major advantage offered by the OTSG design is the ability to be run dry. This provides the facility with the capability to operate in both simple cycle and combined cycle modes, thereby increasing operational flexibility, without the need for a bypass stack or diverter valve system.

Process water makeup requirements for Phase I are expected to range between 60 and 70 gallons per minute (gpm). Following completion of Phase II, process makeup requirements increase to satisfy OTSG and cooling tower demands. Cooling tower makeup requirements are expected to range from 450 to 500 gpm during typical summer operating conditions. Cooling tower makeup is expected to be less than 300 gpm during typical winter operating conditions. Assuming the facility operates at full output for 24 hours, about 100,800 gallons per day (gpd) of process water would be consumed in Phase I and about 720,000 gpd in Phase II.

a. Existing Facility Water Use

Water use at the existing facility is variable depending on both electrical output and steam sales for heating or cooling purposes. In general, the facility operates as a base load facility with an electrical output typically ranging between 25 and 35 MW. Peak steam usage generally occurs during the summer and winter seasons to assist SUNY in meeting heating and cooling requirements. Steam usage is lowest during the spring and fall when heating and cooling demands are low.

Raw water for the existing facility is obtained from the SUNY distribution system, which is supplied by the Suffolk County Water Authority (SCWA). The current water supply interconnect is via an 8-inch main that draws water from a 12-inch distribution main in close proximity to the SUNY Physical Plant. The available pressure in the supply line is reported to range from 75 to 85 pounds per square inch (psi).

Based on historic water usage rates, average day demands range from 190,000 to 225,000 gpd. Peak day demands typically range from 270,000 to 300,000 gpd for the existing cogeneration facility.

b. Expansion Facility Water Supply Requirements

Under Phase I, process water would be required for emissions control, SPRay INTercooling, combustion turbine washes/maintenance, and inlet air chilling. For the new LM6000 combustion turbine, water demands during Phase I are expected to range from 60 to 70 gpm (i.e., 86,400 to 100,800 gpd). Under Phase II, when an OTSG and cooling tower are operational, facility water demands are expected to typically range between 400 gpm and 500 gpm (i.e., 576,000 to 720,000 gpd) during summer operating conditions. Peak instantaneous demands are expected to total approximately 600 gpm.

Actual water use at the site would vary with ambient air temperature and electrical output. Because of this, separate water balance analyses were developed to illustrate water use under various modes of operation. They include: peak summer operating conditions (Operating Scenario A), average summer operating conditions (Operating Scenario B), and average ambient operating conditions (Operating Scenario C).

To minimize total water demands and wastewater discharge requirements, recycle/reuse of internally generated process waste streams would also be employed. Water from OTSG sample drains and floor drains at the facility would be recycled and reused in the facility's cooling tower. The net water savings through internal recycle/reuse (as well as the reduction in wastewater generated) is estimated to total nearly 19,000 gpd under typical summer operating conditions.

Peak hourly, average hourly, peak daily and average daily water supply requirements for the facility expansion are summarized in Table 2.9-2.

Table 2.9-2 Peak Hourly, Average Hourly, Peak Daily and Average Daily Water Demands for Various Operating Conditions

Operating Condition	Phase I Hourly Demand (gpm)	Phase II Hourly Demand (gpm)	Phase I Daily Demand (gpd)	Phase II Daily Demand (gpd)
Summer (average operating conditions) 1	68	477	96,500	687,00
Summer (peak operating conditions) 2	68	596	100,800	860,000
Average Ambient Conditions 3	52	281	75,000	405,000

Notes:

1 Estimate assumes 24-hour per day facility operation at 100% load. Phase II estimates assume 10 cycles of concentration in the cooling tower.

2 Estimate assumes 24-hour per day facility operation with full SPRINT operation. Phase II estimates assume 10 cycles of concentration in the cooling tower.

3 Estimate assumes 16-hour per day facility operation at average ambient air temperature.

Table 2.9-3 provides a breakdown of projected water demands on an average monthly and an average annual basis.

c. Available Water Supply and Infrastructure

Based on discussions with the SCWA, adequate distribution and supply capacity for the expansion project is available for Phase II, except possibly during early morning hours in the summer season. From approximately 1:00 AM through 7:00 AM during the summer, SCWA may request that water supply withdrawals from the distribution system be limited to 200 gpm.

Table 2.9-3: Estimated Average Monthly and Annual Water Demand Following Completion of Phase II

Month	Days per month	Hours per Day	Days per Week	Water Use (million gallons)
January	31	16/Avg.	7	12.5
February	28	16/Avg.	7	11.3
March	31	16/Avg.	7	12.5
April	30	16/Avg.	7	12.1
May	31	24/S	7	21.3
June	30	24/S	7	20.6
July	31	24/S	7	21.3
August	31	24/S	7	21.3
September	30	24/S	7	20.6
October	31	24/S	7	21.3
November	30	16/Avg.	7	12.1
December	31	16/Avg.	7	12.5
Annual	365	-	-	199.4

Notes:
/Avg. = Average ambient operating conditions (Operating Scenario C)
/S = Summer operating conditions (Operating Scenario B)

Supplemental demands would be satisfied through withdrawals from campus wells operated by SUNY. SUNY currently operates two campus wells to assist in satisfying physical plant water supply requirements. The capacity of these wells is 1,000 gpm. Based on preliminary discussions with SUNY, a portion of the yield from these wells would be made available to the expansion project as a supplemental makeup supply source.

The SCWA is the largest groundwater purveyor in the nation. SCWA has over 460 active wells that feed 64 water storage tanks. Water production for the system currently exceeds 60 billion gallons per year with peak daily production in excess of 450 million gallons and peak monthly production in excess of 11 billion gallons. SCWA's average annual withdrawal is presently 164 million gallons per day (mgd). The project's projected average annual water use, totaling 405,000 gpd (0.4 mgd) following completion of Phase II, would constitute less than 0.25 percent of average annual water withdrawal for the SCWA system and about 0.5 percent during peak periods.

d. Probable Impacts of the Project on Water Supply

SCWA can supply these quantities of water without a significant adverse impact on the water supply system. In addition, the use of a portion of a SUNY well capacity would not cause a significant adverse impact.

2.9.3. Wastewater Generation

a. Sources of Wastewater

The expansion project would generate process and sanitary wastewater. Sanitary and process waste streams are listed below.

- Sanitary wastewater;
- Demineralizer regeneration wastewater;
- Cooling tower blowdown;
- Boiler drains and sample drains;
- Miscellaneous service water uses (equipment wash downs, floor drains);
- Compressor wash waters;
- Waters from periodic testing of the emergency fire water system; and
- Stormwater from secondary containment basins.

Wastewater from sanitary uses, demineralizer regeneration, cooling tower blowdown and the compressor wash water would be sent to the Suffolk County Sewerage District #21 Sewage Treatment Plant (STP #21). Wastewater from boiler drains, sample drains and miscellaneous service water uses would be sent to the cooling tower basin. Water from testing of the fire fighting system would be sent to the existing stormwater recharge basin. Finally, stormwater from the secondary containment areas would be trucked off-site to a licensed disposal facility. Table 2.9-4 shows the quantities of wastewater that would be sent to STP #21.

Table 2.9-4 Wastewater Generation

Source	Rate	Daily Usage	Monthly Usage
Continuous Generation			
Sanitary waste	2 gpm	2,880	86,400
Cooling tower blowdown	55 gpm	79,200	2,376,000
Periodic Generation			
Demineralization regeneration	4,300 gallons per day	4,300	129,600
Washdown	2,800 gallons per week	400	12,000
Total	NA	86,780	2,604,000

b. Quality of Wastewater

Cation/anion exchange resins in the demineralized water makeup system for the facility would require periodic regeneration. Regeneration is performed by intermittently dosing the resin beds with sulfuric acid or sodium hydroxide. The acid or caustic dosing restores the exchange capacity of the "exhausted" resin beds. Following regeneration, regenerant wastewater and rinse water from the ion exchange vessels would be routed to a neutralization tank for pH adjustment prior to discharge to the STP #21. Regenerant wastewater/rinse water from the existing facility is currently discharged to the STP #21 following neutralization. The neutralization tank would be equipped with acid and caustic feed systems to ensure that the pH of the discharge remains within allowable local limits.

The new cooling tower to be constructed under Phase II would operate at an estimated 10 cycles of concentration. Cooling tower blowdown, required to prevent the excessive buildup of dissolved solids in the tower, would be discharged to the STP #21. Table 2.9-5 provides estimated discharge concentrations for constituents expected in cooling tower blowdown. The temperature of the discharge is estimated to range between 60°F and 90°F.

Table 2.9-5: Projected Wastewater Discharge Characteristics for Cooling Tower Blowdown

Constituent	projected Concentration (mg/l)
Oil and Grease	< 15
Total Suspended Solids	10 to 30
Total Dissolved Solids[1]	1300
Biochemical Oxygen Demand	5 to 30
Calcium	150
Chloride	250
Iron	1.2
Lead	0.01
Magnesium	35
Manganese	0.25
Nitrate	40
Phosphate, total	3.5
Sodium	103
Total Residual Chlorine	0.2
Ammonia, total	0.5 to 2.0
Temperature	60 °F to 90 °F
pH	6.0 to 9.0

Note: Total dissolved solids result primarily from concentration (i.e., cycle up) of the naturally occurring dissolved salts and minerals present in the raw water makeup supply.

Proposed cooling tower maintenance chemicals, required to limit scale, corrosion, and biofouling are listed in Table 2.9-6.

Table 2.9-6 Cooling Tower Maintenance Chemicals

Product	Purpose
Sodium Hypochlorite	Prevent biofouling of heat exchanger surfaces.
Scale Inhibitor (TBD)	Prevent scale formation
Sulfuric Acid	pH adjustment, maintain pH of the discharge within required local limits.

Steam turbine drains and water analysis panel drains would be routed directly to the cooling tower. The blowdown stream would consist essentially of demineralized water containing low concentrations of boiler water chemical conditioners. The projected blowdown volume is estimated to range from 3 to 5 gpm. Given the low dissolved solids contained in this waste stream, it is suitable for reuse in the cooling tower without additional treatment.

Trench type floor drains would be used to collect and convey equipment and floor wash water to an oil water separator, which would recycle this waste stream to the cooling tower. Floor and equipment wash water would be obtained from SCWA. Following processing through the oil/water separator, this waste stream is likely to contain low levels of oil and/or grease (i.e., less than 15 milligrams per liter [mg/l]), detergents or surfactants used for various cleaning/maintenance activities and low levels of suspended solids. The suspended solids concentration of the discharge is expected to range from 10 to 30 mg/l.

Remaining constituents in the wastewater are anticipated to be at concentrations approximately equivalent to the quality of the raw water makeup supply from the SCWA distribution system. This applies to the following constituents or constituent groups: heavy metals, calcium, magnesium, iron, manganese, sodium, chloride, sulfate and phosphate.

The sludge/oil collected in the oil water separator would be managed off-site at an appropriately licensed facility.

The compressors serving the combustion turbine requires periodic cleaning to maintain operating efficiency and prevent excessive wear and tear on internal components. Compressor cleaning can be performed when the combustion turbines are on-line or off-line.

Off-line washes are generally performed on a weekly or bi-weekly basis. An off-line compressor wash consists of injecting a demineralized water/detergent mixture into the compressor when the combustion turbine is off-line to remove accumulated dust, dirt or other contaminants that cannot be removed during an on-line wash. In general, for an LM6000 Unit, the cleaning solution would consist of 25 percent detergent and 75 percent demineralized water. The resultant wastewater would be collected and discharged to the STP #21.

c. Probable Impacts of the Project from Wastewater Generation

Quantity of Wastewater

Much of the wastewater from the proposed project would be reused in the cooling tower or sent to an existing recharge basin for infiltration into the groundwater. These waste streams would not have a significant adverse impact on the wastewater handling systems. Approximately 3,580 gpd during Phase I and about 86,780 gpd during Phase II would be conveyed to STP #21 for treatment and disposal. This STP has a design and permitted capacity of 2,500,000 gpd and currently treats about 2,000,000 gpd. The wastewater would represent about 0.14 percent of the STP's capacity during Phase I and about 3 percent during Phase II. These volumes would not cause a significant adverse impact to STP #21 ability to properly treat and dispose of the wastewater it handles.

Quality of Wastewater

The facility would require authorization from the STP #21 to discharge the sanitary waste stream and process waste streams (i.e., cooling tower blowdown, neutralized regenerant wastewater, and compressor wash water) to the sewer, and would be required to comply with the Sewer Use Limits for pollutants, including specific metals, toxic organics and other parameters. In addition, the discharge of process waste streams is also regulated under Pretreatment Standards for New Sources (PSNS) for the Steam Electric Generating Point Source Category (40 CFR 423.17). The wastewater discharge standards applicable to the proposed facility under 40 CFR 423.17 are listed below.

- No discharge of polychlorinated biphenyl compounds such as those used in transformer fluids;
- The pollutants discharged in metal cleaning wastes shall not exceed listed concentrations of 1 mg/l for total copper (1-day);
- The pollutants discharged in cooling tower blowdown shall not exceed the concentrations in the following:

Parameter	Maximum (mg/l)	Average (mg/l)
Chromium, total	0.2	0.2
Zinc, total	1.0	1.0

The facility cannot discharge any of the EPA-listed 126 priority pollutants.

Given the low volumes of process wastewater proposed for discharge to the sanitary collection system and projected waste stream characteristics, the proposed facility would not result in a violation of applicable discharge limitations or standards and would not cause a significant adverse impact associated with the quality of the wastewater discharge.

2.9.4. Solid Waste

The project would generate small quantities of hazardous and non-hazardous wastes as a result of operation and maintenance of the facility. The process of electrical generation does not produce appreciable amounts of hazardous and non-hazardous wastes when natural gas is utilized as the primary fuel source, as compared to coal or No. 6 fuel oil.

The facility would be classified as a Small Quantity Generator (SQG) of Resource Conservation and Recovery Act (RCRA) hazardous waste (generation of greater than 100 kilograms (kg) and less than 1,000 kg in a given month). The hazardous waste generated would primarily be related to maintenance of the facility and include items such as spent aerosol cans, waste cleaning solvents, and/or waste paint.

Solid waste would be generated at the facility. The solid waste is related mainly to miscellaneous facility worker trash, including paper, cardboard, aluminum, and glass. A recycling program, in accordance with local solid waste vendor programs, would be implemented for these non-hazardous waste streams. It is estimated the facility would generate less than 10 cubic yards of general trash per month. Solid waste containers would be sized appropriately to minimize the need for waste transportation related trips to the facility and would include recycling options.

Small waste streams of off-specification used/waste oil and wastewater would also be generated during maintenance activities at the facility. These wastes would be recycled off-site at licensed receiving facilities, in accordance with the solid waste regulations of the State of New York.

Spent air emission SCR and CO catalysts would generate a waste stream approximately every 6 to 8 years depending upon operational use and the evolution of the catalyst technology. The supplying vendor would recycle these spent catalysts during these maintenance periods.

These quantities and types of solid waste from the proposed project would not have a significant adverse impact on the solid waste handling systems.

2.9.5. Energy

Natural gas demands for the proposed project are insignificant in light of available supplies and the capacity of the conveyance systems. Demands at this facility would not impact regional energy systems nor would they impact or preclude service to other users.

The project would generate electricity for SUNY Stony Brook and for offsite use, as well as generate steam for use in the steam turbine, with the potential to provide steam capability for SUNY's heating and cooling needs. The proposed facility on the SUNY Stony Brook campus would improve reliability of the school's electricity service and the schools ability to generate steam for its heating and cooling needs. In addition, the project would serve a vital public need by providing electric power to Long Island particularly during periods of peak demand and would assist in improving system reliability. Increasing the amount of electricity into the grid would not impact electricity transmission, nor would it preclude connections from other suppliers with proposed generating projects in the region.

The proposed project would not have a significant adverse impact on energy supply and delivery systems. *

2.10 Contaminated Materials

During original development of the existing power generating facility, an environmental site investigation entitled *Baseline Environmental Study for the Stony Brook Cogeneration Facility, Stony Brook, New York*, was conducted and dated November 22, 1993 (1993 Baseline Study).

The project site was a portion of the environmental site investigation, which also included the SUNY West Steam Plant (abutting the subject site to the south) and the SUNY East Power Plant (off East Loop Road on the SUNY Campus). The goal of the 1993 Baseline Study was to identify contaminants in soil and groundwater, if any, and to provide a starting point for future comparisons/analysis of environmental conditions.

During this 1993 Study, soil and groundwater at the project site were analyzed. No evidence of a release of oil and/or hazardous materials (OHM) from the project site was identified during this 1993 Baseline Study. However, the study did identify that soils and groundwater immediately to the west of the proposed project site were contaminated with No. 6 fuel oil from a release that occurred in 1987.

To support this project a Phase I Environmental Site Assessment (ESA) was performed at the project site to build upon the information in the 1993 Baseline Study, as it related to the project site. The project site was inspected on two separate occasions, November 16th and November 26th, 2002, and looked specifically for any poor management practices in housekeeping, or the handling or storage of petroleum, solid and hazardous wastes, and/or the management of hazardous substances. During both visits, the inspectors reported that the housekeeping and the OHM management were exemplary.

In addition, a computerized search of pertinent Federal and State databases was performed to investigate potential adverse environmental impacts at the project site and in the surrounding vicinity that have been reported/recorded by regulatory officials. The search was performed pursuant to ASTM Standard E1527-00 using a database maintained by an independent consultant (Environmental Data Resources, Incorporated (EDR) Radius Map with GeoCheck® Report) and was based on the latitude and longitude of the project site. No evidence of incidents leading to environmental impacts or "contamination" was identified for the project site.

In summary, no evidence of soil and groundwater contamination was identified at the project site, nor were Recognized Environmental Conditions identified for the project site.

A Health and Safety Plan would be developed and implemented prior to construction to ensure that the potential for exposure of construction workers, workers on nearby sites, SUNY Stony Brook employees and students, and others in the area to any contaminants onsite is minimized. The Health and Safety Plan would define worker safety training and monitoring procedures, personal protective equipment, air monitoring equipment, action levels, and appropriate protective measures. In addition, the construction workers would be required to comply with the existing SUNY Stony Brook health and safety programs. All material removed from the project site would be disposed in compliance with all applicable laws and regulations. If deemed necessary, remediation would be performed in compliance with all applicable regulations. With these measures, no significant adverse impacts would occur. *

2.11 Soils and Geology

2.11.1. Topography

The site is level to gently sloping and sits at approximately 100 feet above mean sea level (msl). The surrounding region is hilly, with hilltop elevations in the area ranging from 130-150 feet msl to the west and south. Topographic elevations are illustrated on Figure 1-2.

2.11.2. Soils

The soils at the site are classified as Riverhead and Haven soils, with graded slopes of 0-6 percent. The soils at the site have been reworked during earlier development and are a well-drained medium to moderately coarse sand, with a loam to sandy loam subsoil. The substratum is described as a sand and gravel (USDA, 1975). The surficial geology of the area is classified as a till moraine with highly variable sorting (SUNY, 1989). (See Figure 2.11-1.)

2.11.3. Bedrock

The bedrock underlying the unconsolidated deposits of Long Island is composed of rock originating 245 million to 2 billion years ago. The unconsolidated, surficial geology deposits are so massive on Long Island that little is known regarding the bedrock in the area of the project site (Fisher and Others, 1970; SUNY, 1991). The depth to bedrock beneath the project site is greater than 800 feet below ground surface USGS, 1995).

2.11.4. Seismic Setting

New York State is characterized as a location of moderate level seismicity and seismic hazard. The highest levels of seismicity in the state are located in the metropolitan New York City area, the northern Adirondacks, and Western New York (Jacob, 1993).

New York State has developed new seismic provisions for the New York State Building Code. These provisions have not yet been formally incorporated into the New York State Building Code. The foundation of these draft provisions is a Seismic Zone Map. This map is divided into four seismic zones, A (lowest potential damage), B, C, and D (highest potential for damage), with assigned seismic zone factors equal to 0.09g, 0.12g, 0.15g, and 0.18g, respectively, with "g" equal to the force on an object at the surface relative to gravity. New structures are built based on these seismic zone factors. The seismic factors for each zone identify certain seismic forces on structures during an earthquake with a 10 percent probability of occurring within 100 years. Most of New York State including Long Island, is located within Zone C (Gergely, 1993; Jacob, 1993).

2.11.5. Probable Impacts of the Project

The soils at the site have been previously reworked and are suitable for construction activities. Bedrock and groundwater are located at depths that will not interfere with construction, that is, no groundwater dewatering, nor bedrock blasting would be required to support construction.

The seismic history of the region indicates that moderate energy earthquakes are possible. Seismic provisions are in place within the building codes for construction in this seismic environment. To meet this seismic condition, all project buildings would be built to meet or exceed the most stringent (current or proposed) seismic design provisions. The proposed project is not expected to have a significant adverse impact resulting from soils and geological conditions. *

2.12 Natural Resources

2.12.1. Introduction

This section addresses the natural resources present on the project site and in close proximity to the project site. This information was primarily obtained from an ecological reconnaissance conducted during the early spring of 2002. The New York State Department of Environmental Conservation (NYSDEC) Natural Heritage Program and U.S. Fish and Wildlife Service (USFWS) were contacted regarding the occurrence of any state-listed or federal-listed rare species at the project site or in the vicinity of the site. Responses have not yet been received from these agencies.

2.12.2. Existing Conditions

The project site is situated along the northwest perimeter of the campus and is bounded by the SUNY steam plant to the south, Gymnasium Road to the north, SUNY maintenance facility buildings to the east, and North Loop Road to the west. The project site consists entirely of developed areas (i.e., structures, pavement or landscaping) with some undeveloped areas present to the south and west. The project site has been extensively disturbed and presently contains several buildings and structures associated with the existing power plant on the site. The project site consists of sandy loam material and is designated as graded Riverhead and Haven Soil Series by the Suffolk County Soil Survey (SCS, 1987).

a. Vegetation

The limited areas of vegetation present within the project site consists entirely of landscaped areas associated with the existing power plant facility and other buildings. The site vegetation is several small areas of maintained lawn with scattered ornamental trees (generally less than 30 feet in height).

The vegetation between the North Loop Road and the Long Island Railroad tracks (from the project site to the existing SUNY sewer treatment plant) was also examined and characterized during the site visit. In general, vegetated areas consist of lawn and scattered narrow bands of vegetation consisting of small trees with dense understory scrub-shrub vegetation.

A small ravine is present to the south of the site (i.e., south of the service road that accesses the SUNY facility and maintenance buildings). Vegetation within this ravine is comprised of shrubs and herbaceous vegetation consisting of silky dogwood (*Cornus amomum*) and common cat-tail (*Typha latifolia*) with the invasive, Japanese honeysuckle (*Lonicera japonica*) also present.

b. Wetlands

The project site and immediate vicinity were investigated for the presence of wetlands as defined by the New York State Department of Environmental Conservation (NYSDEC) under the New York Freshwater Wetlands Act and the U.S. Army Corps of Engineers (ACOE) based on the 1987 ACOE Wetlands Delineation Manual. The NYSDEC has mapped all freshwater wetlands greater than 12.5 acres in extent. No NYSDEC mapped freshwater wetlands are present on the project site or within the vicinity of the project site (Figure 2.12-1).

The ACOE regulates certain activities proposed within navigable waters under Section 10 of the Rivers and Harbors Act of 1899. In addition, the ACOE regulates the discharge of dredged or fill material into wetlands under Section 404 of the Clean Water Act. Wetland boundaries regulated by the ACOE are determined using a three parameter approach described in the current accepted Corps Manual (ACOE, 1987) for identifying and delineating jurisdictional wetlands. The manual uses three parameters to identify and delineate wetland boundaries: (1) evidence of wetland hydrology, (2) presence of hydric soils, and (3) predominance of hydrophytic vegetation (as defined by the National Plant List Panel).

The site inspection concluded that navigable waters (as defined by the ACOE) are not present on the project site. A small stream and associated wetlands are present to the south, offsite, within the bottom of the small ravine located south of the service road to the SUNY facility and maintenance buildings. The wetland is jurisdictional under Section 404 of the Clean Water Act. No jurisdictional buffer area is associated with the wetland.

Several large constructed basins are present west of the North Loop Road. The two largest basins are separated by a broad berm although several large culverts provide hydrological connections between these basins. The steep banks adjacent to the two basins preclude the establishment of significant amounts of wetlands vegetation along the periphery of the basins. Another smaller basin is present to the southwest of the two large basins and receives surface water via an overflow pipe from the southernmost large basin. At the time of the site inspection, this small basin did not contain standing water. At the time of the site inspection, surface water within the two large basins was greenish in color. These basins are depicted as wetlands (Palustrine Open Waters) on the National Wetland Inventory map that depicts the project site vicinity (see Figure 2.12-1). However, as these basins are man-made and continue to function as discharge basins, the basins would not be regulated as wetlands by the ACOE.

c. Wildlife

The NYSDEC Natural Heritage Program and the USFWS were contacted regarding the potential presence of state-listed or federal-listed endangered, threatened, or species of special concern within the vicinity of the project site. Responses have not yet been received from these agencies. No endangered, threatened or rare wildlife species were noted during the site reconnaissance.

Wildlife present on the project site is expected to be very limited due to the significant amount of disturbance that has occurred on the project site and extensive amount of development in the site vicinity. The project site itself does not function as important habitat for biological resources. The extensive disturbances to the project site are expected to limit wildlife use of the project site primarily to various avian and small mammal species adapted for developed areas and a maintained lawn community. A few representative bird species expected to inhabit the project site include European starling

(*Sturnus vulgaris*), house sparrow (*Passer domesticus*), rock dove (*Columba livia*), mourning doves (*Zenaida macroura*), northern mockingbird (*Mimus polyglottus*), and American robin (*Turdus migratorius*). Small mammal species anticipated to use the project site would include house mouse (*Mus musculus*), Norway rat (*Rattus norvegicus*), and white-footed mouse (*Peromyscus leucopus*).

Additional wildlife are expected to use the adjacent less-developed habitats associated with the small stream and wetland present within the ravine as well as the man-made basins. Various waterfowl and wading birds would be expected to forage or nest within the basins. Several dozen mallard ducks (*Anas platyrhynchos*) and Canada geese (*Branta canadensis*) as well as ring-billed gulls (*Larus delawarensis*) and a great blue heron (*Ardea herodias*) were noted at the basins during the site inspection. Additional wildlife likely to inhabit the stream/wetland present within the ravine would include amphibians such as the green frog (*Rana clamitans*), reptiles such as the eastern garter snake (*Thamnophia sirtalis*), mammals including the eastern cottontail (*Sylvilagus floridanus*), and birds such as the common yellowthroat (*Geothlypis trichas*), song sparrow (*Melospiza melodia*) and black-capped chickadee (*Parus atricapillus*).

2.12.3. Probable Impacts of the Project

This section addresses the potential impacts to vegetation, wetlands and wildlife associated with the construction and operation of the project.

a. Vegetation

Based on the site reconnaissance, no sensitive plant species were observed on the project site. Office record information regarding historical occurrence of rare and/or sensitive vegetation on the project site is pending from various agencies. Although construction of the project would result in the permanent removal of the vegetation present upon the project site, significant or unusual plant communities, populations, or individuals are not expected to be adversely affected. The plant communities present on the project site consist of scattered areas of maintained lawn and ornamental shade trees.

The project would limit the footprint of disturbance, and locate the facility within the more heavily disturbed portion of the site. Due to the extensive amount of disturbance that has occurred on the project site, important plant communities comprised of native vegetation are not present in the vicinity of the areas of development. Landscaping around the proposed development will utilize native plants to the greatest extent possible and practical.

b. Wetlands

Wetlands are not present on the project site. Although a wetland associated with the small ravine located to the south of the project site is present, no work is proposed within this wetland. Therefore, wetland regulatory programs are not applicable, and no significant adverse impacts would occur to wetland resources located in the vicinity of the project site.

c. Wildlife

Based on the site reconnaissance conducted in the early spring of 2002, there are no sensitive habitats present on the project site. Information regarding historical occurrence of rare and/or sensitive wildlife on the project site is pending. Although construction of the project would result in the permanent removal of the limited vegetation present upon the project site, significant adverse effects to significant or unusual wildlife habitats are not expected.

2.12.4. Conclusions

The entire area of the proposed project site is developed and consists of several large buildings, paved areas, and limited areas of landscaping (lawn and shade trees). No significant vegetation or plant communities are associated with the project site. No wetlands are present on the project site. Although a small wetland is present to the south of the project site, no impacts would result to this wetland from the proposed project. Wildlife usage of the project site is expected to be minimal and restricted to species typically associated with heavily developed areas. No significant habitats or wildlife species are present on the project site. Therefore, the proposed project would have no significant adverse impacts to these natural resources. *

2.13 Water Resources

2.13.1. Groundwater

a. Introduction

The following subsections provide an overview of groundwater resources in the project vicinity. Regional and local water table mapping are provided together with an assessment of the depth to groundwater at the project site.

On Long Island, groundwater represents the primary source for meeting domestic, commercial, and industrial water supply needs. Groundwater is located beneath Long Island in aquifers. Aquifers are geologic formations that can store, transmit, and yield usable quantities of water. These formations can be located in unconsolidated deposits, such as sand and gravel, or in bedrock that has interconnected fractures (cracks). Long Island's principal water supply aquifers are located in unconsolidated deposits.

The three principle aquifers on Long Island, from shallowest to deepest, include the Upper Glacial Aquifer, the Magothy Aquifer, and the Lloyd Aquifer. Across most of Long Island, the Magothy and Lloyd Formations are separated by the Raritan Clay. The bottom of this aquifer system, at the base of the Lloyd Aquifer, rests on bedrock approximately 800 to 1,000 feet below ground surface at the project site.

The top of the groundwater surface at any given location is called the water table. In general, the water table on Long Island slopes gently in conformance with surface topography. Regional water table mapping for Suffolk County is illustrated in Figure 2.13-1. Groundwater in the central and southern portions of Suffolk County typically flows toward the Atlantic Ocean and groundwater along the northern portion of the county flows toward Long Island Sound. The dividing line at the top of the groundwater mound, which extends roughly along the terminal moraine formed during the last ice age, is called the groundwater divide. The general direction of groundwater flow beneath the site is toward the northwest (See Figure 2.13-1).

Approximately one-half of the estimated 45 to 46 inches of annual rainfall on Long Island percolates through the soil to recharge the aquifer system (LIRPB, 1992). The movement of groundwater through the Upper Glacial and Magothy aquifers is related to the horizontal and vertical hydraulic conductivity of the formations, the local groundwater gradient and the effective porosity of the saturated unconsolidated deposits. These parameters can be used to estimate the rate at which a formation can transmit water. The capacity of a formation to transmit water is a function of hydraulic conductivity, groundwater gradient, and aquifer thickness.

Regionally, the hydraulic conductivity of the Upper Glacial Aquifer is documented as approximately six times greater than the underlying Magothy Aquifer (USGS, 1995). Locally, the horizontal hydraulic conductivity of the Upper Glacial Aquifer is estimated to range from 100 to 150 feet per day whereas the vertical hydraulic conductivity is estimated to range between 10 and 15 feet per day. For the Magothy formation, horizontal hydraulic conductivity is estimated to range from 10 to 50 feet per day until you reach the lower Magothy formation, which has an estimated horizontal hydraulic conductivity ranging between 50 and 150 feet per day. The vertical hydraulic conductivity of the Magothy Aquifer is estimated to be significantly lower than the horizontal hydraulic conductivity, ranging between 0.05 and 2.0 feet per day. Because of the large difference between horizontal and vertical hydraulic conductivities of the formations in this area, groundwater moves faster horizontally than vertically through these units (USGS, 1995). The effective porosity of the Upper Glacial and Magothy Formations typically ranges between 0.15 and 0.35 feet per day (CDM, 1994).

In many parts of Suffolk County, groundwater is drawn from the Upper Glacial Aquifer to support private wells and community systems. Larger municipal distribution systems near the project site draw groundwater from the deeper Magothy Aquifer.

b. Groundwater Classifications and Protection Zones

Federal Designations

In 1978, the Environmental Protection Agency (EPA) identified the aquifer system underlying the project site as a Sole Source Aquifer. A Sole Source Aquifer is defined by the EPA as an aquifer that is the sole or principle drinking water source for the area, which, if contaminated would create a significant hazard to public health. The Sole Source Aquifer is inclusive of the three primary aquifers beneath the project site and is identified by the EPA and the NYSDEC as the Nassau-Suffolk Aquifer System (FR, 1978).

State Designations

Groundwater beneath the project site is classified by NYSDEC as Class GA, fresh groundwater that is suitable for use with or without treatment.

