Environmental Report

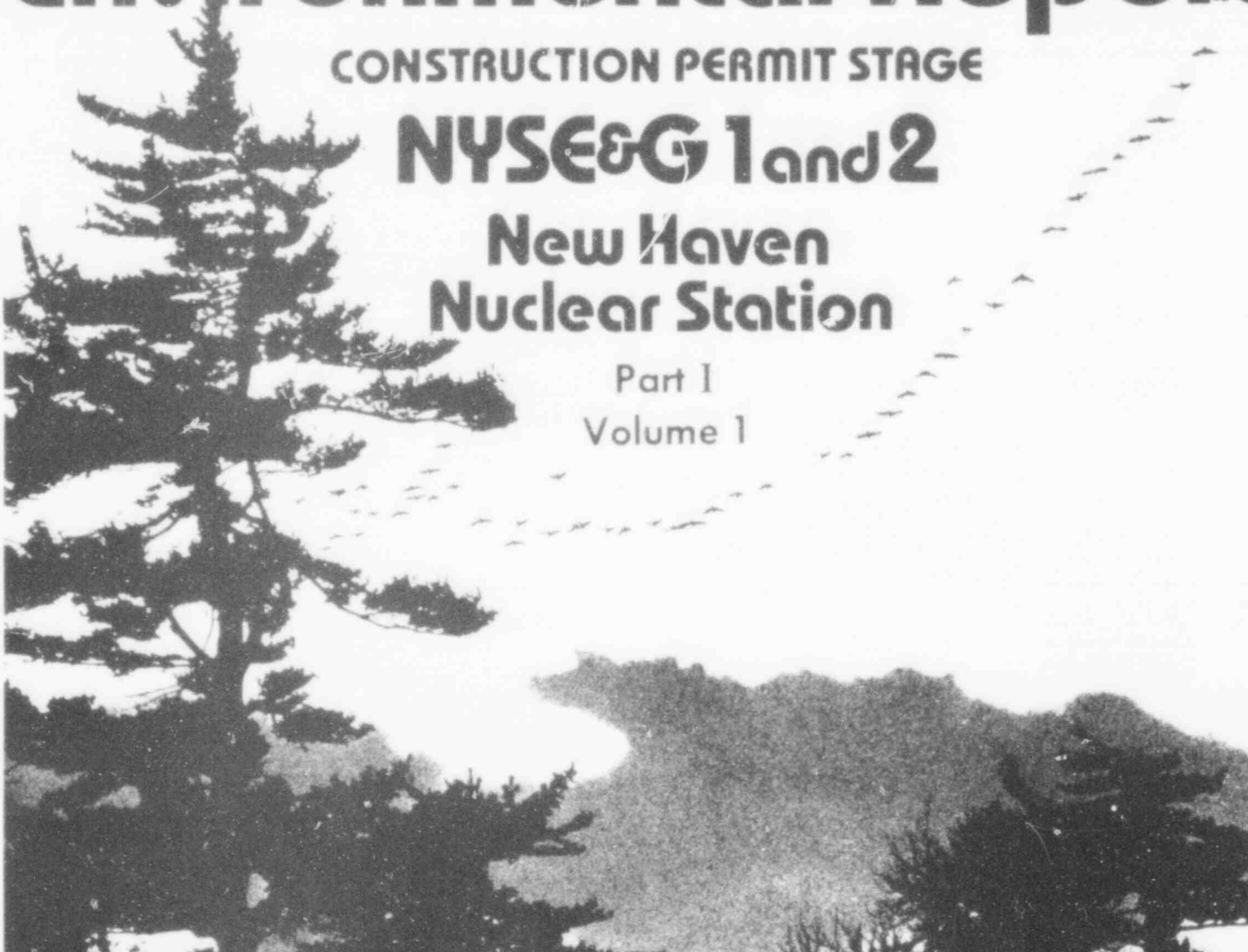
CONSTRUCTION PERMIT STAGE

NYSE&G 1 and 2

New Haven Nuclear Station

Part I

Volume 1



NEW YORK STATE ELECTRIC & GAS CORPORATION

790125 43 407 051

SUMMARY TABLE OF CONTENTS

SUMMARY TABLE OF CONTENTS (Cont'd)

407 053

SUMMARY TABLE OF CONTENTS (Cont'd)

407 054

SUMMARY TABLE OF CONTENTS (Cont'd)

SUMMARY TABLE OF CONTENTS (Cont'd)

407 056

SUMMARY TABLE OF CONTENTS (Cont'd)

407 057

TABLE OF CONTENTS

CHAPTER 1

PURPOSE OF THE PROPOSED FACILITY AND ASSOCIATED TRANSMISSION

407 058

LIST OF TABLES

407 059

LIST OF TABLES (Cont'd)

407 060

LIST OF TABLES (Cont'd)

407 069

LIST OF TABLES (Cont'd)

407 062

LIST OF FIGURES

407 063

LIST OF FIGURES (Cont'd)

407 064

CHAPTER 1

PURPOSE OF THE PROPOSED FACILITY AND ASSOCIATED TRANSMISSION

1.1 SYSTEM DEMAND AND RELIABILITY

NYSE&G

NYSE&G serves a basically suburban and semi-rural area in Upstate New York encompassing 17,000 sq mi, which is approximately 35 percent of the load area of New York State. This upstate electric service area includes all or part of 42 counties, 11 cities, and 141 villages, with a population of 1,700,000, of which 84 percent live outside the corporate limits of cities. The population of 1,700,000 provided the following average number of electric customers in 1977:

Residential	563,000
Commercial	71,300
Industrial	1,300
Other	900
TOTAL	637,100

The historical 1977 to 1978 NYSE&G winter peak load of 2,034 MW occurred on December 12, 1977; NYSE&G electric customers consumed 11,316 GWh of energy in 1977. Table 1.1-1 presents the average annual number of customers for the entire period 1965 to 1977. The energy consumed on NYSE&G's system was supplied from 5 coal-fired generating stations in central New York having an aggregate capacity of 777 MW, a 50 percent share of an 1874 MW coal-fired station at Homer City Pennsylvania, 40 MW of small hydroelectric capacity, 13 MW of diesel generating capacity, a 200 MW purchase from Central Hudson Gas & Electric Corporation, and a 758 MW purchase from the Power Authority of the State of New York.

LILCO

The LILCO service area encompasses approximately 1,230 sq mi of territory with an estimated population of 2,900,000 persons. The area incorporates the counties of Suffolk and Nassau, and the Rockaway Peninsula of Queens County.

The historical peak demand of LILCO's customers of 3,107 MW occurred in the summer of 1977; the 1977 energy requirements of its customers was 13,603 GWH. To meet the demands of its customers, LILCO relies solely on oil fired generation, a list of which can be found in Table 1.1-2.

NYSE&G

The results of NYSE&G's load forecasting model indicate that beginning with the winter 1985 to 1986 peak load period, the generating resources of NYSE&G will no longer be adequate to meet the demands for electricity even under the assumption that NYSE&G's share of Nine Mile Point No. 2, the Somerset unit, and NYSE&G's share of both of the proposed Jamesport 1 & 2 nuclear units are in service as presently planned. The forecast winter surplus/(deficiency), without NYSE&G's 50 percent share of the NYSE&G 1 & 2 nuclear units, is tabulated below:

Load Period (Winter)	NYSE&G Capacity Surplus/(Deficiency) (MW)
1985 to 1986	(315)
1986 to 1987	(548)
1987 to 1988	(772)
1988 to 1989	(445)
1989 to 1990	(693)
1990 to 1991	(366)
1991 to 1992	(625)
1992 to 1993	(897)

The deficiencies indicated for the winter periods of 1988 to 1989 and beyond include NYSE&G's 50 percent share of the Jamesport No. 1 and No. 2 nuclear units (575 MW each) which are currently scheduled to be placed in commercial service in May 1988 and May 1990, respectively. Should currently unforeseen events delay placing these units in operation, the deficiencies in the winter of 1988 to 1989 and beyond could be substantially greater than indicated.

From the foregoing tabulation, it can be seen that additional generating capacity is needed to satisfy the projected demand of NYSE&G's customers. Due to the magnitude of the deficiencies, such capacity should be of the base-load type as illustrated by Figures 1.1-1 through 1.1-4, and the NYSE&G 1 and 2 nuclear units are proposed to satisfy these requirements.

NYSE&G contracted with EBASCO Services, Inc. in February of 1976 to carry out a study of all the methods of base load generation that NYSE&G might construct in the 1985 to 1990 time period[1]. The results of this study presented in January of 1977 entitled Base Load Generation Alternatives 1985-1990 for New York State Electric & Gas Corporation, indicated that base load generation additions should be nuclear. The sizing of the nuclear units was an input of NYSE&G consonant with New York Power Pool (NYPP) sizing of nuclear units in the 1,200 to 1,300 MW range (see Section 9.3 for a detailed discussion of this study).

Examination of total excess capacity available for purchase from NYPP member systems, as reported in the 1978 Report of Member Systems of the NYPP pursuant to Article VIII Section 149-b of the Public Service Law[2] (149-b Report), exclusive of those units which have yet to receive a Certificate of Environmental Compatibility & Public Need (Article VIII Certification) or a Nuclear Regulatory Commission (NRC) construction license, indicates there will not be capacity available which can be purchased to meet the deficiencies of NYSE&G. By the winter of 1987/88, NYSE&G will be unable to purchase the required capacity and there is a definite possibility that a capacity

407 066

deficiency will exist throughout New York State as indicated by the data contained in Table 1.1-3. Essentially, all of the limited capacity which might be available for purchase by NYSE&G in the early to late 1980's will be from oil-fired units and much of this capacity will be from gas turbine peaking units.

In light of these findings, NYSE&G proposes to construct jointly with LILCO two 1,250 MW nuclear units at the New Haven or the alternate site, Stuyvesant, to be placed in service in May 1991 and May 1993. Furthermore, joint ventures are particularly well advised. Both companies are able to share the various benefits and costs of the necessary power plants. In particular, the capital requirements for each are spread more uniformly over a greater time span, thereby producing lower cash requirements in each year and heightened ability to finance construction costs, and the participants are able to take advantage of those economics which exist for larger plants. Further, each system shares the financial risks involved in any licensing/construction delays and operating restrictions, which can cause cost escalation and force the purchase of substitute capacity. Delay in meeting this schedule will (1) detract from the reliability of the interconnected systems of New York State, (2) increase the cost of electric service to the customers in New York State as a whole and those of the Applicants in particular, and (3) result in the costly and unnecessary consumption of large quantities of oil.

The NYSE&G load forecast, which demonstrates the need of NYSE&G for additional generating capacity, was developed through extensive statistical analyses which took into account the full spectrum of factors influencing electric loads. These factors included population growth, availability and price of alternate fuels, the impact of price upon the use of electricity (price elasticity), general economic growth, energy conservation, appliance saturation, and weather. NYSE&G has experienced historical average peak load growths of approximately 4.9 percent per year in the summer and approximately 5.0 percent per year in the winter for the period 1968 through 1977. The corresponding energy growth during this time period was approximately 5.2 percent per year. NYSE&G projects on average annual winter peak load growth of approximately 5.7 percent per year from 1978 to 1984 decreasing to less than 5.0 percent per year in the early 1990's. Annual energy requirements are projected to grow at an average of approximately 5.0 percent per year for the 20 year period 1978 through 1998. In addition, National Economic Research Associates (NERA) was retained by member companies of the NYPP to conduct, and has completed, an updated economic study providing an independent assessment of the electric energy requirements of customers in Applicants' service areas and in the state as a whole. A summary of the results of this updated study are contained in Volume 1 of the 1978 149-b Report[2].

LILCO

LILCO has experienced an average annual historical summer load growth rate of 5.9 percent per year for the 1968 to 1977 time period, as indicated in Table 1.1-4. The corresponding energy growth during this time period was 4.6 percent per year. LILCO projects an annual average summer load growth of 2.4

percent per year for the 1978 to 2000 time period. The energy growth over this time period is expected to be 3.2 percent per year. Table 1.1-5 indicates both the peak load and energy forecasts, Section 1.1.1.2 further discusses the LILCO load forecast methodology.

In an effort to obtain fuel diversity and keep the cost of generating power to a minimum, LILCO has embarked on a nuclear expansion program. The first unit, Shoreham, is an 820 MW BWR scheduled for operation in 1980.

In 1974, LILCO proposed two 1150 MW PWR nuclear units, Jamesport 1 & 2, to be scheduled for 1981 and 1983. They have encountered serious licensing delays and are now rescheduled for 1988 and 1990.

In 1976, at a time when the units were rescheduled for 1983 and 1985, NYSEG was encountering difficulties in obtaining their required capacity for the 1980's. At the same time since LILCO's peak load had declined since 1974, LILCO sold NYSE&G a half interest in the Jamesport units in return for the right to purchase a half interest in the two units which are the subject of this application and report, scheduled for 1988 and 1990. This arrangement offers the following advantages of shared ownership:

1. There are significant economic advantages for a utility's customers in having their baseload power generated by a few large stations whose units are built back-to-back, rather than by many small units, constructed just in time to meet small increments in demand. However, during the first years of their operation few utility systems need all the new MWe's that will be generated by such large back-to-back units. Thus, there is a prudent basis for a utility (a) to build more capacity than its system immediately requires and (b) to sell part of the new station to another system that also needs new generating capacity.

   Such arrangements are particularly well advised when the two systems agree to leapfrog their construction of large new generating facilities. Thus, system A builds sufficient capacity for itself and for system B for the initial period of time, and then system B constructs enough capacity to meet both utilities' needs for the next block of years. In that way, both systems share the various benefits and costs of the necessary power plants.

2. The capital requirements for both systems are spread more uniformly over a greater time span, thereby producing lower cash requirements in each year and heightened capability to finance construction costs.

3. Each system shares the financial risk involved in any licensing/construction delays, which can cause cost escalation and force the purchase of substitute capacity.

4. Further, the impact of a major failure that takes a plant out of service for some prolonged period of time is reduced.

Under the 18 percent reserve requirements of the NYPP, LILCO would not need these units to meet its peak load and reliability requirements until 1995. Nonetheless, if the first unit is in service by 1991, it will be beneficial to LILCO's customers by continuing to reduce their dependence on foreign oil and minimizing the cost of electricity for its customers. However, based on the history of licensing nuclear units in the United States, and especially in New York State, it is very unlikely that these units will be in service as scheduled (1991 to 1993). Therefore, it is prudent for LILCO to proceed with the present application for these units to be sure they are available when they are needed to meet LILCO's peak load and reliability requirements.

NYPP

The composite peak load forecast of the member companies of the NYPP, used in discussing needs of New York State as a whole, shows an average rate of growth of approximately 2.7 percent per year through the late 1990's. The growth rate projected for New York compares with growth rates of about 4.5 percent for New England and 3.4 percent for the Pennsylvania-Jersey-Maryland Pool for the 1978 to 1997 time period as indicated in their respective April 1, 1978 reports to FERC under Order 383-4 (Docket R362). Should growth in use of electricity within New York State significantly exceed that projected by the member companies of the NYPP or should the available generating capacity be significantly less than projected, the ability to maintain reliable electric service to the consumers of New York State could be in jeopardy. The integrated generation expansion plans of the NYPP member companies provide little margin to accommodate the large uncertainties of the future and the NYSE&G 1 & 2 nuclear units are an essential part of this coordinated plan.

NYSE&G

To meet the energy and capacity requirements of its customers and its contractual obligation under the NYPP agreement, in addition to existing generation stations, NYSE&G plans to build an 850 MW coal fired unit at its Somerset site scheduled for service in the fall of 1983. Also, NYSE&G is a part owner in the Nine Mile Point No. 2 nuclear unit, currently under construction and scheduled for service in November 1983, with an 18 percent share (194 MW summer; 196 MW winter). On February 2, 1976, NYSE&G and LILCO signed a Memorandum of Understanding for joint ownership (50 percent/50 percent) of the Jamesport nuclear units, presently scheduled for service in May 1988 and May 1990, and the NYSE&G units, presently scheduled for service in May 1991 and May 1993. The existing long term contracts with PASNY are assumed to be continued; however, the total net purchase from PASNY by NYSE&G will decrease due to withdrawals of capacity by PASNY pursuant to the terms of the contracts.

Although NYSE&G owns and operates a number of units which were built in the 1940's and 1950's, these units are in generally good operating condition and NYSE&G has no current plans to retire any of them. In the event a major component should fail or burdensome environmental modifications should be imposed, it would be necessary to reconsider retirement of older units.

Energy Conservation and Load Management Programs

The historic demands of Applicants have been affected to some degree by programs urging or causing the conservation of electric energy and such programs will affect future forecasts.

NYSE&G

NYSE&G's main effort in the load management area centers on the control of the residential electric water heater load. A controlled electric water heater is defined as one which can only be operated at night during the off peak load period. NYSE&G has been one of the few companies which has had an off peak residential night rate for many years. Letters have been sent to existing customers, which by an examination of their usage patterns appear to have uncontrolled electric water heaters, urging them to convert to off peak control. Also as part of the recent rate filing, May 1978, NYSE&G proposed to stipulate that any new customer requesting the night rate must have a controlled electric water heater. Under this proposal, existing night rate customers would be grandfathered. In addition, NYSE&G is aware of the developing residential load control industry and will monitor this industry closely for potential application on the NYSE&G system.

NYSE&G is currently in the process of completing a preliminary analysis of the effects of load management on its system. These preliminary analyses indicate that if 10 percent or possibly fewer customers utilize electric heat storage systems and controlled electric water heaters, a shift in the peak load on a typical NYSE&G distribution feeder from day to nighttime could occur with an attendant increase in the magnitude of the peak load. The increased peak on the feeder results primarily from the fact that the combined load for storage and nighttime heating is greater than daytime loads. Also, this preliminary analysis indicates that going from the present NYSE&G daily load factor of approximately 80 to 85 percent to the extremely idealistic assumption of a daily 100 percent load factor, a totally flat daily load curve, assuming no reduction in total daily energy requirements, would result in no substantial reduction in base load capacity requirements. Although the shifting of load from peak to offpeak may result in an attendant reduction in capacity requirements, it appears that this potential load shift would mitigate the need for peaking and intermediate type capacity but not reduce the amount of base load generation requirements nor affect proposed NYSE&G generation expansion plans.

Additional information concerning energy conservation and load management can be found in Section 9.1.

The status of NYSE&G load management activities is as follows:

1. Pumped Storage - Hydro Facilities

   Existing peaking facilities, such as pumped storage hydro, continues to be a factor which reduces the need for direct load management since the cost of installing customer load control devices to manage load must be weighed against the relatively low cost of mee .ng the uncontrolled load through existing or new peaking capacity such as pumped storage.

2. Residual Load Control Project

The residential load control project is a study of the ability and willingness of residential customers to shift loads to off-peak periods. A specially designed programmable load control device will be used to test the effect of shifting the time of use of a number of residential loads. An acceptable prototype control device was delivered by the design firm in early May 1978. NYSE&G anticipates ten control devices will be built and installed prior to the 197? to 1979 winter.

3. Time of Day Rates

NYSE&G has noted an intent to file a time of day rate for large customers; and as part of its marginal cost study, has investigated the cost of supplying power during different times of the day. This preliminary analysis indicates that a time of day rate, if implemented, would contain relatively small differences between the on-peak and off-peak rates. Therefore, there may be insufficient reason to initiate a complex time of day rate applicable more generally than that presently in effect or which may be permitted to become effective under current NYSE&G plans.

4. Residential Off-Peak Rate

Recent modifications to the NYSE&G residential rate has the effect of making the night use of appliances much more attractive. Prior to November 1, 1977, the high usage block of the day rate was 2.67 cents/kWh while the comparable night rate block was 1.54 cents/kWh - a difference of 1.13 cents/kWh. Since that time, the high usage block of the day rate has been increased to 3.29 cents/kWh while the night rate has remained at 1.54 cents/kWh - a difference of 1.75 cents/kWh. Thus, the effective incentive for night time usage has increased by 55 percent.

In addition to increasing the incentives for off-peak control, NYSE&G has, as part of its 1978 rate case, proposed to make eligibility for the night rate conditional on off-peak water heater control.

5. Study to Evaluate the Load Management Feasibility on the NYSE&G System

Continued progress has been made in the study to assess the impact of load management on the expansion of the NYSE&G system. A preliminary report is being completed. The preliminary findings aided in finalizing the plans to make eligibility for the existing night rate

407 071

conditional on control of the lower element of electric water heaters.

6. Program to Increase the Number of Exsiting Time Clock Controlled Residential Water Heaters

A program is under development to encourage conversion of existing uncontrolled electric water heaters to night rate operation. The exact nature of the ultimate program is not known at this time.

7. Mandatory Control of Electric Water Heaters in New Residences

NYSE&G has accelerated the schedule of the previously planned Residential Controlled Water Heater Study to enable the plans for the NYSE&G water heater program for new homes to be finalized by the spring of 1978. An interim report from the Water Heater Study was published in May 1978. The findings from this study led to the proposal as part of the current rate case, to make new attachments on the existing off-peak rate conditional on showing that at least one element of an electric water heater has been controlled by the meter. The proposal would also require that the water heaters have at least 80 gallons of storage capacity. With a tank of this size, most customers are expected to be satisfied with the floating upper element operation of their electric water heaters. This should reduce the incidence of customers rewiring their water heaters for uncontrolled operation. Also, this should reduce the need for on-peak operation of the floating upper elemen s.

NYSE&G has also evaluated the impact of electrically controlled water heaters on MW and MWR usage. Preliminary analysis indicates that there is no effect on kWh consumption. The reduction in demand is expected to grow from 38 MW today to an estimated 274 MW in 1995. Again, the projected future effect of controlling electric water heaters assumes PSC concurrence with the night rate requirement modifications as stipulated in the recent NYSE&G rate filing.

8. Extension of the Existing Interruptible Nonpeak Rate to Progressively Smaller Customers

NYSE&G instituted an interruptable nonpeak rate on July 25, 1975. This rate is being extended to large sub-transmission level customers as part of the current rate filing. This provision was approved by the Public Service Commission and became effective on November 1, 1977. NYSE&G surveyed potential users of this rate, however, to date, no additional customers have requested the rate although we have made all eligible customers aware of its potential advantage. Thus, the load controlled under this rate continues to consist of 30 MW by one customer.

NYSE&G has had an interruptible rate in existence for some time although presently only one manufacturer makes use of this rate. The interruptable non-peak rate is available to any customer in service classification 3 having a maximum demand of 5 MW or more, taking service directly from NYSE&G's 23kV to 46kV subtransmission system or 115kV transmission system, and whose demand during non-peak hours is a minimum of 150 percent of the demand during on peak hours. NYSE&G has contacted customers which it feels could make use of this rate, however, as of this time no other industry has applied for this rate.

9. Mandatory Insulation Standards for Nonresidential Customers

   NYSE&G has supported the adoption of statewide energy performance standards for new buildings and has suggested the possibility of making the connection of new nonresidential customers conditional on meeting such standards. The recent progress by the New York State Energy Office in developing a statewide standard has made this criterion unnecessary. It appears likely that an energy performance standard will soon be in effect in New York State. When these standards are promulgated the effect on NYSE&G's load forecast will be analyzed.

LILCO

LILCO has, in fact, given adequate and reasonable consideration to the effects of energy conservation and of programs designed to bring about such reduced energy use in its peak and energy forecasts. The effects of energy conservation have been reflected in LILCO forecasts since 1974.

In the current 1978 149-b filing, the effects of energy conservation both for nonprice and price motivations have been specifically recognized. For the residential forecast the effects of nonprice conservation have been econometrically determined and included in the short-term forecast. In the commercial/industrial forecast, an estimate of short term nonprice conservation has been made. In addition, both forecasts give consideration to price motivated conservation as well. The effects of all conservation related measures appear to have reduced the 1980 peak load forecast by 26 percent.

For the long-range forecast, specific energy conservation measures were separately considered in both the peak and energy forecasts. The specific measures were:

1. Time of use rates - both residential and commercial/industrial

2. Increased applicance efficiency in accordance with the final targets set by the Federal Energy Administration

3. The use of solar energy for residential water heating

4. The widespread use of electric power to store energy for space heating and water heating

5. Extensive insulation retrofit by all residential customers

6. The widespread use of heat pumps which are more efficient than resistance heating

7. Projections of future air conditioning saturations have been lowered to account for the impact of summer/winter aggregate rate differentials on weather sensitive energy and peak usage

It is estimated that the impact of all conservation related measures has served to reduce previous LILCO Peak Demand Forecast by 38 percent by the year 1995.

In addition to the inclusion of the above mentioned specific reductions for conservations, LILCO has again engaged an independent consultant, National Economic Research Associates, to perform an independent, econometric - based, long-range forecast taking specifically into account such items as conservation and load management. Under the NERA conservation and load management scenario their forecast for LILCO Peak for 1995 is 5,022 MW which is 5.5 percent higher than LILCO's Peak Forecast for that year (4,760 MW).

Conservation Measures

To encourage energy conservation, LILCO has initiated education programs directed at conserving energy through more efficient uses of electricity by customers and has also proposed to introduce rate structures designed to reduce energy use.

1. Advertising

   A continuing conservation oriented corporate communications program has been underway since the energy crisis utilizing newspaper advertising, radio, television, and bill inserts. Since late 1973, 23 newspaper advertisements have appeared in such publications as Newsday, L.I. Press, N.Y. Times, N.Y. News, etc., as well as in local weekly newspapers. In this period, 16 different energy conservation messages have been heard on 21 New York City and Long Island radio stations. Those messages were broadcast on 500 separate days at 24 hr intervals between the hours of 8 a.m. and 8 p.m. Sixteen different conservation messages have appeared on New York television. These messages were broadcast on 48 separate days at varying intervals between the hours of 6 p.m. and 11 p.m. Since the 1973 oil embargo, more than 800,000 customers have received conservation oriented bill inserts.

2. Sales Promotion

   LILCO, pursuant to an order of the New York Public Service Commission, has suspended all advertising seeking to promote the use of electric heat and has also suspended promotional allowances to builders for the installation of such systems.

407 074

3. Customer Education

In addition to adversiting, LILCO has made a positive effort to educate customers in the importance of conservation.

Since 1972, bill enclosures have emphasized the energy conservation theme. Some of the specific items covered were (1) benefits of purchasing efficient air conditioning units, (2) stressing the benefits of insulation and offering residential insulation booklets, and (3) saving money through efficient use of appliances.

Energy management check lists were mailed to 34,000 of the Company's largest electric customers and 19,000 gas commercial customers. In addition, LILCO representatives have been making personal calls to the largest 7,000 of these accounts to counsel them on energy saving procedures.

LILCO's mass media advertisements mentioned above have had general as well as specific energy saving advice as it relates to home gas and electric use.

Prints of the Company-produced, award-winning motion picture, "A Word to the Wise - Energy Wise," furnishing home energy saving tips, first released in 1974, are being provided for schools and libraries. The film has been offered for showing to local groups through mailings to civic and community clubs.

To promote the use of added insulation in the home, a comprehensive booklet was produced and made available to LILCO customers. The booklet contains information on types and characteristics of insulating materials available to homeowners. Also included are LILCO recommendations for improved insulation protection, and a table of heating cost savings per degree of added insulation. A section on how to do-it-yourself is included for those customers having access to open or unfinished areas of their homes. Over 30,000 of these booklets have been distributed to LILCO customers through handouts at insulation seminars, requests for booklets via a special bill enclosure, reading racks at all Company commercial offices and handouts at trade shows and exhibitions. In addition, point-of-purchase display holders, along with a supply of the insulation booklets were sent to over 50 retail outlets where insulation materials are sold.

A pamphlet entitled "Energy and Cost Profile of Electric Appliances" was prepared and distributed to all employees and LILCO customer contact outlets. The purpose of this pamphlet is to encourage energy conservation by providing our residential customers with estimates of energy requirements and operating costs for electrical appliances commonly found in the home. The pamphlet contains average electrical consumptions for over 60 different applicances found in the home, enabling customers to gauge their appliance use for more efficient energy utilization. To date, 20,000 copies have been distributed.

LILCO's Consumer Education Center continues to expand its course instruction to conservation topics both in its regular classes and in the appearance of the Center's staff on a local weekly radio show. Representatives conduct a series of classes on various energy conservation topics. Included in the Consumer Education series of programs are: Insulation, Efficient Care and Use of Appliances, and Operation and Maintenance of Heating and Cooling Systems. In 1975, over 3,100 customers attended various Consumer Education Programs at Levittown and at numerous locations throughout Long Island. In 1976, over 7,000 customers attended 167 classes and, in 1977, over 4,025 customers attended 97 classes from January to June.

In addition, Consumer Education Representatives appear on a local weekly radio program called the "Breakfast Club" on Station WGBB. Energy conservation tips and techniques are discussed on this program. Attendance at the program has averaged 900 per week, plus the listening audience.

Since May 1974, Do-it-Yourself Insulation Seminars have been held monthly at various Company facilities. The purpose of these seminars is to inform LILCO residential customers about the type of insulation materials available, the characteristics and effectiveness of such materials, the recommended amounts for maximum protection and various application techniques. Most important, savings to the homeowner in both heating and cooling costs are emphasized, as well as the benefit of increased comfort. Since the program's inception, 96 seminars have been held and attended by over 7,000 customers. A survey of those attending these seminars indicates that a majority of attendees have either added insulation to their home or plan to do so in the near future.

LILCO has mailed to all its residential customers a water restrictor that can be inserted in existing shower heads to conserve water and the energy to heat that water.

Shopping Mall Display - In July 1977, LILCO introduced its new Save-On-Energy exhibit at the major shopping malls on Long Island.

The exhibit is comprised of energy conservation products and concepts, including home insulation information, thermostat setback devices, power attic ventilators, shower head water flow restrictors and other items that can help consumers have money on heating and cooling costs.

Visitors to the display can receive a free, personalized energy audit from a LILCO representative, who will analyze a customer's present energy costs and make recommendations to help reduce these costs. Visitors are encouraged to bring information to the LILCO booth relative to the size of their homes, best estimate of energy bills and the amount of insulation presently installed in their homes.

Trade Shows and Exhibitions - In a continuing effort to project Energy Management concepts to customers and trade allies, LILCO has incorporated its Energy Management theme in displays at trade shows and exhibitions. Modular display units containing slide-sound presentations on proper insulation and efficient utilization of energy are custom designed for various market segments. Some of the major shows include: Nassau Electric League's Annual Exhibition, New York Chapter of the National Home Improvement Council Annual Trade Show, the Suffolk County Builder's Association Exposition and the Levittown Home Show, which attracts thousands of homeowners annually.

New York State Residential Insulation Survey - A statewide insulation survey partly funded by the Federal Energy Administration and the Office of Housing and Urban Development was initiated in January 1977. It involved a joint effort of the New York State Energy Office, the Public Service Commission, and seven major utilities in New York State. The survey analyzed 16,000 returns, selected on a random basis, from detailed questionnaires mailed to homeowners across the state. The study sought to determine the amount and kinds of insulation in homes, the adequacy of available financing for insulation retrofits and the effectiveness of a variety of consumer education sources dealing with insulation.

In summary, the report reveals that more homes have insulation than previously estimated, that a substantial amount of homeowners (30 percent) have added insulation within the past 3 years, and an additional 30 percent plan to add insulation within the next 12 months. Of those who do not plan to insulate, only 1 percent could not obtain financing. Furthermore, the major reason for not planning to insulate appears to center around the consumers' failure to appreciate the energy savings resulting from proper insulation of structures.

4. Commercial - Industrial

A timely and informative compilation of Energy Management tips for commercial and industrial customers was produced in pamphlet form and mailed to over 32,000 commercial and industrial accounts in late 1973 and early 1974. This handy checklist included energy saving tips for heating, air conditioning and ventilation, lighting, and processing. The checklist is used by LILCO commercial and industrial representatives as a handout during regular field calls to customers.

In November 1973, an Energy Management Seminar was held to discuss energy alternatives and efficient utilization of energy with LILCO's commercial and industrial customers. Included in the seminar were presentations covering planning, system selections, insulation, heat recovery, lighting, demand control, and preventive maintenance. Each presentation outlined ways to select, operate and maintain energy consuming systems to achieve the highest operating efficiency.

These Energy Management presentations have been reproduced as a series of pamphlets and distributed as a portfolio to commercial and industrial customers interested in these energy-saving topics. The topics covered are as follows:

Managing Today's Energy Requirements
HVAC System Selection
Insulation - Its Place in Energy Management
The Case for Heat Recovery and Ventilation Control
Preventive Maintenance

To date, over 3,000 Energy Management portfolios have been distributed.

Golden E Award Program - A special award program was initiated in early 1974 for the purpose of recognizing builders who incorporate maximum energy efficiency standards in the construction of new homes. The award entitled the Golden E Award symbolizes excellence on the efficient use of energy. Builders who meet the award requirements, which consist of installing insulation according to LILCO recommendations, receive an attractive plaque which can be displayed in model homes and sale pavilions as visible proof to prospective home buyers that the builders' homes have met high energy efficiency standards.

The award program is intended to provide builders with an incentive to comply with LILCO Insulation Standards and thus provide home buyers with a more comfortable, energy saving home.

To date, 36 awards have been made to builders.

Triple E Award Program - A special award was introduced in June 1975, to encourage energy conservation by recognizing home remodeling contractors who incorporate maximum energy efficiency standards as part of their home remodeling work.

To qualify, contractors must install insulation according to LILCO recommendations as part of ten home remodeling jobs. Contractors receive an attractive award plaque and customers who have full insulation installed as part of their home remodeling receive an award certificate.

To date, 11 awards have been made to home improvement contractors.

Electric Vehicle Demonstration Program - The prime objective is to test and evaluate the practicality, performance, and efficiency of this type of vehicle for meter reading and second car transportation requirements.

A secondary objective is to encourage other vehicle fleet owners on Long Island to consider the range of possible use of electric cars - for example, for downtown safety partrol by police and other units, for meter reading, for security and delivery uses on industrial sites and university campuses, and on the grounds of major hospitals and other institutions.

The program is also expected to build consumer awareness of the capabilities and applications of such vehicles for shopping, commuting, and other short-range uses.

5. Rate Structure

LILCO's rate structure has been and will continue to be changed to encourage a reduction in summer peak load and, therefore, improve the load factor, and promote energy conservation.

For the foreseeable future it is expected that the summer peak will remain dominant. Therefore, in order to assign rates more equitably to generate the required revenues to support both existing and new investments required for the increasing summer load period, the summer/winter rate was instituted. For the four summer months of June through September, the rates equal or exceed the rates effective for the remaining eight winter months. Initially, it was thought that the summer load would remain nonprice elastic. However, with a continuing increase in the summer rate as compared to the winter, it is expected that some indication of price elasticity will be experienced. Whether, under foreseeable rate schedules, such summer rates will affect the customers' use on the hottest days of the summer when the peak demand on the system occurs is unknown.

Since May 1973, the Company's electric rates containing demand meter provisions also contained a 75 percent ratchet clause applying to the period June through September. In June 1976, the ratchet was increased to 85 percent. It operates as follows: the monthly billed demand is not to be less than the greater of the recorded demand or 85 percent of the maximum recorded demand established for June through September, inclusive during the preceding 11 months. This will, in effect, increase the annual demand charge for customers with a high summer demand, and should provide them with an incentive to reduce the use of electricity during peak demand periods.

The Company has implemented time of use rates for its largest commercial and industrial customers effective in February 1977. It also introduced an off-peak energy storage rate for residential customers became effective in December 1977.

In its recent and current rate cases, the Company has moved toward a flattening of its rates for all customers.

6. Efficiency of Production

LILCO has always maintained the most efficient use of its generating facilities in producing electric energy. Specific items are:

As a member of the NYPP, LILCO is able to minimize installed and spinning reserve requirements.

All steam generating and combustion turbines are tested on a semi-annual basis for efficiency and results of these tests are used to adjust the maintenance schedule, if required. Steam units are normally overhauled every year. The combustion turbines are inspected either on an annual basis or every 500 to 700 fired hours. The results of the inspection then determine the need for a major overhaul.

Installation in 1954 of a Leeds & Northrup (L&N) analog economic dispatch computer program for the LILCO system, which includes consideration of incremental generating unit heat rates and fuel costs.

Installation of an IBM digital computer in 1968 for economic dispatch on the LILCO system, with the analog computer remaining as backup.

The system is outgrowing the capabilities of the L&N system, so it is planned to replace both the IBM 1800 computer and the L&N system with a new duel computer system for a completely coordinated system operation, including economic dispatch, data gathering, supervisory control CRT's, etc.

7. Utilization of Electricity by LILCO

The Company's internal energy conservation program is aimed at eliminating careless energy use practices and achieving consumption reductions without interfering with the safety, security, or effectiveness of operations. Such measures include the reduction in winter and increase in summer of building temperatures during and after business hours. Interior illumination was decreased where possible and all exterior lighted signs have been turned off. Exterior and parking lighting have been curtailed, consistent with safety and security. A comprehensive review of operating and maintenance procedures has been conducted to improve the efficiency of energy-related equipment, such as fans, motors, and controls associated with heating, ventilating, and air conditioning systems.

The results of energy management measures put into effect in Company buildings has reduced corporate electric use by an estimated 10 percent (or 2,990 MWH for the year 1977) compared to the base year of 1973.

407 080

8. New Building Construction is Energy Efficient

The two new buildings being built by LILCO, a 28,000 sq ft extension to the Hicksville Office Building and a 20,000 sq ft Office and Security Building at the Shoreham Power Plant site, both will be completed in 1978, incorporate the latest conservation techniques. In addition to the very high insulation levels, both buildings incorporate a Variable Air Volume System, which utilizes all waste heat from lighting fixtures and other occupants. Only when outdoor temperature falls below 25°F will supplemental heating be required (the average winter temperature is 42°F). All energy use will be carefully monitored to determine the overall effects.

1.1.1 Load Characteristics

1.1.1.1 Load Analysis

NYSE&G

1.1.1.1.1 Factors and Patterns of Load Growth

Three important factors influence the rate of growth in the use of electricity in NYSE&G's service area. First, major metropolitan areas in the proximity of portions of the service area have experienced suburban expansion and extensive residential growth. Second, the construction and expansion of major highways have improved transportation to, from, and within the service area. Thirdly, NYSE&G's service area contains portions of the Catskill, Adirondack, and Finger Lakes regions; this factor coupled with its proximity to major highways makes the service area attractive for the location of second or vacation homes.

The peak demands for electricity of NYSE&G's customers have always occurred in the winter. Because of moderate summer temperatures, the percentage of NYSE&G's residential customers having any air conditioning is below regional and national averages. Recent growth in electric space heat reduces the possibility that future summer peaks will exceed winter peaks.

NYSE&G's annual rate of growth averaged approximately 7.3 percent per year for a period 1963 and 1972. More recent experience is shown in the following table:

Year	Actual Peak Load (MW)	% Change	Weather Adjusted Peak Load (MW)	% Change
1972-73	1724	--	1721	--
1973-74	1701	(-1.3)	1681*	(-2.3)
1974-75	1768	3.9	1781	5.9
1975-76	1993	12.7	1927	8.2
1976-77	2070	3.9	2023	5.0
1977-78	2034	(-1.7)	2042	0.9

* includes 79 MW adjustment from daylight savings time to eastern standard time.

The drop in the demand for electricity in 1973 can be attributed to a combination of energy conservation resulting from the oil embargo and the campaigns for such conservation, unusually mild winters, and adverse economic conditions. The most recent actual peak load experience indicates a slight reduction in peak demand from the previous winter, however, a comparison of the "weather adjusted" numbers indicates that NYSE&G has experienced an upward peak load growth trend.