County Designations

To safeguard the long-range water supply for the Island, the Long Island Regional Planning Board (LIRPB) identified eight hydrogeologic zones and recommended that land use controls be adopted for areas contributing recharge to public water supply wells (L.I. 208 Study, 1978). The hydrogeologic zone boundaries were refined in 1992 as part of the Long Island Comprehensive Special Groundwater Protection Plan, and subsequently codified by the Suffolk County Department of Health Services through adoption of Suffolk County Sanitary Code, Article 7.

The hydrogeologic zones (aquifer protection zones identified as Zones I through VIII) are used in-place of wellhead protection zones to safeguard the groundwater resources of the county, especially in deep recharge areas and water supply sensitive areas.

Under Article 7 of the Suffolk County Sanitary Code Zones I, II, III and V were identified as locations that contribute recharge water to a deep groundwater flow system. Deep groundwater flow systems are of particular significance since they supply the bulk of the water currently used across the Island. In general, they encompass the central portion of Suffolk County.

Suffolk County Sanitary Code Article 7 also designates water supply sensitive areas. A water supply sensitive area includes areas in "close proximity" to existing or identified future public water supply wells or wellfields. The term "close proximity" means the land surface area located 1,500 feet upgradient or 500 feet downgradient of public supply wells screened in the Upper Glacial Aquifer (i.e., the surficial aquifer across Long Island).

Review of the Suffolk County Sanitary Code Article 7 - Groundwater Management Zone and Water Supply Sensitive Areas Map indicates that the project site is located at the downgradient edge of Zone I, but does not appear to lie within a designated Water Supply Sensitive Area. The project site also lies within a Special Groundwater Protection Area (LIRPB, 1992).

Special Groundwater Protection Areas were identified by the Long Island Regional Planning Board and in New York State's Long Island Groundwater Management Program in a 1992 study. Within Special Groundwater Protection Areas, the study called for the development of new management programs to ensure the preservation of the existing water quality and the continued recharge of uncontaminated water to these portions of the aquifer.

The location of the project site relative to the Suffolk County Article 7 Hydrogeologic Zones and the Special Groundwater Protection Areas is illustrated in Figures 2.13-2 and 2.13-3.

c. Groundwater Protection

Since the proposed project site falls within Suffolk County Groundwater Management Zone I, the project has been designed to meet the standards for the storage of any toxic or hazardous materials listed under Suffolk County Sanitary Code Articles 7 and 12.

The material storage tanks proposed to support the facility would be designed with state-of-the-art spill prevention, secondary containment, and leak detection/monitoring systems to prevent any accidental spill from permeating, draining, infiltrating, or otherwise escaping from the facility to groundwater.

The unloading areas for potentially hazardous materials would also be constructed with secondary containment systems capable of collecting and preventing the migration of leaks or spills to soil or groundwater.

Where appropriate, secondary containment systems would be designed with visible and audible alarms. All ancillary equipment to prevent a leak or spill would be inspected and tested monthly.

The proposed project is not expected to result in any significant adverse impacts to groundwater resources.

2.13.2. Surface Waters and Aquatic Resources

There are no surface waters or wetlands located on-site, adjacent to the site or along utility interconnection routes. There are also no surface-water drinking water supply intakes located within the project area or along utility interconnection routes.

Since there are no surface waters present on or adjacent to the project site or in areas to be disturbed for interconnections, the project would not result in any significant adverse impacts to surface water resources or aquatic resources of the Suffolk County. *

2.14 Stormwater Management and Spill Prevention

2.14.1. Introduction

Currently no stormwater runoff is released to surface waters. Because of the low topographic relief of the project site and surrounding area, surface run-on from offsite areas is also negligible.

The existing facility has and operates using a Storm Water Pollution Prevention Plan and a Spill Prevention, Control and Countermeasure (SPCC) plan. The operators and all contractors are contractually obligated to maintain a clean work environment while onsite work is performed.

The following presents descriptions of the techniques used to prevent stormwater and spill contamination, and a conceptual site plan showing intended structures and improvements to prevent stormwater contamination, including chemicals, fuel oil or other contaminants from storage facilities, product delivery, plant operation, plant maintenance, and waste handling activities.

2.14.2. Stormwater Management

Stormwater from the proposed facility would be managed using the existing SUNY Stony Brook system, which currently handles stormwater from the project site and the entire physical plant services complex. There are 30-inch and 12-inch stormwater mains at the project site that ultimately discharge to stormwater recharge basins located to the east of the physical plant services complex. Stormwater from these basins infiltrates to the groundwater.

Stormwater quality would continue to be regulated by the State Pollutant Discharge Elimination System (SPDES) permit issued to SUNY Stony Brook. This permit ensures that the stormwater quality would not adversely affect groundwater quality.

2.14.3. Aboveground Storage Tank and Containment System Design Guidelines

The secondary containment, monitoring systems, and spill and overfill prevention systems at the facility would be designed, constructed, and installed in accordance with industry standards or applicable codes. The project would be designed and operated in accordance with standards established by Article 12 of the Suffolk County Sanitary Code, Toxic and Hazardous Materials Storage and Handling Controls, and 6 NYCRR 596, Hazardous Substance Bulk Storage Tanks (ammonia, sulfuric acid [or hydrochloric acid], sodium hydroxide, sodium hypochlorite).

As required by Article 12 of the Suffolk County Sanitary Code, any new aboveground storage tanks, secondary containment basins and off loading areas for toxic or hazardous materials or petroleum products would be designed based on the following:

- Secondary containment basins would be capable of storing 110 percent of the design capacity of the storage tank contents;
- The entire area enclosed by the tank would be made permanently impervious to the types of products being stored;

- Drainage of precipitation from within the diked area or off loading area would be controlled in a manner that will prevent any toxic or hazardous materials from entering the ground, groundwaters or surface waters of Suffolk County;
- A positive means of detecting an overfilling condition would be provided so as to identify and halt any spillage;
- The overflow point on the storage facility would be clearly visible to the operator filling the facility or the operator at the receiving facility;
- Any tank sitting on the ground and making contact with the ground would be cathodically protected in conformance with designs previously approved for similar projects and the interior bottom of those facilities would be properly bonded with an epoxy coating to minimize interior corrosion;
- All tanks would be inspected prior to use and proof of inspections would be filed; and
- All aboveground storage tank inspections would be performed by an authorized tank inspection firm or licensed professional engineer in accordance with a written protocol.

The developer would register the new storage tanks after final design of the facility. A New York State Licensed Professional Engineer would prepare these plans. Registration would be completed prior to the start of tank construction.

All piping, fittings, and connections would be fabricated, constructed, and installed in a manner that will prevent the escape of toxic materials contained therein to the ground, groundwater or surface waters of Suffolk County. The piping, fittings and connections would be:

- Protected against corrosion by the use of non-corrodable materials;
- Designed, constructed, and installed with access points to permit periodic pressure testing of all underground piping without the need of extensive excavation;
- Constructed and installed with a simple, effective, reliable means of monitoring the installation for leakage including a warning device to indicate the presence of a leak, spill, or other failure or breach of integrity for piping installed underground or in areas where piping is not clearly visible; and
- Constructed in durable product-tight galleries.

2.14.4. Aqueous Ammonia Unloading and Storage Area

The aqueous ammonia unloading and storage area would be provided with secondary containment encompassing the unloading area, the storage tanks and transfer pump area. Stormwater within the containment area would be directed to a low point sump from which it will be pumped for off-site treatment at an appropriately licensed facility. The pump would be manually operated following visual inspection by maintenance staff. If any unusual conditions are encountered (odors or visual evidence of a leak or spill) the discharge pump would not be activated until the problem can be corrected.

Each ammonia tank would be equipped with automated level monitoring gages, intermediate level warning indicators, as well as visual and audible high-level alarms. Leak detection devices would also be installed within the secondary containment structure.

All unloading operations would be performed under the direct supervision of plant personnel in accordance with the facility's tank truck unloading procedures. Appendix F contains an Ammonia Risk Assessment.

2.14.5. Transformer Containment Area

New transformers would be provided with secondary containment. Adequate volume would be provided for storage of transformer fluid as well as stormwater retention. Stormwater within the containment dike would be pumped for off-site disposal at an appropriately licensed facility.

2.14.6. Indoor Material Storage Areas

Facility operations require limited amounts of lubricating oils and certain other industrial chemicals, which would be stored in specially designed, covered containment areas. Except for the ammonia, acid and caustic storage tanks, all onsite chemical storage areas would be situated indoors with appropriate containment. Any solids or liquids found within containment areas would be collected for off site disposal at an appropriately licensed facility.

The combustion turbine and generator sets contain lube oil. The oil would be stored in steel tanks. The lube oil reservoirs would have secondary containment designed to contain 110 percent of the oil volume in the unlikely event of a catastrophic failure. Visual and automated leak detection would be provided by the level and pressure indicating control system.

Chemicals, used oils and lubricants would be stored in designated areas with secondary containment. Any incompatible materials (e.g., acid and caustic) would be in separate containment areas. The portable containers within the storage enclosure would not be stacked more than two high without using a properly designed storage rack for that purpose. In addition, portable containers would not be stacked without adequate equipment.

Employees responsible for the handling, storage and management of oil or chemicals would be familiar with proper drum handling methods and procedures in order to prevent spills or leaks from oil/chemical storage drums when in use outside of enclosed containment areas. All employees handling chemicals would receive training in the management of toxic and/or hazardous materials according to Occupational Safety and Health Act (OSHA) and the respective manufacturer's recommendations.

Repairs or modifications to the drum storage enclosure would be performed pursuant to a written protocol previously submitted to the Suffolk County Department of Health Services.

Empty containers or drums, which previously contained toxic or hazardous materials that are empty and no longer in use, would be labeled as such, and not reused unless they are properly relabeled with their contents. Unless containers are labeled empty, they must be treated as active containers. Empty containers would be stored in a way that prevents precipitation from entering the containers. Any water or material observed in an "empty container" would be presumed to be contaminated with the previous contents of the container.

2.14.7. Probable Impacts of the Project

Implementation of the measures discussed above would prevent any significant adverse impacts. *

2.15 Construction

2.15.1. Introduction

Construction of the Calpine SUNY Stony Brook Electric Generating Facility would occur in two (2) phases. Phase I would take approximately 4-6 months, and Phase II, commencing shortly after the construction start of Phase I, would take approximately 15 months.

The first phase (Phase I) would be the construction of a simple cycle GE LM6000 gas fired combustion turbine generator (CT) and associated air pollution control equipment housed in the Once Through Steam Generator (OTSG), which would not be operational. Construction of Phase I would commence in the 1st quarter of 2003 and would be operational by summer of 2003.

The second phase (Phase II) would be the activation of the OTSG and construction of the steam turbine generator and associated cooling tower, which would be operational in 2004.

Construction activities are summarized below.

2.15.2. Construction Description

a. Preconstruction Site Preparation

<u>Phase I</u>

The project site is currently used as a parking lot. The site is located on the western campus perimeter bordered by Gymnasium Road. Trailers or similar portable structures would be provided onsite and at the construction laydown area for temporary offices and for employee comfort facilities during construction.

Demolition of some of the existing parking facilities and limited excavation and site grading would occur during the initial stages of construction. This would be followed by installation of the equipment foundations for the new LM6000 unit. Installation of the equipment pad would require excavation to accommodate a subbase and concrete foundation for the unit. Excavation for the CT foundation would extend beyond the actual footprint of the pad to accommodate concrete forms and to enable the placement of select fill, as needed. Excavated material would either be removed from the proposed project site for off-site disposal, or stockpiled on-site for reuse. Soil erosion and sediment controls would be installed to reduce the potential for erosion and soil loss. It is not expected that there would be the transport of significant soil from the site. All soils disposed of off-site would be disposed of in accordance with all applicable rules and regulations.

Construction of the pads requires approximately 4,200 (Phase I and II) cubic yards of concrete. Engineering properties of the soils would be confirmed as part of the geotechnical investigations. Following confirmatory testing of the exposed foundation subbase soils, concrete would be poured to form the equipment pad.

Site preparation would require heavy equipment for grading and excavation and pad construction. This would include backhoes, front-end loaders, dump trucks, and concrete trucks. During this period, which should last approximately four (4) months (Phase I and II), there would be an estimated 125 workers at the site. Truck trips would be heaviest during the pad installation and would amount to about 40 per day, primarily for concrete delivery.

Phase II

Phase II construction would require limited site preparation as most of the work would be completed during Phase I construction.

b. Unit Assembly and Site Finish

Phase I

Approximately 60 percent of the proposed facility (which includes the CT unit, control system, gas compressor, electric transformer, etc.) would be delivered to the project site in a modular form on trucks, ready for placement on the concrete foundation pad. An on-site crane would be required to lift the components from the transport vehicles for placement on the individual equipment pads.

While the major units of the proposed facility are delivered in modular form, other elements of the facility would be transported to the site in component parts for final on-site fabrication and assembly. This would include the exhaust stack, equipment housing for air compressors, sprint skid, water injection pumps, water filtration systems, etc., gas and water piping, and electrical conduits. On-site fabrication would generally require welding and bolting of pieces.

Separate steel reinforced concrete pads would be constructed for support equipment (e.g., transformers, gas compressors, and water tanks). Construction of the pads for these equipment pieces would be similar, and would consist of excavation and cast in place concrete. This construction would occur in the sequence that this equipment arrives at the site. Concurrently, excavation and trenching for utility connections (gas and water piping and electrical conduits) would occur. Final site installation activities would include restoring all disturbed site areas, striping of designated parking areas and installation of additional security lighting, as necessary.

During the peak phase, about 300 employees would be at the site with the average number of construction workers being 150. Equipment would include cranes, air compressors, and hand held equipment.

Phase II

Most of the equipment that comprises Phase II would be delivered to the project site in modular form on trucks, ready for placement on the concrete foundation pad. Some on-site fabrication and assembly would be required during Phase II. On-site fabrication would generally require welding and bolting of pieces.

The total time required for unit installation would be approximately 15 months from the commencement of Phase I construction. During the peak phase, which would last approximately 4 months, about 300 employees would be at the site with the average number of construction workers being 150. Equipment would include cranes, air compressors, and hand held equipment.

c. Utility Connections

The proposed facility requires connections to a natural gas pipeline, an electrical substation, and water and sewer services.

Phase I

A 69 kV underground electric feeder would connect the Facility to the existing LIPA Stony Brook substation located on the SUNY Stony Brook campus. The electrical interconnection would be via new underground electric transmission lines (about 800 feet).

Natural gas would be delivered by an existing 12 inch high pressure line located on the west side of the project site. There are two existing gas compressors at the site. An additional gas compressor rated at 1,000 horsepower is proposed for the project. A new gas line would be constructed from the existing 12-inch line to the proposed site.

The existing facility currently receives water through an 8 inch line that enters the plant on the southwest end of the building. Water would be supplied to the project through the existing 8 inch line located adjacent to the site. Water would be supplied by the Suffolk County Water Authority (SCWA).

Existing sewer connections to the existing facility are via a 24 inch collector and treated at the Suffolk County Sewer District #21, Sewage Treatment Plant which is located approximately 3,000 feet northeast of the existing NCP facility. The project would tie into the existing 24-inch collector and be treated at the sewage treatment plant.

Utility connections would require the use of backhoes, front-end loaders, dump trucks and utility line trucks. This construction period would overlap with the generating units' installation.

Phase II

Phase II utility connections would be the same as for Phase I.

d. Start-Up and Testing

Phase I

While the CT would be pretested off-site, there would also be testing of all systems prior to start-up and operation. Testing would include the CT, fuel management system, alarm and shut-down devices, auxiliary systems, and unit vibration. Water injection valves and piping are checked for completeness and operation.

The interconnection testing includes high-pressure testing of gas and liquid pipelines, weld testing of all piping during construction, in accordance with American Society of

Mechanical Engineers (ASME) B31.1 of the pressure piping code. Electrical testing includes point-to-point high voltage and resistance tests of electrical cables to detect integrity of electrical connections and insulation integrity per the latest edition of the National Electric Code (NEC). The CT set is again fully re-tested, including calibration of valving and voltage regulator.

Phase II

There would be testing of all systems prior to start-up and operation at the project site. Testing would include the OTSG, steam turbine, cooling tower, alarm and shut-down devices, and auxiliary systems. Water injection valves and piping are checked for completeness and operation. Interconnection testing would also occur to ensure that all connections are secure and safe for operation.

2.15.3. Probable Impacts of the Project

All construction activities would take place in accordance with good construction practices, SUNY requirements, and with the requirements of the various permits for facility construction and operation.

Potential impacts have been assessed for both Phase I and Phase II construction. Except where noted, impacts and control methods are expected to be similar. As a result, this section has not been broken out into Phase I impacts assessment and control methods and Phase II impacts assessment and control methods.

a. Traffic

During construction of the proposed facility, two categories of vehicle trips would encompass the construction activity: worker trips and equipment/supply deliveries. The first category, worker trips, are construction workers traveling to and from the job site. The maximum projected peak number of construction workers employed at any one time would be approximately 300 with an average of 150 construction workers. Construction would be completed in two phases lasting 15 months. It should be noted that the peak construction workforce would only be required during about 4 months. During off-peak construction times, traffic would be significantly less.

Construction may occur over 12 hours (7 AM to 7 PM), 6 days per week (no Sunday). It is expected that evening activities would be necessary for certain construction tasks (e.g., concrete pours) but would require a smaller number of workers than would occur during peak daytime hours. Based on the typical construction workday, it is anticipated that the majority of the construction workers would arrive at and depart the proposed project site outside of peak roadway hours. It is anticipated that construction workers would park their vehicles at the south P lot and be bussed to the construction site.

Truck movements for materials delivery and removal would be spread throughout the day on weekdays, and would generally occur between the hours of 8 AM and 4 PM, depending on the period of construction. Again, extensions of this basic workday, or moderate amounts of evening or weekend work would likely occur. The maximum number of trucks is estimated to be approximately 40 trucks per day. Trucks would enter through the South Campus entrance per SUNY guidelines.

Based on the amount of construction-related traffic expected, the hours when trips would occur, the limited duration of peak construction, and existing roadway traffic volumes and capacity, it is not anticipated that construction activities would result in any significant adverse traffic impacts.

b. Hazardous Materials

Soils and groundwater immediately to the west of the proposed project is known to be contaminated with No. 6 fuel oil from a release that occurred in 1987. If deemed necessary, remediation would be performed in compliance with all applicable regulations.

A Health and Safety Plan would be developed and implemented by the proposed project's general contractor prior to construction to ensure that the potential for exposure of construction workers, workers on nearby sites, SUNY Stony Brook employees and students, and others in the area to any contaminants onsite is minimized. The Health and Safety Plan would define worker safety training and monitoring procedures, personal protective equipment, air monitoring equipment, action levels, and appropriate protective measures. In addition, the construction workers would be required to comply with the existing SUNY Stony Brook health and safety programs. All material removed from the project site would be disposed in compliance with all applicable laws and regulations. Hazardous materials required during construction would be stored in designated areas and provided with secondary containment. With these measures, no significant adverse impacts would occur during construction.

c. Air Quality

This section presents a discussion of potential air quality impacts from the construction of the proposed project. Construction-related emissions can be classified into two distinct sources: criteria pollutant emissions from private and construction vehicle internal combustion engines; and fugitive dust that results from vehicle movement over paved and unpaved roads, material handling, earth moving/grading, etc.

Construction-related emissions from the two types of sources vary with the types of activities associated with the three typical phases of a construction project. The EPA, in Section 13.2.3 of its AP-42 emission factor guidance (EPA, 1995), identifies three phases of a heavy construction project with respect to construction-related emissions:

- *Phase 1:* Debris Removal;
- *Phase 2:* Site Preparation; and
- *Phase 3:* General Construction.

AP-42 includes the following activities under each phase:

- *Phase 1:* Debris removal of any man-made or natural obstructions can include blasting, explosion, mechanical removal, material loading/unloading, and vehicular traffic over unpaved areas;

- *Phase 2:* Site preparation is grading and soil stabilization, and cut and fill activities which can include movement of large earth moving equipment over disturbed surfaces, material/aggregate loading and unloading, vehicular traffic over unpaved areas; and
- *Phase 3:* General construction is foundation work, structural steel, exterior/interior operations, piping/electrical work, final landscaping.

Potential criteria pollutant (engine) and fugitive dust emissions associated with the 15-month construction schedule are discussed below.

Vehicle Emissions

Vehicle emissions can occur as a result of traffic and/or added trip length from private vehicles that encounter roadway diversions or detours associated with the proposed project, as well as from emissions from the actual construction vehicles. If the diversions and detours are significant, or impact a large number of private vehicles, an air quality analysis is recommended by the regulatory agency (NYSDOT, Environmental Analysis Bureau). For the construction of the project, there would be only brief road closures or diversion for utility line road crossings or receiving large equipment. Therefore, an air impact analysis for this aspect of construction (i.e., private vehicles) is not necessary.

Construction vehicles would emit criteria pollutants. However, impacts are expected to be minimal for several reasons. During site preparation limited demolition would be required because the project site is relatively clear of existing structures. While there may be some grading required of the site during site preparation, it is anticipated that heavy construction activity likely would be limited to a short period. During unit assembly and site finish, impacts would be minimal since much of the equipment is prefabricated prior to arrival at the project site. In addition, construction vehicles to be used would be well maintained which would result in efficient fuel combustion and minimal criteria pollutant emissions.

The number of vehicles would be modest and would not cause a significant adverse impact.

Fugitive Dust

As stated above, heavy construction activities would be minimal, as demolition and grading activities are not anticipated to be significant. In addition, the nearest on-campus housing (Kelly Quad) and the nearest off-campus residences are sufficiently distant from the project site such that there would be minimal impacts from fugitive dust emissions. Several measures would be employed during construction activities to ensure that dust suspension is kept low. These include:

- Keeping construction vehicle speed low to reduce dust suspension;
- Covering exposed stockpiles of soil and gravel to eliminate wind-driven dust suspension, or as an alternate, minimizing the height of these piles;
- The periodic washing of paved surfaces during dry periods as a means to suppress dust suspension; and

- The application of water on stockpiles and unpaved roads during dry periods as a means to suppress dust suspension.

d. Noise

Noise levels of construction equipment typically utilized for this type of project are presented in Table 2.15-1 (BBN, 1971). It is important to note that the equipment presented are not used in each phase of construction. Further, equipment used is not generally operated continuously, nor is the equipment always operated simultaneously. Typical site average sound levels for each phase of construction (BBN, 1971) are presented in Table 2.15-2. The highest site average sound levels (89 dBA at 50 feet) are associated with excavation and finishing activities. During both, Phase I and Phase II construction excavation work would be limited.

Table 2.15-1: Noise Levels of Major Construction Equipment

Equipment Type	Noise Level at 50 Feet (dBA)
Trucks	91
Crane	83
Roller	89
Bulldozers	80
Pickup Trucks	60
Backhoes	85

Source: (BBN, 1971)

Table 2.15-2 Typical Site Average Noise Levels at 50 Feet by Construction Activity (dBA)

Construction Phase	Noise Level at 50 Feet (dBA)
Site Clearing	84
Excavation	89
Foundations	77
Building Assembly	84
Finishing	89

The noise levels presented in Tables 2.15-1 and 2.15-2 would be attenuated by a variety of mechanisms. The most significant of these is the attenuation of the sound with distance. In general, this mechanism would result in a 6 dBA decrease in the sound level with every doubling of distance from the source. For example, the 89 dBA sound level associated with excavation and finishing would be attenuated to 63 dBA at a distance of 1,000 feet. The site is approximately 1,000 feet from the nearest on-campus housing and approximately 850 feet from the nearest off-campus residence. At these distances, noise due to excavation or finishing would be expected to result in a noise level of 63 dBA at the nearest on-campus housing and 64 dBA at the nearest off-campus residence. At times, noise from these and other construction activities would be readily noticeable and intrusive. However, these effects would occur for a limited time period, during daytime hours (i.e., between the hours of 7 AM and 7 PM), and during some phases of construction, noise from construction activities would not produce noticeable increases in noise levels even at these close locations.

The sound levels presented are those which would be experienced by people outdoors. A building (house) would provide significant attenuation for those who are indoors. Sound levels can be expected to be up to 27 dBA lower indoors with the windows closed. Even in homes with the windows open, indoor sound levels can be reduced by up to 17 dBA (EPA, 1974). Lastly, in order to reduce construction noise levels to the greatest extent possible and practical, functional mufflers would be maintained on construction equipment.

It should be noted that the Town of Brookhaven noise standard exempts construction activities, with the restriction that construction activity is only allowed between the hours of 7 AM and 6 PM on weekdays. As discussed in Section 2.1.3, the project is not subject to these local regulations, and construction activities at times would take place during evening hours and on Saturday. Hours of construction would be determined in consultation with SUNY Stony Brook.

Therefore, no significant noise impacts due to facility construction are anticipated.

2.15.4. Erosion Control

Stormwater management during construction activities would be performed through implementation of a site-specific erosion and sediment control plan. In accordance with NYSDEC guidelines, the erosion and sediment control plan would include both structural and non-structural components. The structural components are expected to consist of hay bale barriers/silt fencing, inlet protection for existing or newly installed catch basins, and installation of a stabilized construction entrance or other appropriate means to limit potential off-site transport of sediment. The non-structural "best management practices" would include routine inspection, dust control, cleaning and maintenance programs, instruction on the proper management, storage and handling of potentially hazardous materials, as well as identification of parties responsible for implementation and on-going maintenance programs. All temporary control measures would be maintained until disturbed areas of the site are stabilized and a permanent stormwater management system is complete and operational. *

2.16 Cumulative Impacts

A cumulative impact analysis was performed to examine whether the proposed project, cumulatively with other relevant facilities (i.e., facilities built for LIPA for the Summer of 2002, and facilities proposed for LIPA for the Summer of 2003), would have the potential for causing significant adverse environmental impacts. The cumulative impact analysis considered each of the environmental categories (i.e., land use and zoning, community facilities, cultural resources, contaminated materials, traffic, air quality, noise, etc.) as analyzed above. Because of the very localized extent of each such facility's impacts, in all areas other than air quality, cumulatively the new LIPA electric generating facilities have no potential for significant impacts.

With respect to air quality, the LIPA facilities would also have only very localized effects, though other larger facilities (not part of the LIPA system) could have broader impacts. Consequently, quantified analyses were performed to assess the potential cumulative air quality impacts of the proposed project together with such facilities. The detailed cumulative analyses contained in Section 2.7, "Air Quality," show that all of the maximum concentrations from stack emissions would be below the applicable air quality standards. Therefore, in terms of air quality, the proposed project would not, either individually or cumulatively, have any significant adverse environmental impacts. *

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Appendix A
Completed EAF

Appendix A
State Environmental Quality Review
FULL ENVIRONMENTAL ASSESSMENT FORM

Purpose: The full EAF is designed to help applicants and agencies determine, in an orderly manner, whether a project or action may be significant. The question of whether an action may be significant is not always easy to answer. Frequently, there are aspects of a project that are subjective or unmeasurable. It is also understood that those who determine significance may have little or no formal knowledge of the environment or may not be technically expert in environmental analysis. In addition, many who have knowledge in one particular area may not be aware of the broader concerns affecting the question of significance.

The full EAF is intended to provide a method whereby applicants and agencies can be assured that the determination process has been orderly, comprehensive in nature, yet flexible enough to allow introduction of information to fit a project or action.

Full EAF Components: The full EAF is comprised of three parts:

Part 1: Provides objective data and information about a given project and its site. By identifying basic project data, it assists a reviewer in the analysis that takes place in Parts 2 and 3.

Part 2: Focuses on identifying the range of possible impacts that may occur from a project or action. It provides guidance as to whether an impact is likely to be considered small to moderate or whether it is a potentially-large impact. The form also identifies whether an impact can be mitigated or reduced.

Part 3: If any impact in Part 2 is identified as potentially-large, then Part 3 is used to evaluate whether or not the impact is actually important.

THIS AREA FOR LEAD AGENCY USE ONLY
DETERMINATION OF SIGNIFICANCE -- Type 1 and Unlisted Actions

Identify the Portions of EAF completed for this project: ☒ Part 1 ☐ Part 2 ☐ Part 3

Upon review of the information recorded on this EAF (Parts 1 and 2 and 3 if appropriate), and any other supporting information, and considering both the magnitude and importance of each impact, it is reasonably determined by the lead agency that:

☒ A. The project will not result in any large and important impact(s) and, therefore, is one which will not have a significant impact on the environment, therefore **a negative declaration will be prepared.**

☐ B. Although the project could have a significant effect on the environment, there will not be a significant effect for this Unlisted Action because the mitigation measures described in PART 3 have been required, therefore **a CONDITIONED negative declaration will be prepared.***

☐ C. The project may result in one or more large and important impacts that may have a significant impact on the environment, therefore **a positive declaration will be prepared.**

*A Conditioned Negative Declaration is only valid for Unlisted Actions

Calpine Stony Brook Energy Center
Name of Action

Long Island Power Authority
Name of Lead Agency

Ed Grilli	Chief of Staff
Print or Type Name of Responsible Officer in Lead Agency	Title of Responsible Officer
Edward A. Grilli	[signature]
Signature of Responsible Officer in Lead Agency	Signature of Preparer (if different from responsible officer)

January 21, 2003
Date

PART 1 -- PROJECT INFORMATION
Prepared by the Project Sponsor

NOTICE: This document is designed to assist in determining whether the action proposed may have a significant effect on the environment. Please complete the entire form, Parts A through E. Answers to these questions will be considered as part of the application for approval and may be subject to further verification and public review. Provide any additional information you believe will be needed to complete Parts 2 and 3.

It is expected that completion of the full EAF will be dependent on information currently available and will not involve new studies, research or investigation. If information requiring such additional work is unavailable, so indicate and specify each instance.

Name of Action Calpine Stony Brook Energy Center - 79.9 MW installation of a gas fired combined cycle (CC) electrical generating plant to be located adjacent to an existing gas fired cogeneration facility

Location of Action (include Street Address, Municipality and County)

North Loop Road, State University of New York at Stony Brook, Brookhaven, Suffolk County, NY

Name of Applicant/Sponsor Calpine Stony Brook Energy Center 2, Inc.

Address The Pilot House, 2nd Floor, Lewis Wharf

City / PO Boston State MA Zip Code 02110

Business Telephone 617-557-5300

Name of Owner (if different) ____

Address ____

City / PO ____ State ____ Zip Code ____

Business Telephone ____

Description of Action:

The Project is the construction of a 79.9 MW gas fired combined cycle (CC) electrical generating facility at the State University of New York (SUNY) at Stony Brook, in the Town of Brookhaven, New York. The Project will be constructed adjacent to the existing cogeneration facility on an already developed site. The site is located on the campus perimeter bordered by Gymnasium Road to the north, SUNY Facilities Management and Maintenance Buildings to the east, the SUNY Steam Plant to the south and North Loop Road to the west. The Project will generate electricity for use by SUNY and the Long Island Power Authority (LIPA) service area, as well as provide backup steam capability for the University's heating and cooling needs. Construction will take place in two phases. The first phase will be the construction of a simple cycle gas fired turbine with an output to the grid of approximately 44 MW, to be operational by the summer of 2003. The second phase will be the construction of the heat recovery steam generator and steam turbine generator to be operational by the summer of 2004. LIPA would enter into a power purchase agreement to purchase the power generated by the proposed facility and not used by SUNY.

For process and cooling water needs, the plant is reviewing two options. Option A would use water supplied by a new line from the Suffolk County Water Authority's distribution system. Option B would use water from wells on the University's campus. The proposed facility will use an existing wastewater line to the existing County wastewater treatment facility. It is proposed to connect to the county's wastewater treatment infrastructure at the headworks.

The unit will use water injection and Selective Catalytic Reduction (SCR) to achieve low NOx emissions rates. The unit will also use an Oxidation Catalyst to achieve low CO and VOC emission rates.

Please Complete Each Question -- Indicate N.A. if not applicable

A. SITE DESCRIPTION

Physical setting of overall project, both developed and undeveloped areas.

1. Present Land Use ☐ Urban ☐ Industrial ☐ Commercial ☐ Residential (suburban) ☐ Rural (non-farm) ☐ Forest ☐ Agriculture ☒ Other Industrial use at State University

2. Total acreage of project area: approximately 1.5

APPROXIMATE ACREAGE	PRESENTLY		AFTER COMPLETION	
Meadow of Brushland (Non-agricultural)		acres		acres
Forested		acres		acres
Agricultural (includes orchards, cropland, pasture, etc.)		acres		acres
Wetland (Freshwater or tidal as per Articles 24, 25 of ECL)		acres		acres
Water Surface Area		acres		acres
Unvegetated (Rock, earth or fill)		acres		acres
Roads, buildings and other paved surfaces	1.5	acres	1.5	acres
Other (Indicate type)		acres		acres

3. What is predominant soil type(s) on project site? The area is currently mapped as containing Riverhead and Haven Soils, Graded, 0 to 8 percent, though most of the actual site is currently paved).

   a. Soil drainage: ☒ Well drained 100 % of site ☐ Moderately well drained ____% of site.

   b. If any agricultural land is involved, how many acres of soil are classified within soil group 1 through 4 of the NYS Land Classification System? NA Acres (see 1 NYCRR 370).