To estimate long-term growth, NYSE&G has developed a mathematical model (load model), which is utilized in making long-range forecasts of peak load. The load model enables NYSE&G to assess, among other things, changing economic conditions and the impacts of the conservation of energy. Calculations in the temperature-sensitive component of the model, using 1973 data, indicate that electric loads did not correspond with previous experience for a few months. The use of electricity did not increase as much as one would have expected as temperatures moved downward. The trend did not continue beyond the winter of 1973 apparently because thermostats were set at pre-1973 levels.

Much of the reduction of electric use in 1973, which was thought to be the result of energy conservation, was probably due to a faltering economy. Subsequent to 1973, a decline in construction activity reduced growth rates considerably below earlier forecasts. After introducing the decrease in the Gross National Product (GNP) in 1974 as a factor of industrial growth in the load model, the amount of decreased use of electricity, which can be assigned to conservation, is relatively small.

NYSE&G's analyses do not support the contention that the advances of the cost of electricity have, as yet, resulted in lowering the demands for electricity. The reduction in load in 1973 preceeded the major increases in rates and increased payments pursuant to fuel adjustment clauses. After the imposition of higher rates and larger fuel adjustments, the only clearly identifiable load decrease was that associated with general economic factors.

The dramatic increase in load growth in the winter of 1975-76 can be attributed to the unusually cold weather in late January and early February and to increased economic activity. A revival in the economy in the State of New York could lead to substantial increases in the demand for electricity.

1.1.1.1.2 Load Forecast Results

Upon application of the load model, the resultant forecasts are illustrated in Tables 1.1-6 and 1.1-7. These tables show that NYSE&G predicts an average annual winter peak load growth of approximately 5.7 percent from 1978 to 1984 decreasing to less than 5.0 percent in the early 1990's; the summer peak load is expected to grow at approximately 4.7 percent per year from 1978 to 1998. The forecast growth rate for energy is approximately 5.0 percent per year for the corresponding 20-year period.

New York Power Pool Agreement

On July 21, 1966, Central Hudson Gas & Electric corporation; Consolidated Edison Company of New York, Inc.; Long Island Lighting Company; New York State Electric & Gas Corporation; Niagara Mohawk Power Corporation; Orange and Rockland Utilities, Inc.; and Rochester Gas & Electric Corporation made an agreement called the New York Power Pool Agreement (NYPP).

The objectives are defined in the agreement as follows:

> "The parties desire to achieve optimum coordination in the planning and operation of their electric systems and to provide a means whereby all parties may realize and share in the mutual benefits which can be obtained thereby."

Consistent with this is the objective to achieve maximum economy of operation through purchases and sales of capacity and energy consistent with power system reliability requirements. After adoption of the reliability criteria, NYPP member systems have agreed that, to avoid a loss of load more than once in 10 years, each member system must maintain generating reserves equal to 18 percent of its individual annual peak load. As a result, Applicants operate their systems in such a manner as to serve their customers in the cheapest and most efficient manner.

The need for the proposed facility is based on the Applicants' responsibility to provide an adequate and reliable source of electricity to its customers as required by law and its construction and operation is consonant with the objectives of the NYPP agreement.

New York State became a summer peaking area in 1968 and is expected to remain one for the length of the period discussed in this report. The New York State Interconnected Systems experienced a historical peak demand of 21,214 MW on July 21, 1977 at the hour ending 2:00 P.M. The 1973 to 1976 historical experience is considered an aberration in the load and energy growth trends brought about by the oil embargo, lower than normal summer temperatures, and economic conditions in New York City and New York State as a whole.

From 1968 to 1973, the average growth rate of energy consumption for New York State was 5.1 percent as compared to an annual average growth rate of 5.7 percent in peak demand. In the 1978 to 1995 period, annual energy and peak demand are expected to grow at average annual growth rates of approximately 3.1 percent and 2.8 percent respectively for New York State. These growth rates are lower than those of surrounding areas, both historically and in the forecast period.

Generating Capacity Projections

NYSE&G's existing generating capacity of 1,766 MW in the summer of 1978 consists of five coal-fired generating stations in Central New York with an installed aggregate capacity of 777 MW and a 50 percent share of a 1,87 MW coal-fired, mine-mouth plant at Homer City, Pennsylvania, jointly owned with

Pennsylvania Electric Company. Other sources include 39 MW of small hydroelectric and 13 MW of diesel electric generating capacity. To meet the anticipated summer 1978 peak load, NYSE&G will purchase 758 MW of capacity under long-term contracts with the Power Authority of the State of New York (PASNY) from the Robert Moses Hydro Project at Niagara Falls, the Robert Moses Hydro Project at Massena, the Blenheim-Gilboa pumped storage hydro project, and the James A. FitzPatrick nuclear project. In addition, NYSE&G is under contract to purchase Central Hudson Gas & Electric's share (100 MW) of Blenheim-Gilboa and will purchase an additional 100 MW of oil fired capacity from Central Hudson Gas & Electric. NYSE&G's total summer 1978 capability was 2,724 MW.

To meet the future energy and capacity requirements of its customers and its contractual obligation under the NYPP agreement, NYSE&G plans to build an 850 MW coal fired unit at its Somerset site scheduled for service in the fall of 1983. Also, NYSE&G is a part owner in the Nine Mile Point No. 2 nuclear unit, scheduled for service in November 1983, with an 18 percent share (194 MW summer, 196 MW winter). On February 2, 1976, NYSE&G and LILCO signed a Memorandum of Understanding for joint ownership (50 percent/50 percent) of the Jamesport nuclear units, scheduled for service in May 1988 and May 1990, and the NYSE&G 1 & 2 nuclear units, scheduled for service in May 1991 and May 1993. It was assumed existing long term contracts with PASNY will be continued; however, 20 MW of the contracted purchase will expire in 1985 and approximately 470 MW will expire in early 1990.

The 1973 oil embargo and the 1977-78 coal miners' strike underscore the desirability and need for fuel diversification in the installed capacity of a utility. N&SE&G is critically dependent on coal as a fuel source, 97 percent of its present installed capacity (1,714 MW) being coal fired. Should future events result in the substantial reduction or unavailability of coal, the effect on NYSE&G's capacity could range from minor deratings to major capacity shortages with attendant customer disconnections.

Current events cause an increasing uncertainty that existing capacity will continue to be available at present ratings. One cause of this is the increasingly stringent environmental laws and regulations which are being promulgated by various governmental entities. As a result, some existing capacity may be required to conform with strict thermal and air pollution standards which may require the installation of equipment lowering plant capabilities and decreasing net generation output. Therefore, projected capacity excesses which might be available for short term purchase from other NYPP member systems may not be available. Presently, approximately 60 percent, or more than 17,000 MW of the existing capacity in New York State, is oil fired capacity and an oil shortage could cause drastic and detrimental effects upon the availability of capacity in New York State and elsewhere.

The possibility of future oil and coal shortages and deratings resulting from environmental laws and regulations which would reduce projected NYPP capacity excesses, leads one to the conclusion that NYSE&G reliance on potential long-term capacity purchases as an alternative to the construction of the proposed facilities would not be based on sound judgment.

NYSE&G

NYSE&G monthly peak load and energy requirements for the period of January 1977 to December 1980 are indicated in Table 1.1-8 which corresponds to Form A-1 of 16NYCRR72. Projected peak load and energy requirements for NYSE&G for the first full year of operation for each of the NYSE&G nuclear units are indicated on Table 1.1-9. Projected monthly peak loads and energy requirements for NYSE&G interruptable rate customers during the first full year of commercial operation of either unit are indicated in Table 1.1-10. Estimated load (MW) and energy (MWh) purchases for NYSE&G for the same time period are indicated in Table 1.1-11.

Table 1.1-12 which corresponds to Form A-2 of 16NYCRR72 indicates historical summer peak load and capacity requirements for 1968 to 1977. Table 1.1-13 which corresponds to Form A-3 of 16NYCRR72 indicates historical winter peak load and capacity requirements for 1968-69 to 1977-78. Table 1.1-14 indicates forecast summer peak load capacity requirements for 1978 to 1998 and Table 1.1-15 indicates forecast winter peak load and capacity requirements for 1978-79 to 1998-99.

NYSE&G's existing generating capability is shown in Table 1.1-16 which corresponds to Form A-4 of 16NYCRR72 and NYSE&G proposed generator additions for the reporting period are listed in Table 1.1-17 which corresponds to Form A-5 of 16NYCRR72. Table 1.1-18 which corresponds to Form A-6 of 16NYCRR72 indicates that no generator of NYSE&G is proposed for retirement during the reporting period even though some units will exceed 40 years of operation.

Table 1.1-19 shows NYSE&G's historical hourly load tabulations for the summer 1977 peak load day (August 29, 1977) and the winter 1977-78 peak load day (December 12, 1977).

NYPP

Historical peak load and energy requirements for the New York State Interconnected Systems from 1968-1977 are indicated in Table 1.1-20; Table 1.1-21 indicates firm purchases and sales for the above historical period.

Projected installed net capability, purchases, sales, peak load, scheduled maintenance, annual energy requirements and load factor for the member systems of NYPP are indicated in Tables 1.1-22 (summer) and 1.1-23 (winter) for the period 1978-1998. Projected capacity additions for NYPP are indicated in Table 1.1-24.

Monthly peak loads and energy requirements for NYPP for the first full year of commercial operation of the proposed nuclear units are indicated in Table 1.1-25.

LILCO

The system peak changed from the winter to the summer season in 1968. The increase in system peak load, 1968, to the summer of 1977 has been 1,247 MWe, an average of 5.9 percent per year. Annual energy consumption has increased by 4,500,000 MWh, an average of 4.6 percent per year. These historical data are shown in Table 1.1-4. Historical monthly energy requirements for the period October 1972 through March 1978 are shown in Table 1.1-26.

Table 1.1-27 shows LILCO's historical hourly load tabulations for the summer 1977 peak load day (July 21, 1977) and the winter 1977-78 peak load day (December 12, 1977).

The future estimated requirements for the system show an average increase in demand for electricity of only 2.5 percent per year and an increase in the supply of energy of 3.5 percent per year through the year 1991.

System peak loads and energy requirements shown in Table 1.1-5 reflect values forecast in January, 1978. They include estimates of the continuing effect of load reductions influenced by conservation efforts.

Forecast monthly peak load and energy requirements for the period January 1978 through December 1982 are indicated in Table 1.1-28.

Load Duration Curves

NYSE&G

As can be seen by an examination of the estimated NYSE&G annual load duration curves (Figures 1.1-1 through 1.1-4), the NYSE&G share of the NYSE&G 1 & 2 nuclear units is needed for baseload operation. The capacity indicated on these curves takes into account maintenance, forced outage rates, and average daily unavailable capacity. An examination of the order of dispatch of the projected NYSE&G units available for service in the 1991-1994 time frame confirm a need for baseload capacity. The bandwidth labeled "remaining NYSE&G generation" contains the existing 12 NYSE&G central area generating units all of which will be over 30 years old by 1990 and which cannot be expected to run at more than a capacity factor in the 25 to 60 percent range (intermediate capacity) to serve NYSE&G customers. As indicated on Figures 1.1-1 through 1.1-4, after the peaking and "remaining NYSE&G generation" capacity is applied to the portion of the load curve reflecting availability periods less than 60 percent, it is apparent that additional capacity required to meet NYSE&G customer needs will have to run at a capacity factor greater than 60 percent. A capacity factor of 60 percent or greater would indicate the need for baseload capacity.

NYPP

The estimated NYPP annual load duration curves (Figures 1.1-5 through 1.1-8) show that any nuclear additions will be utilized as baseload generation. The generating capacity indicated under the load duration curves has been adjusted to recognize scheduled maintenance, forced outage rates, and average daily unavailable capacity.

LILCO

Load duration curves for the LILCO system for the years 1991 through 1994 are shown in Figures 1.1-9 through 1.1-12. The year is assumed to start in May to coincide with the service dates of the NYSE&G units.

The LILCO annual load duration curves are the actual shape of the 1976 load, which had a load factor of 56 percent. This is close to the forecasted 57 percent load factor for 1991. No attempt has been made to adjust the historical curve.

1.1.1.2 Demand Projections

NYSE&G

Following is a brief summary of the load forecasting methodology used in reaching the accompanying conclusions.

NYSE&G has a Load Forecasting Committee which is responsible for forecasting electric use on an annual basis and also on a peak hour basis for winter and summer loads. The Committee is chaired by the Chief Planning Engineer. Other members are the Manager of Power Supply, the Comptroller, the Manager of Market Research, an Area General Manager, an Assistant to the Chairman, and an Administrative Assistant. With this array of personnel, the Committee has the benefit of the expertise of many functions and points of view.

Each August, the Committee requests each of the 13 operating districts to provide an estimate of the annual kWh's to be sold in each sales category taking into account the average monthly customers, average weather normalized annual use per customer, new housing starts, business conditions and other known factors which affect residential, commercial, and industrial sales for the coming two years. The forecasts submitted by each district are reviewed by the Load Forecasting Committee which directs each district to be questioned as to changes in growth patterns which appear to be outside normal ranges. When the Committee has determined that forecasts for each class of customer for each district are reasonable, the forecasts are combined into a company-wide forecast. The data is used in formulating the income forecast for the following two years.

The peak demand forecast for the first two years is based on the two-year kWh sales forecast. For periods of time longer than two years, the Committee has adopted a load forecasting methodology utilizing a multiple regression model. The model has been designed to be very flexible so as to accept a wide range of basic assumptions. The model is first presented to the Committee with a set of preliminary assumptions. These assumptions are discussed individually, modified in accordance with Committee consensus, and agreed upon.

Following are the assumptions adopted by the Committee which were reflected in the Load Model:

Electric Forecast Assumptions

1. The energy conservation observed since the winter of 1973 will continue at the same absolute level. (This reduction amounts to 142 MW at the time of the winter peak.)

2. The real (after inflation) price of electricity is expected to increase at an average of 2.4 percent per year.

3. A limited supply of natural gas will be available for new customers for the term of the forecast, but total quantities will be limited to those available from attrition and reduction of curtailment levels. New gas sales will be made only in areas supplied by Consolidated Gas Supply Corporation and National Fuel Gas.

4. The past relationship between Gross National Product and industrial electric sales will continue.

5. Commercial non-temperature dependent load will continue to grow at the present annual compound rate.

6. The non-temperature dependent portion of the "other public authority" class will grow at a slower rate than the historical trend.

7. Gross National Product will increase at the rate forecast by the McGraw-Hill Publications Department of Economics and published in the September 15, 1977 Electrical World.

8. The introduction of electric vehicles will have no effect on the peak demand since it will be an offpeak load.

9. No major unknown use of electricity will occur. In particular, no new large home applicances will be introduced.

10. Population and household growth will follow New York State Economic Development Board projections published March 1976.

11. "Company Requirements" will remain at current percentages. (This category of sendout includes the effects of losses, "billing lag," unmetered use, theft, company use, and meter error.)

12. All new customers will conform to the insulation standards presently contained in the electric rate schedule.

The load model will be described in detail later in this section. It reflects the effects of household growth, appliance saturations, growth in real Gross National Product, growth in electrically heated homes and other winter temperature sensitive load, growth in summer temperature sensitive load, variations in weather, and hour-by-hour energy conservation.

The model is separated into a cold weather model and a warm weather model. In addition, a separate set of coefficients was developed for each hour of the week. This results in 336 separate equations. This method of modelling each hour gives the model the ability to forecast peak demand as well as energy sendout. The model also has the ability to forecast typical daily and monthly load profiles as well as monthly and annual kWh sendouts. Thus, the system load factor is also derived from the model.

The model was developed from hourly sendout data for the period October 1969 through July 1977. This period, unlike prior periods, was characterized by increasing real electricity prices. The forecast is based on the expectation that real electricity prices will rise at this same rate in the future.

During the fall of 1973, a strong campaign to conserve energy resulted in a sudden and substantial reduction in load. Load data analyzed for the period between October 1973 and July 1977 shows no further reduction attributable to energy conservation. The forecast assumes the energy conservation reduction will persist at the same absolute level.

The forecast of energy and peak loads are displayed in Table 1.1-29 and Table 1.1-30, respectively. Table 1.1-31 is a comparison between the historic and forecast energy growth rates.

Future Modifications to Methodology

In any viable forecasting procedure, the methodology must be flexible to allow changing conditions to be reflected in the forecast. The methodology used in this forecast is extremely flexible and it is to be expected that slight changes in the forecast will occur each year as changing conditions and assumptions are reflected in the model. The assumptions are based on the best judgement of the Load Forecasting Committee.

In March of 1977, the Company began appliance saturation studies to fill the gaps between census years. Using the results of these studies, the Market Research Department will attempt to correlate customer electric use to such information as appliance saturations, family size, and housing characteristics. Future appliance saturation studies are expected to be scheduled at regular intervals.

There is a possibility that in the future, forecasts will be prepared for geographic subdivisions of the Company. This modification will be adopted if load research indicates such a step will enhance the accuracy of the forecast.

In 1978, the Company plans to survey commercial loads in an attempt to better forecast the load growth of the commercial customer class.

407 089

Historical Data - "Temperature Adjusted"

Regression coefficients have been developed for the model to adjust historical peak demands to normal weather conditions.

Method of Adjustment - Winter

1. The daily December peaks for the 5 weekdays prior to Christmas were each adjusted to a daily average temperature of 18°F. The adjusted peak demand is the average of the daily adjusted demands.

2. The January weekday peaks were each adjusted to a daily average temperature of 2°F. These adjusted daily demands were averaged to obtain the overall January adjusted peak.

3. The higher of the December and January adjusted peaks was used as the winter adjusted peak.

Table 1.1-32 lists the actual and adjusted peaks.

Method of Adjustment - Summer

The 2:00 p.m. demands for each weekday in August were adjusted to 79°F daily average temperatures. The adjusted summer peak demands were determined by averaging the daily adjusted demands.

Table 1.1-33 lists the actual and adjusted peaks.

Energy Adjustments

The energy data was not adjusted because the relatively minor variations in annual average temperatures have had little effect on annual electric sendouts.

Demographic and Appliance Data

The NYSE&G household forecast is based on the New York State Economic Development Board demographic projection. This is a 25-year projection of population and households. Through a detailed analysis, NYSE&G related the population and, in turn, the household projections to its service area. Table 1.1-34 lists both projections. The forecasts of residential customers and all-electric residential units were developed from the household data.

Table 1.1-34 lists the real gross national product assumed in the electric forecast. This data was specifically correlated with industrial electric use in the model. This data is based on the projection by the McGraw-Hill Publication Department of Economics as published in the September 15, 1977 Electrical World.

Table 1.1-35 lists the historical and projected applicance-customer saturation of selected residential appliances in the NYSE&G Service Area. The 1977 data is based on the Company's 1977 Residential Appliance Survey. In all, 6,400 questionnaires were sent out, distributed in accordance with the Company's eight geographic areas. The survey was returned by 4,219 customers, or 66 percent.

Load Demand and Load Forecast Methodology

The NYSE&G load forecasting model is based on a multiple regression model of NYSE&G sendout for the period Octobe 1969 through July 1977. A different regression model was developed for each hour of the week for both warm and cold days. Thus, there are 336 possible models. In practice, the number of models was reduced to less than half that number because of the similarity between loads at different hours during the year. For example, the noon weekday model is essentially the same Monday through Friday while the noon Saturday model is valid for only one day per week.

The model is broken into two major categories: weather sensitive load (based on Broome County Airport observations) and baseload. The weather sensitive portion is expected to account for almost half of peak load growth.

Weather sensitive load is correlated with average daily temperature in the summer equation. More complex models with non-coincident temperatures and humidity were tried and rejected as not greatly contributing to accruacy. In addition, the humidity is almost impossible to forecast and analyze statistically over an area as large and diverse as NYSE&G's service area in upstate New York. Summer temperature sensitive load is "grown" over time through the use of observed, as well as assumed growth factors.