4. Are there bedrock outcroppings on project site? ☐ Yes ☒ No

   a. What is depth to bedrock > 800 (in feet)

5. Approximate percentage of proposed project site with slopes:
   ☒ 0-10 % 100 % ☐ 10-15 % ___% ☐ 15% or greater ____ %

6. Is project substantially contiguous to, or contain a building, site or district, listed on the State or National Registers of Historic Places? ☐ Yes * ☒ No * Confirmatory correspondence with NYSOPRHP is pending.

7. Is project substantially contiguous to a site listed on the Register of National Natural Landmarks? ☐ Yes ☒ No

8. What is the depth of the water table? 80 (in feet)

9. Is site located over a primary, principal, or sole source aquifer? ☒ Yes ☐ No

10. Do hunting, fishing or shell fishing opportunities presently exist in the project area? ☐ Yes ☒ No

11. Does project site contain any species of plant or animal life that is identified as threatened or endangered? ☐ Yes ☒ No

According to:

Based on site visit by TRC project team ecologist. A TRC ecologist visited the site and found no evidence of threatened and endangered species or suitable habitat. Confirmatory correspondence with resource agencies is pending.

Identify each species:

12. Are there any unique or unusual land forms on the project site? (i.e., cliffs, dunes, other geological formation?)
☐ Yes ☒ No

Describe:

13. Is the project site presently used by community or neighborhood as an open space or recreation area?
☐ Yes ☒ No

If yes, explain:

14. Does the present site include scenic views known to be important to the community? ☐ Yes ☒ No

15. Streams within or contiguous to project area:

None

16. Lakes, ponds, wetland areas within or contiguous to project area:

None. There are man made detention basins near the project.

b. Size (in acres):

17. Is the site served by public utilities? ☒ Yes ☐ No

a. If YES, does sufficient capacity exist to allow connection? ☒ Yes ☐ No

b. If YES, will improvements be necessary to allow connection? ☒ Yes ☐ No

18. Is the site located in an agricultural district certified pursuant to Agriculture and Markets Law, Article 25-AA, Section 303 and 304? ☐ Yes ☒ No

19. Is the site located in or substantially contiguous to a Critical Environmental Area designated pursuant to Article 8 of the ECL, and 6 NYCRR 617? ☒ Yes ☐ No The entire SUNY campus is located in a special groundwater protection area.

20. Has the site ever been used for the disposal of solid or hazardous wastes? ☐ Yes ☒ No

B. Project Description

1. Physical dimensions and scale of project (fill in dimensions as appropriate).
   a. Total contiguous acreage owned or controlled by project sponsor: *1.5 acres. * The Project parcel is a 1.5 acre parcel of the 200+ acre SUNY campus complex.
   b. Project acreage to be developed: 1.5 acres initially; 1.5 acres ultimately.
   c. Project acreage to remain undeveloped: 0 acres.
   d. Length of project, in miles: ____________ (if appropriate)
   e. If the project is an expansion, indicate percent of expansion proposed: ____________ %
   f. Number of off-street parking spaces existing * proposed ___ * Parking is shared with other campus uses. About 54 parking spaces could be eliminated by the Project. No new spaces are proposed for the Project.
   g. Maximum vehicular trips generated per hour: < 15 (upon completion of project)
   h. If residential: Number and type of housing units: __________

	One Family	Two Family	Multiple Family	Condominium
Initially				
Ultimately				

   i. Dimensions (in feet) of largest proposed structure: 82 height; 65 width; 215 length.
   j. Linear feet of frontage along a public thoroughfare project will occupy is 0 ft.

2. How much natural material (i.e. rock, earth, etc.) will be removed from the site?: * up to 4500 cubic yards. * Area of disturbance will be less than 1.5 acres, all presently paved.

3. Will disturbed areas be reclaimed? ☐ Yes ☐ No ☒ N/A

   a. If yes, for what intended purpose is the site being reclaimed?

   b. Will topsoil be stockpiled for reclamation? ☐ Yes ☒ No
   c. Will upper subsoil be stockpiled for reclamation? ☐ Yes ☒ No

B & C are not applicable – site is paved.

4. How many acres of vegetation (trees, shrubs, ground covers) will be removed from site? 0 acres

5. Will any mature forest (over 100 years old) or other locally-important vegetation be removed by this project?
☐ Yes ☒ No

6. If single phase project: Anticipated period of construction: ________ months, (including demolition)

7. If multi-phased:

a. Total number of phases anticipated ___2___ (number)
b. Anticipated date of commencement phase 1: ___Mar___ month ___2003___ year, (including demolition)
c. Approximate completion date of final phase: ___June___ month ___2004___ year.
d. Is phase 1 functionally dependent on subsequent phases? ☐ Yes ☒ No

8. Will blasting occur during construction? ☐ Yes ☒ No

9. Number of jobs generated: during construction ___130___; after project is complete ___2 new hires (maximum).___

10. Number of jobs eliminated by this project ___0___.

11. Will project require relocation of any projects or facilities? ☒ Yes ☐ No

If yes, explain:

Parking space associated with the SUNY central stores warehouse will be relocated. No other structures will be disturbed.

12. Is surface liquid waste disposal involved? ☒ Yes ☐ No

a. If yes, indicate type of waste (sewage, industrial, etc) and amount ___Boiler Blow down and Cooling tower blow down (volume approximately 100,000 gallons per day)___

b. Name of water body into which effluent will be discharged ___Discharge to be into the Suffolk County Wastewater Treatment System.___

13. Is subsurface liquid waste disposal involved? ☐ Yes ☒ No Type ________

14. Will surface area of an existing water body increase or decrease by proposal? ☐ Yes ☒ No

If yes, explain:

15. Is project or any portion of project located in a 100 year flood plain? ☐ Yes ☒ No

16. Will the project generate solid waste? ☒ Yes ☐ No

a. If yes, what is the amount per month ___<0.5___ tons
b. If yes, will an existing solid waste facility be used? ☒ Yes ☐ No
c. If yes, give name ___Existing contract will be modified to include waste generated from this project location___.
d. Will any wastes not go into a sewage disposal system or into a sanitary landfill? ☒ Yes ☐ No

e. If yes, explain:

Small quantities of waste oil, and CT washdown water may be generated, and will be disposed off site by a qualified hazardous waste vendor.

17. Will the project involve the disposal of solid waste? ☐ Yes ☒ No

a. If yes, what is the anticipated rate of disposal? __________ tons/month.
b. If yes, what is the anticipated site life? __________ years.

18. Will project use herbicides or pesticides? ☐ Yes ☒ No
19. Will project routinely produce odors (more than one hour per day)? ☐ Yes ☒ No

20. Will project produce operating noise exceeding the local ambient noise levels? * ☐ Yes ☒ No

* The Project has the potential to reduce some existing sources of noise and will not significantly increase noise above existing ambient levels.

21. Will project result in an increase in energy use? ☒ Yes * ☐ No
If yes, indicate type(s):

* The project will generate approximately 79.9 MW of new electricity. Increase in energy use or "parasitic load" will be created by the generation of the plant's gross electrical output.

22. If water supply is from wells, indicate pumping capacity NA * gallons/minute. *Water will be purchased from SCWA or, as backup, via underutilized wells on the campus.

23. Total anticipated water usage per day 700,000 - 1,200,000 gallons/day.

24. Does project involve Local, State or Federal funding? ☐ Yes ☒ No

If yes, explain:

25. **Approvals Required:**

			Type	Submittal Date
City, Town, Village Board	☐ Yes	☒ No	See response to 25.C.2 below.	
City, Town, Village Planning Board	☐ Yes	☒ No		
City, Town Zoning Board	☐ Yes	☒ No		
City, County Health Department	☐ Yes	☒ No		
Other Local Agencies	☐ Yes	☒ No		
Other Regional Agencies	☐ Yes	☒ No		
State Agencies	☒ Yes	☐ No	SUNY SPDES Stormwater Permit Modifications for Operation and /or Construction (possible)	1/03
			SUNY SPDES Pre-Treatment Permit Modification to existing POTW (possible)	02/15/03
			LIPA, Approval of Power Purchase Agreement	01/03
			NYSPSC Section 68 Certificate	01/03
			DEC Air Permit to Construct	03/03
Federal Agencies	☒ Yes	☐ No	FAA "No Hazard" for stack	01/03
			EPA PSD air permit (possible)	03/03

C. Zoning and Planning Information

1. Does proposed action involve a planning or zoning decision? ☐ Yes ☒ No

   If Yes, indicate decision required:

   ☐ Zoning amendment ☐ Zoning variance ☐ New/revision of master plan ☐ Subdivision
   ☐ Site plan ☐ Special use permit ☐ Resource management plan ☐ Other

2. What is the zoning classification(s) of the site?

Not applicable. Because the Project is on the SUNY property and will support State University purposes, it is not subject to local zoning and regulations pursuant to the State Education Law.

3. What is the maximum potential development of the site if developed as permitted by the present zoning?

N/A

4. What is the proposed zoning of the site?

N/A

5. What is the maximum potential development of the site if developed as permitted by the proposed zoning?

N/A

6. Is the proposed action consistent with the recommended uses in adopted local land use plans? ☒ Yes* ☐ No

* The Project is not subject to local land use plans, however, the Project is consistent with local land use in that it is an on-campus industrial use at a location already used for the same purposes.

7. What are the predominant land use(s) and zoning classifications within a ¼mile radius of proposed action?

Educational (SUNY), with mixed residential and institutional to the north/west.

8. Is the proposed action compatible with adjoining/surrounding land uses with a ¼ mile ☒ Yes ☐ No

9. If the proposed action is the subdivision of land, how many lots are proposed? N/A

a. What is the minimum lot size proposed? ____________

10. Will proposed action require any authorization(s) for the formation of sewer or water districts? ☐ Yes ☒ No

11. Will the proposed action create a demand for any community provided services (recreation, education, police, fire protection?

☐ Yes ☒ No No new services required

a. If yes, is existing capacity sufficient to handle projected demand? ☐ Yes ☐ No

12. Will the proposed action result in the generation of traffic significantly above present levels? ☐ Yes ☒ No*

* There will be a maximum of two new hires and traffic will remain the same as the existing operation. During the construction phase, traffic will be impacted by "bell curve" increase in manpower, with a maximum of approximately 130 workers and an average of approximately 68 workers.

a. If yes, is the existing road network adequate to handle the additional traffic. ☒ Yes ☐ No

D. Informational Details

Attach any additional information as may be needed to clarify your project. If there are or may be any adverse impacts associated with your proposal, please discuss such impacts and the measures which you propose to mitigate or avoid them.

E. Verification

I certify that the information provided above is true to the best of my knowledge.

Applicant/Sponsor Name Donald Neal Date 1/14/03

Signature Donald Neal

Title Environmental, Health and Safety Manager

If the action is in the Coastal Area, and you are a state agency, complete the Coastal Assessment Form before proceeding with this assessment. *

* The Project is not in the coastal zone area. One of the alternatives for discharging water to the county sewer system may require a determination of whether coastal assessment applies to the second phase of the Project.

PART 2—PROJECT IMPACTS AND THEIR MAGNITUDE

Responsibility of Lead Agency

General Information (Read Carefully)

- In completing the form the reviewer should be guided by the question: Have my responses and determinations been **reasonable?** The reviewer is not expected to be an expert environmental analyst.
- The **Examples** provided are to assist the reviewer by showing types of impacts and wherever possible the threshold of magnitude that would trigger a response in column 2. The examples are generally applicable throughout the State and for most situations. But, for any specific project or site, other examples and/or lower thresholds may be appropriate for a Potential Large Impact response, thus requiring evaluation in Part 3.
- The impacts of each project, on each site, in each locality, will vary. Therefore, the examples are illustrative and have been offered as guidance. They do not constitute an exhaustive list of impacts and thresholds to answer each question.
- The number of examples per question does not indicate the importance of each question.
- In identifying impacts, consider long term, short term and cumulative effects.

Instructions (Read carefully)

a. Answer each of the 20 questions in PART 2. Answer **Yes** if there will be any impact.
b. **Maybe** answers should be considered as **Yes** answers.
c. If answering **Yes** to a question, then check the appropriate box (column 1 or 2) to indicate the potential size of the impact. If impact threshold equals or exceeds any example provided, check column 2. If impact will occur but threshold is lower than example, check column 1.
d. Identifying that an impact will be potentially large (column 2) does not mean that it is also necessarily **significant**. Any large impact must be evaluated in PART 3 to determine significance. Identifying an impact in column 2 simply asks that it be looked at further.
e. If reviewer has doubt about size of the impact, then consider the impact as potentially large and proceed to PART 3.
f. If a potentially large impact checked in column 2 can be mitigated by change(s) in the project to a small to moderate impact, also check the **Yes** box in column 3. A **No** response indicates that such a reduction is not possible. This must be explained in Part 3.

IMPACT ON LAND	1 Small to Moderate Impact	2 Potential Large Impacts	3 Can Impact Be Mitigated By Project Change
1. Will the proposed action result in a physical change to the project site? ☐NO ■ YES			
Examples that would apply to column 2			
• Any construction on slopes of 15% or greater, (15 foot rise per 100 foot of length), or where the general slopes in the project area exceed 10%.	☐	☐	☐ Yes ☐ No
• Construction on land where the depth to the water table is less than 3 feet.	☐	☐	☐ Yes ☐ No
• Construction of paved parking area for 1,000 or more vehicles.	☐	☐	☐ Yes ☐ No
• Construction on land where bedrock is exposed or generally within 3 feet of existing ground surface.	☐	☐	☐ Yes ☐ No
• Construction that will continue for more than 1 year or involve more than one phase or stage.	☐	☐	☐ Yes ☐ No
• Excavation for mining purposes that would remove more than 1,000 tons of natural material (i.e., rock or soil) per year.	☐	☐	☐ Yes ☐ No
• Construction or expansion of a sanitary landfill.	☐	☐	☐ Yes ☐ No
• Construction of a designated floodway.	☐	☐	☐ Yes ☐ No
• Other impacts **Construction of electric generating facilities on a existing parking lot. The impact is not considered significant.**	■	☐	☐ Yes ■ No
2. Will there be an effect to any unique or unusual land forms found on the site? (i.e., cliffs, dunes, geological formations, etc.) ■NO ☐ YES			
• Specific land forms:	☐	☐	☐ Yes ☐ No

IMPACT ON WATER

	1 Small to Moderate Impact	2 Potential Large Impacts	3 Can Impact Be Mitigated By Project Change
3. Will the proposed action affect any water body designated as protected? (Under Articles 15, 24, 25 of the Environmental Conservation Law, ECL) ■ NO ☐ YES			
Examples that would apply to column 2			
• Developable area of site contains a protected water body.	☐	☐	☐ Yes ☐ No
• Dredging more than 100 cubic yards of material from channel of a protected steam.	☐	☐	☐ Yes ☐ No
• Extension of utility distribution facilities through a protected water body.	☐	☐	☐ Yes ☐ No
• Construction in a designated freshwater or tidal wetland.	☐	☐	☐ Yes ☐ No
• Other impacts: ______	☐	☐	☐ Yes ☐ No
4. Will proposed action affect any non-protected existing or new body of water? ■ NO ☐ YES			
Examples that would apply to column 2			
• A 10% increase or decrease in the surface area of any body of water or more than a 10-acre increase or decease.	☐	☐	☐ Yes ☐ No
• Construction of a body of water that exceeds 10 acres of surface area.	☐	☐	☐ Yes ☐ No
• Other impacts. ______	☐	☐	☐ Yes ☐ No
5. Will Proposed Action affect surface or groundwater quality or quantity? ☐ NO ■ YES			
Examples that would apply to column 2			
• Proposed Action will require a discharge permit.	☐	☐	☐ Yes ☐ No
• Proposed Action requires use of a source of water that does not have approval to serve proposed (project) action.	☐	☐	☐ Yes ☐ No
• Proposed Action requires water supply from wells with greater than 45 gallons per minute pumping capacity.	☐	☐	☐ Yes ☐ No
• Construction or operation causing any contamination of a water supply system.	☐	☐	☐ Yes ☐ No
• Proposed Action will adversely affect groundwater.	☐	☐	☐ Yes ☐ No
• Liquid effluent will be conveyed off the site to facilities which presently do not exist or have inadequate capacity.	☐	☐	☐ Yes ☐ No
• Proposed Action would use water in excess of 20,000 gallons per day.	■	☐	☐ Yes ■ No
• Proposed Action will likely cause siltation or other discharges into an existing body of water to the extent that there will be an obvious visual contrast to natural conditions.	☐	☐	☐ Yes ☐ No
• Proposed Action will require the storage of petroleum or chemical products greater than 1,100 gallons.	■	☐	☐ Yes ■ No
• Proposed Action will allow residential uses in areas without water and/or sewer services.	☐	☐	☐ Yes ☐ No
• Proposed Action locates commercial and/or industrial uses which may require new or expansion of existing waste treatment and/or storage facilities.	☐	☐	☐ Yes ☐ No
• Other impacts: **Water would come from Suffolk County Water Authority, and wastewater would be treated at Suffolk County Sewerage District #21 Sewage Treatment Plant. Groundwater would not be significantly affected.**	☐	☐	☐ Yes ☐ No
6. Will proposed action alter drainage flow or patterns, or surface water runoff? ■ NO ☐ YES			
Examples that would apply to column 2			
• Proposed Action would change flood water flows.	☐	☐	☐ Yes ☐ No

	1 Small to Moderate Impact	2 Potential Large Impacts	3 Can Impact Be Mitigated By Project Change
• Proposed Action may cause substantial erosion.	☐	☐	☐ Yes ☐ No
• Proposed Action is incompatible with existing drainage patterns.	☐	☐	☐ Yes ☐ No
• Proposed Action will allow development in a designated floodway.	☐	☐	☐ Yes ☐ No
• Other impacts: ______	☐	☐	☐ Yes ☐ No
IMPACT ON AIR			
7. Will proposed action affect air quality? ☐NO ■ YES **Examples** that would apply to column 2			
• Proposed Action will induce 1,000 or more vehicle trips in any given hour.	☐	☐	☐ Yes ☐ No
• Proposed Action will result in the incineration of more than 1 ton of refuse per hour.	☐	☐	☐ Yes ☐ No
• Emission rate of total contaminants will exceed 5 lbs. per hour or a heat source producing more than 10 million BTU's per hour.	■	☐	☐ Yes ■ No
• Proposed action will allow an increase in the amount of land committed to industrial use.	☐	☐	☐ Yes ☐ No
• Proposed action will allow an increase in the density of industrial development within existing industrial areas.	☐	☐	☐ Yes ☐ No
• Other impacts: **Detailed modeling analyses found no significant air quality impacts.**	☐	☐	☐ Yes ☐ No
IMPACT ON PLANTS AND ANIMALS			
8. Will Proposed Action affect any threatened or endangered species? ■NO ☐ YES **Examples** that would apply to column 2			
• Reduction of one or more species listed on the New York or Federal list, using the site, over or near site or found on the site.	☐	☐	☐ Yes ☐ No
• Removal or any portion of a critical or significant wildlife habitat.	☐	☐	☐ Yes ☐ No
• Application of pesticide or herbicide more than twice a year, other than for agricultural purposes.	☐	☐	☐ Yes ☐ No
• Other impacts: ______	☐	☐	☐ Yes ☐ No
9. Will Proposed Action substantially affect non-threatened or non-endangered species? ■NO ☐ YES **Examples** that would apply to column 2			
• Proposed Action would substantially interfere with any resident or migratory fish, shellfish or wildlife species.	☐	☐	☐ Yes ☐ No
• Proposed Action requires the removal or more than 10 acres of mature forest (over 100 years of age) or other locally important vegetation.	☐	☐	☐ Yes ☐ No
IMPACT ON AGRICULTURAL LAND RESOURCES			
10. Will the proposed Action affect agricultural land resources? ■NO ☐ YES **Examples** that would apply to column 2			
• The proposed action would sever, cross or limit access to agricultural land (includes cropland, hayfields, pasture, vineyard, orchard, etc.)	☐	☐	☐ Yes ☐ No

	1 Small to Moderate Impact	2 Potential Large Impacts	3 Can Impact Be Mitigated By Project Change
• Construction activity would excavate or compact the soil profile of agricultural land.	☐	☐	☐ Yes ☐ No
• The proposed action would irreversibly convert more than 10 acres of agricultural land or, if located in an Agricultural District, more than 2.5 acres of agricultural land.	☐	☐	☐ Yes ☐ No
• The proposed action would disrupt or prevent installation of agricultural land management systems (e.g., subsurface drain lines, outlet ditches, strip cropping); or create a need for such measures (e.g., cause a farm field to drain poorly due to increased runoff).	☐	☐	☐ Yes ☐
• Other impacts: ______________________	☐	☐	☐ Yes ☐ No
IMPACT ON AESTHETIC RESOURCES			
11. Will proposed action affect aesthetic resources? ■ NO ☐ YES (If necessary, use the Visual EAF Addendum in Section 617.20, Appendix B.)			
Examples that would apply to column 2			
• Proposed land uses, or project components obviously different from or in sharp contrast to current surrounding land use patterns, whether man-made or natural.	☐	☐	☐ Yes ☐ No
• Proposed land uses, or project components visible to users of aesthetic resources which will eliminate or significantly reduce their enjoyment of the aesthetic qualities of that resource.	☐	☐	☐ Yes ☐ No
• Project components that will result in the elimination or significant screening of scenic views known to be important to the area.	☐	☐	☐ Yes ☐ No
• Other impacts: ______________________	☐	☐	☐ Yes ☐ No
IMPACT ON HISTORIC AND ARCHAEOLOGICAL RESOURCES			
12. Will Proposed Action impact any site or structure of historic, pre-historic or paleontological importance? ■ NO ☐ YES			
Examples that would apply to column 2			
• Proposed Action occurring wholly or partially within or substantially contiguous to any facility or site listed on the State or National Register of Historic Places.	☐	☐	☐ Yes ☐ No
• Any impact to an archaeological site or fossil bed located within the project site.	☐	☐	☐ Yes ☐ No
• Proposed Action will occur in an area designated as sensitive for archaeological sites on the NYS Site Inventory.	■	☐	☐ Yes ■ No
• Other impacts: The site has previously been disturbed, and the project would not have a significant impact.	☐	☐	☐ Yes ☐ No
IMPACT ON OPEN SPACE AND RECREATION			
13. Will Proposed Action affect the quantity or quality of existing or future open spaces or recreational opportunities? ■ NO ☐ YES			
Examples that would apply to column 2			
• The permanent foreclosure of a future recreational opportunity.	☐	☐	☐ Yes ☐ No
• A major reduction of an open space important to the community.	☐	☐	☐ Yes ☐ No
• Other impacts: ______________________	☐	☐	☐ Yes ☐ No

	1 Small to Moderate Impact	2 Potential Large Impacts	3 Can Impact Be Mitigated By Project Change
IMPACT ON CRITICAL ENVIRONMENTAL AREAS			
14. Will Proposed Action impact the exceptional or unique characteristics of a critical environmental area (CEA) established pursuant to subdivision 6 NYCRR 617.14(g)? ■ NO ☐ YES			
List the environmental characteristics that caused the designation of the CEA. ____________________ ____________________ ____________________ ____________________ ____________________			
Examples that would apply to column 2			
• Proposed Action to locate within the CEA?	☐	☐	☐ Yes ☐ No
• Proposed Action will result in a reduction in the quantity of the resource?	☐	☐	☐ Yes ☐ No
• Proposed Action will result in a reduction in the quality of the resource?	☐	☐	☐ Yes ☐ No
• Proposed action will impact the use, function or enjoyment of the resource?	☐	☐	☐ Yes ☐ No
• Other impacts: ____________________ ____________________	☐	☐	☐ Yes ☐ No
IMPACT ON TRANSPORTATION			
15. Will there be an effect to existing transportation systems? ■ NO ☐ YES			
Examples that would apply to column 2			
• Alteration of present patterns of movement of people and/or goods.	☐	☐	☐ Yes ☐ No
• Proposed Action will result in major traffic problems.	☐	☐	☐ Yes ☐ No
• Other impacts. ____________________ ____________________	☐	☐	☐ Yes ☐ No
IMPACT ON ENERGY			
16. Will proposed action affect the community's sources of fuel or energy supply? ☐ NO ■ YES			
Examples that would apply to column 2			
• Proposed Action will cause a greater than 5% increase in the use of any form of energy in the municipality.	☐	☐	☐ Yes ☐ No
• Proposed Action will require the creation or extension of an energy transmission or supply system to serve more than 50 single or two family residences or to serve a major commercial or industrial use.	☐	☐	☐ Yes ☐ No
• Other impacts: **The proposed project would provide additional electric to Long Island.**	■	☐	☐ Yes ■ No

	1 Small to Moderate Impact	2 Potential Large Impacts	3 Can Impact Be Mitigated By Project Change

NOISE AND ODOR IMPACTS

17. Will there be objectionable odors, noise, or vibration as a result of the Proposed Action? ■ NO ☐ YES

Examples that would apply to column 2

	1	2	3
• Blasting within 1,500 feet of a hospital, school or other sensitive facility.	☐	☐	☐ Yes ☐ No
• Odors will occur routinely (more than one hour per day).	☐	☐	☐ Yes ☐ No
• Proposed Action will produce operating noise exceeding the local ambient noise levels for noise outside of structures.	☐	☐	☐ Yes ☐ No
• Proposed Action will remove natural barriers that would act as a noise screen.	☐	☐	☐ Yes ☐ No
• Other impacts: ______	☐	☐	☐ Yes ☐ No

IMPACT ON PUBLIC HEALTH

18. Will Proposed Action affect public health and safety? ☐ NO ■ YES

Examples that would apply to column 2

	1	2	3
• Proposed Action may cause a risk of explosion or release of hazardous substances (i.e., oil, pesticides, chemicals, radiation, etc.) in the event of accident or upset conditions, or there may a be a chronic low level discharge or emission.	■	☐	☐ Yes ■ No ☐
• Proposed Action may result in the burial of "hazardous wastes" in any form (i.e., toxic, poisonous, highly reactive, radioactive, irritating, infectious, etc.)	☐	☐	☐ Yes ☐ No
• Storage facilities for one million or more gallons of liquefied natural gas or other flammable liquids.		☐	☐ Yes ☐ No
• Proposed action may result in the excavation or other disturbance within 2,000 feet of a site used for the disposal of solid or hazardous waste.	☐	☐	☐ Yes ☐ No
• Other impacts. **Detailed modeling of a ammonia spill found no potential for significant impact.**	☐	☐	☐ Yes ☐ No

IMPACT ON GROWTH AND CHARACTER OF COMMUNITY OR NEIGHBORHOOD

19. Will proposed action affect the character of the existing community? ■ NO ☐ YES

Examples that would apply to column 2

	1	2	3
• The permanent population of the city, town or village in which the project is located is likely to grow by more than 5%.	☐	☐	☐ Yes ☐ No
• The municipal budget for capital expenditures or operating services will increase by more than 5% per year as a result of this project.	☐	☐	☐ Yes ☐ No
• Proposed action will conflict with officially adopted plans or goals.	☐	☐	☐ Yes ☐ No
• Proposed action will cause a change in the density of land use.	☐	☐	☐ Yes ☐ No
• Proposed Action will replace or eliminate existing facilities, structures or areas of historic importance to the community.	☐	☐	☐ Yes ☐ No
• Development will create a demand for additional community services (e.g., schools, police and fire, etc.)	☐	☐	☐ Yes ☐ No
• Proposed Action will set an important precedent for future projects.	☐	☐	☐ Yes ☐ No
• Proposed Action will create or eliminate employment.	☐	☐	☐ Yes ☐ No
• Other impacts: ______	☐	☐	☐ Yes ☐ No

20. Is there, or is there likely to be, public controversy related to potential adverse environmental impacts? ■ No ☐ Yes

If any action in Part 2 is identified as a potential large impact or if you cannot determine the magnitude of impact, proceed to Part 3.

PART 2—PROJECT IMPACTS AND THEIR MAGNITUDE

Responsibility of Lead Agency

General Information (Read Carefully)

- In completing the form the reviewer should be guided by the question: Have my responses and determinations been **reasonable?** The reviewer is not expected to be an expert environmental analyst.
- The **Examples** provided are to assist the reviewer by showing types of impacts and wherever possible the threshold of magnitude that would trigger a response in column 2. The examples are generally applicable throughout the State and for most situations. But, for any specific project or site, other examples and/or lower thresholds may be appropriate for a Potential Large Impact response, thus requiring evaluation in Part 3.
- The impacts of each project, on each site, in each locality, will vary. Therefore, the examples are illustrative and have been offered as guidance. They do not constitute an exhaustive list of impacts and thresholds to answer each question.
- The number of examples per question does not indicate the importance of each question.
- In identifying impacts, consider long term, short term and cumulative effects.

Instructions (Read carefully)

a. Answer each of the 20 questions in PART 2. Answer **Yes** if there will be any impact.
b. **Maybe** answers should be considered as **Yes** answers.
c. If answering **Yes** to a question, then check the appropriate box (column 1 or 2) to indicate the potential size of the impact. If impact threshold equals or exceeds any example provided, check column 2. If impact will occur but threshold is lower than example, check column 1.
d. Identifying that an impact will be potentially large (column 2) does not mean that it is also necessarily **significant**. Any large impact must be evaluated in PART 3 to determine significance. Identifying an impact in column 2 simply asks that it be looked at further.
e. If reviewer has doubt about size of the impact, then consider the impact as potentially large and proceed to PART 3.
f. If a potentially large impact checked in column 2 can be mitigated by change(s) in the project to a small to moderate impact, also check the **Yes** box in column 3. A **No** response indicates that such a reduction is not possible. This must be explained in Part 3.