The winter weather sensitive load is modeled through the use of a linear relationship with temperature. A second variable reflects the lag between temperature and temperature sensitive load. A third variable indicates the effect of wind. All of these variables are "grown" over time in direct proportion to the growth of electric heat. Also considered in the growth of these variables was the existence of temperature sensitive loads other than space heat (e.g., furnace fans).

The baseload in both the warm and cold day models is modelled through the use of both light level variables and variables for all other baseload. The model for the hours of 4 a.m. through 9 a.m. has a morning lighting variable. This variable reflects the increasing demand as sunrise occurs later in the day. A comparable evening lighting variable is incorporated for the hours of 4 p.m. through 9 p.m.. This variable accounts for the additional evening residential lighting occurring with earlier sunset times. The third light level variable is based on cloud cover. The demand increases during cold weather as the sky becomes more overcast. A comparable variable was attempted during the summer, but failed to produce statistically significant results.

The remaining baseload was correlated to a baseload growth factor. This factor is created from a detailed analysis of the base load components and is used by itself as an independent variable. It is also applied to forecast the growth of the light level variables.

407 099

The growth factor is totalled from the various components of baseload. For purposes of the study, the average estimated baseload in 1968 was selected as the base and set to one. The actual use by the various customer classifications was expressed as a percentage at that point in time.

The model currently uses the same growth factor for each hourly model. With the future availability of load research data, however, the model may be designed to use different customer use ratios in different hours. This would better reflect the true situation. Nevertheless, the regression coefficients tend to largely compensate for this problem. Thus, an hour in which the growth rate has been estimated too low will show a slightly high regression coefficient and a negative constant. An hour which is growing slower than the norm will have the opposite result.

The following is a discussion of the treatment of each customer class. See Table 1.1-36 for a definition of customer classes.

Street and Highway Lighting

This component is minor and not subject to meaningful analysis. It was set to its long term (1959 to 1972) growth rate of 4.8 percent.

Other Public Authorities

This component is based on decisions not directly related to the economy. Further study may reveal some cause and effect relationships. An analysis of new loads during the 1971 to 1973 period reveals that fully 40 percent of the absolute growth in this sector is temperature related and is, therefore, taken into consideration in other parts of the model. While the overall long term (1954 to 1976) growth rate of this class has been 9.0 percent, the growth rate of the base, non-temperature sensitive load has trended downward to 7.9 percent per year. Through judgement, the growth rate of this component was reduced to 4 percent for the years 1974 through 1998 to account for the slowdown in both state office building construction and school construction.

While this component was analyzed separately, the results are reflected in the Commercial sector per the definition.

Commercial (Except Other Public Authorities)

The commercial component is probably related to gross national product (GNP) and the number of households. Nevertheless, no strong year-to-year dependency could be detected. Until recently, the growth rate had been fairly smooth in both good and bad economic times. Therefore, the growth was set at the non-temperature dependent load growth rate of recent years. This reduced the long term (1954-1976) overall growth rate from 7.8 percent to 5.9 percent.

Industrial

The regression analysis demonstrated a strong correlation between NYSE&G industrial electrical growth and the GNP. In contrast, very little correlation could be found between industrial electric growth and New York State economic indicators. The findings match with the diverse nature of the NYSE&G Service Area and the broad economic base of the industries served. Clearly, the industrial growth is an exponential curve similar to GNP growth. Much stronger proof that industrial electric use is related to the GNP is the similar year-to-year behavior of the two-growth rates. Some 76 percent of this year-to-year variation in NYSE&G industrial electric growth could be accounted for by variations in the growth of GNP.

The relationship found was:

$Y = 1.50X - 0.66$
Y = Percent annual change in industrial electric use
X = Percent annual change in the real gross national product

This relationship is based on data over the period 1954 to 1976.

See Table 1.1-34 for the GNP forecast used to project the electric use by the industrial class.

Residential

Residential kWh sales accounted for 41 percent of all sales in 1976. Fortunately, this major component easily lends itself to analysis. Unlike the commercial sector, the residential class is made up of a homogeneous set of customers with relatively known uses for the power consumed. Appliance saturation data has been accurately gathered in the census of 1960 as well as that of 1970 (Table 1.1-35). Results from the 1977 Residential Appliance Survey are also included. Using published average usage per appliance, the appliances measured in both 1960 and 1977 accounted for 78 percent of the average electric use per home. While most of the increase in average annual use per household between 1960 and 1977 ,could be attributed to increased appliance saturations, a portion was assumed to be due to increased use per appliance. The most important example is the refrigerator which has increased in average use from approximately 728 kWh per home in 1960 to 1,525 kWh per home in 1977. Average annual use for several appliances was changed to reflect more current information.

The portion of use per customer not accounted for by the large appliances was assumed to continue to grow at the historical rate of 5 percent per year.

Using the forecast of appliance saturation (such as that for 1995 shown in Table 1.1-35) as well as the estimate of unaccounted for use, a forecast was made of average kWh use per residential customer. The kWh use for air conditioning and space heat was subtracted from the total use per customer as these components were treated in the weather sensitive portions of the model.

To determine the overall kWh use by the residential non-temperature sensitive component, the average use per customer was multiplied by the customer projection shown in Table 1.1-34. The growth rate derived drom this analysis was used to "grow" the residential component of the baseload growth factor.

The residential sector (other than temperature sensitive load) is expected to show a slow reduction in growth rate over the next 20 years. While the past twenty years saw major increases in appliance saturation, the next twenty will see those appliances reach near ultimate saturation levels. No new major appliances are expected to be developed with the possible exception of the electric vehicle which may be an offpeak load.

At full appliance saturations, the major growth in the residential sector will come from the increase in the number of households. Households will, however, also be increasing at a slower rate. Thus, in the absence of any new major appliances, the non-temperature sensitive load is expected to grow at a declining rate.

Improved appliance efficiencies and lifestyle changes are expected to reduce the electric use per appliance somewhat as real electric prices increase and the "conservation ethic" becomes a permanent fixture. On the other hand, increased income is expected to push appliance saturations to their natural limit.

Discussion of Important Assumptions

1. Temperature Sensitive Load

Air conditioning and space heat are covered separately in this summary because temperature sensitive load is expected to contribute approximately 30 percent of the absolute growth in summer peak and approximately 40 percent of the absolute growth in winter peak.

Air Conditioning

One input data source is the projected growth in air conditioning. Unlike space heat, no detailed data is kept up to date on air conditioning load. The residential saturation data that is kept does not cover the very large commercial and public authority classes. Even with the inadequacies of the data, a separate forecast of this component improves the accuracy of the model.

One accurate source of data is the model regression coefficients obtained by separately analyzing each year between 1968 and 1977. This analysis showed that the amount of air conditioning load grew at a high rate between 1968 and 1973 and experienced a large drop in 1974 after which the growth resumed at a slower rate. The implication was that a major energy conservation effort had reduced the air conditioning load. For this reason, a second summer temperature sensitive variable was included to measure the amount of conservation existing after January 1, 1974.

The major summer temperature sensitive variable was "grown" at 10 percent per year over the period of the data (October 1969 to July 1977). The growth rate of 10 percent was chosen because it represented the best "fit." This growth rate was also consistent with other information such as the home air conditioning saturation shown in Table 1.1-35.

The 10 percent growth rate cannot be sustained indefinitely as it must trend toward the overall growth rate of construction. For this reason the absolute amount of growth in air conditioning was assumed to increase at a rate slightly greater than the growth rate of new construction. This is based on the observation that most new commercial and public authority construction has for some time, been air conditioned. The practical effect of this assumption is to slowly reduce the rate of growth while slowly increasing the absolute year-to-year growth.

The following growth rates were based on the above assumptions:

Assumed Air Conditioning Growth Over Previous Year

Year	Percent	Year	Percent	Year	Percent
1978	8	1985	6	1992	5
1979	7	1986	6	1993	5
1980	7	1987	6	1994	5
1981	7	1988	6	1995	4
1982	7	1989	5	1996	4
1983	7	1990	5	1997	4
1984	[illegible]	1991	5	1998	4

Space Heat

The winter temperature sensitive load component was "grown" through the use of the total number of all-electric residential units as a multiplier. This statistic is readily available, is accurate, and can be forecast with reasonable precision. An ttempt has also been made to better estimate the contribution of the commercial and industrial classes to the Company's space heat load. This was accomplished by adding an equivalent number of residential space heating customers to the residential space heat class for the commecial and industrial space heat additions since January 1970. For the future, an estimate of additions for the commercial and industrial class was made and these were added as equivalent residential space heat customers.

A small part of the winter temperature sensitive load is due to appliances other than space heat, such as furnace fans. The data indicated that this load is the equivalent of approximately 10,300 all-electric homes. Therefore, for purposes of analysis only, the number of residential space heat customers was increased by 10,300 units over the entire period of the study. Failure to make this adjustment would have cause the space heat contribution to be overestimated because the model would have falsely attributed all temperature sensitive load to space heat. These 10,300 units were not included in Table 1.1-37.

Following are the factors used in preparing the long-range forecast of electrically heated dwelling units:

a. Electrically heated dwelling units include all types of residential units -- single family homes, including mobile homes, townhouses, and all apartments (including those master-metered).

b. These are the assumptions made in producing the forecast:

   1. The severe downturn in housing starts, begun in 1973, will continue through 1979, and begin to show recovery in 1980.

   2. A limited supply of natural gas will be available for new customers for the term of the forecast, but total quantities will be limited to those available from attrition and reduction of curtailment levels.

   3. An increasing share of electric heat installations will come from the conversion market. As those heating systems that went into new homes in the late fifties and early sixties are ready for replacement, a significant number are expected to convert to electric heating.

c. Table 1.1-37 lists the forecast of electrically heated dwelling units by type (new or conversions). This table indicates the steadily decreasing percentage growth in total units added each year as well as the steady increase that can be expected in the saturation rate of these units. The total number of electrically heated dwelling units is plotted in Figure 1.1-13.

2. Price Elasticity

Negative 0.5 is the assumed coefficient of price elasticity. The coefficient of price elasticity was based on conclusions of an independent study of price elasticity and load growth conducted for NYSE&G by National Economic Research Associates (NERA) in 1974 and 1975.

NYSE&G estimates that real electricity prices will increase at an average annual rate of 2.4 percent. This estimate parallels the situation which has occurred for the years on which the actual data is based; and, because of this, NYSE&G feels the marked behavior at this particular real price increase is "built-into" the regression coefficients. As such, no additional correction due to elasticity was deemed necessary.

407 096

While the computation of the real price of electricity shown in Figure 1.1-14 is based on the Consumer Price Index, use of the Wholesale Price Index gives a similar result.

In February 1975, an independent load forecast and study of price elasticity by NERA was completed for NYSE&G. The primary purpose of this study was to analyze the effect of price changes of electricity and competitive fuels. It became evident that such a study was necessary to cope with the expected future condition of rising real electricity prices. Until recently, NYSE&G rates had, by comparison, been steadily decreasing in real terms.

Where possible, the NERA study was based on data from the NYSE&G Service Area. This data was compared with national data and the conslusions were compared to those of other experts in the field of price elasticity. After adjusting for inconsistencies in method, the NERA conclusions were found to differ little from those of other researchers.

One conclusion from the NERA report is that a price elasticity of -0.5 for residential customers is probably appropriate nationally as well as for the NYSE&G Service Area.

NERA found the commercial sector much harder to analyze due to its lack of homogeneity of customers. Nevertheless, a general conclusion was reached that the price elasticity for this component is about -0.5.

The NERA report contains much additional information an[illegible] cus[illegible]on. No short summary of the report would be adequate. Only a re[illegible] of the full text can give a clear insight into the me[illegible] and assumptions that went into the report.

3. Rate Modification

NYSE&G will doubtless make modifications to the form of its electric rates over the next 20 years. The primary purpose of these modifications will probably be to make revenues better reflect costs The current "generic rate hearing" is investigating the basis fo several suggested changes in rate structures.

Experience has shown that, at least in the short term, the price elasticity of the peak demand is less than that of the annual electric sales.

This forecast assumes that the peak demand and energy use will respond equally to expected price changes. Thus, it is implicitly assumed the on-peak price of electricity will increase more rapidly than that for off-peak electricity.

407 097

4. Energy Conservation

Through the use of dummy variables, the absolute amount of energy conservation has been quantified for each hour of the week. A variable was introduced in the winter model which was set to zero prior to October 1973 and set to one after January 1, 1974. The resulting regression coefficient measured the sudden drop in load which occurred following the start of the Arab oil embargo. Ongoing analysis has shown the magnitude of peak load reduction attributable to energy conservation at that point in time has remained essentially constant since then.

The results indicated that the percentage energy conservation was greater at night and on weekends than during the day. This agreed with the observation that great energy savings were achieved by turning off unnecessary equipment during unoccupied periods.

A similar dummy variable was introduced into the summer model. In addition, however, it was found that a temperature sensitive dummy variable was necessary to explain much of the summer energy conservation.

It has been determined by experience that the application of the energy conservation adjustments on very hot days causes an underestimate of the peak demand of approximately 30 MW. This is the needle peak effect which has occurred on many systems since the Arab oil embargo.

A similar needle peak effect of 2[illegible] MW has been tentatively identified in the winter peak.

Including the needle peak effect, the annual load factor of the load lost due to energy conservation was about 91 percent based on its contribution to the summer peak and 84 percent based on its contribution to the winter peak. This is compared with an overall company load factor in 1976 of 80.5 percent based on the summer peak and 61.4 percent based on the winter peak.

The assumption was made that the absolute amount of energy conservation observed since January 1974 will continue at the same level over the entire period of the forecast.

Energy conservation is also assumed to occur as a reaction to rising real electric prices. In the second 10 years of the forecast, our studies indicate that real electric prices should decrease at approximately 2 percent per year. In spite of this expected decrease, the assumption was made that the electric growth would grow at a rate consistent with a 2.4 percent per year increase in real electric prices. Thus, the implicit assumption was made that, because of government mandated energy conservation standards, electric growth will continue, throughout the forecast period, at the lowered rates consistent with rising real electric prices.

Forecast Sensitivity Analysis

This section illustrates the effect of varying the basis assumptions. This is easily done since the NYSE&G forecast is based on explicit assumptions of social, demographic, and economic variables.

A few assumptions can be statistically analyzed to assign probabilities of occurrence. Three such sources of variation are: 1) weather variations, 2) economic cycles, and 3) random errors in the model. Note that these variables are not cumulative. Therefore, a variation in one year does not imply that the forecast long term growth rate is in error.

A much larger potential source of deviation from forecast is found in variables which cannot be mathematically analyzed. One important example is the growth rate of electrically heated homes. The more significant factors impacting on this forecast are:

1. The availability and price of alternate fuels
2. Changing consumer preferences
3. The price of electricity
4. Changes in the form of the electric rate
5. New technology
6. The rate of residential construction
7. Government regulation

It is obvious that any of these factors could have a tremendous effect on the growth rate of electrically heated homes. These factors become more important when it is considered that approximately 40 percent of the absolute growth in the winter peak over the next 20 years is expected to be due to space heat.

The NYSE&G forecast is based on a set of assumptions considered to be the most likely to occur. If the probability distribution is not skewed, then the NYSE&G forecast can be considered to be based on a 50 percent probability of being exceeded.

First to be analyzed will be the known forecast deviation. Then the effect of varying several of the most important assumptions will be illustrated.

Over the period of the data (October 1969 through July 1977) the standard deviation of the model error was approximately 45 MW. This deviation is caused by undetermined factors. In addition, any year in the future could be affected by events which cause a step function in the electric growth. One example was the reduction in load following the Arab oil embargo which continues to reduce the winter peak demand by 142 MW. The construction of a major energy intensive industry would have the opposite effect.

The larger part of short term deviation is due to weather variations. The following table quantifies the effect on the winter forecast variations in

407 091

extreme weather. Considered are variations in temperature, cloud cover, and wind.

Winter Period	Probability of Being Exceeded			
	50%	40%	30%	20%
78/79	2,200 MW	2,220 MW	2,230 MW	2,250 MW
83/84	2,900	2,930	2,950	2,980
88/89	3,840	3,880	3,910	3,960
93/94	4,950	5,000	5,050	5,110
98/97	6,220	6,280	6,350	6,420

For assumptions other than weather, we hesitate to assign probabilities that would be based largely on judgement. Therefore, the effect of varying certain important assumptions is illustrated in Tables 1.1-38 through 1.1-40 without assigning specific probabilities of occurrence.

The preceding sensitivity analysis has focused on effects to the demand forecast caused by changes in assumptions made in developing the forecast. As a further item, NYSE&G expects that increased popularity and installation of heat pumps will have no effect on the demand forecast due to the operating characteristics of heat pumps at low temperatures coincident with peak demands. It is expected that there would be a reduction in annual energy requirements over a pure resistance heating system with a heat pump.

The forecast was based on an assumption of no electric vehicles. If electric vehicles had been included in the forecast, the energy sendout would increase by approximately 5,000 MWh per 1,000 vehicles per year. If electric vehicles are used only as limited range second cars, their batteries can probably be charged during off peak hours. Therefore, only widespread acceptance of electric vehicles would have a significant impact on the peak demand forecast.

An increase of 100 in the number of households will result in an increase of approximately 60 in the number of all-electric homes.

Residential space heating contributes 7.3 kW per home to the system peak.

Example Calculations

The actual development and application of the Load Model is quite involved. The following example attempts to explain the development and application of one of the many hourly equations. The example used in this case is 7 p.m. for Monday through Friday on cold days. Cold days are those under 60°F at the Broome County Airport.

Step one was the development of the input data used in establishing the regression coefficients. For the 7 p.m. hourly model, 1,003 data points were used over the period October 9, 1969 through July 29, 1977.

The first data to be established was the baseload growth factor. Recall that 1968 was selected as the base year and set to one for the purpose of this forecast. The following table lists the components of the 1968 baseload growth factor.

Components of 1968 Baseload Growth Factor

Class	1968 kWh Sales (Millions)	Total (Percent)	Baseload Growth Factor
Residential	2,454	38.6	0.386
Commercial	1,351	2..3	0.213
Industrial	1,867	29.4	0.294
Street Lighting	88	1.4	0.014
Public Authorities and Others	589	9.3	0.093
TOTAL	6,349	100.0	1.000

The year 1968 was chosen as the last year in which temperature related load was not a substantial portion of overall sales. This is important since other parts of the load model are used to identify the temperature related components.

After 1968, appliance saturation and customer growth was used to establish the non-temperature dependent load growth in the residential sector. For example, by January of 1977 the non-temperature dependent residential load was calculated to have grown by about 68 percent. Thus, the residential baseload growth factor was set at 0.386 x (1.68) = 0.649.

As stated previously, the Street Lighting and Commercial sectors were estimated to have a growth of non-temperature dependent loads of 4.8 percent and 5.9 percent, respectively. The historic 7.9 percent growth rate of the Public Authority sector was reduced to 4.0 percent after January 1974. Applying these annual growth rates on a monthly basis results in the January 1977 baseload growth rates shown below:

Class	Baseload Growth Factor
Public Authorities	0.159
Street Lighting	0.021
Commercial	0.347

The industrial class was evaluated through the use of actual economic conditions as explained by the GNP. For example, the real GNP (1972 dollars) was $1,051.8 billion in 1968 and $1,078.8 billion in 1969 for a growth of 2.6 percent. Using the relationship of GNP growth and industrial growth as detailed before, the net growth in GNP translates to a 3.3 percent growth of industrial electric use. This increases the industrial baseload growth factor from 0.294 in 1968 to 1.033 x 0.294 or 0.304 in 1969. In like manner, the industrial use was evaluated monthly so that by January of 1977 the industrial baseload growth factor had increased to 0.379.

To summarize the example, the January 1977 baseload growth factor is totalled below:

Class	Baseload Growth Factor
Residential	0.649
Commercial	0.347
Industrial	0.379
Street lighting	0.021
Public authorities and other	0.159
TOTAL	1.555

Using the same methodology, the baseload growth factor was calculated for each month over the period of the data as well as for various months through 1998.

In this way, if underlying factors change, their effect can be reflected in the forecast. For example, changes in appliance saturations, population, and GNP can be evaluated to determine the effect on electric sales.

The second data point to be established was the number of all-electric residential units. Detailed records are kept on this statistic so that, for example, the number of all-electric units was found to be 40,400 in January, 1977. To this statistic, 10,300 was added to account for temperature dependent load not attributable to space heat, and 16,000 for the equivalent commercial space heat load. Thus, the total multiplier was set at 40,400 + 10,300 + 16,000 or 66,700.

The third group of data points to be determined were those of weather. For example, the temperature at 7 p.m., Wednesday, January 12, 1977, was +4°F at the Broome County Airport. Twenty-four hours earlier, the temperature had been 9°F. The sky cover over the previous 12 hours had averaged 78 percent. The average wind speed during those 12 hours had been 13 knots.

The last data point to be determined was the time of sunset. For example, the sun sets at 4:54 p.m. on January 12. This data point was used to estimate the evening lighting factor.

After determining the original data points, the actual variables were calculated. This was necessary because the variables were often functions of the original data points.

The same procedure was used to determine the dependent and independent variables for all the other 878 data points. This information was used in a multiple regression computer program which generated regression coefficients. The calculated coefficients were those that give the smallest standard error of estimate over the October 9, 1969 through July 29, 1977 period. The winter coefficients are listed in Table 1.1-41. Refer to hour 19 under the listing of winter coefficients to determine the coefficients applicable to 7 p.m.

The coefficients applicable to winters at 7 p.m. on Wednesday are listed below:

Independent Variable	Regression Coefficient
Wind-temperature index	0.015
Energy conservative	-142
Winter temperature	0.114
Evening lighting	1.227
Winter temperature lag	-1.6
Baseload growth	646.2
Cloud cover	1.622
Constant	128

Applying the regression coefficient to the variables calculated above gives the model estimate of the 7 p.m., January 12, 1977 load. This comparison was performed for each of the 1,003 data points to evaluate the accuracy of the model. Table 1.1-42 is the January 12, 1977 calculation.

After establishing the regression coefficients, the next step is to forecast data for future periods and to use the regression coefficients to forecast loads. To illustrate this, a calculation is shown below for January 1985. The same weather and sunset time data that was used in the 1977 example is used in 1985 for purposes of comparison. The two changing data points are the baseload growth variable and the number of all-electric homes.

The baseload growth variable is first adjusted for consistency with the 2-year income forecast. The forecast baseload growth variable is then established in the same manner as in the previous example. The January 1985 components are listed below:

Class	Baseload Growth Factor
Residential	0.883
Commercial	0.499

Class	Baseload Growth Factor
Industrial	0.518
Street lighting	0.027
Public authorities and other	0.204
TOTAL	2.131

The total number of all electric units in January 1985 can be found in Figure 1.1-13. This number is about 94,400 units. To this must be added the adjustment of 10,300 units plus the commercial space heat addition of 30,200 units to arrive at total equivalent all electric units of 134,900.

Table 1.1-43 is the calculation of the 7 p.m. demand of a January 1985 weekday with weather identical to that of January 22, 1977. The 1985 calculation results in a demand of 3,029 MW or 53 percent higher that the January 1977 estimate of 1,983 MW.

The same level of winter and summer demands can be caused by widely varying conditions. For example, the summer peak could occur on a very hot August day at 2 p.m. or on a slightly cooler September day at 9 p.m. The winter peak would be similar regardless of whether it occurred prior to Christmas on a 10°F day or in January on a 2°F day. For ease of calculation, the winter and summer peaks were calculated from equivalent peak conditions.

The conditions at the time of the average summer peak are equivalent to those at 2 p.m. on an August day with an average daily temperature of 79°F.

The conditions at the time of the average winter peak are equivalent to those at 7 p.m. on January 15 on a day with an evening temperature of 10°F from the previous day, and an average wind of 15 knots.

A standard model year was made up of actual weather conditions for 12 average months. For example, January 1972 was used along with February 1974 and March of 1974. It is particularly important that actual weather be used rather than average monthly temperatures because the spring and fall months contain a mix of heating and air conditioning.

The standard model year is used in conjunction with the model regression coefficients to forecast a typical set of demands for the 8,760 hr of a year. The sendout is totalled by day, month, and year. Temperature sensitive sendout and energy conservation are listed separately on an annual basis.

Since the total energy sendout is simply the sum of each hourly demand in the year, the model gives energy and demand forecasts which are entirely consistent with one another. The resulting load factor slowly declines in the near future before stabilizing in the late 1980's.

Figure 1.1-15 illustates the effect when the 168 hr in a week are combined in the model. Seven days are shown with actual versus model estimates of demand. The model is equally accurate for all other days, including monthly and annual peaks.

While the fit is not perfect, it is clear that the model is a close representation of the actual demand components. Note that the model is able to approximate the actual hourly demands while those demands change by hundreds of M.. and while the entire profiles of the days change.

Multiple Regression Data

Tables 1.1-41 and 1.1-44 list the correlation coefficients applicable for weekdays. Not shown are the correlation coefficients for Saturday and Sunday.

Below is a brief description of the application of the variables included in the model. Standard statistical tests were performed and all equations were judged to be acceptable.

The model was carefully designed to avoid some of the pitfalls common to multiple regression analysis. Of primary concern was correlation between independent variables. Excessive interaction between variables can cause faulty and erratic regression coefficients. For this reason, the baseload growth factor was developed prior to its inclusion in the multiple regression program. The alternative would have been the introduction of demographic data directly into the multiple regression program. This could, however, lead to erroneous results since demographic data series as gross national product and households tend to show a high interaction.

The second major concern was the possibility of interaction over time, or serial correlation. It was found that this problem only existed when two or more hours per week were used as data points. Nevertheless, a comparison of the conclusion when only one hour was introduced showed insignificant differences. Therefore, while the Durbin-Watson coefficient was, for many hours, near one, an analysis proved that no real problem existed.

The third concern was the elimination of hours affected by events other than normal load growth. This included: most holidays, July 1972 after hurricane Agnes, evening lighting prior to Christmas, and several other clearly definable events.

Variables were normally rejected if their t values for more than a few of the hourly equations were less than two. Most t values were considered higher than two. This is an indication that: 1) the variables are valid, and 2) the regression coefficients are accurate.

Use of Regression Coefficients
Winter Temperature Factor: A x B x (63-T)

A = Regression coefficient
B = Equivalent all-electric units (thousands)
T = Coincident temperature at the Broome County Airport

Winter Wind - Temperature Index: A x B x (63-T) x C/100

A = Regression coefficient
B = Equivalent all-electric units (thousands)
T = Coincident temperature at the Broome County Airport
C = Four times the average wind speed in knots during the previous twelve hr at the Broome County Airport

Winter Temperature Lag Factor: (A x B x (D-C)/100)

A = Regression coefficient
B = Equivalent all-electric units (thousands)
C = Current Broome County Airport temperature
D = Twenty-four hr previous temperature

Base Load: A x B

A = Regression coefficient
B = Baseload growth factor

Winter Cloud Cover: A x B x C

A = Regression coefficient
B = Four times the average sky cover, in tenths, during the previous twelve hr at Broom County Airport (overcast = 4 x 10 (tenths) = 40)
C = Baseload growth factor

Morning Lighting Factor: A x B x C

A = Regression coefficient
B = Time of sunrise in minutes later than 5 a.m. (e.g., 6:30 a.m. = 90)
C = Baseload growth factor

Evening Lighting Factor: A x B x C

A = Regression coefficient
B = Baseload growth factor
C = Time of sunset in minutes before 9 p.m. (ex. 5 p.m. = 240)

Note: C is limited to certain bounds depending on the hour. Below are those limits:

	Lower Bound	Upper Bound
4 p.m.	205	None
5 p.m.	190	None
6 p.m.	175	None
7 p.m.	None	230
8 p.m.	None	195
9 p.m.	None	195

Summer Temperature Factor: A x B x (T-45)2.1

A = Regression coefficien
B = Summer temperature de ent load growth factor
T = Average temperature over the previous 24 hr at the Broome County Airport

Base Load Conservation: A x B

A = Regression coefficient
B = (prior to 10/10/73 = 0; after 1/1/74 = 1)

Summer Temperature Conservation: A x (T-45)2.1

A = (prior to 10/10/73 = 0; after 1/1/74 = regression coefficient)
T = Average temperature during the previous 24 hr at the Broome County Airport

Weekday Dummy Variables: A x B

A = Regression coefficient
B = One for weekday in question and zero for other days

Summer Monthly Dummy Variable: A x B

A = Regression coefficien
B = One for month in question and zero for other months

NYSE&G historical monthly load and energy data is indicated in Table 1.1-45 for the period October 1972 through May 1978. A copy of the final report supplied to the FPC in accordance with FPC Order 496 and is provided in Appendix 1.1-A.

LILCO

The summer peak forecast methodology includes two approaches (1) an appliance contribution to peak estimate for the residential class, and (2) a summer load factor combined with the sales forecast for the commercial and industrial clas . Tables 1.1-46 through 1.1-48 illustrate the basis for the official LILCO summer peak forecast.

For the residential customers, all load producing applicances which could be identified were listed and their kW contributions to peak were estimated from load research studies and from other applicable studies. In the case of small appliances, swimming pool pumps and heating plants, in-house estimates were made using judgments about unit size and frequency of operation. Next, the average life of each appliance was obtained, based primarily on a 1975 USDA study. The energy savings chosen as targets by the Federal Energy Administration, as published in the Federal Register on July 15, 1977, were translated to kW peak savings. However, the anti-sweat device savings for frost-free refrigerators and the improved cycling efficiency savings for room air-conditioners were not considered applicable to peak. To obtain the efficient kW at peak for each type of appliance, the kW values, as reduced by FEA target savings when new appliances are phased in, were multiplied by 5/"Appliance Life". This allows for the replacement of 5 years of existing stock by 1985. For the 1995 peak, appliance life did not enter into the calculation, since virtually all existing appliances would have been replaced with the more efficient ones by that time.

Appliance saturations were forecasted by combining historical saturation data with a logistic curve fitting routine. When saturations are multiplied by the efficient kW at peak per appliance, the result obtained is kW per customer at peak. Table 1.1-49 illustrates the appliance saturation study.

To project residential customers, a methodology largely based upon the one utilized by the Nassau-Suffolk Regional Planning Board in their projections was taken under consideration and, with modifications, utilized[1] (projections made available to LILCO in a draft of NSRPB's Coastal Zone Management Report, in July 1977). Land use methods are especially well suited for smaller areas particularly when accurate housing data is available. In this instance, census data (both federal and interim) and active residential electric meter data is readily available. Modifications included an adjustment to the rates of housing activity in the towns as well as to average household size which affected population projections. Another significant change is that the current projections now reflect the LILCO service area as opposed to the previous approach which included only the Counties of Nassau and Suffolk in their entirety.

The early years of the LILCO long range customer forecast utilized the Company short range forecast, but thereafter the rate and amount of housing activity varies throughout the service area. The Nassau-Suffolk Regional Planning Board's estimate of available land and the associated zoning requirements is recognized as the best approach for Long Island. The starting point for LILCO's estimates is the data on which the LILCO publication Population Survey 1977 is based. This is an annual publication produced by LILCO for internal use and for use by various agencies both public and private. Table 1.1-50 illustrates the residential customer forecast by major subclass.

The following table compares the household projections of the New York State Economic Development Board (Cohort-Survival Method) with those of the Nassau-Suffolk Regional Planning Board and LILCO's (both of which are based upon available land and applicable zoning).

407 106

Year	New York State Economic Development Board	Nassau-Suffolk Regional Planning Board	LILCO In-House Analysis
1985	950,000	842,533	869,000
2000	1,177,000	952,262	985,000

Note: EDB & NSRPB projections are for the Nassau-Suffolk SMSA while the LILCO projection contains minor adjustment to adjust to the LILCO service territory (include Rockaway Peninsula and exclude Villages of Freeport, Greenport, and Rockville Centre).

The 1985 and 1995 customer forecasts were then multiplied by a customer adjustment factor of 1.005 in the summer and 1.002 in the winter peak calculations, because August and December customer counts are historically greater than the annual average number of customers. The final step in estimating the residential portion of peak load is multiplying the adjusted number of customers by the more efficient kW at peak per customer.

While changes in an area's zoning can locally affect population and numbers of households, each rezoning to permit a higher density is generally accompanied by another rezoning somewhere else that reduces population projected to continue increasing in the foreseeable future.

The commercial/industrial portion of peak demand is estimated by a forecast of load factor and kWh sales, as shown in the aforementioned tables. The forecast of load factor (60 percent summer; 70 percent winter) is based upon annual load research studies on nine major classes of business. Hourly kW demands are collected for each class, and the sample is stratified using Dalenius & Hodges and Neyman Sample Allocation techniques. The sample is designed to yield an overall 95 percent confidence level, and, in addition, many individual strata have 90 percent confidence levels. The load factors of commercial/industrial classes were weighted to arrive at a representative total load factor.

The long range forecast of commercial and industrial electric sales included four components (1) commercial customers, (2) commercial use per customer, (3) industrial customers, and (4) industrial use per customer.

The forecast of commercial (nonmanufacturing) customers was based on the 1966 to 1976 historical relationship between commercial customers and residential customers. The resultant regression exhibited a correlation of 0.9963 which was far superior to the results of other regression testing using such independent variables as gross national product, Index of Business Activity, and Disposable Income per Household. Having arrived at the projecting equation, the residential customer forecast, based on LILCO's own in-house household projections, was used as the independent variable in projecting future commercial customer growth. Table 1.1-51 shows the resulting commercial customer forecast.

407 109

The second component of the commercial/industrial long-range sales forecast was the forecasting of use per commercial (nonmanufacturing) customer. Although growth in use per customer had followed general economic growth in the past, a relationship between these two variables was not considered sufficient for the purpose of forecasting use per customer growth since widespread use of heat pumps,more efficient lighting systems, and more stringent commercial building insulation requirements will occur in the future. Also, the pricing and supply of fossil fuels may encourage fuel shifting to electricity generated by nuclear power. To estimate use per customer, a logistic curve was fitted to historical data, and a Fibonacci Search routine interated to an asymptote. This asymptote was adjusted to reflect expected conservation and increased efficiency in energy use, as shown in Table 1.1-52. The Conservation and Efficiency Asymptote was then entered into the logistic routine and the equation was reestimated. Table 1.1-53 illustrates the data, equation, and resultant use per customer forecast. Multiplication of this use per customer forecast by the expected customers yields sales for the commercial class.

The third major component of the total commercial/industrial long-range forecast was the projection of future industrial customer growth. The same independent variables tested for a significant relationship with commercial customer growth were also tested with historical industrial customer data. The results proved to be marginal at best, both statistically and logically. The majority of industrial activity on Long Island has historically been in the areas of defense and electronics which most certainly accounts for lack of strong correlation with any economic or demographic variable. Additionally, any forecast made with these economic or demographic variables yielded what was considered to be an inordinately high rate of long range customer growth. Therefore, a simple time series equation was constructed using historical (1966 to 1976) industrial customers as the dependent variable. The resulting equation had a correlation of 0.9714. This equation was then used to forecast future industrial customers. Table 1.1-54 (Long Range Industrial Customer Forecast) shows the input data series, regression equation and accompanying statistics, and the resultant projections.

The final major component needed to forecast commercial/industrial sales was a forecast of use per industrial customer. A Conservation and Efficiency Asymptote was derived in the manner described for commercial use per customer. Changes in use per customer were distributed evenly over the time period 1982 to 2010 to reach the asymptote by the year 2010.

The forecast of industrial use per customer can be found in Table 1.1-55, and the determination of the use per industrial customer asymptote can be found in Table 1.1-56.

Table 1.1-57 shows the combination of the commercial and the industrial customers and uses per customer to yield commercial and industrial electric energy sales.

Sales forecasts and load factor were then combined by use of the formula:

407 110

$$\frac{\text{GWH Sales X 100}}{\text{Hour/Year X Load Factor}}$$

to obtain MW at peak for the commercial and industrial group.

The residential and commercial/industrial portions of the peak were combined with the contribution to peak caused by Brookhaven and other public authorities. At this point, the impact of residential and commercial/industrial time of use rates was estimated and subtracted from the peak demand.

Assessments have been made to determine the eligibility of residential customers for the time of use rate. Presently, some 1,200 customers have been identified as eligible for LILCO's new residential time of use rate. To be eligible for this rate a customer's annual usage must have exceeded 45,000 kWh. From this point, a scenario has been developed reflecting some notion of cost vs benefit. Based upon costs of metering and costs for additional generation, it has been assumed that to be cost effective, from both a customer and company point of view, a customer must be capable of shifting at least 1.5 kW of coincident peak usage. It was further estimated that a shift of this magnitude would be feasible if it represented no more than 25 percent of a customer's coincident peak demand. This assumption led to the conclusion that only those customers whose coincident peak demand exceeded 6.0 kW would be potential time of use rate candidates. Using our load research data and extrapolating sample characteristics to our total residential customer population it was estimated that approximately 12 percent of the total number of residential customers have a coincident demand of 6.0 kW or greater.

After discussions with meter and test departments, a somewhat optimistic schedule of time of use meter placement of 7,000 per year was arrived at as a goal. Under this meter replacement schedule it would take 20 years to convert the 12 percent of our total residential customer population. Due to time of use meters a reduction of 14 MW per year has been estimated for the years 1980 to 1985. From 1986 to 1998 an annual reduction of 11 MW per year was estimated. The reason for the larger annual reduction in the earlier years stems from the fact that larger usage customer will be placed on the rate first and should be able to shift more absolute load although we estimate the same percentage reduction for all customers. Note that these annual forecasted reductions are cumulative.

In February 1977, LILCO instituted the first mandatory time of use rate in the United States for 185 of its largest commercial/industrial customers. Up to this point, insufficient time and manpower has precluded a complete analysis of the effects of time of day pricing on these large commercial/industrial customers. Even if an analysis had been performed however, it is doubtful that the results would be valuable for use in a long-term forecast since the changes made by these customers, if any, would be classified as short run. It is expected that a true response by these customers would require capital investment and thus, time. Furthermore, there is a point at which the cost of an investment to reduce peak load would exceed the benefits derived from any time of use rate. Our forecast assumes that only those customers with a billed demand in excess of 50 kW will find it cost/beneficial to be on such a rate.

In order to assess what average peak reduction could be expected by placing customers on such a rate, two points of information were relied upon:

1. Preliminary analysis of those customers who have installed load limiting devices indicates that they have been able to effect a reduction of 10 percent in their peak demands.

2. Studies done by Dr. Kent Anderson of NERA indicate that the optimal effect of all forms of load management will approach a 10 percent reduction. Further savings will not be cost justified (EPRI Load Forecasting Symposium, New Orleans, LA December 1977).

Therefore in assessing the impact of time of use rates the following scenario was employed:

1. All customers with a billed demand over 50 kW could be placed on this rate.

2. Since these customers can shift a substantial amount of absolute load it would be cost/beneficial to transfer these customers to this rate as quickly as possible; by 1983 all existing customers could be converted if an acceptable, mass producible, multi-register demand metering system would be available in the near future.

3. A 10 percent value has been chosen as the most likely reduction possible under this rate structure.

The latest studies of system losses using the planned peak generation configuration, estimates system losses to be in the 8 percent range. During the forecast period, new generation will be added east of LILCO Load Center (Shoreham and Jamesport). This would normally call for an increase in system losses. However, it is also expected that during the forecast period the greatest growth will occur in Suffolk, thus shifting the load center eastward as well. Thus, a constant system loss value of 8 percent is forecast.

The winter peak forecast, similarly constructed, can be found in Table 1.1-48.

Having the 1985 and 1995 target peak forecasts for the summer and the 1977 normalized summer peak, the intermediate years were then filled in using the relative yearly growths in the energy forecasts as a guide. This same allocation technique was used for the winter peaks. Table 1.1-58 exhibits the final peak forecasts as well as the energy forecast and resultant load factors. Table 1.1-59 shows historical summer and winter peaks, experienced and weather normalized.