IMPACT ON LAND	1 Small to Moderate Impact	2 Potential Large Impacts	3 Can Impact Be Mitigated By Project Change
1. Will the proposed action result in a physical change to the project site? ☐ NO ■ YES			
Examples that would apply to column 2			
• Any construction on slopes of 15% or greater, (15 foot rise per 100 foot of length), or where the general slopes in the project area exceed 10%.	☐	☐	☐ Yes ☐ No
• Construction on land where the depth to the water table is less than 3 feet.	☐	☐	☐ Yes ☐ No
• Construction of paved parking area for 1,000 or more vehicles.	☐	☐	☐ Yes ☐ No
• Construction on land where bedrock is exposed or generally within 3 feet of existing ground surface.	☐	☐	☐ Yes ☐ No
• Construction that will continue for more than 1 year or involve more than one phase or stage.	☐	☐	☐ Yes ☐ No
• Excavation for mining purposes that would remove more than 1,000 tons of natural material (i.e., rock or soil) per year.	☐	☐	☐ Yes ☐ No
• Construction or expansion of a sanitary landfill.	☐	☐	☐ Yes ☐ No
• Construction of a designated floodway.	☐	☐	☐ Yes ☐ No
• Other impacts **Construction of electric generating facilities on a existing parking lot. The impact is not considered significant.**	■	☐	☐ Yes ■ No
2. Will there be an effect to any unique or unusual land forms found on the site? (i.e., cliffs, dunes, geological formations, etc.) ■ NO ☐ YES			
• Specific land forms:	☐	☐	☐ Yes ☐ No

IMPACT ON WATER

	1 Small to Moderate Impact	2 Potential Large Impacts	3 Can Impact Be Mitigated By Project Change
3. Will the proposed action affect any water body designated as protected? (Under Articles 15, 24, 25 of the Environmental Conservation Law, ECL) ■NO ☐ YES			
Examples that would apply to column 2			
• Developable area of site contains a protected water body.	☐	☐	☐ Yes ☐ No
• Dredging more than 100 cubic yards of material from channel of a protected steam.	☐	☐	☐ Yes ☐ No
• Extension of utility distribution facilities through a protected water body.	☐	☐	☐ Yes ☐ No
• Construction in a designated freshwater or tidal wetland.	☐	☐	☐ Yes ☐ No
• Other impacts: ________________	☐	☐	☐ Yes ☐ No
4. Will proposed action affect any non-protected existing or new body of water? ■NO ☐ YES			
Examples that would apply to column 2			
• A 10% increase or decrease in the surface area of any body of water or more than a 10-acre increase or decease.	☐	☐	☐ Yes ☐ No
• Construction of a body of water that exceeds 10 acres of surface area.	☐	☐	☐ Yes ☐ No
• Other impacts. ________________	☐	☐	☐ Yes ☐ No
5. Will Proposed Action affect surface or groundwater quality or quantity? ☐NO ■ YES			
Examples that would apply to column 2			
• Proposed Action will require a discharge permit.	☐	☐	☐ Yes ☐ No
• Proposed Action requires use of a source of water that does not have approval to serve proposed (project) action.	☐	☐	☐ Yes ☐ No
• Proposed Action requires water supply from wells with greater than 45 gallons per minute pumping capacity.	☐	☐	☐ Yes ☐ No
• Construction or operation causing any contamination of a water supply system.	☐	☐	☐ Yes ☐ No
• Proposed Action will adversely affect groundwater.	☐	☐	☐ Yes ☐ No
• Liquid effluent will be conveyed off the site to facilities which presently do not exist or have inadequate capacity.	☐	☐	☐ Yes ☐ No
• Proposed Action would use water in excess of 20,000 gallons per day.	■	☐	☐ Yes ■ No
• Proposed Action will likely cause siltation or other discharges into an existing body of water to the extent that there will be an obvious visual contrast to natural conditions.	☐	☐	☐ Yes ☐ No
• Proposed Action will require the storage of petroleum or chemical products greater than 1,100 gallons.	■	☐	☐ Yes ■ No
• Proposed Action will allow residential uses in areas without water and/or sewer services.	☐	☐	☐ Yes ☐ No
• Proposed Action locates commercial and/or industrial uses which may require new or expansion of existing waste treatment and/or storage facilities.	☐	☐	☐ Yes ☐ No
• Other impacts: **Water would come from Suffolk County Water Authority, and wastewater would be treated at Suffolk County Sewerage District #21 Sewage Treatment Plant. Groundwater would not be significantly affected.**	☐	☐	☐ Yes ☐ No
6. Will proposed action alter drainage flow or patterns, or surface water runoff? ■NO ☐ YES			
Examples that would apply to column 2			
• Proposed Action would change flood water flows.	☐	☐	☐ Yes ☐ No

	1 Small to Moderate Impact	2 Potential Large Impacts	3 Can Impact Be Mitigated By Project Change
• Proposed Action may cause substantial erosion.	☐	☐	☐ Yes ☐ No
• Proposed Action is incompatible with existing drainage patterns.	☐	☐	☐ Yes ☐ No
• Proposed Action will allow development in a designated floodway.	☐	☐	☐ Yes ☐ No
• Other impacts: ____________________	☐	☐	☐ Yes ☐ No
IMPACT ON AIR			
7. Will proposed action affect air quality? ☐NO ■ YES **Examples** that would apply to column 2			
• Proposed Action will induce 1,000 or more vehicle trips in any given hour.	☐	☐	☐ Yes ☐ No
• Proposed Action will result in the incineration of more than 1 ton of refuse per hour.	☐	☐	☐ Yes ☐ No
• Emission rate of total contaminants will exceed 5 lbs. per hour or a heat source producing more than 10 million BTU's per hour.	■	☐	☐ Yes ■ No
• Proposed action will allow an increase in the amount of land committed to industrial use.	☐	☐	☐ Yes ☐ No
• Proposed action will allow an increase in the density of industrial development within existing industrial areas.	☐	☐	☐ Yes ☐ No
• Other impacts: **Detailed modeling analyses found no significant air quality impacts.**	☐	☐	☐ Yes ☐ No
IMPACT ON PLANTS AND ANIMALS			
8. Will Proposed Action affect any threatened or endangered species? ■NO ☐ YES **Examples** that would apply to column 2			
• Reduction of one or more species listed on the New York or Federal list, using the site, over or near site or found on the site.	☐	☐	☐ Yes ☐ No
• Removal or any portion of a critical or significant wildlife habitat.	☐	☐	☐ Yes ☐ No
• Application of pesticide or herbicide more than twice a year, other than for agricultural purposes.	☐	☐	☐ Yes ☐ No
• Other impacts: ____________________	☐	☐	☐ Yes ☐ No
9. Will Proposed Action substantially affect non-threatened or non-endangered species? ■NO ☐ YES **Examples** that would apply to column 2			
• Proposed Action would substantially interfere with any resident or migratory fish, shellfish or wildlife species.	☐	☐	☐ Yes ☐ No
• Proposed Action requires the removal or more than 10 acres of mature forest (over 100 years of age) or other locally important vegetation.	☐	☐	☐ Yes ☐ No
IMPACT ON AGRICULTURAL LAND RESOURCES			
10. Will the proposed Action affect agricultural land resources? ■NO ☐ YES **Examples** that would apply to column 2			
• The proposed action would sever, cross or limit access to agricultural land (includes cropland, hayfields, pasture, vineyard, orchard, etc.)	☐	☐	☐ Yes ☐ No

	1 Small to Moderate Impact	2 Potential Large Impacts	3 Can Impact Be Mitigated By Project Change
• Construction activity would excavate or compact the soil profile of agricultural land.	☐	☐	☐ Yes ☐ No
• The proposed action would irreversibly convert more than 10 acres of agricultural land or, if located in an Agricultural District, more than 2.5 acres of agricultural land.	☐	☐	☐ Yes ☐ No
• The proposed action would disrupt or prevent installation of agricultural land management systems (e.g., subsurface drain lines, outlet ditches, strip cropping); or create a need for such measures (e.g., cause a farm field to drain poorly due to increased runoff).	☐	☐	☐ Yes ☐
• Other impacts: ______________________	☐	☐	☐ Yes ☐ No

IMPACT ON AESTHETIC RESOURCES

11. Will proposed action affect aesthetic resources? ■ NO ☐ YES
(If necessary, use the Visual EAF Addendum in Section 617.20, Appendix B.)

Examples that would apply to column 2

	1	2	3
• Proposed land uses, or project components obviously different from or in sharp contrast to current surrounding land use patterns, whether man-made or natural.	☐	☐	☐ Yes ☐ No
• Proposed land uses, or project components visible to users of aesthetic resources which will eliminate or significantly reduce their enjoyment of the aesthetic qualities of that resource.	☐	☐	☐ Yes ☐ No
• Project components that will result in the elimination or significant screening of scenic views known to be important to the area.	☐	☐	☐ Yes ☐ No
• Other impacts: ______________________	☐	☐	☐ Yes ☐ No

IMPACT ON HISTORIC AND ARCHAEOLOGICAL RESOURCES

12. Will Proposed Action impact any site or structure of historic, pre-historic or paleontological importance? ■ NO ☐ YES

Examples that would apply to column 2

	1	2	3
• Proposed Action occurring wholly or partially within or substantially contiguous to any facility or site listed on the State or National Register of Historic Places.	☐	☐	☐ Yes ☐ No
• Any impact to an archaeological site or fossil bed located within the project site.	☐	☐	☐ Yes ☐ No
• Proposed Action will occur in an area designated as sensitive for archaeological sites on the NYS Site Inventory.	■	☐	☐ Yes ■ No
• Other impacts: **The site has previously been disturbed, and the project would not have a significant impact.**	☐	☐	☐ Yes ☐ No

IMPACT ON OPEN SPACE AND RECREATION

13. Will Proposed Action affect the quantity or quality of existing or future open spaces or recreational opportunities? ■ NO ☐ YES

Examples that would apply to column 2

	1	2	3
• The permanent foreclosure of a future recreational opportunity.	☐	☐	☐ Yes ☐ No
• A major reduction of an open space important to the community.	☐	☐	☐ Yes ☐ No
• Other impacts: ______________________	☐	☐	☐ Yes ☐ No

	1 Small to Moderate Impact	2 Potential Large Impacts	3 Can Impact Be Mitigated By Project Change
IMPACT ON CRITICAL ENVIRONMENTAL AREAS			
14. Will Proposed Action impact the exceptional or unique characteristics of a critical environmental area (CEA) established pursuant to subdivision 6 NYCRR 617.14(g)? ■ NO ☐ YES			
List the environmental characteristics that caused the designation of the CEA.			
Examples that would apply to column 2			
• Proposed Action to locate within the CEA?	☐	☐	☐ Yes ☐ No
• Proposed Action will result in a reduction in the quantity of the resource?	☐	☐	☐ Yes ☐ No
• Proposed Action will result in a reduction in the quality of the resource?	☐	☐	☐ Yes ☐ No
• Proposed action will impact the use, function or enjoyment of the resource?	☐	☐	☐ Yes ☐ No
• Other impacts:	☐	☐	☐ Yes ☐ No
IMPACT ON TRANSPORTATION			
15. Will there be an effect to existing transportation systems? ■ NO ☐ YES			
Examples that would apply to column 2			
• Alteration of present patterns of movement of people and/or goods.	☐	☐	☐ Yes ☐ No
• Proposed Action will result in major traffic problems.	☐	☐	☐ Yes ☐ No
• Other impacts.	☐	☐	☐ Yes ☐ No
IMPACT ON ENERGY			
16. Will proposed action affect the community's sources of fuel or energy supply? ☐ NO ■ YES			
Examples that would apply to column 2			
• Proposed Action will cause a greater than 5% increase in the use of any form of energy in the municipality.	☐	☐	☐ Yes ☐ No
• Proposed Action will require the creation or extension of an energy transmission or supply system to serve more than 50 single or two family residences or to serve a major commercial or industrial use.	☐	☐	☐ Yes ☐ No
• Other impacts: **The proposed project would provide additional electric to Long Island.**	■	☐	☐ Yes ■ No

	1 Small to Moderate Impact	2 Potential Large Impacts	3 Can Impact Be Mitigated By Project Change

NOISE AND ODOR IMPACTS

17. Will there be objectionable odors, noise, or vibration as a result of the Proposed Action? ■ NO ☐ YES

Examples that would apply to column 2

	1	2	3
• Blasting within 1,500 feet of a hospital, school or other sensitive facility.	☐	☐	☐ Yes ☐ No
• Odors will occur routinely (more than one hour per day).	☐	☐	☐ Yes ☐ No
• Proposed Action will produce operating noise exceeding the local ambient noise levels for noise outside of structures.	☐	☐	☐ Yes ☐ No
• Proposed Action will remove natural barriers that would act as a noise screen.	☐	☐	☐ Yes ☐ No
• Other impacts: ____________________	☐	☐	☐ Yes ☐ No

IMPACT ON PUBLIC HEALTH

18. Will Proposed Action affect public health and safety? ☐ NO ■ YES

Examples that would apply to column 2

	1	2	3
• Proposed Action may cause a risk of explosion or release of hazardous substances (i.e., oil, pesticides, chemicals, radiation, etc.) in the event of accident or upset conditions, or there may a be a chronic low level discharge or emission.	■	☐	☐ Yes ■ No ☐
• Proposed Action may result in the burial of "hazardous wastes" in any form (i.e., toxic, poisonous, highly reactive, radioactive, irritating, infectious, etc.)	☐	☐	☐ Yes ☐ No
• Storage facilities for one million or more gallons of liquefied natural gas or other flammable liquids.		☐	☐ Yes ☐ No
• Proposed action may result in the excavation or other disturbance within 2,000 feet of a site used for the disposal of solid or hazardous waste.	☐	☐	☐ Yes ☐ No
• Other impacts. Detailed modeling of a ammonia spill found no potential for significant impact.	☐	☐	☐ Yes ☐ No

IMPACT ON GROWTH AND CHARACTER OF COMMUNITY OR NEIGHBORHOOD

19. Will proposed action affect the character of the existing community? ■ NO ☐ YES

Examples that would apply to column 2

	1	2	3
• The permanent population of the city, town or village in which the project is located is likely to grow by more than 5%.	☐	☐	☐ Yes ☐ No
• The municipal budget for capital expenditures or operating services will increase by more than 5% per year as a result of this project.	☐	☐	☐ Yes ☐ No
• Proposed action will conflict with officially adopted plans or goals.	☐	☐	☐ Yes ☐ No
• Proposed action will cause a change in the density of land use.	☐	☐	☐ Yes ☐ No
• Proposed Action will replace or eliminate existing facilities, structures or areas of historic importance to the community.	☐	☐	☐ Yes ☐ No
• Development will create a demand for additional community services (e.g., schools, police and fire, etc.)	☐	☐	☐ Yes ☐ No
• Proposed Action will set an important precedent for future projects.	☐	☐	☐ Yes ☐ No
• Proposed Action will create or eliminate employment.	☐	☐	☐ Yes ☐ No
• Other impacts: ____________________	☐	☐	☐ Yes ☐ No

20. Is there, or is there likely to be, public controversy related to potential adverse environmental impacts? ■ No ☐ Yes

If any action in Part 2 is identified as a potential large impact or if you cannot determine the magnitude of impact, proceed to Part 3.

Appendix B
Equipment Description

THE S&S ENERGY PRODUCTS ORGANIZATION

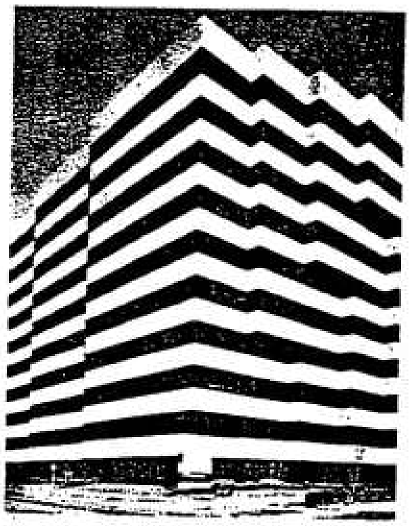
Horseshoes to Turbine Horsepower

The traditions of S&S Energy Products are built upon a century of pride and responsibility. We "Serve our customers, and we take care of what we sell."

Our business began in a blacksmith shop in Houston, Texas. In 1903 C. Jim Stewart, a master blacksmith, joined Joe R. Stevenson, a carriage maker, to form C. Jim Stewart & Stevenson, Houston's first carriage repair and "horse shoeing parlor." From this modest blacksmith shop, S&S grew into a corporate network circling the globe. This remarkable growth was built on a simple philosophy, "Serve the customer...give him your best on every job."

Automobiles soon replaced horses, diesel engines were added, and gas turbines products became part of the company's sales. In 1998, the Gas Turbine Division of Stewart & Stevenson became a proud part of GE Power Systems, giving added strength and versatility to all the products and services we offer our customers.

Today, as part of GE's world-wide power programs, the honest traditions of the blacksmith's shop—"Reliability and caring for the customer's needs" remain an integral part of all that S&S Energy Products produces for the energy needs of an emerging world.



S&S Energy Products World Headquarters

S&S Energy Products (SSEP), is a GE Power Systems Business. We serve gas turbine customers world wide from our Houston, Texas and Budapest, Hungary facilities.

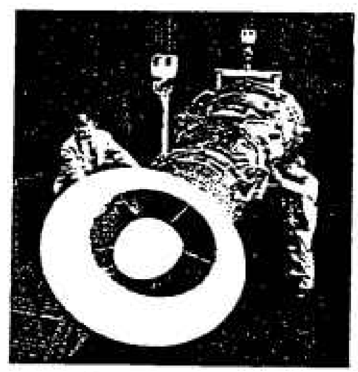
Principal S&S Energy Products business operations are:

- **Gas Turbine Generators**
  Packaged gas turbine generator sets in the 6-50 MW range. Units are complete with accessory equipment, ready for installation at customer's site.
- **Balance -of-Plant**
  "Turnkey" installations, including plant design, procurement, construction, commissioning and training.

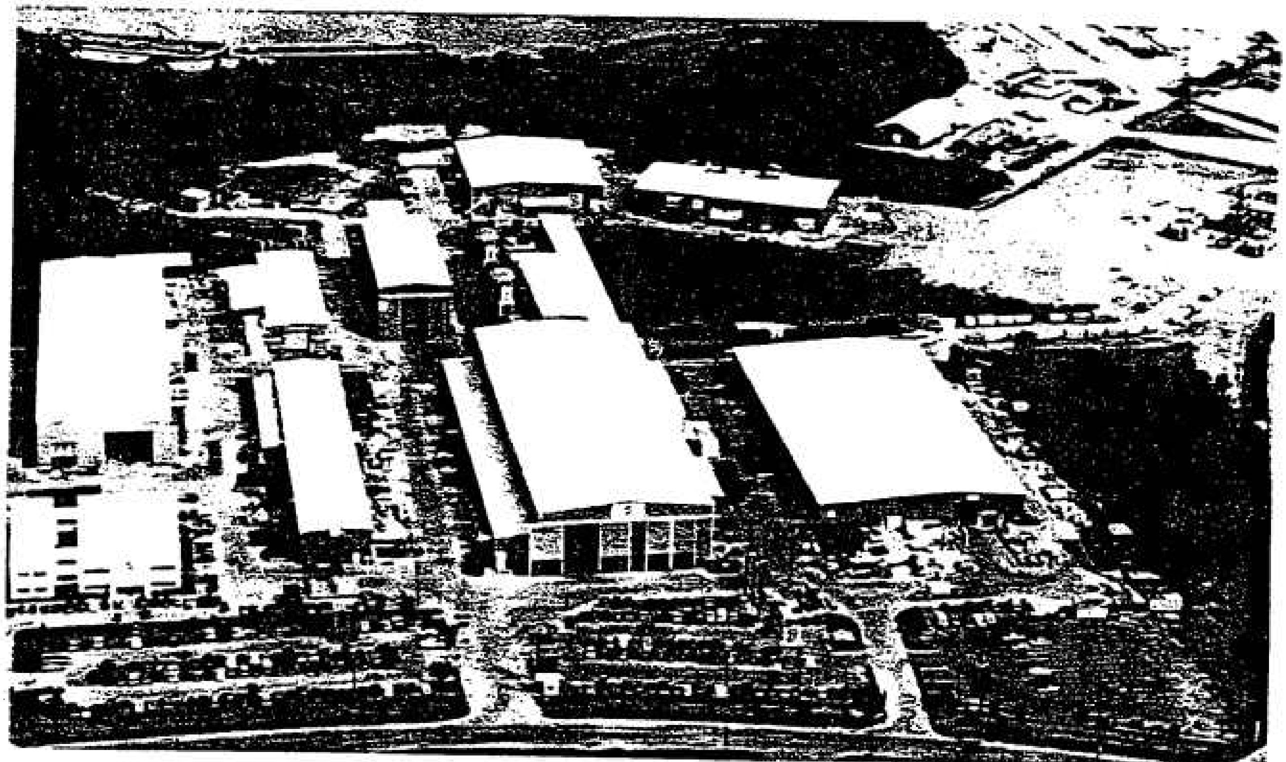
GE Aeroderivative and Package Services (GE A&PS) completes GE's customer support with the following services:

- **Maintenance and Repair**
  GE-A&PS provides "total package care" for General Electric, Pratt & Whitney, Rolls-Royce, and Solar Gas Turbine Packages, as follows:
- Field Service
  We provide trained technicians to repair and maintain gas turbines, generators, and all the package auxiliary systems.

  GE A&PS Service is available through-out the world-24 hours a day, 365 days a year.
- Gas Turbine Overhaul
  GE A&PS overhauls and rebuilds gas turbines to manufacturers original specifications. Conversions, modifications, and upgrades can be added. The rebuilt turbine can be full-load tested with out precision dynamometer
- Parts and Equipment
  To speed repairs and support our customers, GE A&PS maintains a multi-million dollar inventory of parts, equipment and supplies at depots near our customers.



S&S Energy Products Packages Industrial Gas Turbines with flight-proven reliability



JACINTOPORT (HOUSTON, TEXAS) GAS TURBINE FACILITY
Deepwater port speeds marine shipment.

Business Overview

S&S Energy Products is a leading supplier of aeroderivative gas turbines for industrial and marine applications. We take ***single source responsibility for the total equipment package.***

For more than 50 years. S&S Energy Products has provided power-generating equipment to utilities, industries and navies throughout the world. We have built more than 500 gas turbine packages now operating on six continents. We put our best into each unit that we build - all our skill and field experience.

We build with standardized designs, proven and reproven in tropic heat, desert sand and arctic cold.

For site specific requirements we add features from our list of pre-engineered options. We fabricate and assemble each unit in modern factories using a quality system certified to ISO 9001.

General Electric's obligations don't end when a unit rolls out our door. A sister division, GE AP&S provides job-site supervision.

Then GE-A&PS* backs up our customers with a multi-million dollar inventory of turbine parts ready for immediate shipment.

And GE-A&PS service department is renowned throughout the industry. They support our customers with field service anywhere in the world - 24 hours a day, 365 days a year.

Meeting our customer's requirements for quality, dependability, and outstanding service is the goal of S&S Energy Products and the entire GE Power Systems Organization.

GAS TURBINE PRODUCTS

S&S Energy Products offers gas turbine packages rated from 6 to 50 MW. The prime movers for these packages are industrialized versions of flight-proven aircraft turbines manufactured by the General Electric Products Group, and 6-12MW frame-type gas turbines built by the Nuovo Pignone division of GE Power Systems.

These rugged gas turbines provide outstanding "availability" to the operator. The turbines are designed for continuous, base load operation, and their modular design makes them simple to repair and maintain. When it's time for overhaul, a hot section module or a complete exchange engine can be installed at the site, and the turbine returns to service quickly, with minimum downtime to the plant.

S&S Energy Products packages the following gas turbine engines. Performance data for Generator Sets is shown in Section 3.

PGT5B

A compact, state-of-the-art 6MW gas turbine for Power Generation and Cogeneration applications. The PGT5B features an axial compressor, a dry-low-emission annular combustor and an air cooled turbine. The PGT5B is available as a single-shaft engine for power generation/cogeneration, and as a two-shaft unit for mechanical drive of compressors and pumps.

PGT10B

This heavy duty 12 MW gas turbine is a refinement of the field-proven PGT10 and incorporates the latest aerodynamic design in a compact and versatile package. The PGT10B features a single, rugged combustor able to burn a wide range of fuels, including distillates, gaseous fuels, low KJ gas and residuals with the use of a special combustion system.The single-shaft version is optimized for power generation and cogeneration applications, and the two-shaft version is designed for mechanical drive applications.

LM1600

A three-shaft gas turbine derived from the F404 fighter jet engine. Can be used for mechanical drives and power generation. Produces 13,440 kW at base load.

LM2500

GE's most experienced aero-derivative engine. It is derived from the TF-39 engine used on DC-10 wide bodied jets. More than 1000 LM2500 engines are in service world-wide with over 4 million hours of industrial operation. The LM2500 has documented industrial availability exceeding 99%. Its two-shaft design permits direct coupling to a 50 or 60 Hz generator, eliminating the need for a gear box. The LM2500 produces 22,800 KW of electrical power.

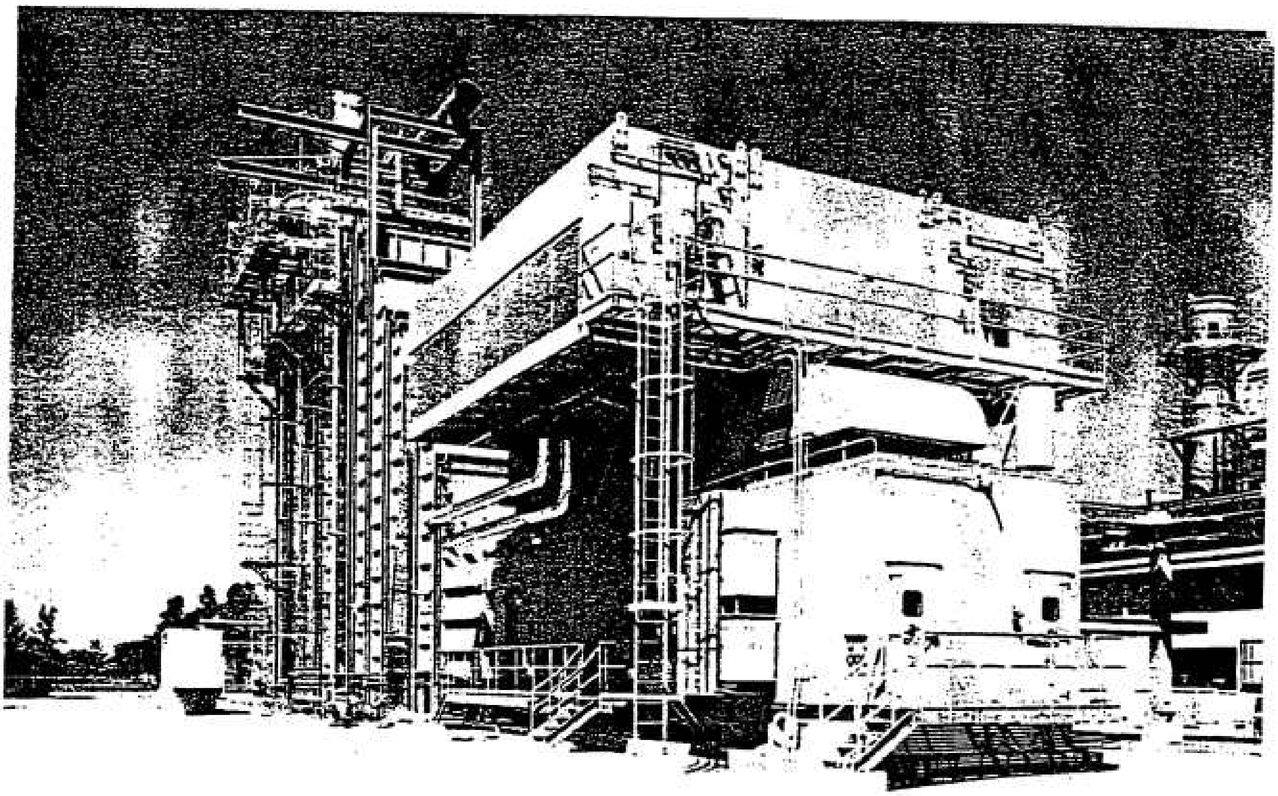
LM2500 +

The LM2500+ is an upgraded version of the LM2500 gas turbine. An additional compressor "Stage 0" and redesigned airfoils have been added. These improvements produce 20% greater airflow and 25% greater output. To handle this additional power, the LM2500+ casings and shafts have been strengthened. This upgraded engine retains the proven LM2500 design, with output increased to 28.5 MW.

LM6000

The LM6000 is derived from the GE CF6-80C2 jet aircraft engine used in the Boeing 747 and 767, the McDonnell Douglas MD-11, and the Airbus A300.

The LM6000 is a two-shaft gas turbine with an output speed of 3600 RPM. It is directly coupled to an electric generator for 60 Hz applications and geared to 3000 RPM for 50 Hz applications. With a simple cycle heat rate of 8701 KJ/KWH, the LM6000 is one of the most fuel efficient gas turbine in the world. Its generator set rating of 43.4 MW and axial exhaust make the LM6000 an outstanding selection for simple-cycle or combined-cycle operation.



Sacramento MUD installed four LM6000 turbine generator sets for combined cycle cogeneration to support their grid.

OWNER	LOCATION	GT MODEL	NO.	DUTY LTSA/O&M	DEL. DATE
Sithe Energies USA, Inc.	Greeley, CO	5000*	2	Cogen	1988
Reedy Creek Utilities	Orlando, FL	5000	1	CHP-Utility	1988
Sithe Energies USA, Inc.	San Diego, CA	5000	1	Cogen	1989
Calpine Corp. Greenleaf II	Yuba City, CA	5000 STIG-120	1	Cogen	1989
Dynegy - San Joaquin	Tracy, CA	5000 STIG-120	1	Cogen	1989
Dynegy - Chalk Cliff	Bakersfield, CA	5000 STIG-120	1	Cogen	1989
Tropicana Foods	Bradenton, FL	5000 STIG-120	1	Cogen (LTSA)	1989
Sithe Energies USA, Inc.	Oxnard, CA	5000 STIG-120	1	Cogen	1989
Shenzhen Huaneng EDC	Shenzhen, China	5000 STIG-120	2	Utility	1990
Megan-Racine Assoc.	Canton, NY (R)	5000 STIG-80	1	Cogen	1990
Dynegy - Badger Creek	Bakersfield, CA	5000 STIG-80	1	Cogen	1990
Peabody Municipal Electric	Peabody, MA	5000	1	Utility	1990

OWNER	LOCATION	GT MODEL	NO.	DUTY LTSA/O&M	DEL. DATE
Coastal Power	Fulton, NY	5000 STIG-120	1	Cogen	1990
City of Anaheim	Anaheim, CA	5000 STIG-120	1	Utility	1990
Yuba City Cogeneration Partners	Yuba City, CA	5000 STIG-120	1	Cogen (O&M)	1990
Dynegy - McKittrick	Bakersfield, CA	5000 STIG-120	1	Cogen	1990
Dynegy - Live Oak	Bakersfield, CA	5000 STIG-120	1	Cogen	1991
GPU International	Syracuse, NY	5000 STIG-80	2	Cogen (O&M)	1991
BASF	Ludwigshafen, Germany	5000 STIG-120	1	Cogen	1991†
AKZO Chemicals	Ede, The Netherlands	5000 STIG-80	1	Cogen	1991†
Atlantic Generation	Binghampton, NY	5000 STIG-120	1	Cogen	1991
Yin Chuan Power Co.	Dongguan, China	5000 STIG-120	4	IPP	1991
Cal Energy	Northeast, PA	5000*	2	Cogen	1991
Atocraft/Salim	Indonesia	5000 STIG-120	2	Utility	1991
Empresa Electrica	Guatemala	5000 STIG-120	1	Utility (O&M)	1991
Shenzhen Xiehe Power Co.	Shenzhen, China	5000 STIG-120	1	IPP	1992
GPU International	Onondaga, NY	5000 STIG-80	1	Cogen	1992
Ecopetrol-Gualanday	Ibague, Colombia	5000 STIG-120	1	Indus PG (O&M)	1992
AKZO Chemicals	Arnhem, The Netherlands	5000 STIG-80	1	Cogen	1992†
Ecopetrol-Ocoa	Villavicencio, Colombia	5000 STIG-120	1	Indus PG (O&M)	1992
TransAlta Energy	Ottawa, Canada	6000*	1	Cogen	1992
Bis Enerji	Bursa, Turkey	5000 STIG-120	1	Indus PG	1992
TransAlta Energy	Mississauga, Canada	6000*	2	Cogen	1992
Ecopetrol-Yumbo	Cali, Colombia	5000-STIG-120	1	Indus PG (O&M)	1992
Dana Corp.	Dada City, FL	6000	2	Cogen (O&M)	1992
Modesto Irrigation Dist.	Modesto, CA	5000 STIG-120	1	Utility	1992
GPU International	Umatilla, FL	6000	2	Cogen (O&M)	1992
Sithe Energies USA, Inc.	Ogdensburg, NY	6000	1	Cogen	1992
Orion Holdings	E. Syracuse, NY	6000	2	Cogen	1992
K&M/Proelectrica	Cartagena, Colombia	5000 STIG-120	2	IPP (O&M)	1993
Florida Power Corp.	Gainesville, FL	6000*	1	CHP/Utility	1993
Tenaga Nasional	Port Klang, Malaysia (R)	5000	2	Utility	1993
Cal Energy/Statoil Energy	Kennedy Airport, NY	6000	2	Cogen	1993
Hutchinson Electric Utilities	Hutchinson, MN	6000	1	Utility	1993

OWNER	LOCATION	GT MODEL	NO.	DUTY LTSA/O&M	DEL. DATE
Lake Superior Power	Sault Ste. Marie, Canada	6000	2	Cogen (O&M)	1993
CSW/Thermo Power	Ft. Lupton, CO	6000*	2	Cogen (O&M)	1993
Atlantic Electric	Vineland, NJ	6000	1	Cogen	1993
Enron	Las Vegas, NV	6000	1	Cogen	1993
CSW/Thermo Power	Ft. Lupton, CO	6000*	3	Cogen (O&M)	1994
NCPA	Lodi, CA	5000 STIG-120	1	Utility	1994
Rochester Gas & Electric	Fillmore, NY	6000	1	Utility	1994
NCPA	Ceres, CA	5000 STIG-120	1	Utility	1994
Kissimmee Utlity Authority	Kissimmee, FL	6000	1	Utility	1994
Arroyo Energy	Escondido, CA	6000	1	Cogen	1994
S.P.E.	Gent, Belgium	6000 DLE	1	CHP/Utility	1994†
Dynegy-Bear Mt.	Bakersfield, CA	5000 STIG-120	1	Cogen	1994
O.M.P.A.	Ponca City, OK	6000	1	Utility	1994
Cal Energy/Statoil Energy	Stony Brook, NY	6000	1	Cogen	1994
Sacramento M.U.D.	Sacramento, CA	6000	2	Cogen	1994
CSW Energy/El Paso	Bartow, FL	6000 DLE	2	Cogen	1994
Willamette Industries	Albany, OR	6000	1	Cogen	1994
ENRON/Singapore Power	Hainan Island, China	6000	3	IPP	1995
N.V. PNEM	Eindhoven, The Netherlands	6000 DLE	1	Utility	1995†
TECO Energy	Escuintla, Guatemala	6000	2	IPP (O&M)	1995
Charter Oak Energy	Tucuman, Argentina	6000	4	IPP (O&M)	1995
Northland Power	Iroquois Falls, Canada	6000	2	Cogen (LTSA)	1995
Sacramento, M.U.D.	Sacramento, CA	6000	2	Cogen	1995
Western Mining	Leinster, W. Australia	6000	1	Indus PG (O&M)	1995
Luz y Fuerza, S.A.	San Lorenzo, Honduras	6000	1	IPP (O&M)	1995
Coastal Power/WUXI Huada Electric	Wuxi, China	6000	1	Utility	1995
Kinder Morgan	Monfort, CO	6000	1	Cogen (O&M)	1995
Emelec	Guayaquil, Ecuador	6000	1	Utility (O&M)	1995
TransAlta Energy/Mercury Energy	Auckland, New Zealand	6000*	2	Cogen	1996
TransAlta Energy	Kalgoorie, W. Australia	6000	1	Cogen (O&M)	1996
Duke/Electroquil	Guayaquil, Ecuador	6000	2	IPP (O&M)	1996

OWNER	LOCATION	GT MODEL	NO.	DUTY LTSA/O&M	DEL. DATE
TransAlta Energy	Windsor, Canada	6000 DLE	1	Cogen	1996
TransAlta Energy	Kambalda, W. Australia	6000	1	Indus PG (O&M)	1996
Pegasus Gold	Katherine, Australia	6000	1	Indus PG (O&M)	1996
United Phosphorous	Gujarat, India	6000	1	Cogen (O&M)	1996
Northeast Utilities	Milford, CT	6000	4	Utility	1996
Connecticut Light & Power	Hartford, CT (R)	6000	1	Utility	1996
TransCanada Power, LP	Tunis, Canada	6000	1	IPP	1996
Electrabel	Lanaken, Belgium	6000 DLE	1	CHP	1996†
Coastal Power/WUXI Shunda Electric	Wuxi,China	6000	1	Utility	1996
Duke Electroquil	Guayaquil, Ecuador	6000	2	IPP (O&M)	1996
Powerfin, S.A.	Valparaiso, Chile (R)	6000	2	Utility	1996
Eletronorte	Porto Velho, Brazil	6000	1	Utility	1997
Eletronorte	Manaus, Brazil	6000	2	Utility	1997
Tractebel	Geel, Belgium	6000 DLE	1	Cogen	1997†
Emelec	Guayaquil, Ecuador	6000	1	Spare (O&M)	1997
Eletronorte	Manuas, Brazil	6000	1	Spare	1997
Southern Electric	Burghfield, England	6000 Sprint	1	Utility (LTSA)	1997
Southern Electric	Chickerell, England	6000 Sprint	1	Utility (LTSA)	1997
ATAER Elektrik	Izmir, Turkey	6000	1	Cogen (LTSA)	1997
Air Liquide	Torrolavega, Spain	6000	1	Cogen	1997†
Hays Chemical	England	6000	1	Cogen	1997†
BSES	Kerala, India	6000	3	Utility	1998
BIS Enerji	Bursa, Turkey	6000	1	Cogen (LTSA)	1998
Entek (KOC)	Bursa, Turkey	6000	2	Cogen (LTSA)	1998
Hays Chemical	England	6000	1	Cogen	1998
Copesa	Panama	6000	1	Cogen	1998
CSW/Thermopower	Ft.Lupton, CO	6000*	1	Spare	1998
Atco Power	Grande Prairie, Alberta	6000 DLE	1	Utility	1998
TransAlta Energy	Ft. Nelson, B.C.	6000*	1	Cogen	1998
Atco Power	Rainbow Lake, Alberta	6000	1	Cogen	1998
BSES	Kerala, India	6000	3	Utility	1998
Zorlu Enerji	Lulleburgaz, Turkey	6000	1	IPP/LTSA	1998

OWNER	LOCATION	GT MODEL	NO.	DUTY LTSA/O&M	DEL. DATE
Zorlu Enerji	Bursa, Turkey	6000	1	IPP/LTSA	1998
Tosoh Petrochemicals	Yokkaichi, Japan	6000	1	Cogen	1998
Enel	Managua, Nicaragua	6000	1	Utility	1998
Dynegy	Chicago, IL	5000	1	IPP	1999
Endesa	Charrua, Chile	6000	2	Utility	1999
West Texas Municipal Power	Lubbock, TX	6000 Sprint	1	Utility	1999
Illinois Power	Tilton, IL	6000	4	Utility	1999
SCEGCO	Urguhart, SC	6000	1	Utility	1999
Enron	Teeside, England	6000	1	IPP	1999
Sowega LLC	Albany, GA	6000 Sprint	2	Utility	1999
AMP-Ohio	Ohio	5000	2	Utility	1999
El Paso Energy	Manaus, Brazil	6000 Sprint	2	IPP	1999
Allegheny Energy	Springdale, PA	6000	2	Utility	1999
Power and Water Authority	Darwin, Australia	6000	1	Utility	1999
Cobee Power	Bula Bula, Bolivia	6000	2	IPP	1999
Black Hills/Indeck	Denver, CO	6000 Sprint	2	IPP	1999
Black Hills/Indeck	Boulder, CO	6000 Sprint	1	IPP	1999
Cinergy	Cadiz, IN	6000	3	IPP	1999
Southwestern Electric Coop.	St. Elmo, IL	6000 Sprint	1	Utility	2000
Jonesboro Light Plant	Jonesboro, AR	6000 Sprint	1	Utility	2000
Williams Company	Worthington, IN	6000	4	IPP	2000
Reliant Energy	Shelby Co., IL	6000	5	IPP	2000
PSE&G	Burlington, NJ	6000	4	Utility	2000
Ameren	Pinckneyville, IL	6000	4	Utility	2000
City of Jamestown	Jamestown, NY	6000	1	Utility-chp	2000
Front Range LLC	Ft. Lupton, CO	6000 Sprint	4	IPP	2000
PP&L Global	Wallington, CT	6000	5	IPP	2000
Reliant Energy	TBD	6000	11	IPP	2001
				TOTAL = 50	LM5000
				TOTAL = 182	LM6000

*Steam for NO Control Only (No Additional Power Boost "STIG")
†Manufactured by S&S business associate
(R) Equipment later relocated.

LM6000 TURBINE GENERATOR PACKAGING CONCEPT

EXECUTIVE SUMMARY

The LM6000 Package

The S&S Energy Products LM6000 PC gas turbine-generator package is ISO rated* as follows:

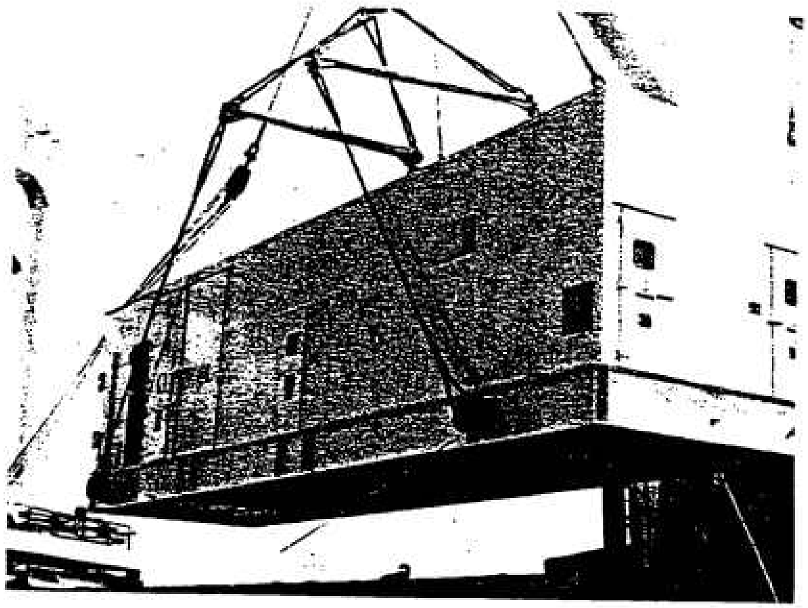
50 Hz.	KW	kJ/kWh
LM6000	43,076	8,701
LM6000 SPRINT	46,892	8,707

The package features the General Electric LM6000 gas turbine and a matching electric generator. It is designed for Simple-Cycle, Combined-Cycle and Cogeneration installations.

The LM6000 is built with rugged components for base-load utility service. It can also start and stop easily for "peaking" or "dispatched" applications.

The LM6000 turbine with generator and accessories form a complete package ready to install.

* Includes generator and gearbox losses. Ratings are at 15°C, no inlet/exhaust losses, natural gas fuel, sea-level, 60% RH. kJ ratings are based on LHV.



"Factory Packaged" LM6000 Turbine Generator Set
Full Load Tested – Ready For Installation.

Factory Packaging

S&S Energy Products uses modern factories to assemble our gas turbine-generator packages.

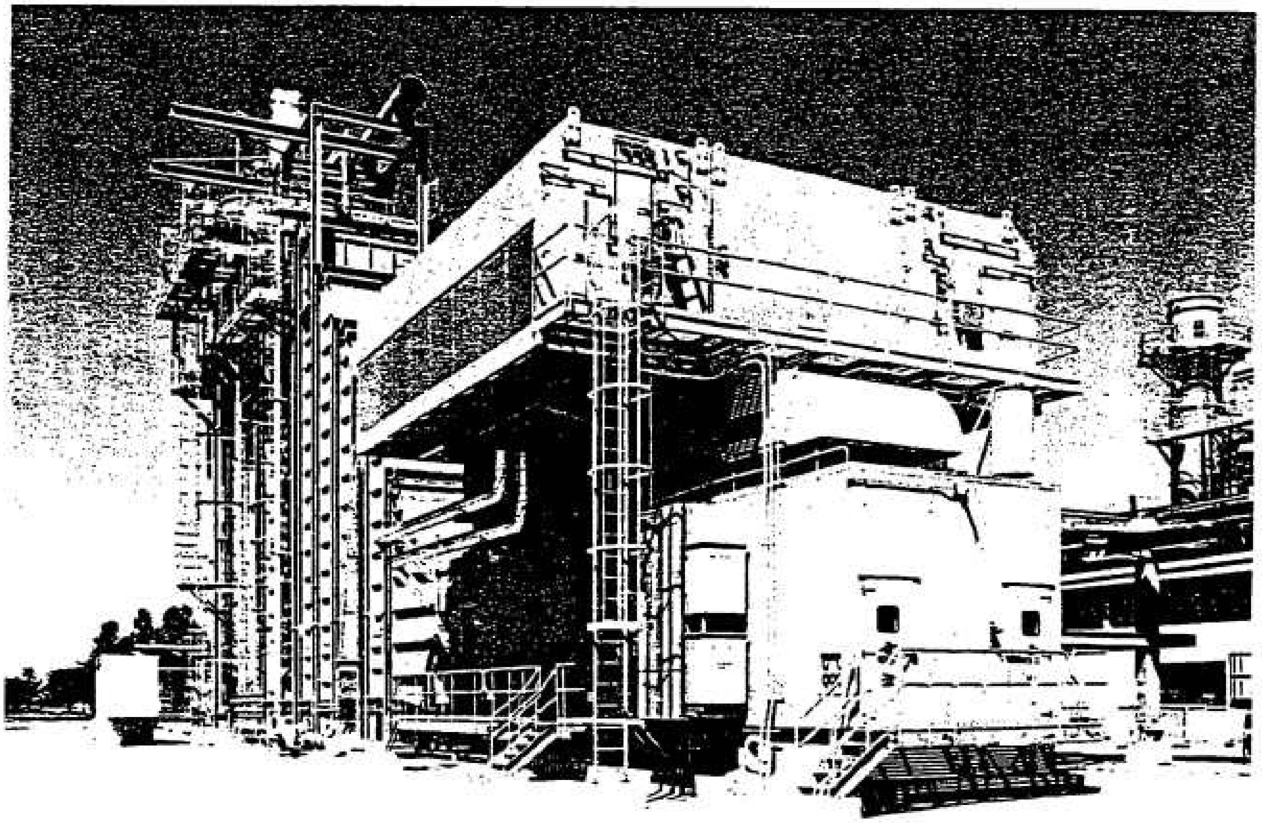
"Factory Packaging" brings:

- ISO 9001 QUALITY - controlled fabrication, assembly and testing.
- DEPENDABILITY - from standardized, field proven designs.
- RELIABILITY – proven with rigorous factory testing before shipment.
- ECONOMY - from lower field labor costs and faster installation, and start up.

Over the last 20 years, the petroleum industry has saved millions in capital investment costs and field start-up time by preassembling and testing equipment modules before shipment to offshore platforms.

S&S Energy Products has adopted this "factory packaging concept" for our complete line of gas turbine products. Successful "Factory Packaged" installations include simple-cycle, cogeneration, and combined-cycle sites. The units power electrical generating plants and specialized facilities including universities, hospitals, food processing plants, and pulp and paper plants.

We build our units *tough*. We start



The LM6000 Factory Package Is A Complete Turbine Generator Set.
Easy To Transport – Simple To Install – Tested And Ready To Work.

with a rigid I-beam base plate and a weatherproof acoustic enclosure assembled in our factory. Second, we install the LM6000 gas turbine and its performance-matched generator. Finally, we add the balance of the system, piping, wiring, controls, fans, motors and pumps, to make a complete, functional unit.

We verify each new design with a full-load string test in our plant and we string test selected units from each production line.

Following minimal disassembly, the unit is ready for shipment to the job site.

Value of Factory Packaging

Factory Packaging saves time and money and produces a better product.

Clients who have installed both factory-packaged and field-erected gas turbine equipment appreciate the advantages and cost savings of the factory-packaging concept. This savings must be quantified and credited to a bid evaluation before an "apples to apples" cost comparison with field-erected equipment is possible.

Several major Architect/ Engineering firms have conducted evaluations of S&S Energy Products' factory-packaged equipment versus field-erected equipment. These studies were done on behalf of their clients in various geographical areas of the United States. Each study recognized four basic financial benefits of the factory-packaging concept.

Appendix C
Agency Correspondence

Appendix D
Unanticipated Discovery Plan

UNANTICIPATED DISCOVERY PLAN

Calpine Stony Brook Energy Center 2, Inc. recognizes that it is possible that sites could be discovered during construction. Calpine Stony Brook Energy Center 2, Inc. is committed to the protection and preservation of cultural resources, in accordance with federal and state legislation. This plan presents the approach that Calpine Stony Brook Energy Center 2, Inc. will use to address such emergency discoveries and ensure that any potentially significant archaeological resources discovered during construction, including human remains, are dealt with in full accordance with state and federal requirements, including the most recent *Standards for Cultural Resource Investigations and Curation of Archaeological Collections in New York State.* Calpine Stony Brook Energy Center 2, Inc.'s approach will also ensure that procedures and lines of communication with the appropriate government authorities are clearly established prior to the start of construction so that discoveries can be addressed in a timely manner, minimizing the impacts to the construction schedule to the extent possible.

At present, no archaeological sites are recorded within the project area. Based on the background research conducted for the project as part of the Phase IA study, the potential for identifying archaeological sites has been determined to be low. However, in the event that sites are found during construction, it is important for all involved personnel to follow standardized procedures in accordance with all state and federal regulations.

Both the environmental inspectors and the construction personnel will be provided with a preconstruction briefing regarding potential cultural resources indicators. These indicators will include items such as recognizable quantities of bone, unusual stone deposits and ash deposits, or black-stained earth that could be evident in spoil piles or trench walls during construction. In the event that potentially significant cultural resources or human remains are discovered during construction, the environmental monitors and construction personnel will be instructed to follow the specific requirements and notification procedures outlined below. Cultural resource discoveries that require reporting and notification include, any human remains and any recognizable, potentially significant concentrations of artifacts or evidence of human occupation.

If cultural resources indicators are found by construction personnel, the construction supervisor will be notified immediately. The supervisor, in turn, will notify the environmental inspector, who will notify an archaeologist Calpine Stony Brook Energy Center 2, Inc. will have available to respond to this type of find. Based on the information provided, the archaeologist will determine if a visit to the area is required and, if so, will inform the construction crews. No construction work at the site that could affect the artifacts or site will be performed until the archaeologist reviews the site. The site will be flagged as being off-limits for work, but will not be identified as an archaeological site per se in order to protect the resources. The archaeologists will conduct a review of the site and will test the site as necessary. The archaeologist will determine, based on the artifacts found and on the cultural sensitivity of the area in general, whether the site is potentially significant and will consult with the New York State Historic Preservation Office regarding site clearance.

Appendix E

CTG Stack Visible Water Vapor Plumes

CTG Stack Visible Water Vapor Plumes

Water vapor emitted from the stack flues can, under certain meteorological conditions, condense to form a visible "steam plume." In order to assess the frequency and extent of visible plumes resulting from steam condensation, TRC's Plume Visibility Model (VISPLUME) was used as a post-processor to the EPA Industrial Source Complex (ISC) model. The ISC model was run with a unit emission (1.0 g/s) of water vapor for each hour over a five-year period (1991-1995), and the VISPLUME post-processor was then used to determine the hours and receptors for which the mixture of the emitted gases and ambient air would be below the water dew point. These are the conditions that could cause a visible water-vapor plume to form.

This model was run using stack conditions and emission rates for the combined-cycle operation of the Calpine Stony Brook Energy Center 2 at an ambient temperature of 59°F. Emissions data are also available for hypothetical ambient temperatures of –10°F and 110°F, and the water vapor content of the emitted gases increases with ambient temperature. The modeling using an ambient temperature of 59°F is considered to be conservative (*i.e.*, over-estimate the frequency of visible water-vapor plumes), because the model showed that about 92% of the visible water-vapor plumes occurred for ambient temperatures below 59°F, at which water-vapor emission rates would be lower than those predicted at 59°F.

A receptor grid was modeled extending up to 500 meters downwind and up to 500 meters above the ground, at 25-meter intervals. The plume was considered to be "visible" at a receptor if the temperature of the stack gas/air mixture was below its dew point.

Table 1 presents a summary of the total number of hours studied over the five-year period, sorted by weather conditions and time of day. Weather conditions were determined from hourly observations at the National Weather Service station at MacArthur Airport in Islip, NY from 1991 through 1995, with the exception of 39 hours for which data are missing. Weather conditions considered as "Clear" do not necessarily mean that the sky was free of clouds, but only that no precipitation or fog was observed during that hour, and the relative humidity was less than 100%. "Twilight" conditions refer to early morning hours less than one hour before sunrise, or evening hours less than one hour after sunset.

Table 1: Total Hours Studied in 1991-1995

	Clear T>32F	Clear T<32F	Observed Fog	100% Humidity	Rain No Fog	Snow No Fog	Total
Daytime	16,116	1,513	3,313	553	404	108	22,007
Twilight	2,160	462	754	178	71	23	3,648
Night	10,017	3,112	3,494	929	427	151	18,130
Total	28,293	5,087	7,561	1,660	902	282	43,785

Table 2 shows the predicted number of hours of visible water vapor plumes over the five-year period, sorted by weather conditions and time of day. A water vapor plume is considered "visible" if at least one receptor (at least 25 m downwind of the stack) shows that the mixture of the emitted plume and ambient air is below the water dew point.

Table 2: Number of Hours of Visible Plumes in 1991-1995

	Clear T>32F	Clear T<32F	Observed Fog	100% Humidity	Rain No Fog	Snow No Fog	Total
Daytime	1,700	675	1,667	530	141	88	4,801
Twilight	586	305	429	177	28	17	1,542
Night	3,585	2,207	2,107	925	230	129	9,183
Total	5,871	3,187	4,203	1,632	399	234	15,526

Although the 15,526 hours of predicted visible water vapor plumes over five years represent about 35.5% of the total number of hours studied, many of the visible plumes were predicted to occur during hours when observed fog, 100% humidity, rain, or snow would have hindered visibility even in the absence of the Project. Only 9,058 hours (20.7% of the total hours studied) with visible plumes over five years were predicted during clear weather conditions. Of these clear weather hours with predicted visible plumes, 5,792 of them were at night when they would only be visible due to artificial light or to an observer attempting to look through the plume at a bright object.

Only 2,375 hours of visible water vapor plumes (5.4% of the hours studied) were predicted during clear weather during daylight hours, when the plume would be noticeable in otherwise good visibility. This represents only 13.5% of the total hours of clear weather during daylight hours, meaning that during daylight conditions of good visibility, there would be about a 13.5% chance of the plume from the Calpine Stony Brook Energy Center 2 being visible due to water-vapor condensation.

Table 3 presents a summary of the number of hours of predicted visible water vapor plumes sorted by weather and by month of the year.

Table 3. Number of Hours of Visible Plumes by Month

	Clear T>32F	Clear T<32F	Observed Fog	100% Humidity	Rain No Fog	Snow No Fog	Total
January	562	1,091	507	111	44	89	2,404
February	425	786	486	153	14	57	1,921
March	690	292	641	197	57	53	1,930
April	675	30	499	199	47	4	1,454
May	485	0	332	211	37	0	1,065
June	158	0	133	114	12	0	417
July	51	0	50	65	5	0	171
August	184	0	72	82	3	0	341
September	333	0	208	63	19	0	623
October	770	14	359	202	28	0	1,373
November	883	231	377	126	56	4	1,677
December	655	743	539	109	77	27	2,150

The hours of visible water vapor plumes in this table include those predicted to occur at night or during twilight hours. This table shows a strong seasonal dependence on the likelihood of visible water vapor plumes. Visible water vapor plumes would be much more frequent during winter than summer, with intermediate frequencies during spring and autumn. The frequency of visible water vapor plumes would be highest during the coldest ambient temperatures and lower during the warmest ambient temperatures.

Appendix F
Endpoint Calculations for Aqueous Ammonia Tank Spills

Endpoint Calculation for Aqueous Ammonia Tank Spill

1 - Introduction

The Calpine Stony Brook Energy Center 2 Project provides for two tanks each capable of storing 8,000 gallons of 19 wt% aqueous ammonia solution. Each horizontal cylindrical tank is to be 10 feet in diameter and 15 feet long, surrounded by an impermeable containment berm, designed to minimize the surface area for evaporation in the event of total tank failure and spillage of the tank contents. The containment berms are to be covered with at least two layers of plastic balls, designed to float on the liquid surface in the event of a spill, and further lower the surface area for evaporation.

Although facilities storing aqueous ammonia solutions containing less than 20 wt% ammonia are not required to comply with the EPA Risk Management Planning Rule, the *EPA Offsite Consequence Analysis Guidance* (April 1999) does provide some guidance for estimating the potential consequences of an accidental spill of aqueous ammonia and subsequent partial evaporation of ammonia into the atmosphere. This Appendix summarizes the calculation procedures that were used to estimate the endpoint distance to the ERPG-2 concentration threshold of 150 ppm.

2 - Optimization of Berm Dimensions

The *EPA Offsite Consequence Analysis Guidance* (EPA-OCAG) defines a worst-case release of volatile liquids stored at atmospheric pressure as the instantaneous spillage of the entire contents into the containment berm, followed by evaporation of the toxic component (ammonia in this case) at a rate which depends on pool temperature, wind speed, and pool area. The equation given the EPA-OCAG is as follows:

$$E = \frac{0.284 M^{2/3} U^{0.78} A P_v}{82.05 T} \qquad \text{(Eq. 1)}$$

where:

E = evaporation rate in lb/min
M = molecular weight of toxic component
U = wind speed, m/s
A = pool area, ft^2
P_v = partial pressure of toxic component, mmHg
T = absolute temperature of liquid pool, degrees Kelvin.

Since the evaporation rate is directly proportional to the pool area as limited by the berm, the berm dimensions should be optimized in order to minimize the pool area, and thereby minimize the ammonia evaporation rate in the event of a spill.

The need for minimum surface area must be balanced against the requirements for space between the berm and the tank for pumps, piping and maintenance access, as well as the ability of the berm to contain escaped liquid for other spill scenarios. For example, if a small leak develops in the side of the tank below the liquid level, the resulting liquid stream should not pass over the berm wall.

For a storage tank that is a horizontal cylinder 10 ft in diameter and 15 feet long, filling the tank with 8,000 gallons of aqueous ammonia would result in a liquid level 9.35 ft above the bottom of the tank. For a skirt height of the tank (distance between the bottom of the diked area and the bottom of the tank) that is 4 feet, the maximum liquid level would be 13.35 ft above the bottom of the diked area.

For a given liquid level, the exit velocity of liquid from a hole in the side of the tank depends on the hole height—the lower the hole, the more liquid pressure is driving the flow, and the faster the liquid flows. If friction is neglected, the exit velocity is given by:

$$v_e = \sqrt{2g(z_L - z_h)} \quad \text{(Eq. 2)}$$

where:

v_e = exit velocity
g = acceleration of gravity
z_L = liquid height in tank
z_h = hole height

For a leak along the cylindrical surface, this exit velocity (perpendicular to the tank surface) can be resolved into horizontal and vertical velocity components. For a leak along the end of the tank, the velocity is assumed to be horizontal only.

From the vertical velocity component (if any) and the difference in height between the hole and the berm wall, the time required for the liquid to fall under the influence of gravity from the hole height to the berm height is calculated as:

$$t = \frac{v_v + \sqrt{v_v^2 + 2g(z_h - z_b)}}{g} \quad \text{(Eq. 3)}$$

where

v_v = vertical (upward) component of hole exit velocity
z_b = berm wall height

The minimum horizontal distance between the tank surface and the berm wall required so that the liquid stream does not pass over the berm wall is equal to the fall time multiplied by the horizontal component of the hole velocity. For a tank that is centrally located within the diked area, the required berm width is then equal to twice this distance (since a leak could occur in either side of the tank) plus the width of the tank at the given height, and the required berm length is equal to twice this distance plus the length of the tank.

For a given assumed berm height z_b, and the fixed liquid level z_L, the required berm length and width were calculated for values of hole height at 6-inch intervals between z_b and z_L. The maximum values were then taken as the required berm length and width for the given berm height.

This calculation was repeated for several values of berm height z_b at 1-foot intervals. It was found that increasing the height of the berm wall enabled the walls to be placed much closer to the tank, thereby reducing the evaporation area. An optimum situation was obtained for a berm 11 feet high, which would require a berm 20 ft long and 16 ft wide. This design would also allow 2.5 feet of clearance at each end of the tank, and 3 feet of clearance along the sides of the tank, which would allow enough space for piping and maintenance access.

3 – Reduction of Evaporation Area using Floating Balls

One method which is commonly used to reduce the impact of accidental ammonia spills is to fill the containment berm with at least two layers of light, impermeable spheres (usually plastic balls) which would float on the liquid in the event of a spill, thereby reducing the evaporation area and resulting evaporation rate.

In order to estimate the impact of using floating balls, the remaining evaporation area can be estimated as the area of the interstices between a layer of close-packed balls along a horizontal plane through their centers (which would be the minimum, and therefore limiting, area for flow). It can be shown that a layer of close-packed balls results in a hexagonal, honeycomb-like pattern in which each ball is tangent to six other balls, which is repeated over the entire surface of the berm.

If lines are drawn between the centers of three mutually-tangent balls, they form an equilateral triangle whose area is given by:

$$A_t = r^2\sqrt{3} \qquad \text{(Eq. 4)}$$

where r is the radius of each ball. Within this triangle, each of the three balls blocks a circular sector of 60°, whose area is equal to $^1/_6$ of the area of the circle. The total area obstructed by the circular sectors from three balls is equal to 3 times $^1/_6$ of the area of the circle, or:

$$A_b = \frac{3}{6}\left(\pi r^2\right) = \frac{\pi r^2}{2} \qquad \text{(Eq. 5)}$$

The open area remaining in the interstices is then given by $A_t - A_b$. Since this pattern is repeated over the entire area of the berm, the ratio of the evaporation area between all the interstices to the total berm area is given by:

$$\frac{A_e}{A} = \frac{A_t - A_b}{A_t} = 1 - \frac{\pi}{2\sqrt{3}} \approx 0.0931. \qquad \text{(Eq. 6)}$$

In order to estimate the evaporation area for a spill in a berm covered with plastic balls, the berm area was multiplied by 0.0931. Although this calculation may slightly under-estimate the evaporation area due to additional open area along the edges of the berm where each ball is not tangent to six other balls, this effect is more than compensated by the fact that the presence of the balls will greatly reduce the wind speed along the liquid surface relative to the wind speed in open air.

Since, according to Equation 1, evaporation rate increases with wind speed, the greatly reduced wind speed along the liquid surface will reduce the evaporation rate far more than "edge effects" will increase the evaporation area, if the ball diameter is much smaller than the berm width. Since the reduction in wind speed is difficult to quantify, it was determined that reducing the evaporation rate based on the area ratio of interstices between a layer of close-packed balls would probably over-estimate the actual evaporation rate, and provide a conservative, safe value for the endpoint distance.

4 – Partial Pressure of Ammonia over Aqueous Solutions

Ammonia and water form a highly non-ideal solution, so the partial pressure of ammonia (P_v in Equation 1) cannot be calculated by the ideal-solution approximation of multiplying the vapor pressure of pure ammonia by the mole fraction. Experimental values of the partial pressure of ammonia over aqueous solutions were taken from Table 3-23 in *Perry's Chemical Engineers' Handbook* (page 3-68), for increments of 5 mol % ammonia and 10°F.

For each temperature in the table, a least-squares regression was performed of partial pressure of ammonia as a function of weight percent ammonia, to obtain an equation of the form:

$$P_v = ax + bx^2 + cx^3 \qquad \text{(Eq. 7)}$$

where x represents the weight percent of ammonia in the solution, and a, b, and c are constants, which depend on temperature. For temperatures between those listed in the table in *Perry's Chemical Engineers' Handbook*, vapor pressures were interpolated between the two "straddling" temperatures using the Clauseus-Clapeyron approximation, where it is assumed that

$$P_v = \exp\left(\alpha - \frac{\beta}{T}\right) \qquad \text{(Eq. 8)}$$

where T is absolute temperature in degrees Kelvin, and α and β are constants, for a given ammonia concentration. Absolute temperature in degrees Kelvin is calculated from temperature F in degrees Fahrenheit using the formula

$$T = \frac{(F - 32)}{1.8} + 273.15 \qquad \text{(Eq. 9)}$$

For each of the two "straddling" temperatures, values of P_v were calculated for the given ammonia concentration x using Equation 7, which were then substituted into Equation 8, which results in two equations, which were then solved for the constants α and β. These constants, and the actual temperature T were then re-substituted into Equation 8 to obtain the partial pressure P_v.

5 – Weather Conditions for Dispersion Modeling

The EPA Risk Management Planning Rule states that the worst-case release should be modeled assuming the highest temperature recorded at a site, with a wind speed of 1.5 m/s, and Class F stability. It should be stressed that the combination of the highest temperature recorded at a site and Class F stability is physically impossible, since Class F stability only occurs at night, but the record-high temperature occurs during daylight hours.

Since the aqueous ammonia tanks at the proposed Project site are not subject to the Risk Management Planning Rule, since the ammonia concentration is less than 20 wt%, it was decided to seek a more realistic worst-case scenario which could actually occur. High temperatures tend to increase evaporation rate due to much higher partial pressures, whereas low wind speeds and very stable conditions are unfavorable to dispersion, and result in higher downwind concentrations for a given evaporation rate.

It was therefore decided to test two unfavorable, but plausible weather scenarios:

1) the record-high temperature (101°F at Islip) for the most stable conditions that occur during daylight hours (Class D). Since a 1.5 m/s wind speed during sunny weather results in Class A or B stability (more favorable to dispersion), the wind speed was set to 4 m/s, the lowest wind speed for which Class D stability is possible during sunny weather.

2) Class F stability for the highest temperature that can occur at night, which was estimated to be 85°F. In this case, the wind speed was set to 1.5 m/s, as recommended by the Risk Management Planning Rule.

For each scenario, the partial pressure of ammonia was calculated using the procedures described in Section 4, and the evaporation area was calculated by multiplying the berm area (320 ft^2) by the reduction factor in Equation 6. The appropriate temperature and wind speed, as well as the molecular weight of ammonia (M = 17.03) were then substituted into Equation 1, in order to calculate the ammonia evaporation rate. Temperatures were converted to degrees Kelvin using Equation 9.

6 – Dispersion Modeling using the DEGADIS Model

These two release scenarios were simulated using the DEGADIS dispersion model, which has been approved by EPA, and has been shown by independent tests to slightly over-predict downwind concentrations as compared to experimental ammonia releases.

In reality, the ammonia evaporation rate decreases slowly with time, because ammonia evaporates more rapidly than water, causing the solution to become more dilute with time, thereby decreasing the ammonia partial pressure. However, the release was simulated as a steady-state release at the initial (maximum) evaporation rate, in order to simplify the calculation. This also leads to the model over-estimating the hourly average downwind concentration relative to that resulting from the decreasing evaporation rate.