407 112

1.1.1.3 Power Exchanges

Table 1.1-3 shows load and capacity requirements for NYSE&G for the winters of 1978 to 1979 through 1993 to 1994 excluding all proposed NYSE&G capacity which has not received regulatory approval. It also shows maximum purchase capacity available from other NYPP companies. The capacity available for short term purchase is generally dependent on the timely completion of new units. The capacity possibly available for purchase, indicated in Table 1.1-3, excludes all proposed NYPP units which do not have either PSC Article VIII Certification or an NRC construction permit, and make no allowance for delays in the inservice dates of units presently under construction. Also, the table assumes that the total excess capacity is available to NYSE&G when, in fact, other member companies of NYPP may compete for portions of that capacity. Also, load growth rates, higher than those presently projected, could exhaust the capacity excesses presumed to be available for purchase. Further, NYSE&G deficiencies are of sufficient magnitude to indicate the need for base-load capacity; and a seller normally sells capacity from its least efficient units which are, in general, gas turbines or other high-production cost oil-fired units. It is particularly uneconomic to purchase energy or operate these units for base-load service.

At the time of NYSE&G's Winter 1991 to 1992 peak load, which is projected to be 4,480 MW, and assuming the proposed NYSE&G No. 1 nuclear unit is in service, NYSE&G will have a 806 MW, or 18.0 percent reserve margin, as illustrated in Table 1.1-15. Table 1.1-14 shows NYSE&G's summer load and capacity projections, with the proposed NYSE&G nuclear units in service. Tables 1.1-60 and 1.1-61, for summer and winter respectively, indicate the NYSE&G's load and capacity projections without the proposed NYSE&G nuclear units.

Table 1.1-22 shows that the summer 1991 coincident peak load for the New York State Interconnected Systems is forecast to be 30,380 MW, an increase of only 9,166 MW from actual summer 1977 coincident peak load of 21,214 MW. Table 1.1-23 shows winter peak load and capacity data for the New York State Interconnected Systems. Present plans to meet the projected load increase for the summer of 1991 propose a total of 18 new units and 10 upratings of existing units. The units consist of 5 base-load fossil units with an aggregate capacity of 4,100 MW, 3 fossil unit upratings totalling 468 MW, 7 base-load nuclear units with an aggregate capacity of 7,800 MW, 6 nuclear upratings totalling 420 MW, 4 pumped storage hydro units with a total rating of 1,000 MW, 1 gas turbine uprating with an aggregate capacity of 175 MW, hydro capacity additions of 142 MW, and 2 combustion turbine units with an aggregate capacity of 32 MW. It is projected that 2,297 MW of existing capacity will be retired by the summer of 1991. Table 1.1-24 identifies the capacity additions noted above and their scheduled inservice dates.

It should be noted that of the total 14,137 MW of new capacity projected in New York State between the summer 1978 and the summer of 1991, fully 3,081 MW or approximately 22 percent will be owned by PASNY. The purposes for which PASNY can contract to sell this capacity are constrained by legislation and, therefore, may be unavailable for sale to other NYPP member systems.

Also, in the light of recent experience throughout the electric utility industry, it is unlikely that all 18 units will be in service by the summer of 1991, as projected. Although it would be speculative to assume that any specific unit will be delayed, there is a large potential for delay. The schedule is based on timely and affirmative action being taken by the Nuclear Regulatory Commission and the New York State Board on Electric Generating Siting and the Environment in issuing construction and/or operating permits involving 11 units totalling 8,220 MW of base-load nuclear capacity: Shoreham Unit 1; Nine Mile Point No. 2, Sterling, Greene County, Jamesport 1 & 2, NYSE&G 1; and upratings of Indian Point Unit 2, Indian Point Unit 3, Ginna and FitzPatrick. In addition, there are four fossil units, totaling 3,250 MW, which are scheduled for service prior to 1991 which will require approval solely from the New York State Board on Electric Generation Siting and the Environment. It is probable, for any one of a number of reasons, that one or more such permits will not be issued at the time currently projected.

Proceedings involving the issuance of local construction and discharge permits, which may be subject to extensive litigation, could extent inservice dates of some of the 18 units. Also, the US Environmental Protection Agency (EPA) Effluent Guidelines may result in the removal of certain generating stations from service for retrofitting of cooling towers and/or pollutant removal systems which could reduce the amount of capacity available for service from the amounts shown herein. In addition to the potential for administrative and legal delays, there is the potential for construction and equipment delays.

Further illustration of the uncertainties of the scheduled inservice dates of future units is demonstrated by an Edison Electric Institute report[3] which analyzed the steam generating capacity delays and cancellations (300 MW and larger), which were announced during 1976. That report showed that, nationwide, 42 nuclear units, aggregating 49,054 MW, were delayed for a year or more and two nuclear units, totalling 2,414 MW, were cancelled during that period alone. During the same period, 28 conventional steam units, aggregating 18,108 MW, were delayed for a year or more and 6 such units, totalling 4,408 MW, were cancelled. The combined delays of all steam units totalled 67,162 MW. The total of all steam units cancelled during the period was 8,820 MW.

With all the potential for delay in the commercial operation of the capacity scheduled to be in service by the summer 1991, and the potential for reduced capacity of plants now in service, it would be poor planning to rely on the hope that each and every proposed unit will be placed in service on scheduled as presently forecast.

A June 26, 1978 report entitled "Review of 'Data on Coordinated Regional Bulk Power Supply Programs - FERC (FPC) Order 383-4, Docket R-362, Appendix A-1' dated April 1, 1978 with respect to the Power Supply of New England and New York" issued by the Chairman of the Northeast Power Coordinating Council serves to summarize recent history of peak load and capacity projections as reported by the NYPP. The following is an excerpt from the above report:

407 119

1983 Forecast Annual Peaks and Capacity Projections - MW

New York	Forecast Annual Peak	Total Capacity Projection
1974 R-362	33,690	47,480
1975 R-362	29,980	40,506
1976 R-362	27,600	37,700
1977 R-362	26,850	32,583
1978 R-362	24,050	31,754
Total decrease	9,640	15,726
Percent decrease	29	33

This illustrates the contention that even though NYPP member systems have reduced their load forecasts in the past few years, they have reduced to an even greater extent their projected capacity additions.

Capacity Available for Purchase

An analysis of excess capacity within the NYPP available for purchase by NYSE&G was completed using the 1978 PSC 149-b Report(1). This analysis was done assuming that future capacity additions were completed by their target dates exclusive of units which have yet to receive an NRC construction license or Article VIII Certification.

Table 1.1-3 illustrates the results of this analysis.

The following table is an excerpt from Table 1.1-3 illustrating the three year period 1991 to 1993 during which the two NYSE&G 1 & 2 units are scheduled for service.

Comparison of NYPP Capacity Excess/(Deficiency)

Winter Period

	1991 to 1992	1992 to 1993	1993 to 1994
CHG&E	(219)	(284)	(355)
Con Ed	631	454	277
LILCO	43	(64)	(170)
NMPC	(1,114)	(1,373)	(1,632)
O&RU	(354)	(390)	(425)
RG&E	(418)	(513)	(607)
Subtotal	(1,431)	(2,170)	(2,912)
NYSE&G	(2,625)	(2,897)	(3,180)
TOTAL	(4,065)	(5,067)	(6,092)

407 115

With respect to supply from adjacent areas outside of New York State, the NYPP member companies have explored the possibility of obtaining firm commitments for generation supply from outside the NYPP on a long range basis. Not surprisingly, adjacent areas respond that it is not their policy to install surplus generating capacity which could be made available to outside pools on a firm, long-range basis. It is recognized by all, however, that from time to time, some amounts of generating capacity may be available on a seasonal basis. To the extent that these amounts are economically available with a secure fuel supply to optimize construction or operating schedules, they will certainly be utilized. They do not, however, offer a permanent substitute for the capacity proposed by the NYSE&G 1 & 2 nuclear units. It would be illogical to assume that base load capacity would be available for purchase in the early 1990's.

In light of these findings, NYPP proposes the generation expansion plan set forth in this application and of which the NYSE&G 1 & 2 nuclear units are an integral part. Delay in meeting this schedule will significantly detract from the reliability of the interconnected systems of New York State, will substantially increase the cost of electric service to customers in New York State as a whole and those of NYSE&G in particular, and will result in unnecessary consumption of large quantities of oil.

LILCO

Table 1.1-4 shows experienced power exchanges at summer peak hours.

Tables 1.1-2, 1.1-62, and 1.1-63 show the forecasted power exchanges at time of summer and winter peaks, for which firm contracts exist.

These purchases include the firm purchase from the FitzPatrick unit from PASNY starting at 67 MW 1978 summer and 27 MW 1978 winter and declining to 0 MW by 1987 and a 59 MW purchase from the Vermont Yankee Unit for the 1978 summer.

1.1.2 System Capacity

1.1.2.1 Generation Mix

Economic generation mix studies[2] performed by the NYPP member systems indicate that long range guidelines for new capacity additions should be roughly 85 percent base load and 15 percent peaking between 1981 and 2000. The economic studies further indicated that nuclear generation is the most economical choice for the 85 percent base-load mix, while pumped storage hydro and gas turbines are economical for peaking requirements. The generation mix developed in these studies is an economic optimum for the given set of assumptions. The costs of cooling towers on all proposed base-load units and sulfur removal on coal-fired units were included. Other factors, such as fuel flexibility or site availability, may lead to different conclusions when conducting studies dealing with the installation of specific units.

More advanced forms of generation (magnetohydrodynamics, solar, fusion, etc.) were not considered in the optimum mix study although some forms will undoubtedly become part of the long-range generation mix. More active investigations will be pursued whenever any new source of power generation appears sufficiently advanced in its research and development to warrant such considerations.

1.1.2.2 Licensing

Of 28 new generating units, totalling 20,050 MW (Table 1.1-24), licensing applications have been submitted for 24 units including the units proposed herein. Of these 24 units, applications for 12 units have been submitted to the Federal Energy Regulatory Commission. Ten of these 24 units will require certificates issued pursuant to Article VIII of the Public Service Law. Of the ten units in the Article VIII process, three are in or shortly will be in the hearing stage; two are in the briefing stage; three are awaiting a Siting Board decision; and the remaining two units are the subject of this application. Of the remaining four units one is an oil fired unit under construction and the remaining three will require construction permits from the Nuclear Regulatory Commission and the Public Service Commission, however, these applications have not yet been filed.

It is clear from all of the foregoing that NYSE&G has no sound alternative other than to proceed with the construction of the proposed generation station.

1.1.2.3 Economic Factors

In the 1977 149-b Report[1], the members of the NYPP presented the results of economic analyses which demonstrated that a NYPP generation expansion plan which brings future generating units into service in advance of the date when they are needed for capacity purposes alone, results in substantial cost savings to the electric consumers of New York State (1977 149-b Volume 1, Exhibit 14). This is brought about by the substitution of nuclear and coal fired generation to supply energy which otherwise would be supplied from the existing oil fired units in New York State.

Production costing analysis based on the present NYPP generation plan, as set forth in the 1978 149-b Report[2], indicates that a 2-year delay of the proposed NYSE&G 1 and 2 nuclear facilities will result in the use of approximately 46,000,000 barrels of residual oil, which would otherwise be conserved. Using presently projected fuel costs, the resultant production cost increase, which would accrue to the electric consumers of New York State, translates to approximately $1,245,000,000 for this delay. The cumulative savings occasioned by such oil substitution are very substantial and over a 30-year plant lifetime for NYSE&G 1 & 2, the production cost savings for the state as a whole far exceed the capital cost of building the nuclear plant. Thus, placing NYSE&G 1 & 2 nuclear units in service in 1991/93 even if not needed for capacity reasons will save the electric consumers of New York State more than $5,000,000,000 in production costs (expressed as present worth of revenue requirements over a 30-year plant life).

407 117

In addition to the obvious, and enormous, economic benefits to be gained by early installation and operation of the NYSE&G units, they will also displace 600 to 700 million barrels of oil over the 30 year plant life, thus significantly reducing New York State and US dependency on foreign oil resources which is consistent with the national policy.

1.1.2.4 Fuel Supply

Development of a coordinated statewide long-range expansion plan required certain assumptions regarding the cost, availability, and environmental acceptability of each type of fuel under consideration. One of the most critical problems facing the NYPP member systems today is the assurance of adequate fuel supply for the future, pending development of new resources or revitilization of classical resources. Under current plans requirements for coal and nuclear fuel in New York State will continue to increase for the foreseeable future. The requirement for oil will continue to increase until the mid-1980's as plants presently under construction are completed. Even at presently forecast growth rates, fuel energy requirements for the New York utilities will almost double by 1995.

The US goal of reducing dependence on foreign oil sources, if carried out, will require shifts away from the use of oil for the generation of electricity. For the member systems of NYPP to reduce oil consumption, it will be necessary to shift to other types of fuels for new generating units. It must be recognized, however, that existing oil-fired plants and those now under construction must continue to operate, thus requiring increased oil consumption until the mid-1980's.

The national energy policy of reducing dependence on foreign energy sources encourages fuller use of coal and nuclear energy to fuel generating plants. Consequently, coal-fired units have been included in the long range plans of NYPP member systems to permit fuel diversity and to satisfy near term capacity requirements which cannot be met by nuclear units because of their long lead times.

1.1.2.5 NYSE&G Seasonal Load Requirements

Table 1.1-12 indicates historical summer peak load and capacity requirements for 1968 to 1977. Table 1.1-13 indicates historical winter peak load and capacity requirements from 1968 to 1969 and 1977 to 1978. Table 1.1-14 indicates forecast summer peak load capacity requirements for 1978 to 1998 and Table 1.1-15 indicates forecast winter peak load and capacity requirements from 1978 to 1979 and 1998 to 1999. Firm power purchases and firm power sales, both historical and future, are also indicated on the preceeding [illegible]es.

Table 1.1-16 shows NYSE&G's existing generating capability and Table 1.1-17 lists NYSE&G's proposed generator additions for the reporting period.

Although NYSE&G owns and operates a number of generating units which were built in the 1940's and early 1950's, these units are in generally good

407 118

operating condition, and NYSE&G has no current plans to retire any of them. However, a major component failure or burdensome modification imposed for environmental reasons could necessitate reconsideration of this present position.

1.1.2.6 NYPP Seasonal Capacity Requirements

Tables 1.1-22 and 1.1-23 indicate the capability, peak load, and reserve margins for the New York State Interconnected Systems for the 1978 to 1998 period. Table 1.1-24 lists the projected capacity additions through 1996 for the member systems of the NYPP.

The NYSE&G 1 & 2 nuclear units have been incorporated into the long-range statewide plans of the NYPP and the output of the station will be delivered into the statewide transmission grid.

LILCO

The existing steam units are located at five locations and the peaking units are located at two major sites, Barrett and Holbrook, with the rest distributed around the system to provide area protection and black start capability for four steam stations. The LILCO system is virtually 100 percent oil fired at the present time.

Retirements listed in Tables 1.1-62 through 1.1-64 are based on an estimate of 40-year life for steam units and a 30-year (when the 30th or 40th anniversary of operation occurs in the spring or summer, it is assumed that the unit will be retired the following November) life for gas turbines. This is a rather arbitrary judgement at this time since each unit is analyzed on a case by case basis, but it is a reasonable rule to use for long-range studies. In addition, the Far Rockaway unit will probably be retired in 1981 after Shoreham is operational on a purely economic basis.

Table 1.1-65 lists LILCO monthly peak loads and capacities for the period January 1977 through December 1980. Table 1.1-66 lists LILCO summer peak loads and capacity for the 1968 to 1992 time period; corresponding winter numbers are presented in Table 1.1-67. Table 1.1-68 lists LILCO's existing generating units and Table 1.1-69 lists their future capacity additions. Table 1.1-70 lists projected LILCO generator retirements.

1.1.3 Reserve Margins

Generating Capacity Reserve Margin

The Applicants and other member systems of the Northeast Power Coordinating Council have agreed to a Basic Criteria for Design and Operation of Interconnected Power Systems[4], which require "Generating capacity will be installed and located in such a manner that, after due allowance for required maintenance and expected forced outages, each area's generating supply will equal or exceed area load at least 99.9615 percent of the time. This is equivalent to a 'loss-of-load probability on one day in ten years'."

Accordingly, the member systems of the NYPP have agreed on a generation installed reserve policy that will provide sufficient generating capacity so that the probability of a shortage of generating capacity is no greater than one day in ten years including the effects of ties with adjacent systems.

The members of the NYPP have determined[2] that a minimum generating capacity reserve margin of not less than 23 percent for New York State, as a whole, is required to meet the 1 day in 10 year loss of load probability criterion. This translates to a required reserve margin of 18 percent based on individual member system peak loads. Thus, NYSE&G is required to maintain not only sufficient generating capacity to meet its corporate load requirements but to maintain an 18 percent installed generating capacity reserve margin above its annual corporate peak load.

This installed reserve margin is provided to allow for generator maintenance and outages. NYSE&G central area steam units are scheduled for an annual maintenance of approximately 2 weeks with a major overhaul of approximately 5 weeks scheduled every fifth year. NYSE&G's Homer City generating units are scheduled for an annual maintenance of approximately four weeks with a major overhaul of eight weeks every fifth year. NYSE&G coordinates its maintenance schedule with other member systems of the NYPP.

Figure 1.1-16 shows the combined generating capacity outages of the NYPP member systems at each daily Pool peak hour for 1976. The 23 percent required reserve margin of approximately 4,430 MW is indicated by the horizontal line. It can be seen that the lower limits of the daily capacity outages, on the average, approximate the 4,430 MW reserve requirement. If the reserve margin had not been provided, voltage reductions, and load curtailment would have been required.

Thus, actual system performance data confirms the minimum reserve requirement of 23 percent; and it is thus that the NYPP members design and schedule their generating capacity additions to continually provide at least the required reserve margin.

To do so requires the timely addition of generating capacity on a statewide coordinated basis. In this regard, the Applicants' proposed NYSE&G 1 & 2 nuclear units are an integral part of the coordinated future generation plan of both the Applicants and the NYPP member systems.

LILCO

LILCO's reserve margin responsibility is 18 percent of its annual peak load.

Unit maintenance on the LILCO system is scheduled on a basis that maximizes operating reserve. Steam units are scheduled for an annual overhaul lasting about 10 to 14 days, and a major turbine overhaul every 5 to 6 years. The schedule is modified as required, based on the semi-annual tests.

There will be no effect by the proposed units on the LILCO system existing or planned interconnetcions.

These units will provide LILCO with adequate reserve margin into the next century.

1.1.4 External Supporting Studies

An assessment of the adequacy and expected reliability of the power supply situation of the Applicants as well as the NYPP Member Systems is contained in the "1978 Report of Member Electric Systems of the New York Power Pool pursuant to Article VIII, Section 149-b of the Public Service Law".

A description of the installed reserve criterion is also contained in the 1978 149-b Report as well as the Northeast Power Coordination Council's report entitled "Basis Criteria for Design and Operation of Interconnected Power Systems".

1.1.5 Transmission System

1.1.5.1 Base-Load Flow Cases

One-line diagrams (Figures 1.1-17 through 1.1-26) show the results of base case load flows for the fossil and nuclear primary and alternate sites. Those figures portray the expected system flows in the respective years that each proposed generator is connected to the bulk power transmission network.

1.1.5.2 Stability Studies

System stability testing has demonstrated that the proposed facilities associated with either the primary or alternate site will assure stable electric generator and transmission system performance, consistent with the NYPP and Northeast Power Coordinating Council criteria to which the Applicants subscribe.

1.1.6 References for Section 1.1

1. EBASCO Services, Inc., Base Load Generation Alternatives 1985-1990 for New York State Electric & Gas Corporation. January 1977.

2. 1978 Report of Member Electric Systems of New York Power Pool and the Empire State Electric Energy Research Corporation, pursuant to Article VIII, Section 149-b of the Public Service Law, April 1, 1978.