The purpose of the dispersion modeling is to calculate the downwind distance at which the concentration reaches the ERPG-2 threshold (150 ppm for ammonia), which is the maximum concentration to which it is believed a person can be exposed for one hour without suffering serious health effects. This threshold has been prescribed by the American Industrial Hygiene Association, and is recommended by EPA for calculating endpoint distances for the Risk Management Planning Rule.

The DEGADIS model, in steady-state mode, outputs downwind centerline concentrations at a set of downwind distances chosen by the model. Although the model did not output a distance for which the centerline concentration was exactly 150 ppm, it was possible to interpolate this distance between the two "straddling" distances, for which the concentration was closest to 150 ppm on either side of the threshold. It was assumed, for this interpolation, that centerline concentration is a power-law function of distance of the form

$$C = aX^{-b} \qquad \text{(Eq. 10)}$$

where:

C = centerline concentration in ppm;
X = downwind distance in meters
a and b are constants.

If C_1 and C_2 represent the concentrations output by DEGADIS immediately above and below the threshold concentration C_T (150 ppm), and X_1 and X_2 represent the downwind distances at which they were calculated, these values can be substituted into Equation 10 to obtain two equations, which can be solved for a and b. If the threshold concentration C_T is then substituted for C, and Equation 10 is solved for X, the endpoint distance X_T for which $C = C_T$ is given by:

$$X_T = X_1 \exp\left[\frac{\ln\left(X_2/X_1\right)\ln\left(C_T/C_1\right)}{\ln\left(C_2/C_1\right)}\right] \qquad \text{(Eq. 11)}$$

Equation 11 above was used to interpolate the endpoint distance X_T between the distances X_1 and X_2 for which the centerline concentrations C_1 and C_2 "straddled" the threshold concentration C_T= 150 ppm. This endpoint distance, which DEGADIS outputs in meters, was then converted to feet by dividing by 0.3048 m/ft.

For a wind speed of 1.5 m/s, Class F Stability, and the assumed highest possible night-time temperature (85°F), the calculated endpoint distance was 244 feet (74.5 m). For the record-high temperature, Class D Stability, and a wind speed of 4 m/s (the lowest wind speed that produces Class D stability on a sunny day), the calculated endpoint distance was 144 feet (43.9 m).

These endpoint distances can be considered as conservative, over-estimated values, because:

1) The evaporation rate is calculated at high temperatures (which increase evaporation rate), much higher than the annual average temperature of 51.3°F (at Islip, NY).

2) The evaporation-rate equation (Equation 1) recommended by the EPA assumes a mass-transfer coefficient much higher than that which was experimentally measured.

3) The tendency of the balls to slow down the wind speed at the liquid surface was not taken into account.

4) The actual decrease of evaporation rate with time was not taken into account, but the evaporation rate was assumed constant at the initial maximum rate.

5) The DEGADIS model tends to over-estimate downwind concentrations relative to those measured during experimental ammonia releases.

Appendix G
Health and Safety Plan

CALPINE STONY BROOK ENERGY CENTER 2
HEATH AND SAFETLY PLAN
TABLE OF CONTENTS

SECTION

HEALTH AND SAFETY PLAN
EXECUTIVE SUMMARY

Calpine Stony Brook Energy Center 2, Inc., a subsidiary of the Calpine Corporation (Calpine) has proposed the construction of a state-of-the-art 79.9 megawatt (MW) natural gas-fired combined-cycle unit on property located on the State University of New York (SUNY) Stony Brook campus adjacent to an existing 47 MW cogeneration facility owned and operated by Nissequogue Cogen Partners (NCP), also a subsidiary of Calpine, in the Town of Brookhaven, Stony Brook, New York.

The project site is located on an approximately 1.5-acre parcel of land, wholly within the SUNY physical plant services complex on the SUNY Stony Brook campus. The SUNY physical plant services complex is located on the western edge of the campus and is approximately 12 acres.

During original development of the existing power generating facility, an environmental site investigation was conducted entitled *Baseline Environmental Study for the Stony Brook Cogeneration Facility, Stony Brook, New York*, dated November 22, 1993 (1993 Baseline Study). The project site was a portion of this investigation. No evidence of a release of oil and/or hazardous materials (OHM) from the project site was identified during this study. However, the study did identify that soils and groundwater immediately to the west of the proposed project site were contaminated with No. 6 fuel oil from a release that occurred in 1987. To support development of the Calpine Stony Brook Energy Center 2, a Phase I Environmental Site Assessment (ESA) was performed at the project site to build upon the information in the 1993 Baseline Study, as it related to the project site. Based on the results of the Phase I ESA, no evidence of soil and groundwater contamination was identified at the project site.

Although exposure to contaminated soil and ground water during construction of the Project appears low, a Health and Safety Plan (HASP) will be prepared to minimize onsite and offsite exposure to any potential contaminants that may be encountered during construction activities. The HASP will be designed to protect onsite construction workers, as well as offsite receptors, including SUNY Stony Brook employees and students.

The HASP will define worker safety training and monitoring procedures, personal protective equipment, air monitoring equipment, action levels, and appropriate protective measures.

The HASP will contain the following main sections:

Introduction: This section will summarize the Scope of Work for Construction Activities, and provide a summary of previous environmental site investigations at the project site.

Chemical Hazards: This section will describe the potential chemical hazards that may be encountered during construction of the project, including a summary of ground water and soil analytical data from previous environmental assessments

Physical Hazards: This section will describe the potential physical hazards that site workers can reasonably be expected to encounter, and mitigation measures to reduce the effects of these hazards. Typical hazards that will be addressed include:

- Heat Stress
- Cold Stress
- Noise
- Blood-Bourne Pathogens
- Electrical Hazards
- Fire or Explosion
- Lifting Hazards
- Equipment Safety
- Confined Spaces

Site Controls: This section will identify the methods that will be implemented by the Contractor to reduce on and offsite exposure to potential chemical hazards at the project site, including:

- Control Zones (a clearly identified area that will ensure controlled access to a potentially impacted area);
- Material Control (established procedures for handling potentially contaminated materials and equipment); and
- Personal Protective Equipment (identified equipment that construction workers must wear while working in any potentially impacted areas).

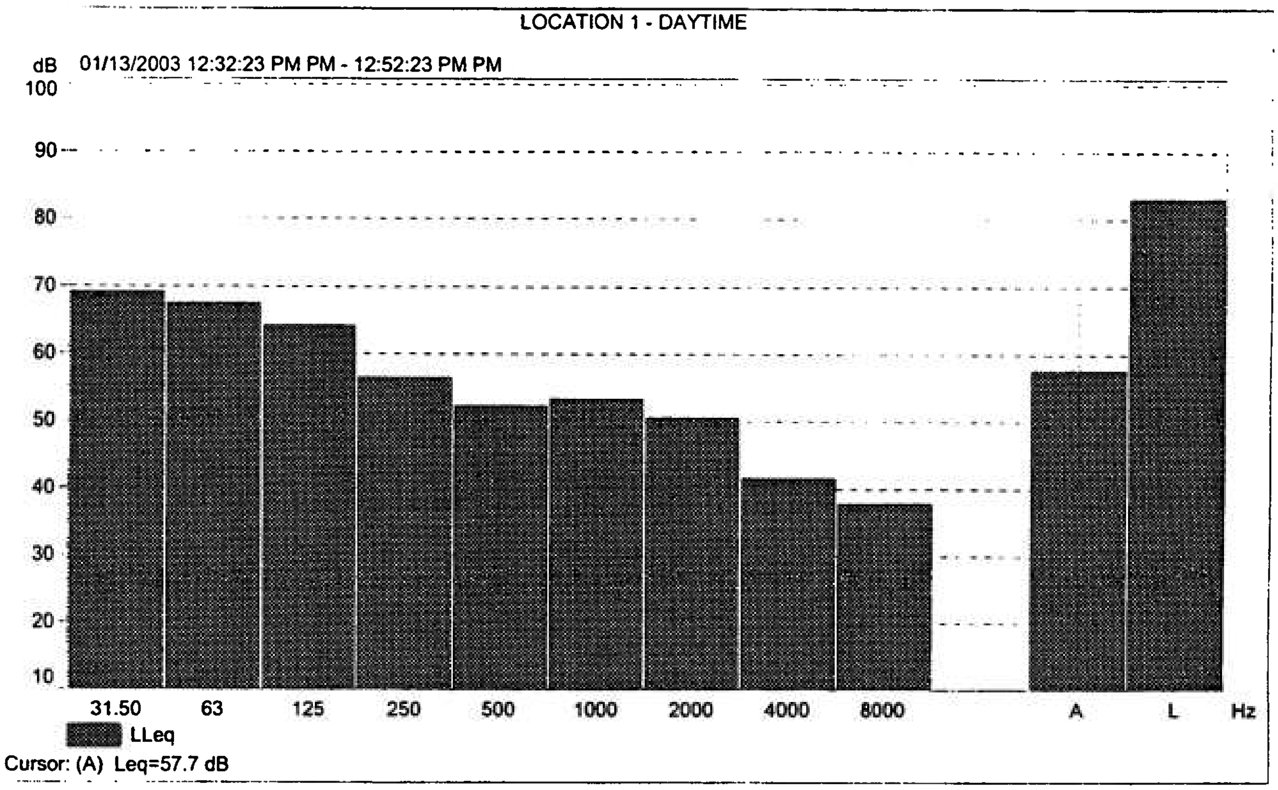
Training Requirements: This section will identify the minimum training requirements for workers at the project site, site-specific training requirements, and site contingency plans. Initial training, site-specific training, and medical surveillance for construction workers will be addressed.

Emergency Response Plan: This section will outline the emergency response plan in the event of an emergency at the site, including the identification of the following:

- Lines of communication;
- Emergency procedures;
- Emergency medical procedures;
- Emergency Assistance Information and Contacts;
- Directions to the nearest hospital with an emergency room; and
- Incident Follow-up.

Appendix H
Noise Information

Noise Monitoring Results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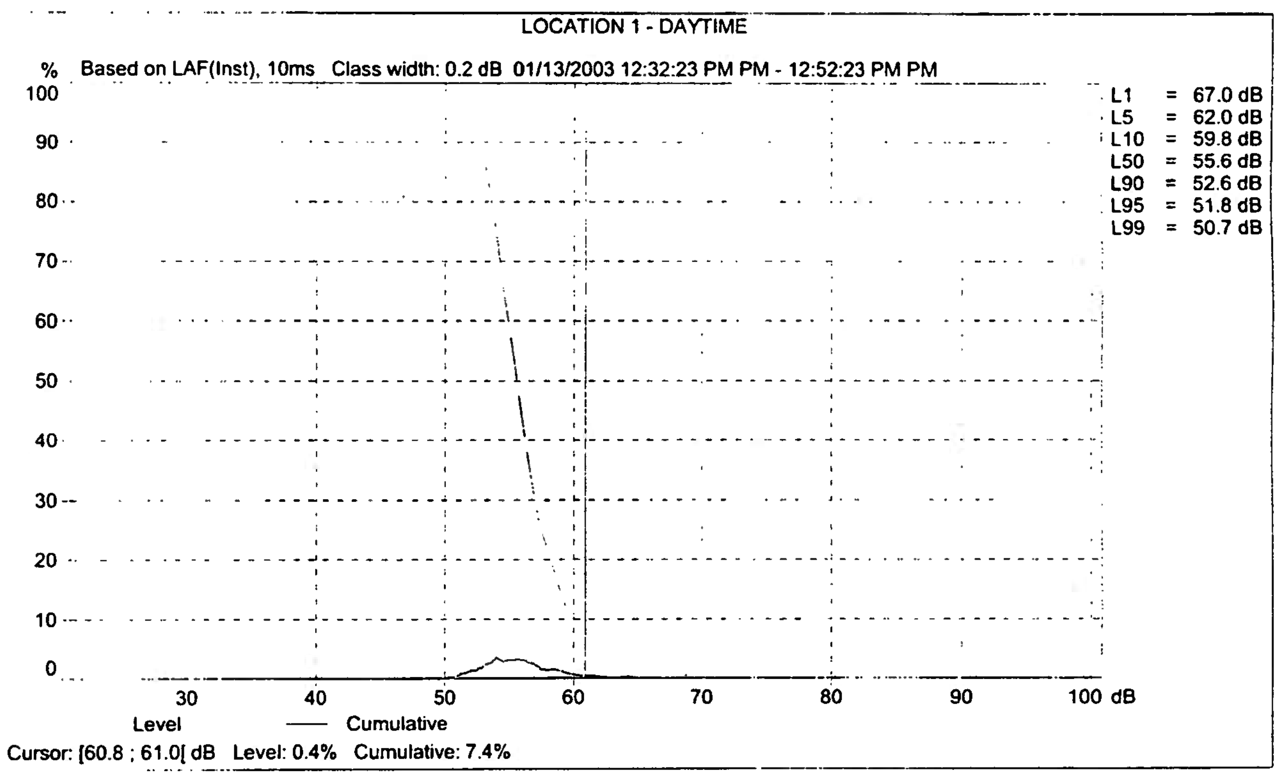
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L10 = 59.8 dB
L50 = 55.6 dB
L90 = 52.6 dB
L95 = 51.8 dB
L99 = 50.7 dB
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90
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40
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70
80
90
100 dB
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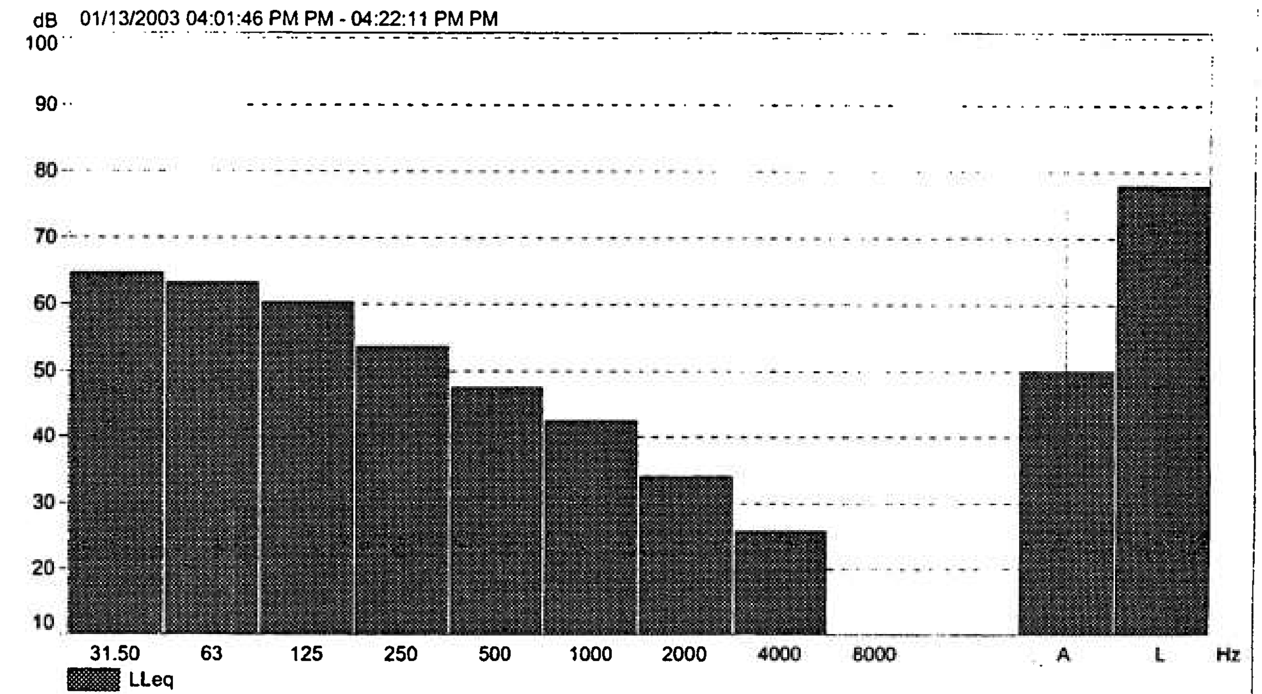
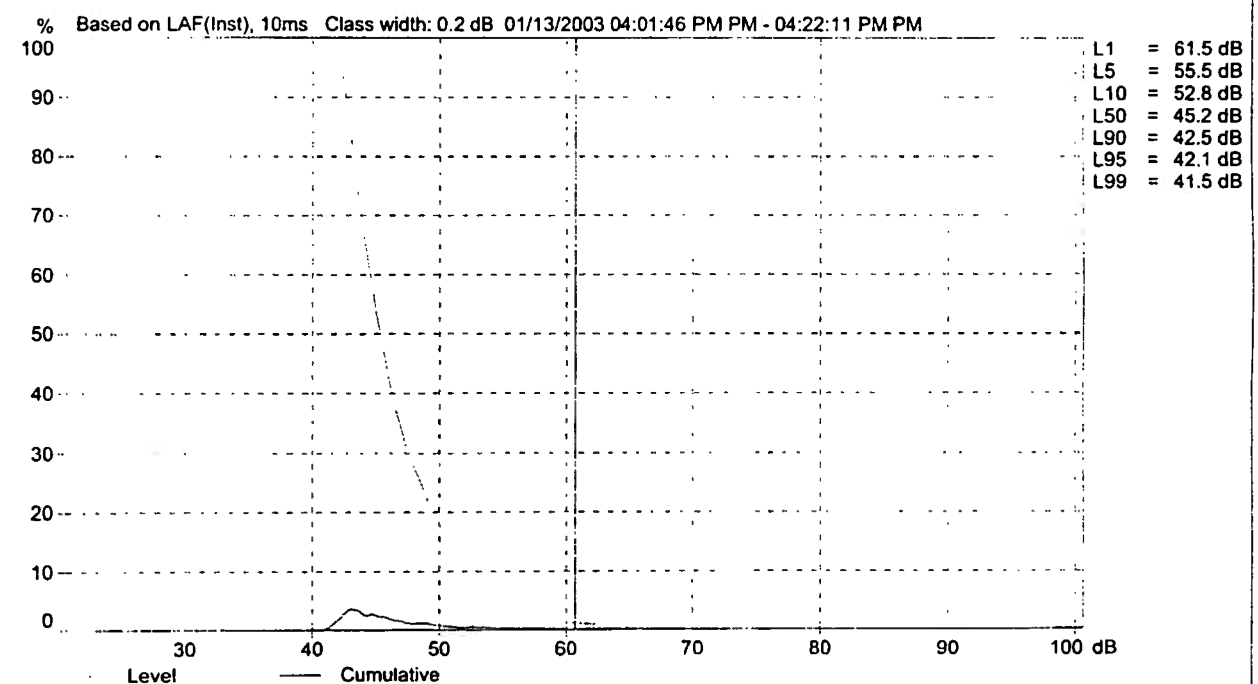
Cursor: [60.8 ; 61.0[dB Level: 0.4% Cumulative: 7.4%

LOCATION 2 - DAYTIME



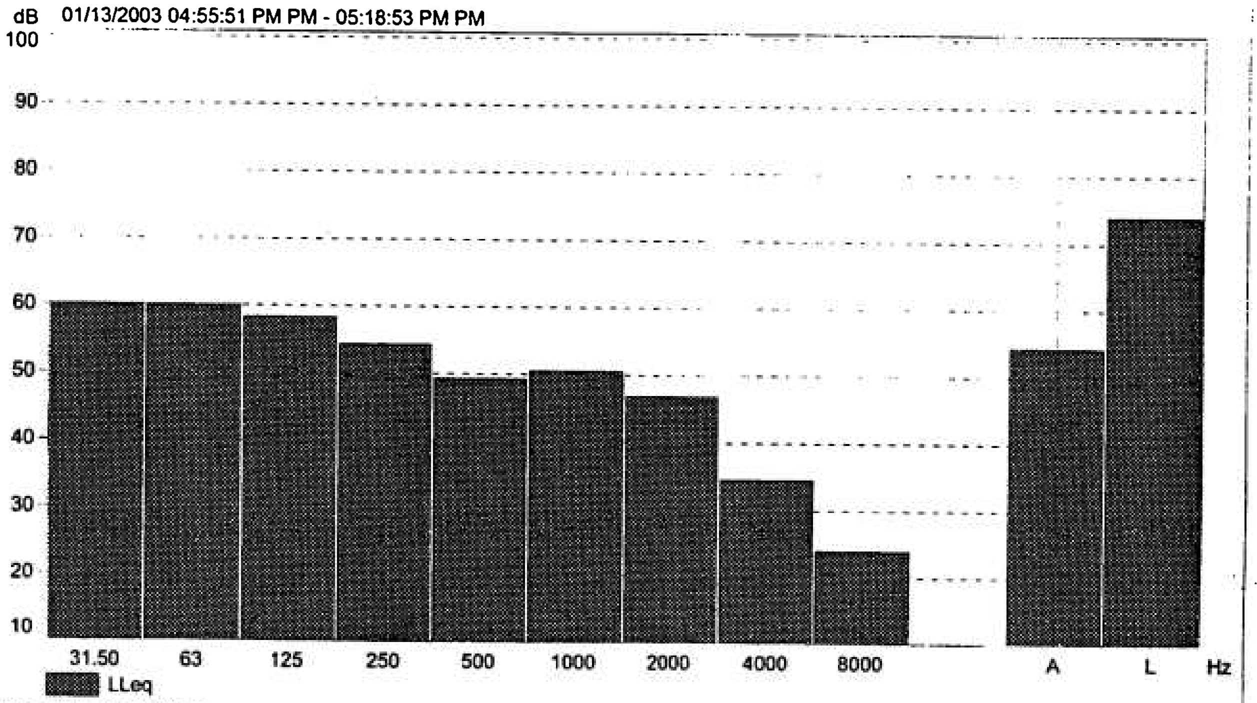
Cursor: (A) Leq=50.1 dB

LOCATION 2 - DAYTIME



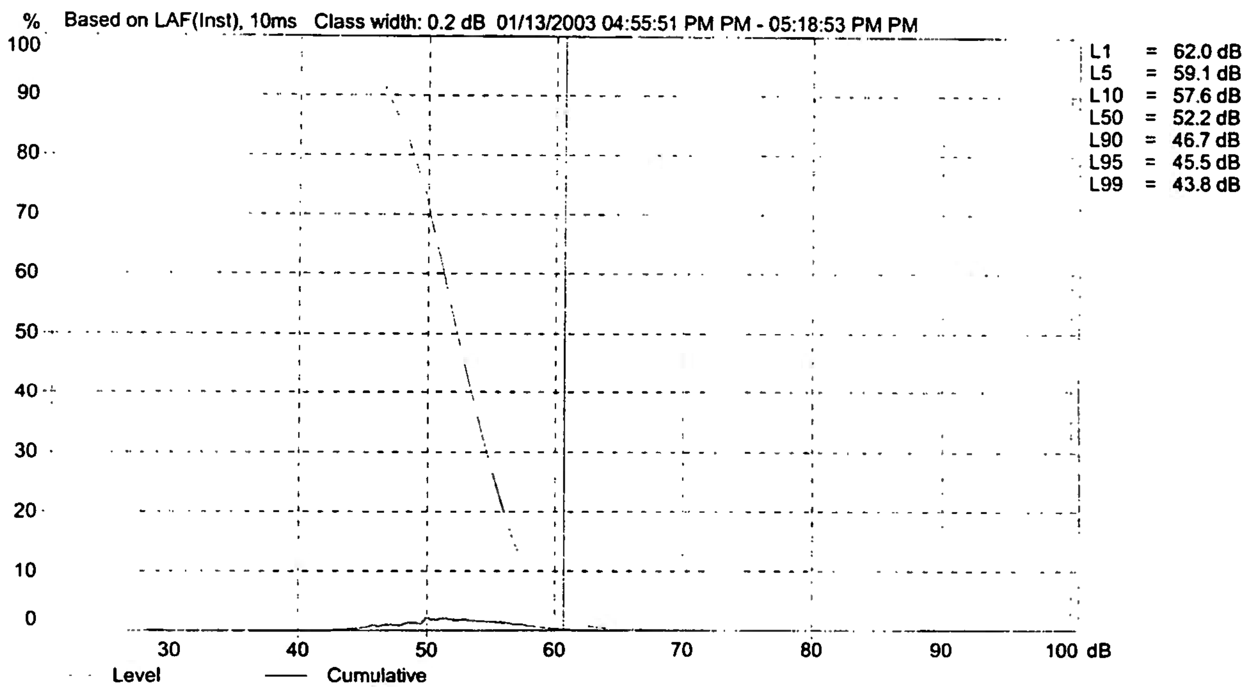
Cursor: [60.6 ; 60.8[dB Level: 0.0% Cumulative: 1.1%

LOCATION 3 - DAYTIME

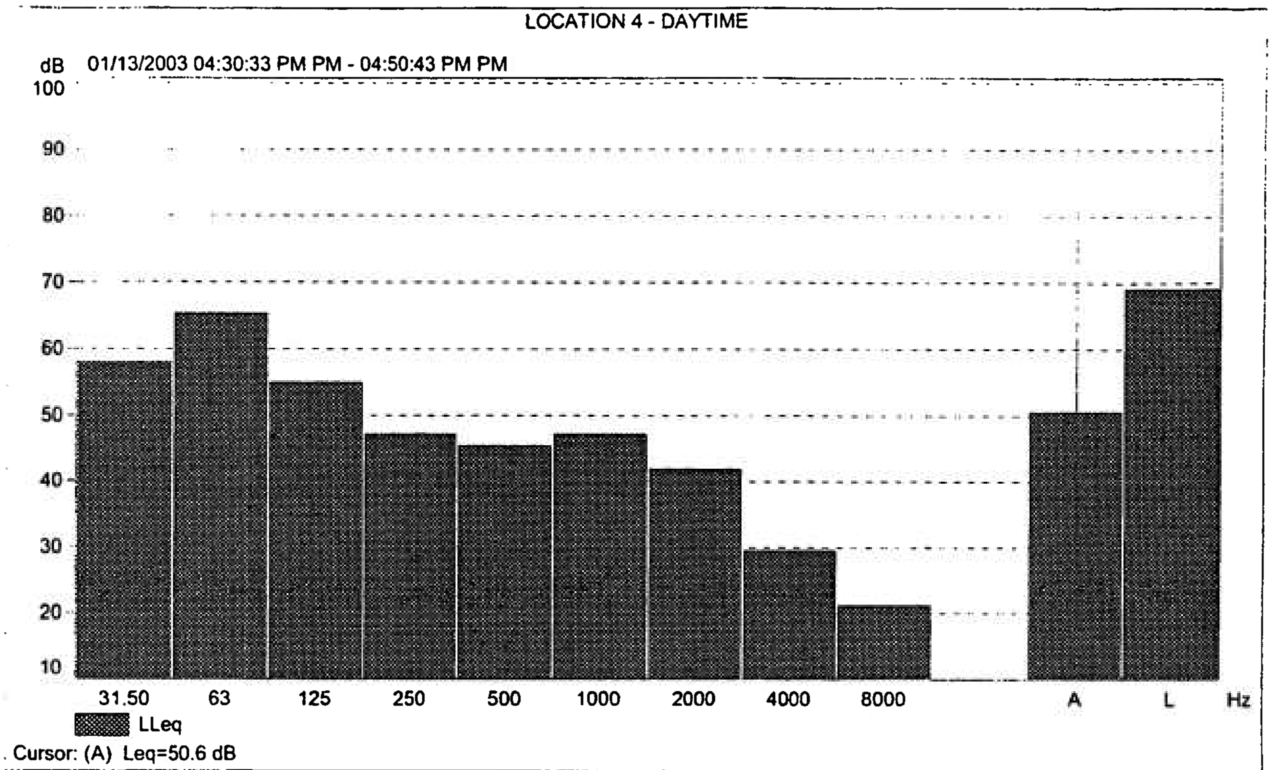


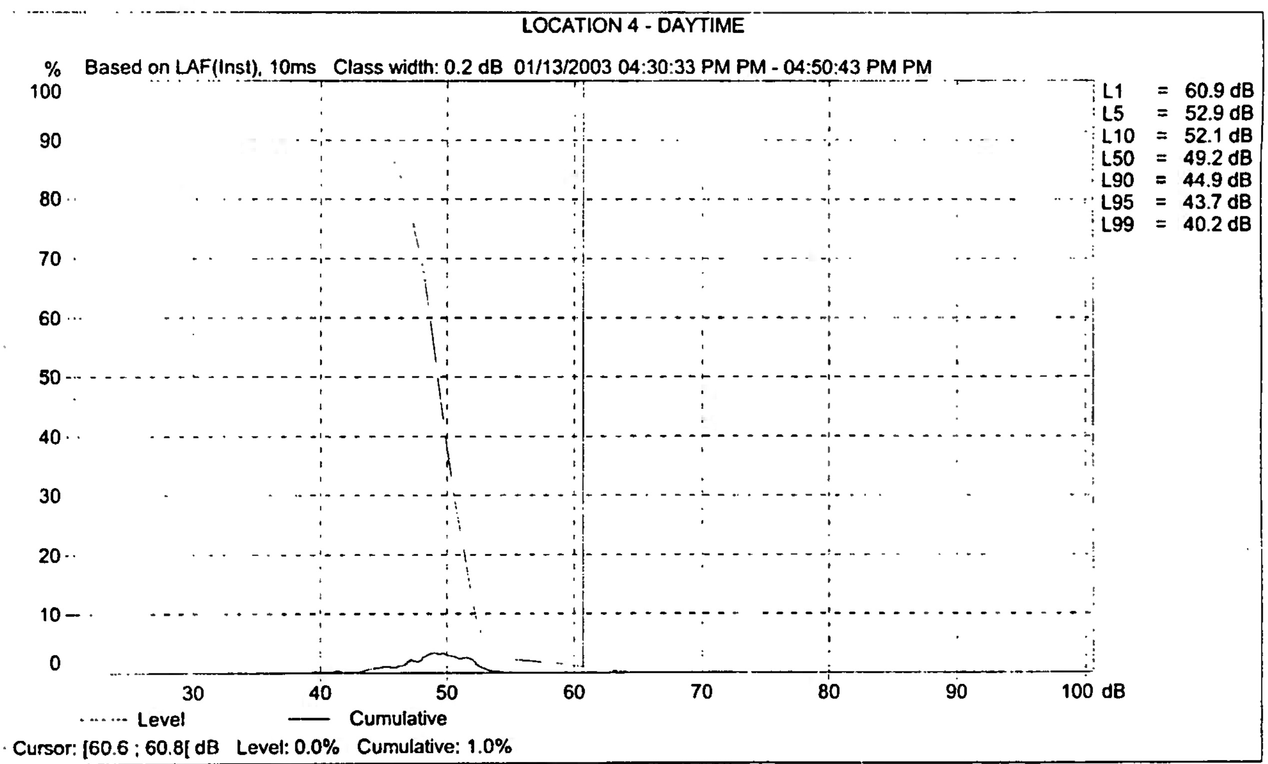
Cursor: (A) Leq=54.4 dB

LOCATION 3 - DAYTIME

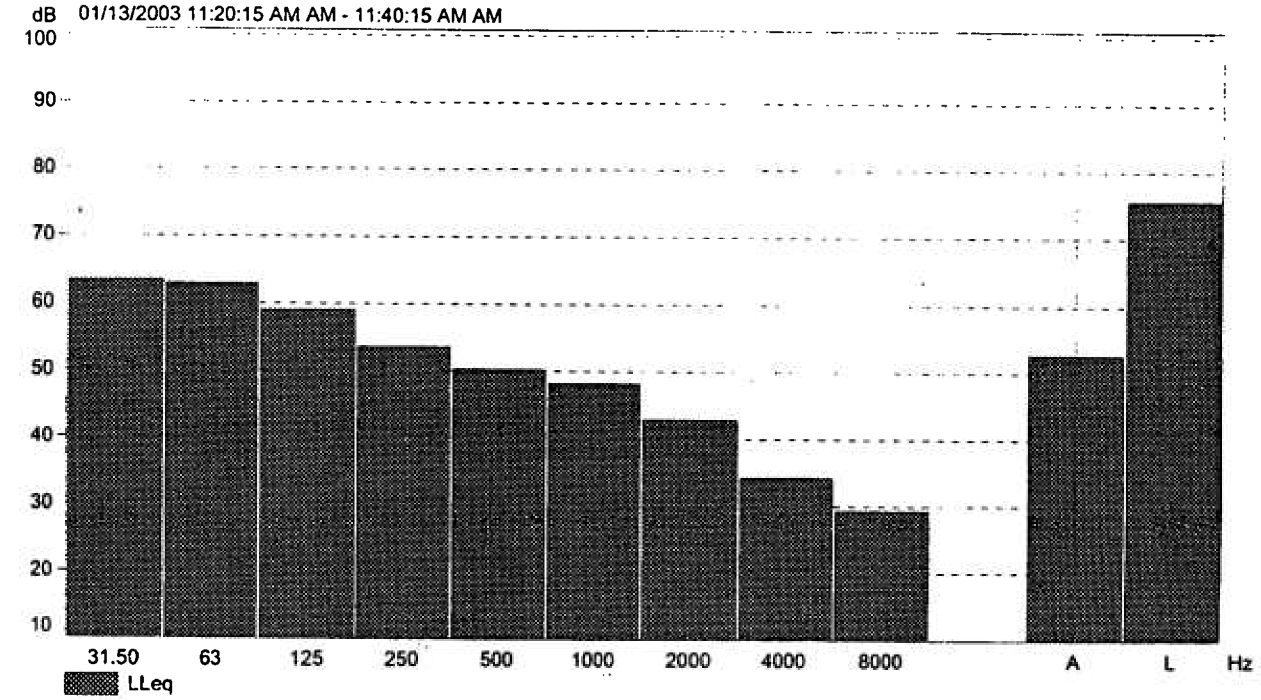


Cursor: [60.6 ; 60.8[dB Level: 0.2% Cumulative: 2.1%

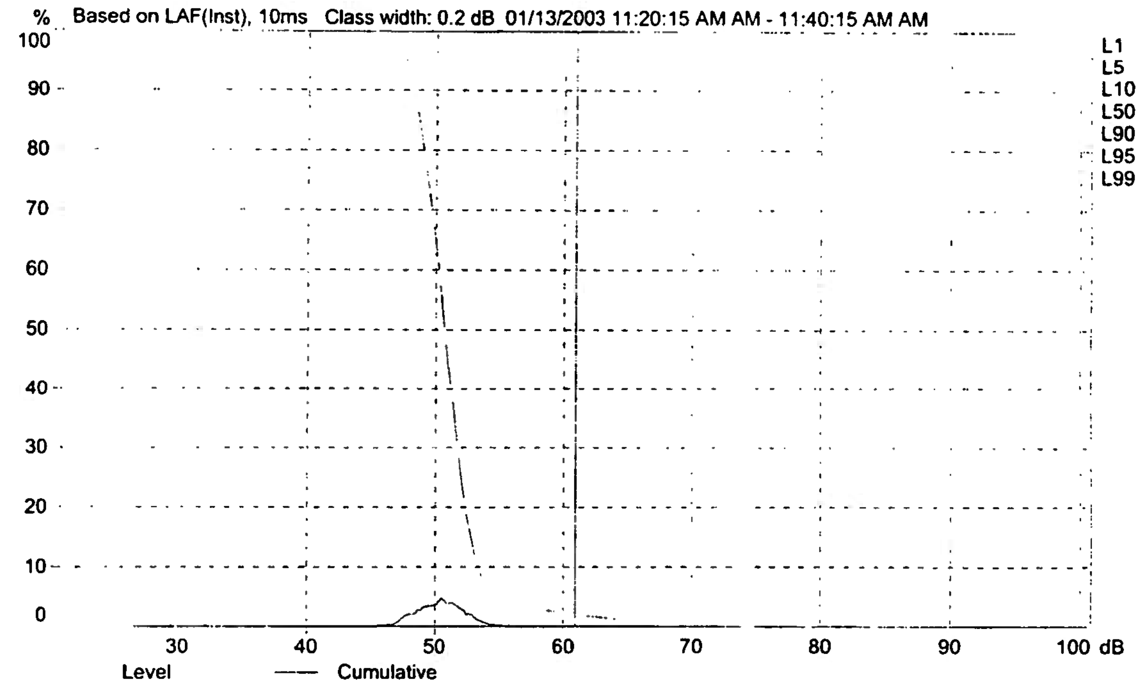

LOCATION 4 - DAYTIME
dB 01/13/2003 04:30:33 PM PM - 04:50:43 PM PM
100
90
80
70
60
50
40
30
20
10
31.50
63
125
250
500
1000
2000
4000
8000
A
L
Hz
LLeq
Cursor: (A) Leq=50.6 dB