3. Edison Electric Institute. 1976 Year-End Summary of the Electric Power Situation in the United States. A Report of the Electric Power Survey Committee of the Edison Electric Institute, December 31, 1976.

4. Northeast Power Coordinating Council. Basic Criteria for Design and Operation of Interconnected Power Systems. Adopted September 20, 1967.

5. State of New York, Executive Department, Economic Development Board. Preliminary Revised Population Projections by Age and Sex for New York State Counties. March 1, 1976.

6. State of New York, Executive Department, Economic Development Board. Preliminary Revised Household Projections for New York State Counties. March 30, 1976.

7. McGraw-Hill Publications Department of Economics. 28th Annual Electric Industry Forecast. Electrical World, September 15, 1977, p 43-58.

NYSE&G ER
NEW HAVEN-NUCLEAR

TABLE 1.1-1

NEW YORK STATE ELECTRIC & GAS CORPORATION
ENERGY REQUIREMENTS (GWH) FOR YEARS 1965 TO 1977

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
Residential Heating	29	46	73	109	157	221	290	379	448	554	649	803	888
Residential Non-heating	1,896	2,005	2[illegible]	2,302	2,464	2,642	2,780	2,941	3,046	3,025	3,144	3,219	3,247
Commercial	1,485	1,628	[illegible],84	1,967	2,151	2,349	2,520	2,784	3,073	3,076	3,238	3,372	3,430
Industrial	1,548	1,737	1,770	1,867	1,974	1,977	2,045	2,192	2,352	2,240	2,221	2,369	2,525
Street and Highway Lighting	79	82	85	88	91	95	98	100	102	108	110	111	110
Sales for Resale	13	14	17	19	21	23	23	25	26	26	25	26	27
Company Requirements	600	636	690	778	821	860	[illegible]39	966	913	902	961	1,231	1,073
Total	5,650	6,184	6,563	7,130	7,679	8,167	8,695	9,387	9,960	8,931	10,348	11,131	11,300
Peak Load*	1,055	1,150	1,220	1,307	1,404	1,496	1,556	1,724	1,701	1,768	1,993	2,070	2,034
Average Number of Customers (in thousands)													
Residential Heating	1.9	2.3	3.4	4.9	6.7	8.9	11.5	14.8	18.8	23.6	28.4	33.5	39.0
Residential Non-heating	443.2	452.4	461.3	467.9	476.5	485.3	494.0	503.0	511.7	516.9	520.0	522.7	524.6
Commercial	60.8	61.9	62.7	63.1	63.9	64.6	65.7	66.9	68.2	69.2	70.0	70.8	71.3
Industrial	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.3	1.3
Other	0.7	0.7	0.8	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9
Total	507.9	518.6	529.5	537.8	549.1	560.8	573.2	586.7	600.7	611.7	620.4	629.1	637.1

NOTE:

* Data series used in determining peak load and energy requirements

407 123

TABLE 1.1-2

LONG ISLAND LIGHTING COMPANY
INSTALLED CAPACITY

Name of Generating	Unit	Type	1990 (*) Projected Function	Actual 1973 Summer	Winter	1974 Summer	Winter	1975 Summer	Winter	1976 Summer	Winter	1977 Summer	Winter	Forecasted 1978 Summer	Winter
Northport	1	ST	B	386	386	386	386	386	386	386	386	386	386	383	383
	2	ST	B	386	386	386	386	386	386	386	386	386	386	383	383
	3	ST	B	386	386	386	386	386	386	386	386	386	386	383	383
	4	ST	B	-	-	-	-	-	-	-	-	-	193	383	383
Port Jeff	1	ST	P	49	49	49	49	49	49	49	49	49	49	48	48
	2	ST	I	49	49	49	49	49	49	49	49	49	49	48	48
	3	ST	I	196	196	196	196	196	196	196	196	196	196	190	190
	4	ST	I	196	196	196	196	196	196	196	196	196	196	190	190
Glenwood	2	ST	-	77	77	77	77	77	77	77	77	77	0	0	0
	3	ST	-	77	77	77	77	77	77	77	77	77	0	0	0
	4	ST	P	114	114	114	114	114	114	114	114	114	114	114	114
	5	ST	P	113	113	113	113	113	113	113	113	113	113	113	113
E.F. Barrett	1	ST	I	189	189	189	189	189	189	189	189	189	189	190	190
	2	ST	I	191	191	191	191	191	191	191	191	191	191	190	190
Far Rockaway	4	ST	P	114	115	114	115	114	115	114	115	114	115	114	114
Mitchel Gardens	1&2	ST	B	-	-	-	-	-	-	-	-	-	-	****32	32
E.F. Barrett		IC	P	306	363	306	363	306	363	306	363	288	341	280	332
Holbrook		IC	P	-	-	258	325	528	664	528	664	528	664	485	625
Other		IC	P	370	454	370	454	370	440	370	440	370	440	348	414
Installed Capacity				3,199	3,341	3,457	3,666	3,727	3,991	3,727	3,991	3,709	4,008	3,874	4,132
Firm Purchases				**										*** 128	28
Total Capacity														4,002	4,160

NOTES:

* B - Base Load; I - Intermediate; P - Peaking

** See Table 1.1-4 for Historical

*** Includes 59 MW from Vermont Yankee

**** Currently Scheduled for August 1978

TABLE 1.1-3

NYSE&G WINTER PEAK LOAD AND CAPABILITY*

	1978/79 (MW)	1979/80 (MW)	1980/81 (MW)	1981/82 (MW)	1982/83 (MW)
Load	2,200	2,290	2,420	2,580	2,740
Reserve Requirement	396	412	436	464	493
Total Required Capability	2,596	2,702	2,856	3,044	3,233
Installed Capability*	1,766	1,766	1,766	1,766	1,766
PASNY Purchases	767	762	756	745	737
Purchases from CHG&E	100	100	300	200	200
N.E. Utilities	---	100	50	142	---
Capability Total	2,633	2,728	2,872	2,853	2,703
Surplus/(Deficiency) Capability	37	26	16	(191)	(530)
Short Term Purchase Capacity Available**					
Central Hudson Gas & Electric Corp.	182	208	1	37	38
Consolidated Edison of New York, Inc.	2,483	2,537	2,575	2,472	2,319
Long Island Lighting Company	682	550	1,226	1,080	935
Niagara Mohawk Power Corp.	2,169	2,155	2,139	2,106	2,082
Orange & Rockland Utilities, Inc.	218	188	152	116	74
Rochester Gas & Electric Corp.	132	270	221	173	113
Purchase Capacity Available	5,866	5,908	6,314	5,984	5,561
Capacity Unobtainable	-	-	-	-	-

TABLE 1.1-3 (Cont'd)

	1983/84 (MW)	1984/85 (MW)	1985/86 (MW)	1986/87 (MW)	1987/88 (MW)
Load	2,900	3,070	3,250	3,440	3,630
Reserve Requirement	522	553	585	619	653
Total Required Capability	3,422	3,623	3,835	4,059	4,283
Installed Capability*	1,962***	1,962	1,962	1,962	1,962
PASNY Purchases	727	718	708	699	699
Purchases from CHG&E	---	---	---	---	---
N.E. Utilities	---	---	---	---	---
Capability Total	2,689	2,680	2,670	2,661	2,661
Surplus/(Deficiency) Capability	(733)	(943)	(1,165)	(1,398)	(1,622)
Short Term Purchase Capacity Available**					
Central Hudson Gas & Electric Corp.	317	203	159	113	(1)
Consolidated Edison of New York, Inc.	2,169	2,206	2,077	1,673	1,339
Long Island Lighting Company	1,022	876	731	597	479
Niagara Mohawk Power Corp.	829	568	376	153	(75)
Orange & Rockland Utilities, Inc.	31	(10)	(58)	(107)	(154)
Rochester Gas & Electric Corp.	206	144	72	(17)	(88)
Purchase Capacity Available	4,574	3,987	3,357	2,412	1,500
Capacity Unobtainable	-	-	-	-	122

407 126

TABLE 1.1-3 (Cont'd)

	1988/89 (MW)	1989/90 (MW)	1990/91 (MW)	1991/92 (MW)	1992/93 (MW)	1993/94 (MW)
Load	3,840	4,050	4,260	4,480	4,710	4,950
Reserve Requirement	691	729	767	806	848	891
Total Required Capability	4,531	4,779	5,027	5,286	5,558	5,841
Installed Capability*	1,962***	1,962	1,962	1,962	1,962	1,962
PASNY Purchases	699	699	699	699	699	699
Purchases from CHG&E	---	---	---	---	---	---
N.E. Utilities	---	---	---	---	---	---
Capability Total	2,661	2,661	2,661	2,661	2,661	2,661
Surplus/(Deficiency) Capability	(1,870)	(2,118)	(2,366)	(2,625)	(2,897)	(3,180)
Short Term Purchase Capacity Available**						
Central Hudson Gas & Electric Corp.	(54)	(107)	(160)	(219)	(284)	(355)
Consolidated Edison of New York, Inc.	1,162	985	808	631	454	277
Long Island Lighting Company	361	255	149	43	(64)	(170)
Niagara Mohawk Power Corp.	(334)	(594)	(866)	(1,114)	(1,373)	(1,632)
Orange & Rockland Utilities, Inc.	(207)	(260)	(319)	(354)	(390)	(425)
Rochester Gas & Electric Corp.	(159)	(242)	(324)	(418)	(513)	(607)
Purchase Capacity Available	769	37	(712)	(1,431)	(2,170)	(2,912)
Capacity Unobtainable	1,101	2,081	2,366	2,625	2,897	3,180

NOTES:

* Excludes all capacity from generation units for which New York State Certification or Nuclear Regulatory Comission construction licenses have not been granted.

** Excesses as indicated in 1978 149-b excluding all capacity from generating units for which New York State Certification or Nuclear Regulatory Commission construction licenses have not been granted.

*** Nine Mile Point No. 2 (18 percent) - 196 MW - November 1983

407 127

TABLE 1.1-4

LOAD ANALYSIS
LILCO HISTORICAL DATA

Year	Summer Peak (MWe)	Winter Peak (MWe)	Annual Energy Requirements (GWH)	Net Power Purchase Or (Sale) at Peak (MWe*)
1968	1,860	1,789	9,085	(257)
1969	2,004	1,954	9,928	(61)
1970	2,174	2,073	10,826	44
1971	2,401	2,138	11,479	1
1972	2,620	2,268	12,243	(91)
1973	2,923	2,137	13,127	316
1974	2,794	2,205	12,672	241
1975	2,933	2,360	12,979	332
1976	2,719	2,494	13,317	154
1977	3,107	2,456	13,603	107

NOTE:

* Includes all types of purchases and sales

TABLE 1.1-5

LOAD ANALYSIS
LILCO FORECASTED DATA

Year	Summer Peak (MWe)	Winter Peak (MWe)	Annual Energy Requirements (GWH)
1978	3,030	2,530	13,830
1979	3,140	2,600	14,230
1980	3,260	2,670	14,690
1981	3,380	2,760	15,240
1982	3,500	2,850	15,960
1983	3,590	2,920	16,540
1984	3,710	3,020	17,180
1985	3,830	3,130	17,740
1986	3,940	3,240	18,400
1987	4,040	3.350	19,710
1988	4,140	3,460	19,980
1989	4,230	3,570	20,680
1990	4,320	3,680	21,430
1991	4,410	3,790	22,130
1992	4,500	3,900	22,880
1993	4,590	4,010	23,500
1994	4,680	4,110	24,180
1995	4,760	4,210	24,850
1996	4,840	4,310	25,560
1997	4,920	4,410	26,120
1998	5,000	4,510	26,740
1999	5,080	4,610	27,360
2000	5,160	4,710	27,980

TABLE 1.1-6

NEW YORK STATE ELECTRIC & GAS CORPORATION
PEAK LOADS (MW)

Summer	Peak Load (MW)	Winter	Peak Load (MW)
1978	1,750	1978-79	2,200
1979	1,820	1979-80	2,290
1980	1,890	1980-81	2,420
1981	1,990	1981-82	2,580
1982	2,090	1982-83	2,740
1983	2,200	1983-84	2,900
1984	2,310	1984-85	3,070
1985	2,420	1985-86	3,250
1986	2,540	1986-87	3,440
1987	2,670	1987-88	3,630
1988	2,800	1988-89	3,840
1989	2,930	1989-90	4,050
1990	3,060	1990-91	4,260
1991	3,200	1991-92	4,480
1992	3,360	1992-93	4,710
1993	3,520	1993-94	4,950
1994	3,680	1994-95	5,190
1995	3,840	1995-96	5,430
1996	4,000	1996-97	5,690
1997	4,180	1997-98	5,950
1998	4,360	1998-99	6,220

407 130

TABLE 1.1-7

NEW YORK STATE ELECTRIC & GAS CORPORATION
ANNUAL ENERGY REQUIREMENTS (GWH)

Year	Energy Requirements (GWH)
1978	11,900
1979	12,300
1980	13,000
1981	13,700
1982	14,500
1983	15,300
1984	16,100
1985	16,900
1986	17,800
1987	18,800
1988	19,800
1989	20,800
1990	21,900
1991	23,000
1992	24,200
1993	25,400
1994	26,600
1995	27,800
1996	29,100
1997	30,500
1998	31,900

TABLE 1.1-8

NEW YORK STATE ELECTRIC & GAS CORPORATION
MONTHLY CAPACITY AND PEAK LOADS

Year / Month	1977 Jan	1977 Feb	1977 Mar	1977 Apr	1977 May	1977 June	1977 July	1977 Aug	1977 Sept	1977 Oct	1977 Nov
Installed Net Capacity (MW)											
Thermal (conventional)	1,377	1,377	1,377	1,377	1,377	1,377	1,377	1,377	1,377	1,377	1,377
Thermal (GT and diesel)	13	13	13	13	13	13	13	13	13	13	13
Thermal (nuclear)	0	0	0	0	0	0	0	0	0	0	0
Hydro (conventional)	40	40	40	40	40	40	40	40	40	40	40
Hydro (pumped storage)	0	0	0	0	0	0	0	0	0	0	0
Total installed	1,430	1,430	1,430	1,430	1,430	1,430	1,430	1,430	1,430	1,430	1,430
Firm Purchases and Sales (MW)											
PASNY firm purchases	846	846	846	846	780	780	780	780	780	780	805
Proposed short term purch.	300	300	300	300	200	200	200	200	200	200	200
Firm sales	0	0	0	0	0	0	0	0	0	0	0
Total Capability (MW)	2,576	2,576	2,576	2,576	2,410	2,410	2,410	2,410	2,410	2,410	2,435
Peak Load (MW)	2,062	1,853	1,779	1,637	1,564	1,522	1,685	1,700	1,619	1,667	1,821
Energy (Million kWh)	1,149	962	968	869	857	838	901	909	866	941	950
Scheduled Maintenance (MW)	0	34	300	300	22	19	32	26	26	128	0

TABLE 1.1-8 (Cont'd)

Year Month	1977 Dec	1978 Jan	1978 Feb	1978 Mar	1978 Apr	1978 May	1978 June	1978 July	1978 Aug	1978 Sept	1978 Oct
<u>Installed Net Capacity (MW)</u>											
Thermal (conventional)	1,377	1,537	1,699	1,709	1,702	1,714	1,714	1,714	1,714	1,714	1,714
Thermal (GT and diesel)	13	13	13	13	13	13	13	13	13	13	13
Thermal (nuclear)	0	0	0	0	0	0	0	0	0	0	0
Hydro (conventional)	40	39	39	39	39	39	39	39	39	39	39
Hydro (pumped storage)	0	0	0	0	0	0	0	0	0	0	0
Total installed	1,430	1,589	1,751	1,761	1,754	1,766	1,766	1,766	1,766	1,766	1,766
Firm Purchases and Sales (MW)											
FASNY firm purchases	805	805	805	805	805	758	758	758	758	758	758
Proposed short term purch.	200	200	200	200	200	200	200	200	200	200	200
Firm sales	0	0	0	0	0	0	0	0	0	0	0
Total Capability (MW)	2,435	2,594	2,756	2,766	2,759	2,724	2,724	2,724	2,724	2,724	2,724
Peak Load (MW)	2,034	2,017	1,975	1,819	1,733	1,597	1,710	1,680	1,750	1,700	1,790
Energy (Million kWh)	1,106	1,145	1,039	1,049	928	900	876	904	955	881	992
Scheduled Maintenance (MW)	0	16	16	145	305	305	185	185	307	307	140

407 133

TABLE 1.1-8 (Cont'd)

Year Month	1978 Nov	1978 Dec	1979 Jan	1979 Feb	1979 Mar	1979 Apr	1979 May	1979 June	1979 July	1979 Aug	1979 Sept
Installed Net Capacity (MW)											
Thermal (conventional)	1,714	1,714	1,714	1,714	1,714	1,714	1,714	1,714	1,714	1,714	1,714
Thermal (GT and diesel)	13	13	13	13	13	13	13	13	13	13	13
Thermal (nuclear)	0	0	0	0	0	0	0	0	0	0	0
Hydro (conventional)	39	39	39	39	39	39	39	39	39	39	39
Hydro (pumped storage)	0	0	0	0	0	0	0	0	0	0	0
Total installed	1,766	1,766	1,766	1,766	1,766	1,766	1,766	1,766	1,766	1,766	1,766
Firm Purchases and Sales (MW)											
PASNY firm purchases	767	767	767	767	767	767	725	725	725	725	725
Proposed short term purch.	100	100	100	100	100	100	100	100	100	100	100
Firm sales	0	0	0	0	0	0	0	0	0	0	0
Total Capability (MW)	2,633	2,633	2,633	2,633	2,633	2,633	2,591	2,591	2,591	2,591	2,591
Peak Load (MW)	2,000	2,120	2,200	2,150	1,950	1,780	1,620	1,770	1,740	1,820	1,780
Energy (Million kWh)	1,022	1,133	1,192	1,125	1,130	966	941	907	938	984	910
Scheduled Maintenance (MW)	95	0	0	220	325	325	170	170	140	95	305

407 134

TABLE 1.1-8 (Cont'd)

Year Month	1979 Oct	1979 Nov	1979 Dec	1980 Jan	1980 Feb	1980 Mar	1980 Apr	1980 May	1980 June	1980 July	1980 Aug
Installed Net Capacity (MW)											
Thermal (conventional)	1,714	1,714	1,714	1,714	1,714	1,714	1,714	1,714	1,714	1,714	1,714
Thermal (GT and diesel)	13	13	13	13	13	13	13	13	13	13	13
Thermal (nuclear)	0	0	0	0	0	0	0	0	0	0	0
Hydro (conventional)	39	39	39	39	39	39	39	39	39	39	39
Hydro (pumped storage)	0	0	0	0	0	0	0	0	0	0	0
Total installed	1,766	1,766	1,766	1,766	1,766	1,766	1,766	1,766	1,766	1,766	1,766
Firm Purchases and Sales (MW)											
PASNY firm purchases	725	762	762	762	762	762	762	724	724	724	724
Proposed short term purch.	100	200	200	200	200	200	200	1[illegible]0	100	100	100
Firm sales	0	0	0	0	0	0	0	0	0	0	0
Total Capability (MW)	2,591	2,728	2,728	2,728	2,728	2,728	2,728	2,590	2,590	2,590	2,590
Peak Load (MW)	1,850	2,080	2,210	2,290	2,250	2,050	1,870	1,680	1,840	1,810	1,890
Energy (Million kWh)	1,024	1,056	1,172	1,231	1,161	1,166	1,022	980	960	1,009	1,035
Scheduled Maintenance (MW)	307	0	0	20	55	55	80	325	145	25	40

TABLE 1.1-8 (Cont'd)