LOCATION 4 - DAYTIME
% Based on LAF(Inst), 10ms Class width: 0.2 dB 01/13/2003 04:30:33 PM PM - 04:50:43 PM PM
L1 = 60.9 dB
L5 = 52.9 dB
L10 = 52.1 dB
L50 = 49.2 dB
L90 = 44.9 dB
L95 = 43.7 dB
L99 = 40.2 dB
100
90
80
70
60
50
40
30
20
10
0
30
40
50
60
70
80
90
100 dB
Level
Cumulative
Cursor: [60.6 ; 60.8[dB Level: 0.0% Cumulative: 1.0%

LOCATION 5 - DAYTIME

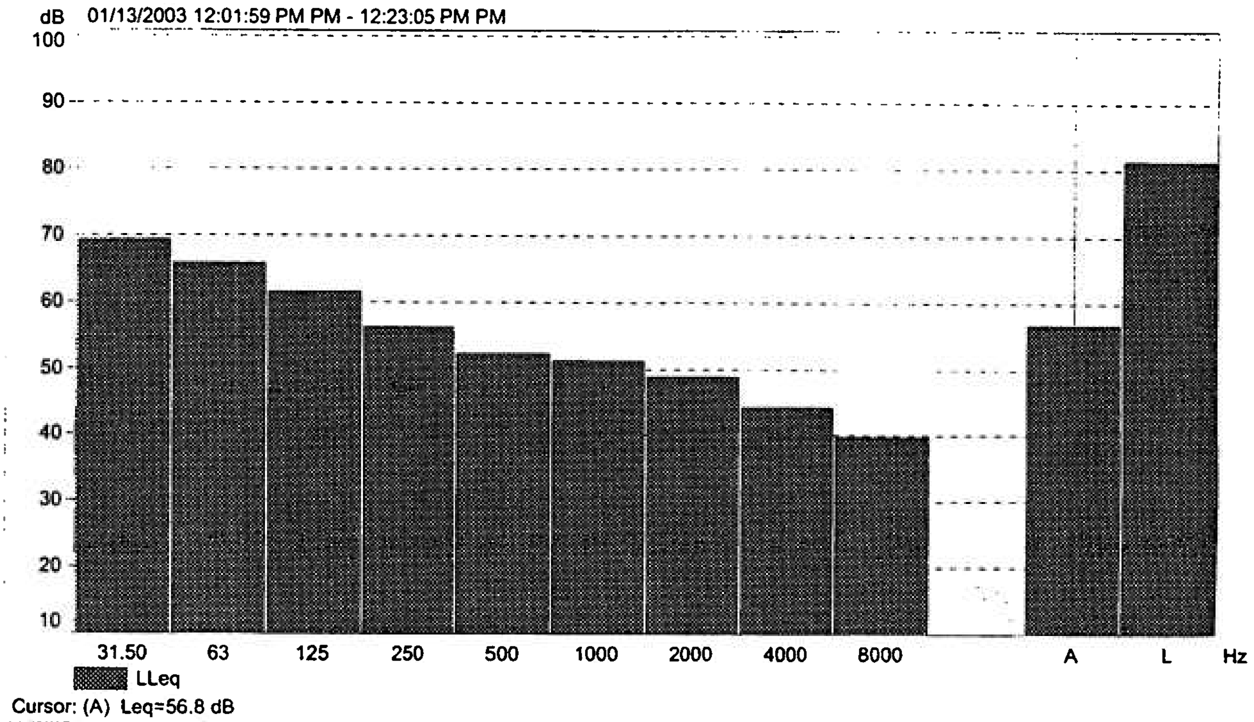


LOCATION 5 - DAYTIME

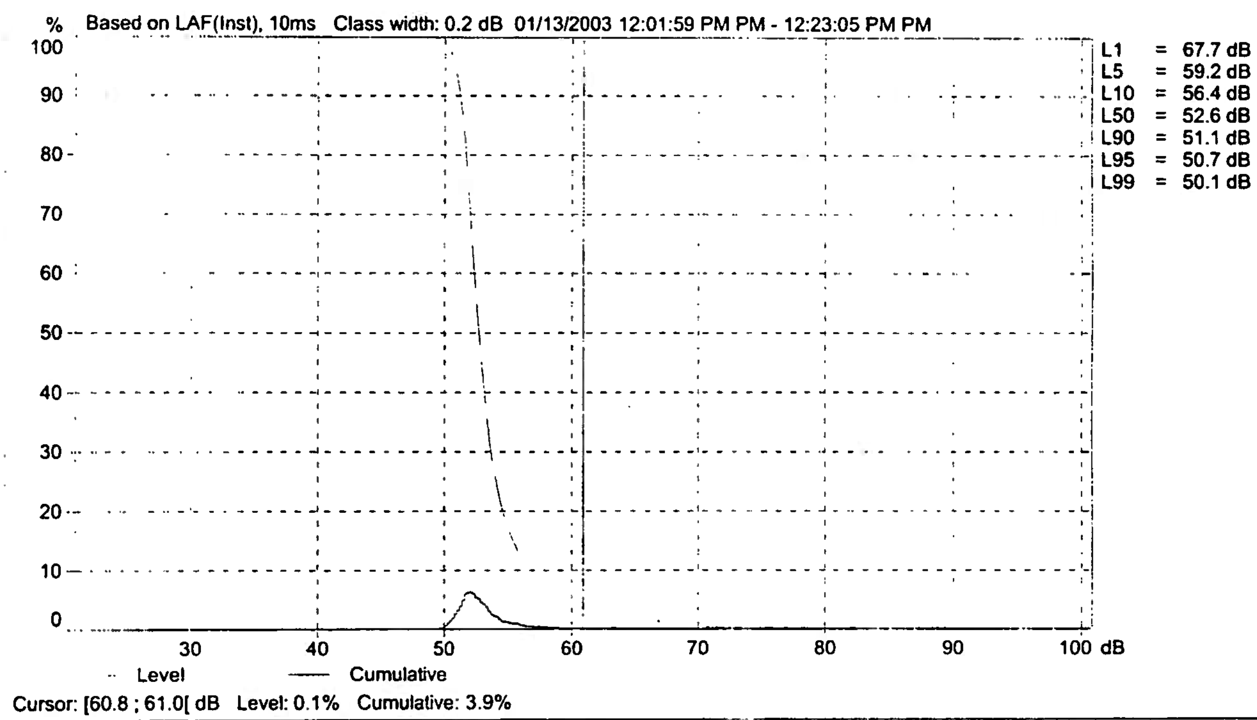


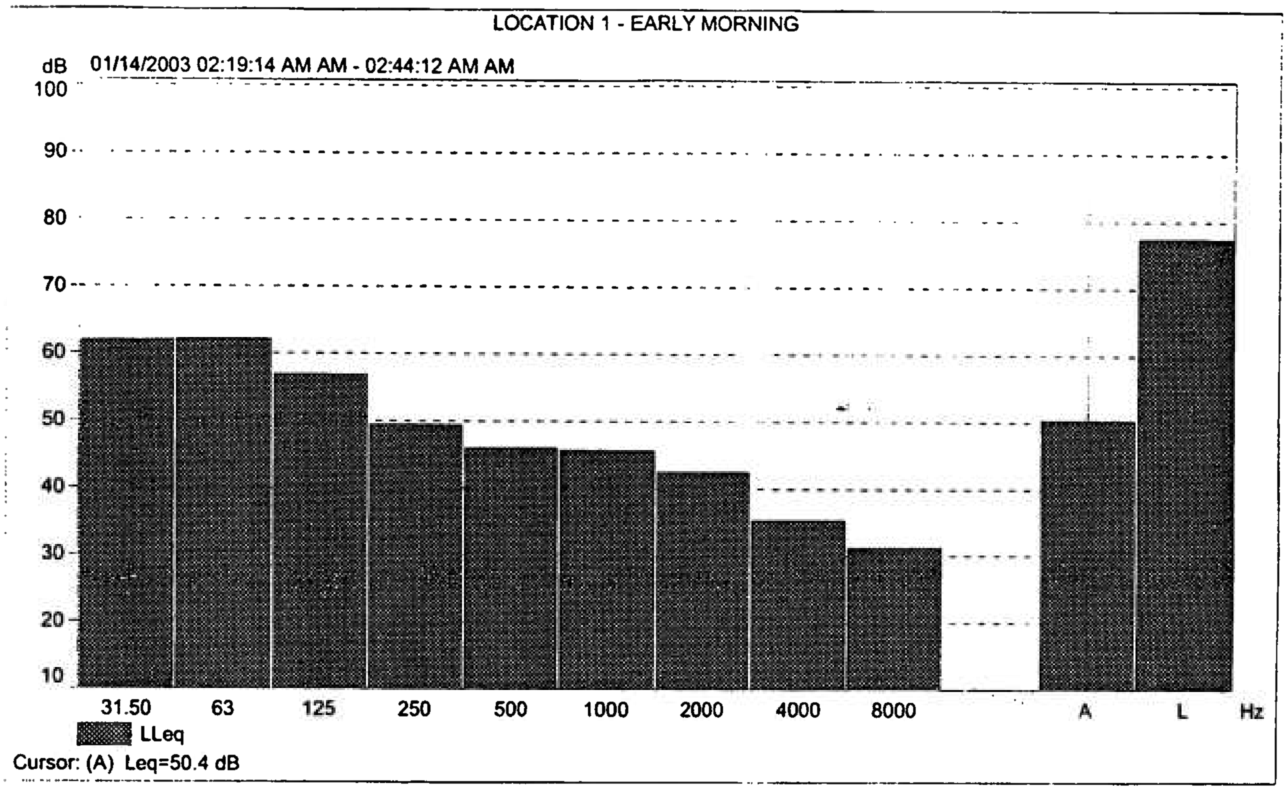
L1	=	64.9 dB
L5	=	55.0 dB
L10	=	53.3 dB
L50	=	50.6 dB
L90	=	48.1 dB
L95	=	47.6 dB
L99	=	46.3 dB

LOCATION 6 - DAYTIME

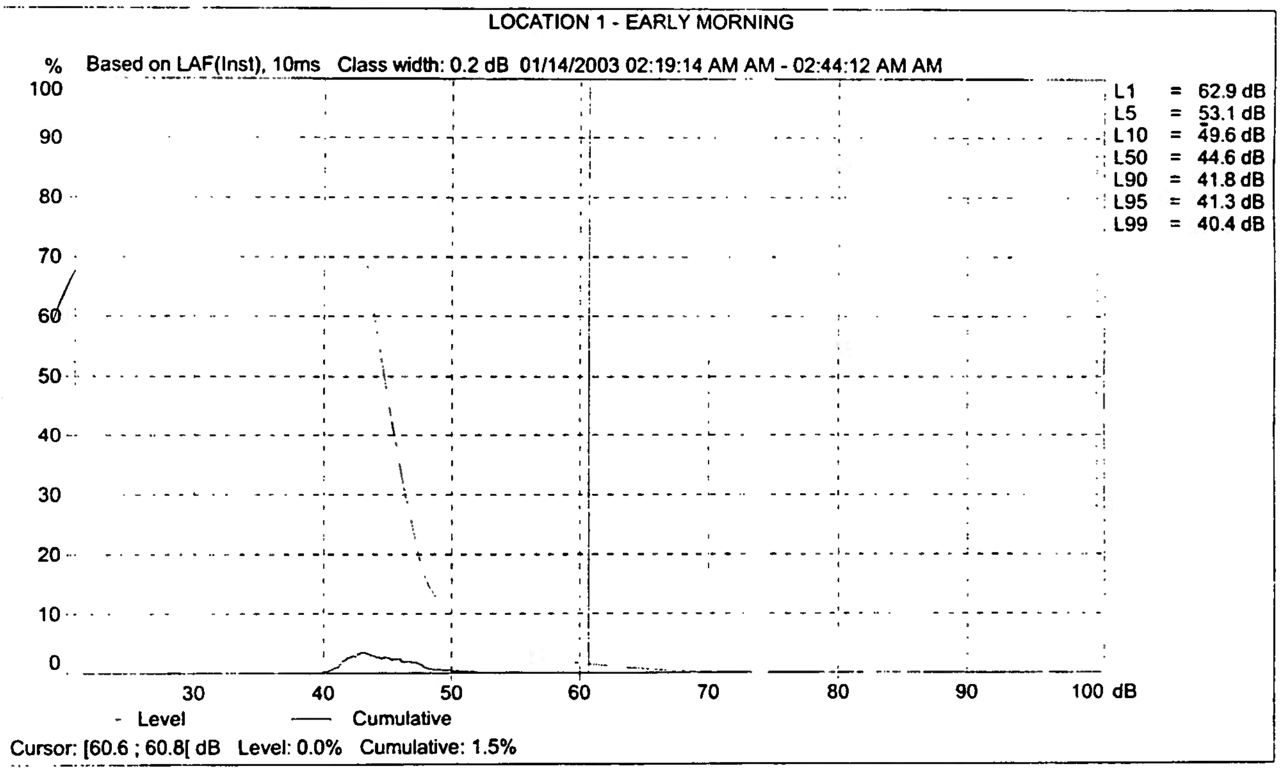


LOCATION 6 - DAYTIME

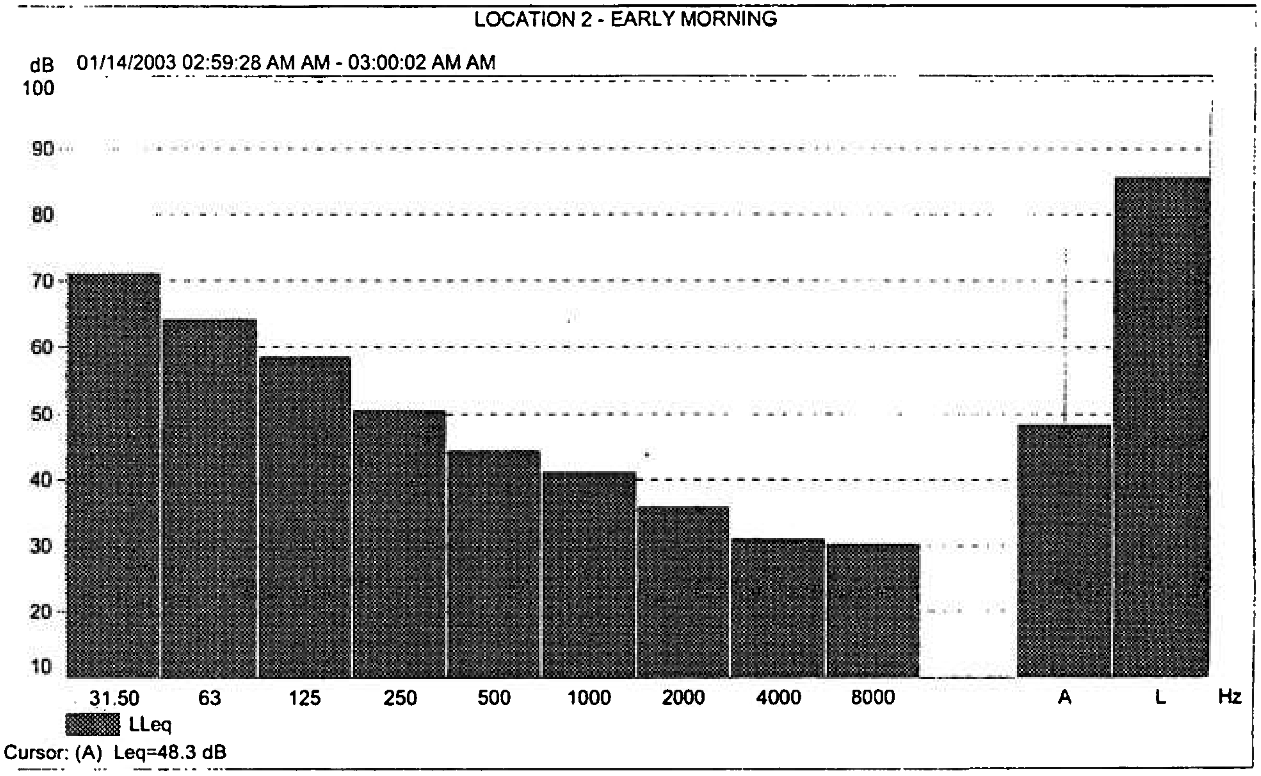




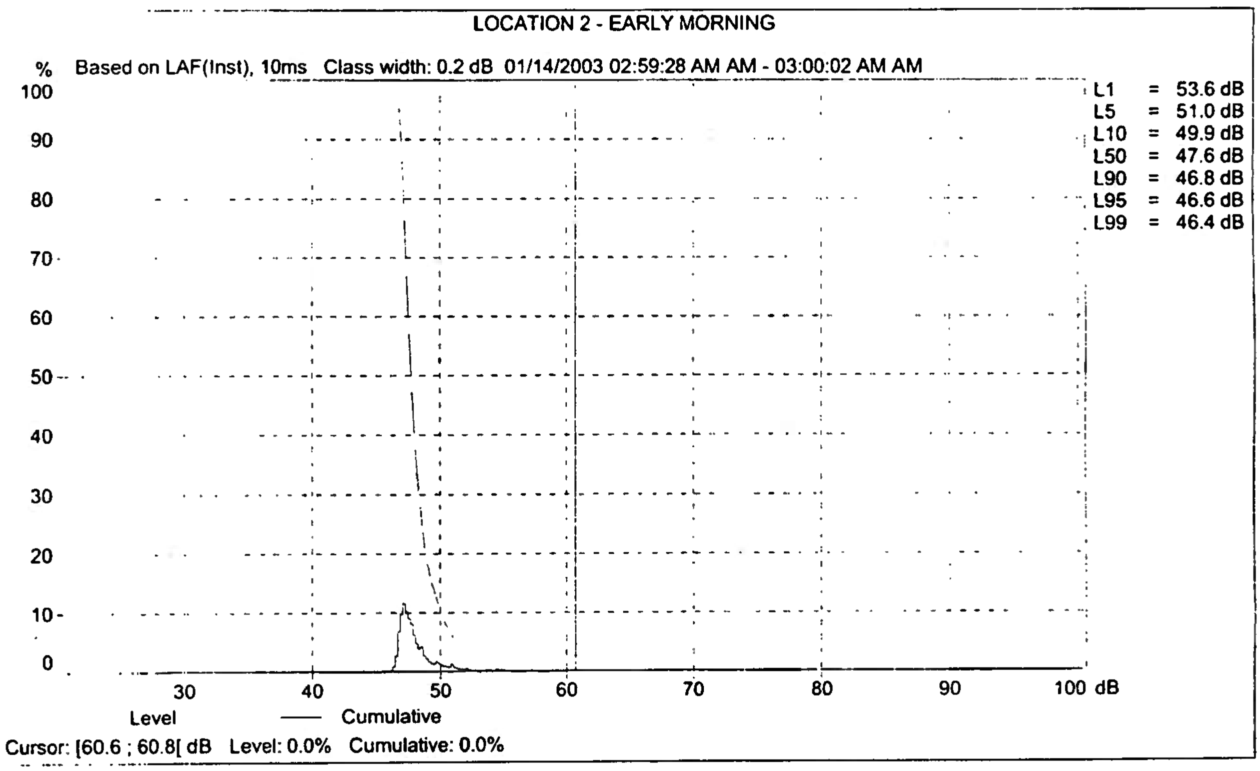
LOCATION 1 - EARLY MORNING
dB 01/14/2003 02:19:14 AM AM - 02:44:12 AM AM
100
90
80
70
60
50
40
30
20
10
31.50
63
125
250
500
1000
2000
4000
8000
A
L
Hz
LLeq
Cursor: (A) Leq=50.4 dB



LOCATION 1 - EARLY MORNING
% Based on LAF(Inst), 10ms Class width: 0.2 dB 01/14/2003 02:19:14 AM AM - 02:44:12 AM AM
L1 = 62.9 dB
L5 = 53.1 dB
L10 = 49.6 dB
L50 = 44.6 dB
L90 = 41.8 dB
L95 = 41.3 dB
L99 = 40.4 dB
100
90
80
70
60
50
40
30
20
10
0
30
40
50
60
70
80
90
100 dB
Level
Cumulative
Cursor: [60.6 ; 60.8[dB Level: 0.0% Cumulative: 1.5%

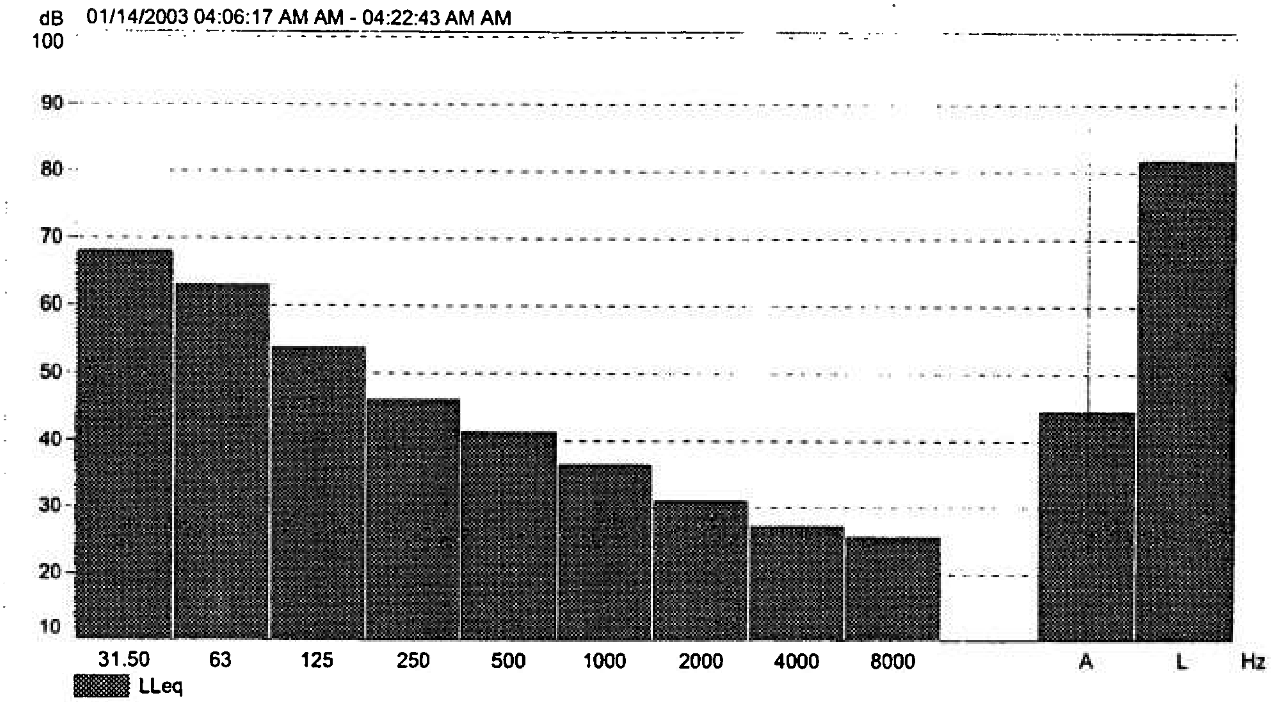


LOCATION 2 - EARLY MORNING
dB 01/14/2003 02:59:28 AM AM - 03:00:02 AM AM
100
90
80
70
60
50
40
30
20
10
31.50
63
125
250
500
1000
2000
4000
8000
A
L
Hz
LLeq
Cursor: (A) Leq=48.3 dB



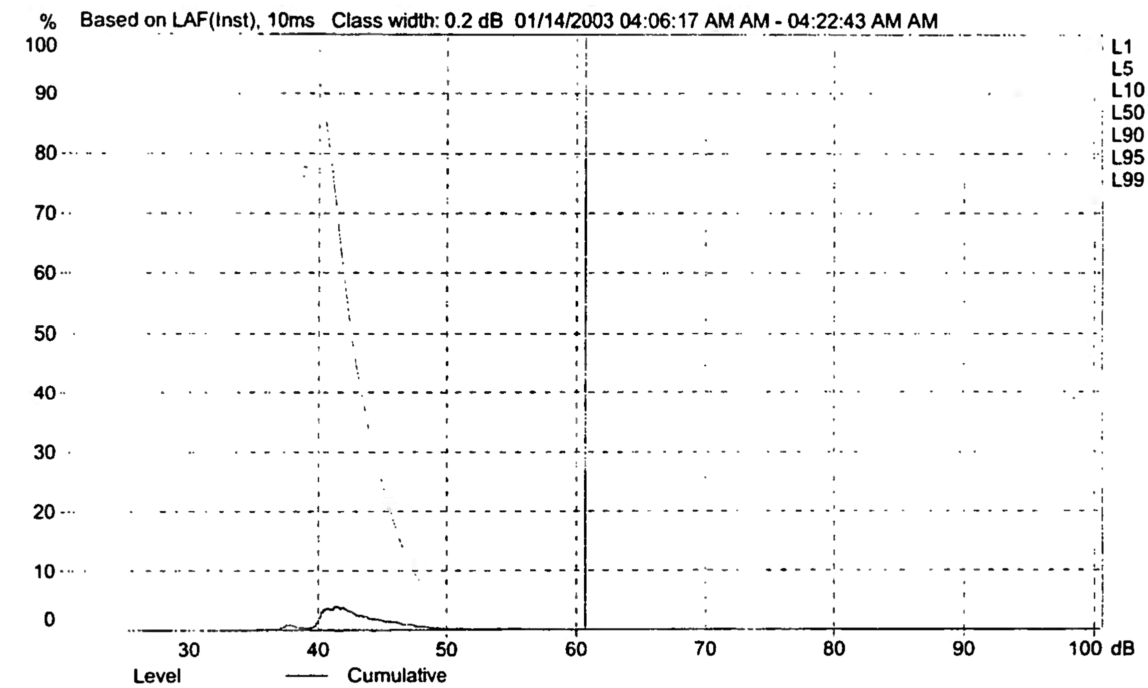
LOCATION 2 - EARLY MORNING
% Based on LAF(Inst), 10ms Class width: 0.2 dB 01/14/2003 02:59:28 AM AM - 03:00:02 AM AM
100
90
80
70
60
50
40
30
20
10
0
30
40
50
60
70
80
90
100 dB
L1 = 53.6 dB
L5 = 51.0 dB
L10 = 49.9 dB
L50 = 47.6 dB
L90 = 46.8 dB
L95 = 46.6 dB
L99 = 46.4 dB
Level
Cumulative
Cursor: [60.6 ; 60.8[dB Level: 0.0% Cumulative: 0.0%

LOCATION 2 - EARLY MORNING



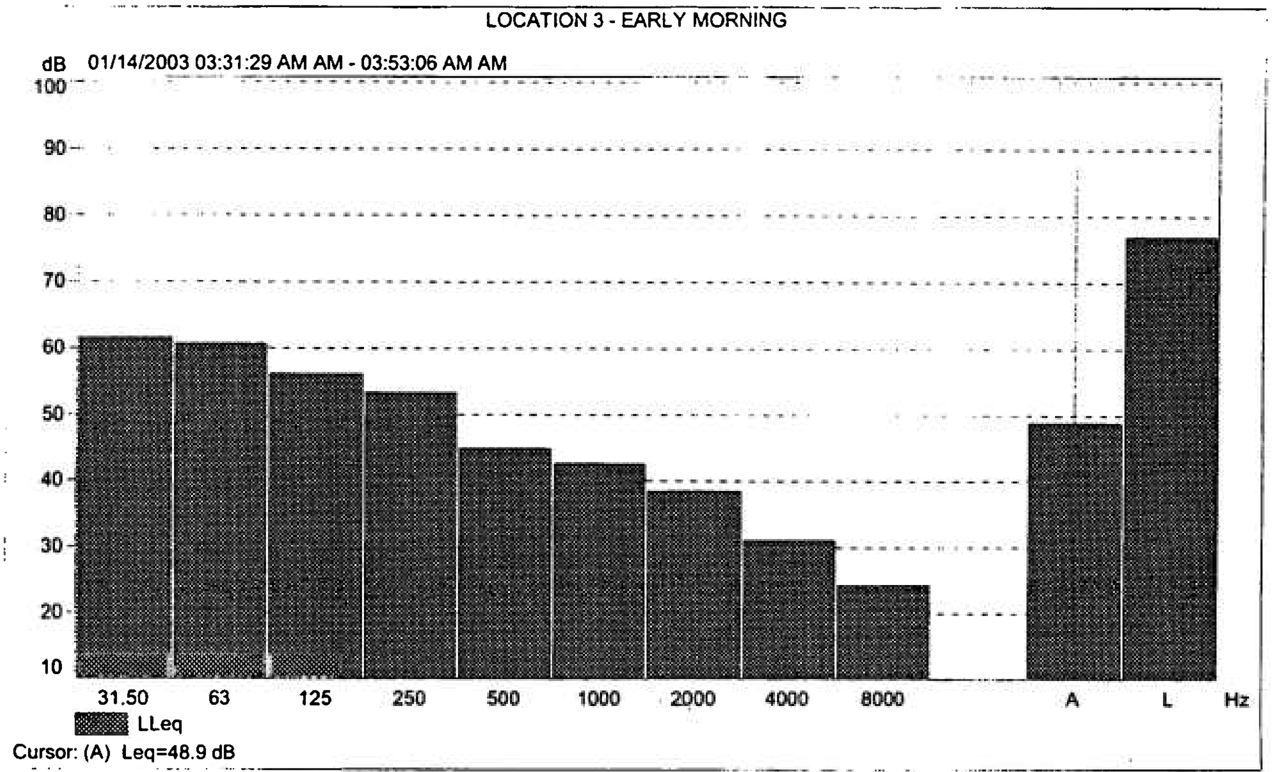
Cursor: (A) Leq=44.5 dB

LOCATION 2 - EARLY MORNING

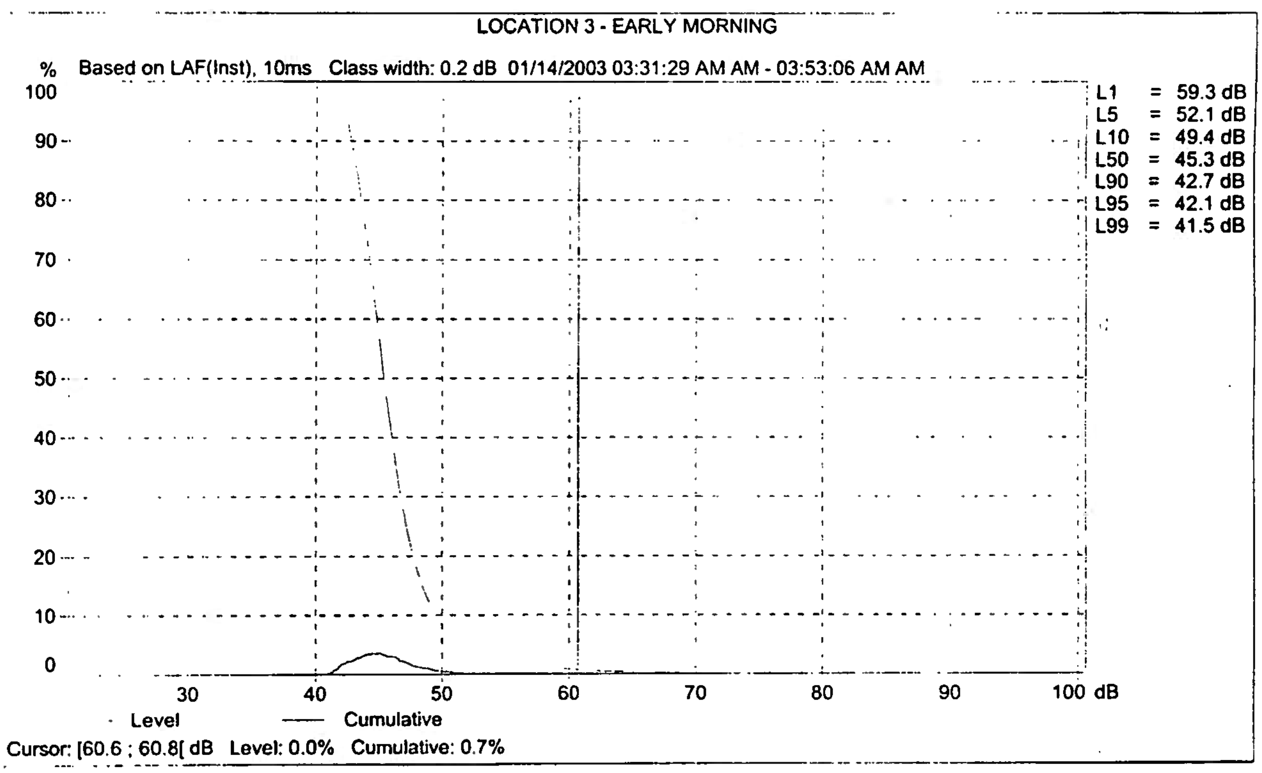


L1	=	52.7 dB
L5	=	48.9 dB
L10	=	47.2 dB
L50	=	42.4 dB
L90	=	40.1 dB
L95	=	38.4 dB
L99	=	37.3 dB

Cursor: [60.6 ; 60.8[dB Level: 0.0% Cumulative: 0.0%

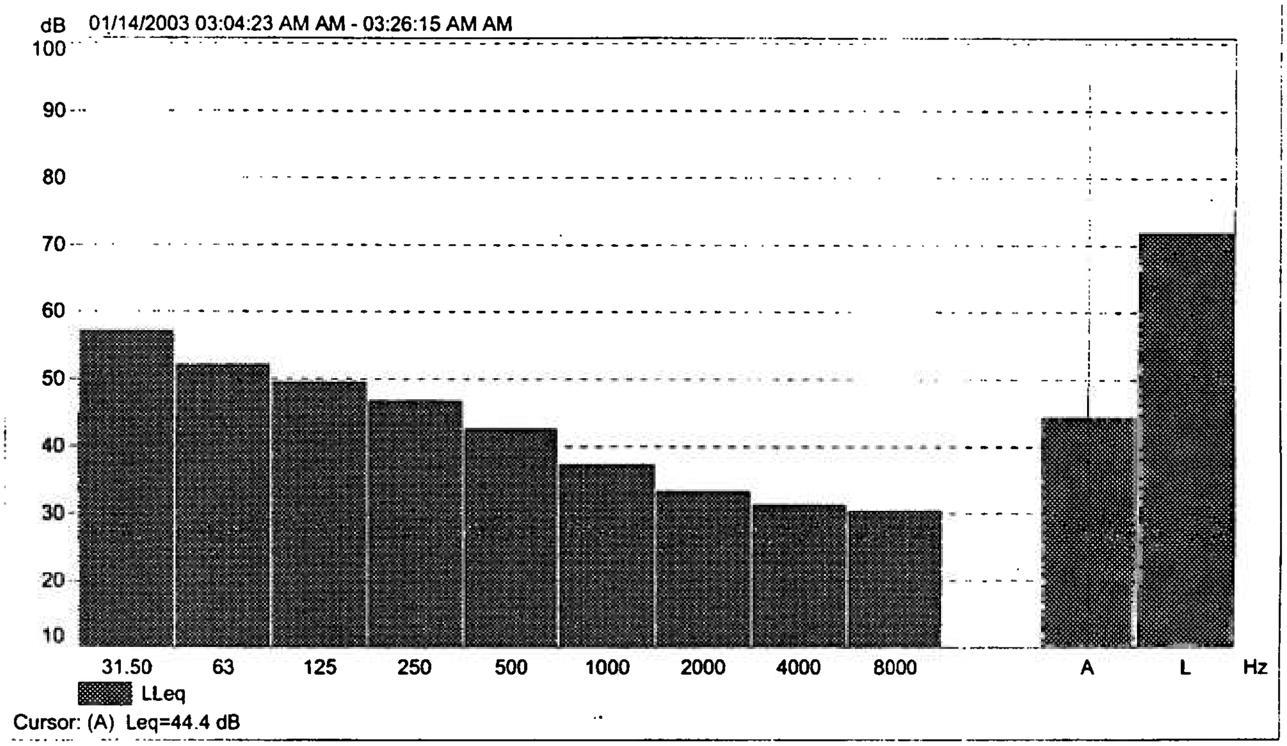


LOCATION 3 - EARLY MORNING
dB 01/14/2003 03:31:29 AM AM - 03:53:06 AM AM
100
90
80
70
60
50
40
30
20
10
31.50
63
125
250
500
1000
2000
4000
8000
A
L
Hz
LLeq
Cursor: (A) Leq=48.9 dB

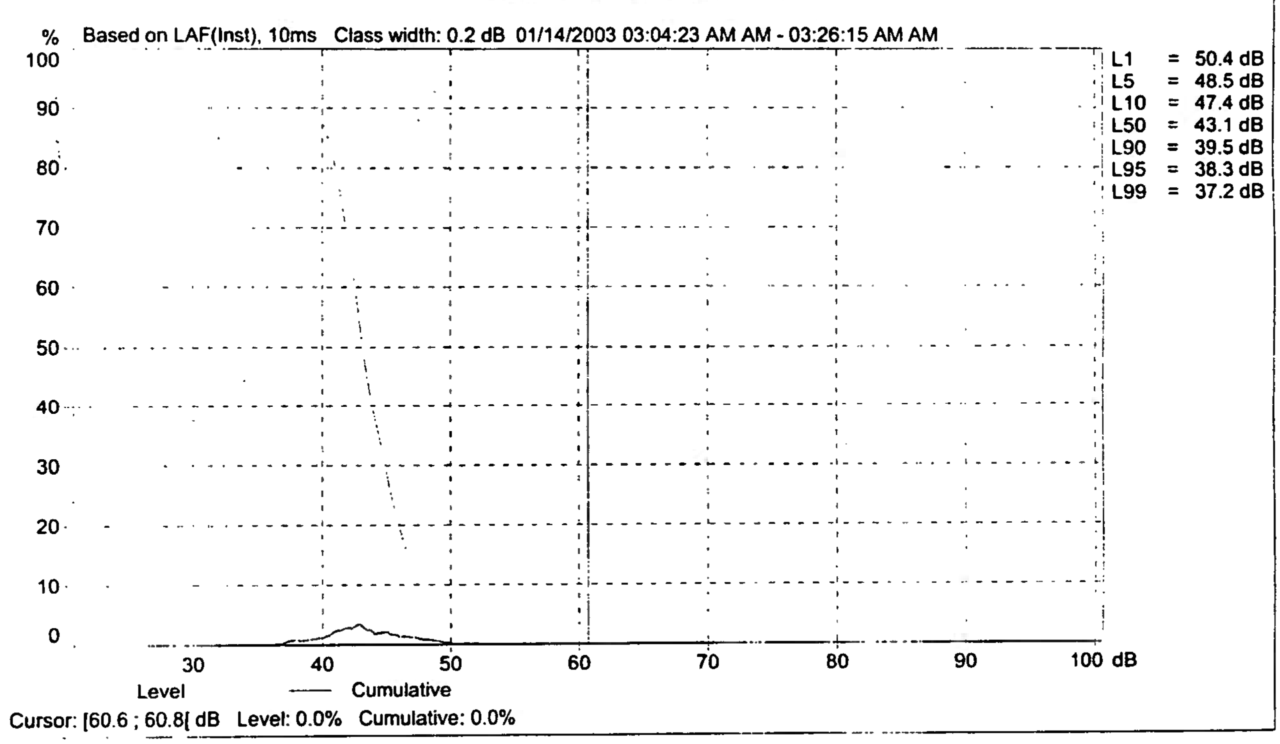


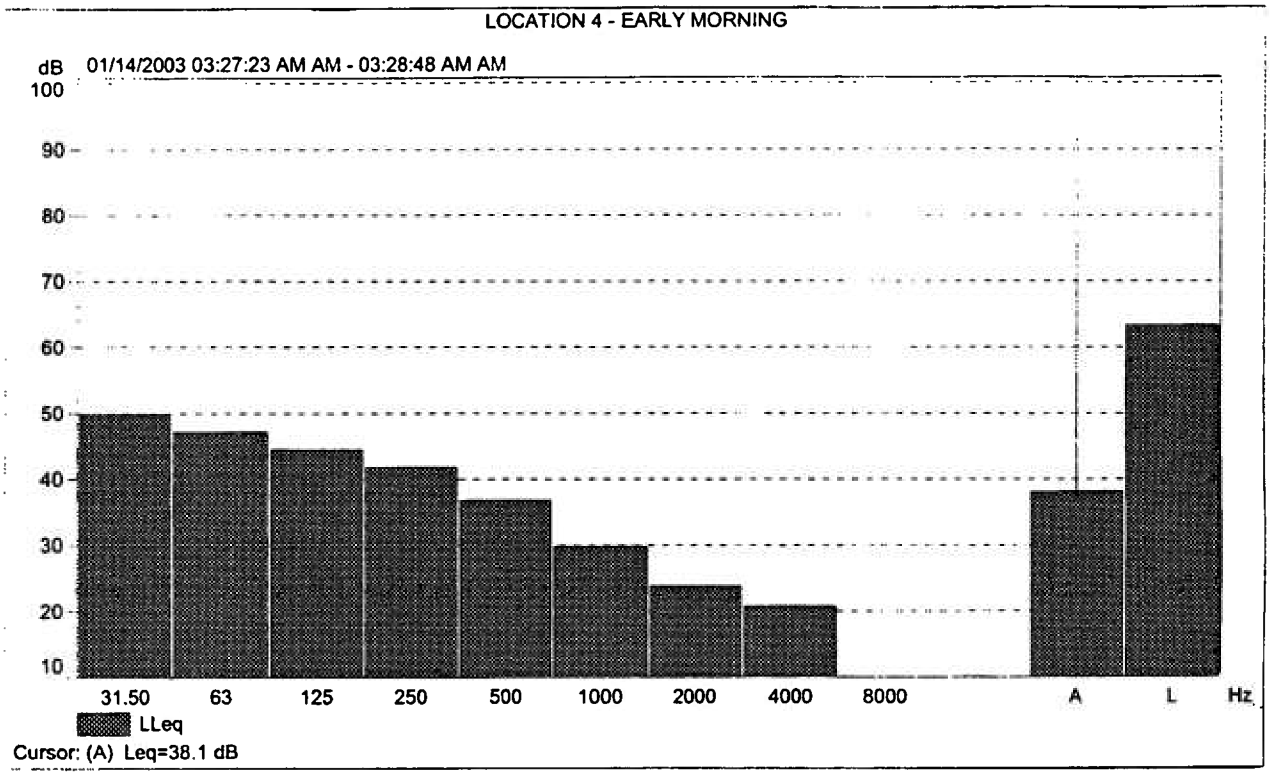
LOCATION 3 - EARLY MORNING
% Based on LAF(Inst), 10ms Class width: 0.2 dB 01/14/2003 03:31:29 AM AM - 03:53:06 AM AM
L1 = 59.3 dB
L5 = 52.1 dB
L10 = 49.4 dB
L50 = 45.3 dB
L90 = 42.7 dB
L95 = 42.1 dB
L99 = 41.5 dB
100
90
80
70
60
50
40
30
20
10
0
30
40
50
60
70
80
90
100 dB
Level
Cumulative
Cursor: [60.6 ; 60.8[dB Level: 0.0% Cumulative: 0.7%

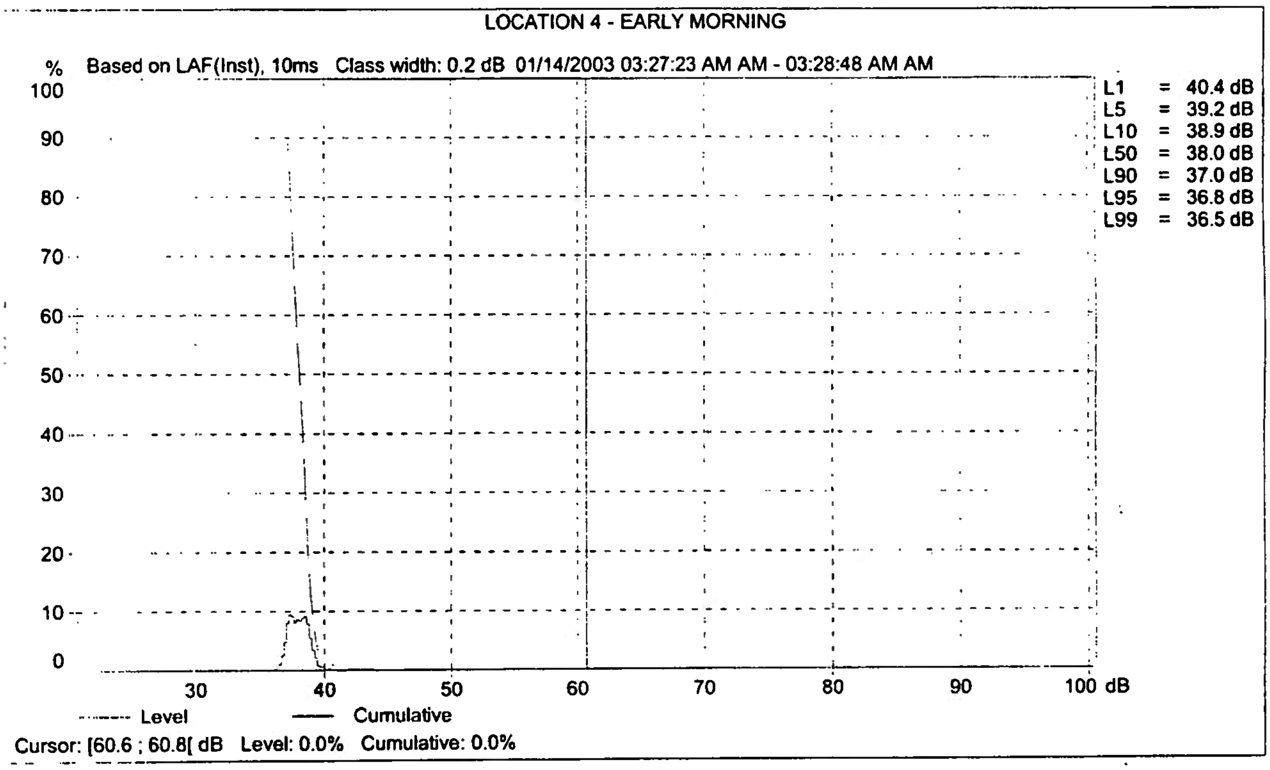
LOCATION 4 - EARLY MORNING

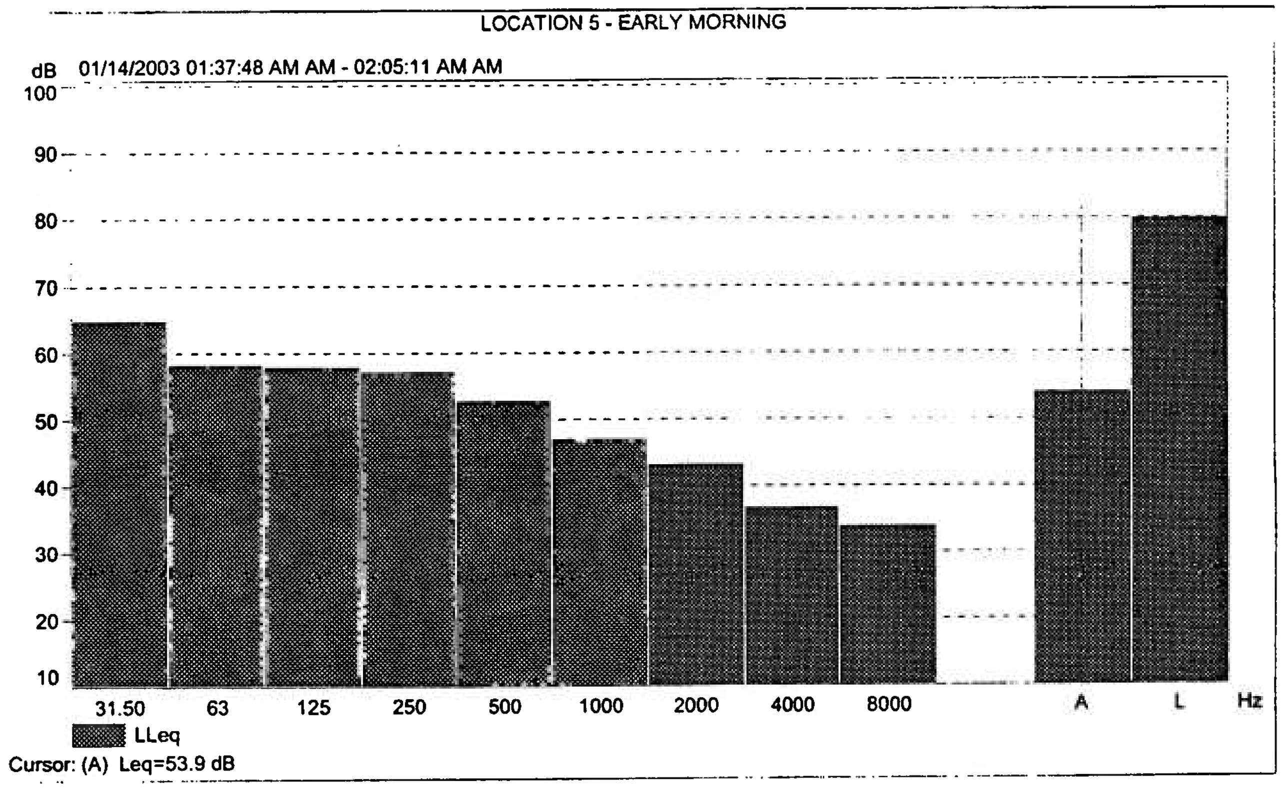


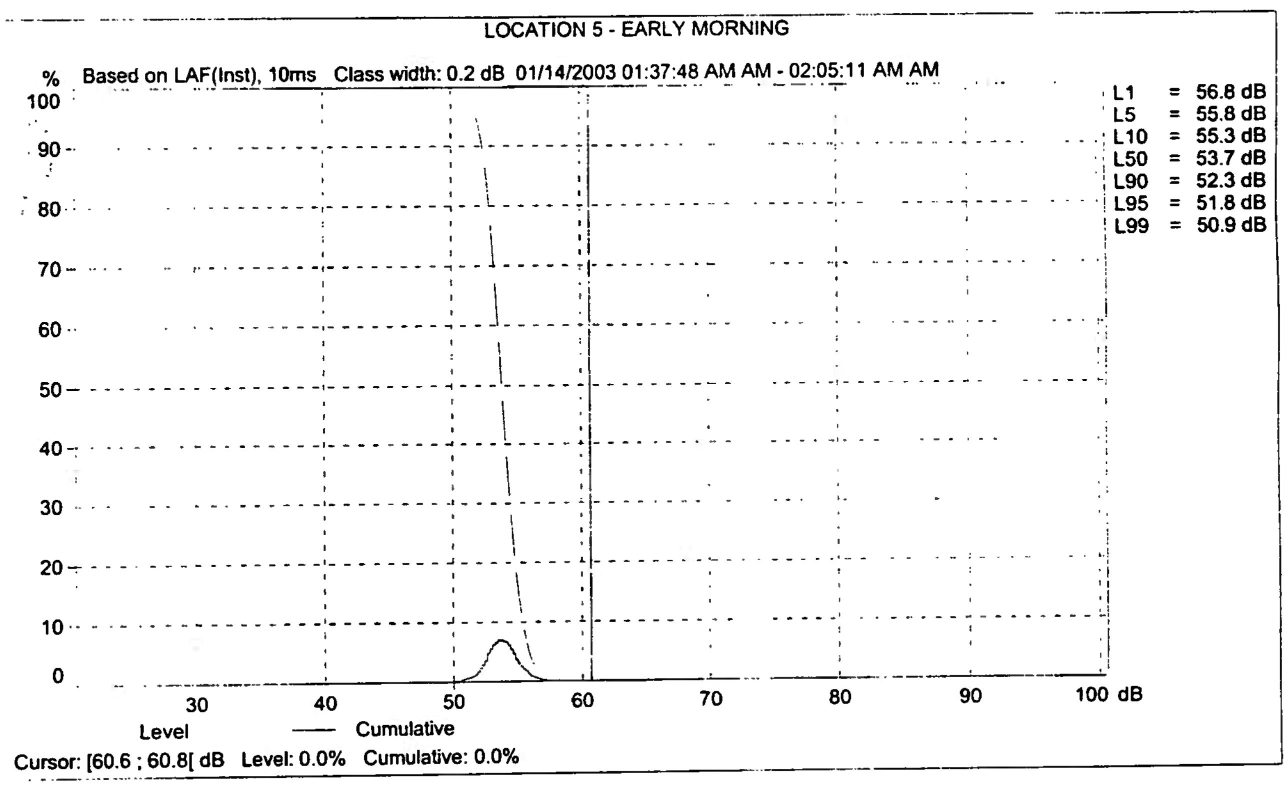
LOCATION 4 - EARLY MORNING

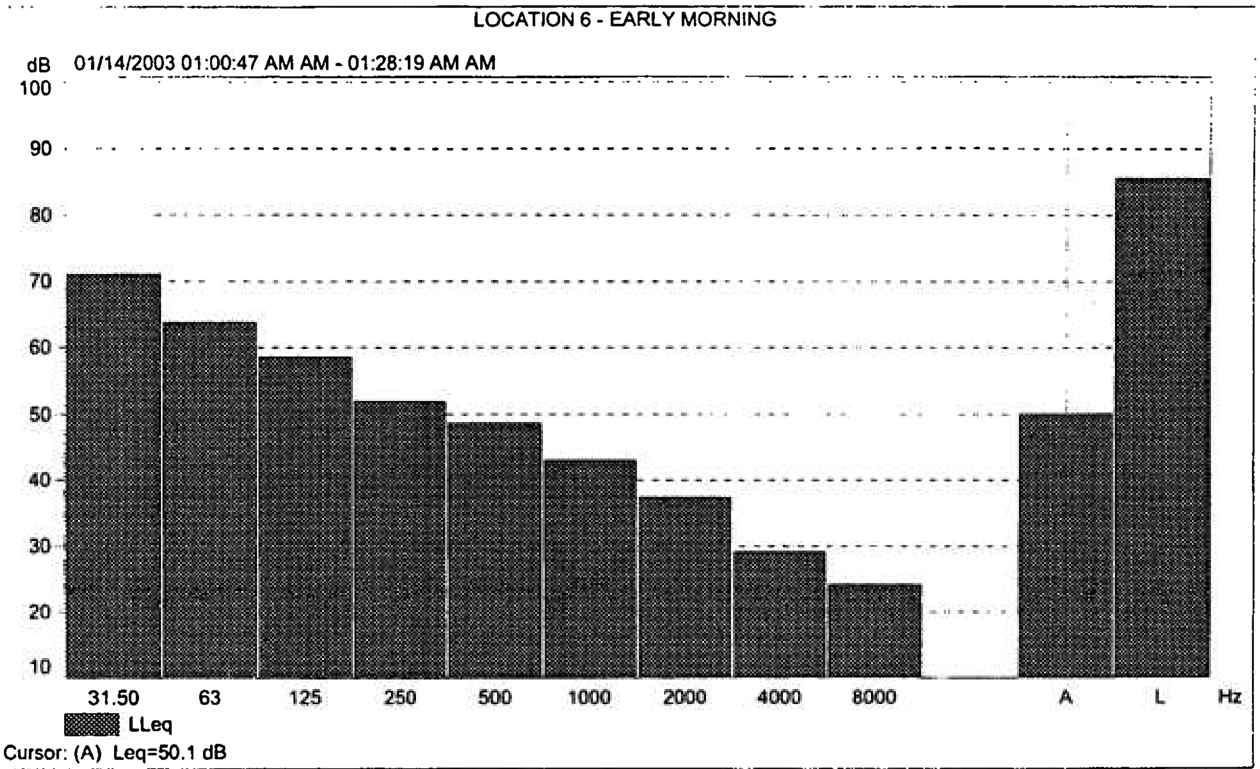



LOCATION 4 - EARLY MORNING
dB 01/14/2003 03:27:23 AM AM - 03:28:48 AM AM
100
90
80
70
60
50
40
30
20
10
31.50
63
125
250
500
1000
2000
4000
8000
A
L
Hz
LLeq
Cursor: (A) Leq=38.1 dB

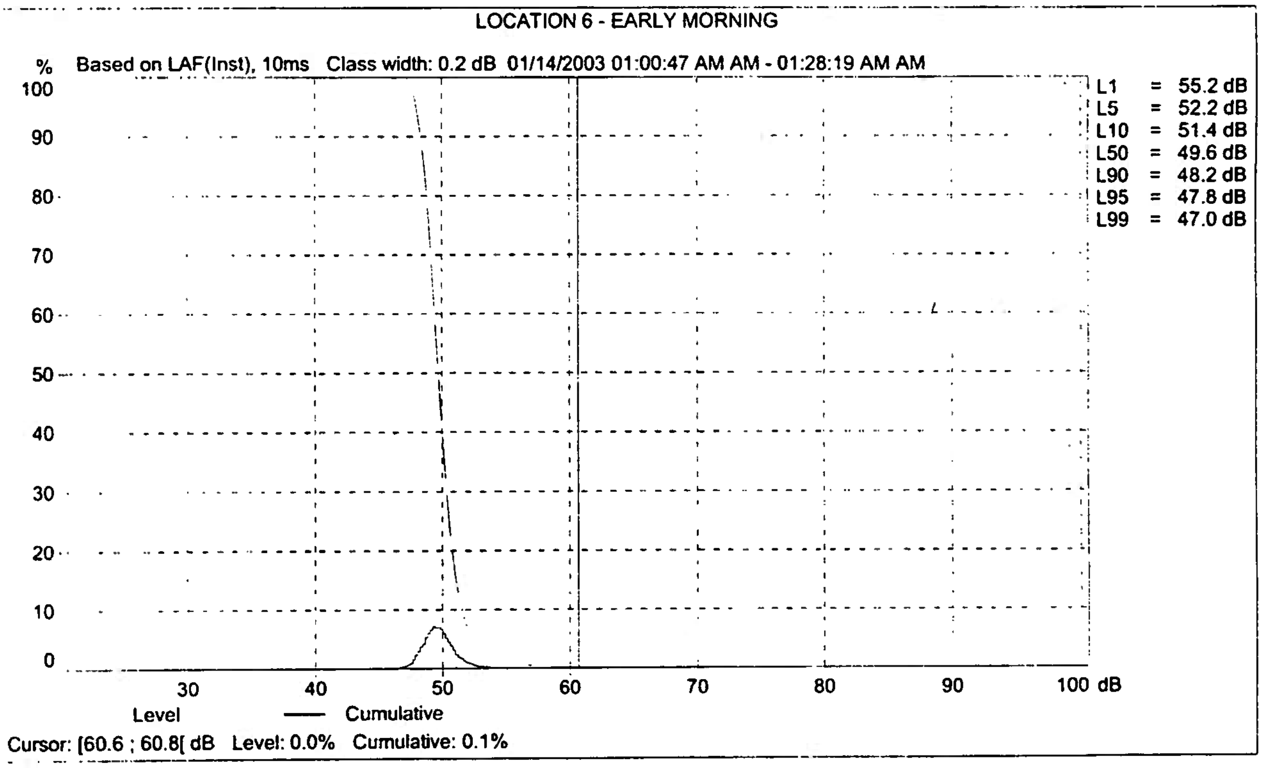

LOCATION 4 - EARLY MORNING
% Based on LAF(Inst), 10ms Class width: 0.2 dB 01/14/2003 03:27:23 AM AM - 03:28:48 AM AM
100
90
80
70
60
50
40
30
20
10
0
30
40
50
60
70
80
90
100 dB
L1 = 40.4 dB
L5 = 39.2 dB
L10 = 38.9 dB
L50 = 38.0 dB
L90 = 37.0 dB
L95 = 36.8 dB
L99 = 36.5 dB
Level
Cumulative
Cursor: [60.6 ; 60.8[dB Level: 0.0% Cumulative: 0.0%


LOCATION 5 - EARLY MORNING
dB 01/14/2003 01:37:48 AM AM - 02:05:11 AM AM
100
90
80
70
60
50
40
30
20
10
31.50
63
125
250
500
1000
2000
4000
8000
A
L
Hz
LLeq
Cursor: (A) Leq=53.9 dB


LOCATION 5 - EARLY MORNING
% Based on LAF(Inst), 10ms Class width: 0.2 dB 01/14/2003 01:37:48 AM AM - 02:05:11 AM AM
L1 = 56.8 dB
L5 = 55.8 dB
L10 = 55.3 dB
L50 = 53.7 dB
L90 = 52.3 dB
L95 = 51.8 dB
L99 = 50.9 dB
100
90
80
70
60
50
40
30
20
10
0
30
40
50
60
70
80
90
100 dB
Level
Cumulative
Cursor: [60.6 ; 60.8[dB Level: 0.0% Cumulative: 0.0%



LOCATION 6 - EARLY MORNING
dB 01/14/2003 01:00:47 AM AM - 01:28:19 AM AM
100
90
80
70
60
50
40
30
20
10
31.50
63
125
250
500
1000
2000
4000
8000
A
L
Hz
LLeq
Cursor: (A) Leq=50.1 dB



LOCATION 6 - EARLY MORNING
% Based on LAF(Inst), 10ms Class width: 0.2 dB 01/14/2003 01:00:47 AM AM - 01:28:19 AM AM
100
90
80
70
60
50
40
30
20
10
0
30
40
50
60
70
80
90
100 dB
Level
Cumulative
L1 = 55.2 dB
L5 = 52.2 dB
L10 = 51.4 dB
L50 = 49.6 dB
L90 = 48.2 dB
L95 = 47.8 dB
L99 = 47.0 dB
Cursor: [60.6 ; 60.8[dB Level: 0.0% Cumulative: 0.1%