Year / Month	1980 Sept	1980 Oct	1980 Nov	1980 Dec
Installed Net Capacity (MW)				
Thermal (conventional)	1,714	1,714	1,714	1,714
Thermal (GT and diesel)	13	13	13	13
Thermal (nuclear)	0	0	0	0
Hydro (conventional)	39	39	39	39
Hydro (pumped storage)	0	0	0	0
Total installed	1,766	1,766	1,766	1,766
Firm Purchases and Sales (MW)				
PASNY firm purchases	724	724	756	756
Proposed short term purch.	100	100	350	350
Firm sales	0	0	0	0
Total Capability (MW)	2,590	2,590	2,872	2,872
Peak Load (MW)	1,850	1,940	2,190	2,330
Energy (Million kWh)	970	1,048	1,125	1,293
Scheduled Maintenance (MW)	40	305	305	0

407 136

TABLE 1.1-9

NYSE&G MONTHLY PEAK AND ENERGY LOADS FOR THE FIRST FULL YEAR OF COMMERCIAL OPERATION OF THE PROPOSED NUCLEAR UNITS

	NYSE&G 1 May 1, 1991		NYSE&G 2 May 1, 1993	
Month	Peak Loads (MW)	Energy Loads (GWh)	Peak Loads (MW)	Energy Loads (GWh)
May	2,840	1,702	3,130	1,880
June	3,110	1,610	3,420	1,753
July	3,060	1,725	3,370	1,905
August	3,200	1,748	3,520	1,905
September	3,130	1,656	3,440	1,803
October	3,460	1,817	3,830	2,007
November	3,950	2,024	4,370	2,235
December	4,330	2,392	4,790	2,667
January	4,480	2,396	4,950	2,660
February	4,400	2,202	4,860	2,447
March	4,010	2,250	4,430	2,474
April	3,500	1,912	3,870	2,102

407 137

TABLE 1.1-10

NYSE&G MONTHLY INTERRUPTABLE PEAK AND ENERGY LOADS
FOR THE FIRST FULL YEAR OF COMMERCIAL OPERATION
OF EITHER OF THE PROPOSED NUCLEAR UNITS

Month	Peak Load (MW)	Energy Load (MWh)
May	16	8,300
June	16	8,800
July	16	8,800
August	17	7,100
September	17	8,900
October	17	9,800
November	0	0
December	0	0
January	0	0
February	0	0
March	0	0
April	0	0

407 138

TABLE 1.1-11

NYSE&G MONTHLY FIRM POWER PEAK AND ENERGY PURCHASES FOR THE FIRST FULL YEAR OF COMMERCIAL OPERATION OF EITHER OF THE PROPOSED NUCLEAR UNITS

Month	Peak Purchases (MW)	Energy Purchases (MWh)
May	699	149,280
June	699	144,470
July	699	149,280
August	699	149,280
September	699	144,470
October	699	149,280
November	699	144,470
December	699	149,280
January	699	149,280
February	699	134,840
March	699	149,280
April	699	144,470

407 139

TABLE 1.1-12

NYSE&G SUMMER CAPACITY PEAK LOADS AND MARGINS

	1968	1969	1970	1971	1972
Installed Net Capability (MW)					
Thermal (conventional)	804	804	1,316	1,354	1,367
Thermal (GT and diesel)	10	10	13	13	13
Thermal (nuclear)	0	0	0	0	0
Hydro (conventional)	41	40	40	40	40
Hydro (pumped storage)	0	0	0	0	0
Undetermined additions	0	0	0	0	0
Total installed	855	854	1,369	1,407	1,420
List Purchases and Sales (MW)					
Firm purchases	611	611	611	604	597
Firm sales	0	0	432	458	45
Total Capability (MW)	1,466	1,465	1,548	1,553	1,972
Peak Load (MW)	1,107	1,182	1,276	1,343	1,424
Month of Seasonal Peak	Aug	July	Sept	June	Aug
Reserve					
Actual (MW)	359	283	272	210	548
Actual (%)	32.4	23.9	21.3	15.6	38.5
Contractual agreement (MW)*	133	142	153	161	171
Scheduled Maintenance (MW)	40	40	0	189	36
Annual Energy Requirements (Million kWh)	7,064	7,609	8,167	8,695	9,387
Load Factor Based On Annual Peak Load (%)	62.1	62.4	62.3	63.8	62.2

407 140

TABLE 1.1-12 (Cont'd)

	1973	1974	1975	1976	1977
Installed Net Capability (MW)					
Thermal (Conventional)	1,367	1,367	1,375	1,375	1,377
Thermal (GT and diesel)	13	13	13	13	13
Thermal (nuclear)	0	0	0	0	0
Hydro (conventional)	40	40	40	40	40
Hydro (pumped storage)	0	0	0	0	0
Undetermined additions	0	0	0	0	0
Total installed	1,420	1,420	1,428	1,428	1,430
List of Purchases and Sales (MW)					
Firm purchases	693	766	807	1,007	980
Firm sales	23	50	0	0	0
Total Capability (MW)	2,090	2,136	2,235	2,435	2,410
Peak Load (MW)	1,583	1,501	1,565	1,578	1,700
Month of Seasonal Peak	Sept	June	Aug	June	Aug
Reserve					
Actual (MW)	507	635	670	857	710
Actual (%)	32.0	42.3	42.8	54.3	41.8
Contractual Agreement (MW)*	190	180	422	426	459
Scheduled Maintenance (MW)	189	300	335	28	26
Annual Energy Requirements (Million kWh)	9,960	9,931	10,348	11,131	11,316
Load Factor Based On Annual Peak Load (%)	66.8	64.1	59.3	61.4	63.5

NOTE:

* Contractual Agreement MW is 12 percent of the peak load prior to 1975; 27 percent of the peak load 1975 and beyond

407 141

TABLE 1.1-13

NYSE&G WINTER CAPACITY PEAK LOADS AND MARGINS

	1968/69	1969/70	1970/71	1971/72	1972/73
Installed Net Capability (MW)					
Thermal (conventional)	804	1,316	1,316	1,354	1,367
Thermal (GT and diesel)	10	13	13	13	13
Thermal (nuclear)	0	0	0	0	0
Hydro (conventional)	41	40	40	40	40
Hydro (pumped storage)	0	0	0	0	0
Undetermined additions	0	0	0	0	0
Total installed	855	1,369	1,369	1,407	1,420
List purchases and sales (MW)					
Firm purchases	667	611	613	606	596
Firm sales	0	186	161	0	0
Total capability (MW)	1,522	1,794	1,821	2,013	2,016
Peak load (MW)	1,307	1,404	1,496	1,556	1,724
Month of seasonal peak	Dec	Dec	Dec	Dec	Jan/73
Reserve					
Actual (MW)	215	390	325	457	292
Actual (%)	16.4	27.8	21.7	29.4	16.9
Contractual agreement (MW) *	157	168	180	187	207
Scheduled maintenance (MW)	0	0	0	0	0
Annaul energy requirements (Million kWh)	7,130	7,679	8,167	8,695	9,387
Load factor based on annual** peak load (%)	62.3	62.4	62.3	63.8	62.2

TABLE 1.1-13 (Cont'd)

	1973/74	1974/75	1975/76	1976/77	1977/78
Installed Net Capability (MW)					
Thermal (conventional)	1,367	1,367	1,375	1,377	1,377
Thermal (GT and diesel)	13	13	13	13	13
Thermal (nuclear)	0	0	0	0	0
Hydro (conventional)	40	40	40	40	40
Hydro (pumped storage)	0	0	0	0	0
Undetermined additions	0	0	0	0	0
Total installed	1,420	1,420	1,428	1,430	1,430
List purchases and sales (MW)					
Firm purchases	792	756	914	1,146	1,005
Firm sales	50	0	0	0	0
Total Capability (MW)	2,162	2,176	2,342	2,576	2,435
Peak load (MW)	1,701	1,768	1,993	2,070	2,034
Month of seasonal peak	Dec	Jan/75	Jan/76	Dec	Dec
Reserve					
Actual (MW)	461	408	349	506	401
Actual (%)	27.1	23.1	17.5	24.4	19.7
Contractual agreement (MW) *	204	212	359	373	366
Scheduled maintenance (MW)	82	0	44	0	0
Annaul energy requirements (Million kWh)	9,960	9,931	10,348	11,131	11,316
Load factor based on annual** Peak load(%)	66.8	64.1	59.3	61.4	63.5

NOTES:

* Contractual agreement MW is 12 percent of the peak load prior to 1975 18 percent of the peak load 1975 and beyond

** Where annual peak load occurs during early part of next year, it is applied against energy requirements of previous year for load factor calculations

407 143

TABLE 1.1-14

NYSE&G SUMMER CAPACITY PEAK LOADS AND MARGINS*
WITH NYSE&G 1 & 2 NUCLEAR UNITS IN SERVICE

	1978	1979	1980	1981	1982	1983	1984	1985
Installed Net Capability (MW)								
Thermal (conventional)	1,714	1,714	1,714	1,714	1,714	1,714	2,564	2,564
Thermal (GT and diesel)	13	13	13	13	13	13	13	13
Thermal (nuclear)	0	0	0	0	0	0	194	194
Hydro (conventional)	39	39	39	39	39	39	39	39
Hydro (pumped storage)	0	0	0	0	0	0	0	0
Undetermined additions	0	0	0	0	0	0	0	0
Total installed	1,766	1,766	1,766	1,766	1,766	1,766	2,810	2,810
PASNY firm purchases	758	725	724	721	716	713	709	706
Purchase from CHG&E	200	100	100	100	200	150	0	0
Proposed short term purchases	0	0	0	0	0	0	0	0
Firm sales	0	0	0	0	0	0	0	0
Total Capability (MW)	2,724	2,591	2,590	2,587	2,6[illegible]2	2,629	3,519	3,516
Peak Load (MW)	1,750	1,820	1,890	1,990	2,090	2,200	2,310	2,420
Month of Seasonal Peak	Aug	Aug	Aug	Aug	Aug	Aug	Aug	Aug
Reserve								
Actual (MW)	974	771	700	597	592	429	1,209	1,096
Actual (%)	55.7	42.4	37.0	30.0	28.3	19.5	52.3	45.3
Contractual agreement (MW)	473	491	510	537	564	594	624	653
Scheduled Maintenance (MW)	307	95	40	40	40	40	40	40
Annual Energy Requirements (Million kWh)	11,900	12,300	13,000	13,700	14,500	15,300	16,100	16,900
Load Factor Based On Annual Peak Load (%)	61.7	61.3	61.3	60.6	60.4	60.2	59.9	59.4

107 149

TABLE 1.1-14 (Cont'd)

	1986	1987	1988	1989	1990	1991	1992	1993
Installed Net Capability (MW)								
Thermal (conventional)	2,564	2,564	2,564	2,564	2,564	2,564	2,564	2,564
Thermal (GT and diesel)	13	13	13	13	13	13	13	13
Thermal (nuclear)	194	194	769	769	1,344	1,969	1,969	2,594
Hydro (conventional)	39	39	39	39	39	39	39	39
Hydro (pumped storage)	0	0	0	0	0	0	0	0
Undetermined additions	0	0	0	0	0	0	0	0
Total installed	2,810	2,810	3,385	3,385	3,960	4,585	4,585	5,210
PASNY firm purchases	702	699	699	699	699	699	699	699
Purchase from CHG&E	0	0	0	0	0	0	0	0
Proposed short term purchases	0	0	0	0	0	0	0	0
Firm sales	0	0	0	0	0	0	0	0
Total Capability (MW)	3,512	3,509	4,084	4,084	4,659	5,284	5,284	5,909
Peak Load (MW)	2,540	2,670	2,800	2,930	3,060	3,200	3,360	3,520
Month of Seasonal Peak	Aug	Aug	Aug	Aug	Aug	Aug	Aug	Aug
Reserve								
Actual (MW)	972	839	1,284	1,154	1,599	2,084	1,924	2,389
Actual (%)	38.3	31.4	45.9	39.4	52.2	65.1	57.3	67.9
Contractual agreement (MW)	686	721	756	791	826	864	907	950
Scheduled Maintenance (MW)	40	40	40	40	40	40	40	40
Annual Energy Requirements (Million kWh)	17,800	18,800	19,800	20,800	21,900	23,000	24,200	25,400
Load Factor Based On Annual Peak Load (%)	59.1	59.1	58.9	58.6	58.7	58.6	58.7	58.6

TABLE 1.1-14 (Cont'd)

	1994	1995	1996	1997	1998
Installed Net Capability (MW)					
Thermal (conventional)	2,564	2,564	2,564	2,564	2,564
Thermal (GT and diesel)	13	13	13	13	13
Thermal (nuclear)	2,594	2,594	2,594	2,594	2,594
Hydro (conventional)	39	39	39	39	39
Hydro (pumpad storage)	0	0	0	0	0
Undetermined additions	0	0	0	0	0
Total installed	5,210	5,210	5,210	5,210	7,210
PASNY firm purchases	699	699	699	699	699
Purchase from CHG&E	0	0	0	0	0
Proposed short term purchases	0	0	0	0	0
Firm sales	0	0	0	0	0
Total Capability (MW)	5,909	5,909	5,909	5,909	5,909
Peak Load (MW)	3,680	3,840	4,000	4,180	4,360
Month of Seasonal Peak	Aug	Aug	Aug	Aug	Aug
Reserve					
Actual (MW)	2,229	2,069	1,909	1,729	1,549
Actual (%)	60.6	53.9	47.7	41.4	35.5
Contractual agreement (MW)	994	1,037	1,080	1,129	1,177
Scheduled Maintenance (MW)	40	40	40	40	40
Annual Energy Requirements (Million kWh)	26,600	27,800	29,100	30,500	31,900
Load Factor Based On Annual Peak Load (%)	58.5	58.4	58.4	58.5	58.5

NOTE:

* NYSE&G 1 May, 1991 (625 MW)
NYSE&G 2 May, 1993 (625 MW)

407 146

TABLE 1.1-15

NYSE&G WINTER CAPACITY PEAK LOADS AND MARGINS *
WITH NYSE&G 1 & 2 NUCLEAR UNITS IN SERVICE

	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86
Installed Net Capability (MW)								
Thermal (conventional)	1,714	1,714	1,714	1,714	1,714	2,564	2,564	2,564
Thermal (GT and diesel)	13	13	13	13	13	13	13	13
Thermal (nuclear)	0	0	0	0	0	196	196	196
Hydro (conventional)	39	39	39	39	39	39	39	39
Hydro (pumped storage)	0	0	0	0	0	0	0	0
Undetermined additions	0	0	0	0	0	0	0	0
Total installed	1,766	1,766	1,766	1,766	1,766	2,812	2,812	2,812
PASNY firm purchases	767	762	756	745	737	727	718	708
Purchase from CHG&E	100	100	300	200	200	0	0	0
Proposed short term purchases	0	100	50	142	0	0	0	0
Firm sales	0	0	0	0	0	0	0	0
Total Capability (MW)	2,633	2,728	2,872	2,853	2,703	3,539	3,530	3,520
Peak Load (MW)	2,200	2,290	2,420	2,580	2,740	2,900	3,070	3,250
Month of Seasonal Peak	Jan	Jan	Jan	Jan	Jan	Jan	Jan	Jan
Reserve								
Actual (MW)	433	438	452	273	-37	639	460	270
Actual (%)	19.7	19.1	18.7	10.6	-1.4	22.0	15.0	8.3
Contractual agreement (MW)	396	412	436	464	493	522	553	585
Scheduled Maintenance (MW)	0	0	0	0	0	0	0	0
Annual Energy Requirements (Million kWh)	11,900	12,300	13,000	13,700	14,500	15,300	16,100	16,900
Load Factor Based on Annual Peak load (%)	61.7	61.3	61.3	60.6	60.4	60.2	59.9	59.4

407 147

TABLE 1.1-15 (Cont'd)

	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94
Installed Net Capability (MW)								
Thermal (conventional)	2,564	2,564	2,564	2,564	2,564	2,564	2,564	2,564
Thermal (GT and diesel)	13	13	13	13	13	13	13	13
Thermal (nuclear)	196	196	771	771	1,346	1,971	1,971	2,596
Hydro (conventional)	39	39	39	39	39	39	39	39
Hydro (pumped storage)	0	0	0	0	0	0	0	0
Undetermined additions	0	0	0	0	0	0	0	0
Total installed	2,812	2,812	3,387	3,387	3,962	4,587	4,587	5,212
PASNY firm purchases	699	699	699	699	699	699	699	699
Purchase from CHG&E	0	0	0	0	0	0	0	0
Proposed short term purchases	0	0	0	0	0	0	0	0
Firm sales	0	0	0	0	0	0	0	0
Total Capability (MW)	3,511	3,511	4,086	4,086	4,661	5,286	5,286	5,911
Peak Load (MW)	3,440	3,630	3,840	4,050	4,260	4,480	4,710	4,950
Month of Seasonal Peak	Jan	Jan	Jan	Jan	Jan	Jan	Jan	Jan
Reserve								
Actual (MW)	71	-119	246	36	401	806	576	961
Actual (%)	2.1	-3.3	6.4	0.9	9.4	18.0	12.2	19.4
Contractual agreement (MW)	619	653	691	729	767	806	848	891
Scheduled Maintenance (MW)	0	0	0	0	0	0	0	0
Annual Energy Requirements (Million kWh)	17,800	18,800	19,800	20,800	21,900	23,000	24,200	25,400
Load Factor Based On Annual Peak load (%)	59.1	59.1	58.9	58.6	58.7	58.6	58.7	58.6

407 148

TABLE 1.1-15 (Cont'd)

	1994/95	1995/96	1996/97	1997/98	1998/99
Installed Net Capability (MW)					
Thermal (conventional)	2,564	2,564	2,564	2,564	2,564
Thermal (GT and diesel)	13	13	13	13	13
Thermal (nuclear)	2,596	2,596	2,596	2,596	2,596
Hydro (conventional)	39	39	39	39	39
Hydro (pumped storage)	0	0	0	0	0
Undetermined additions	0	0	0	0	0
Total installed	5,212	5,212	5,212	5,212	5,212
PASNY firm purchases	699	699	699	699	699
Purchase from CHG&E	0	0	0	0	0
Proposed short term purchases	0	0	0	0	0
Firm sales	0	0	0	0	0
Total Capability (MW)	5,911	5,911	5,911	5,911	5,911
Peak Load (MW)	5,190	5,430	5,690	5,950	6,220
Month of Seasonal Peak	Jan	Jan	Jan	Jan	Jan
Reserve					
Actual (MW)	721	481	221	-39	-309
Actual (%)	13.9	8.9	3.9	-0.7	-5.0
Contractual agreement (MW)	934	977	1,024	1,071	1,120
Scheduled Maintenance (MW)	0	0	0	0	0
Annual Energy Requirements (Million kWh)	26,600	27,800	29,100	30,500	31,900
Load Factor Based On Annual Peak load (%)	58.5	58.4	59.4	58.5	58.5

NOTES:

* NYSE&G 1 May, 1991 (625 MW)

NYSE&G 2 May, 1993 (625 MW)

407 147

TABLE 1.1-16

NEW YORK STATE ELECTRIC & GAS CORPORATION
GENERATING STATION CAPABILITY REPORT

Existing Units (MW)

Station	Unit No.	Installation Date	Type*	Fuel	Net 4-Hour Capability Rating (MW) Summer	Winter	Anticipated Capacity Factor Range
Goudey	7	Jan 1944	TI	Coal	44	44	30 - 65%
Goudey	8	Dec 1951	TB	Coal	82	82	65 - 75%
Greenidge	1	May 1938	TI	Coal	19	19	30 - 65%
Greenidge	2	Sept 1942	TI	Coal	23	23	30 - 65%
Greenidge	3	June 1950	TI	Coal	55	55	30 - 65%
Greenidge	4	Dec 1953	TB	Coal	103	103	65 - 75%
Hickling	1	Dec 1948	TI	Coal	36	36	30 - 65%
Hickling	2	July 1952	TI	Coal	50	50	30 - 65%
Jennison	1	Nov 1945	TI	Coal	35	35	30 - 65%
Jennison	2	Aug 1950	TI	Coal	40	40	30 - 65%
Milliken	1	Oct 1955	TB	Coal	143	143	65 - 75%
Milliken	2	Oct 1958	TB	Coal	147	147	65 - 75%
Homer City**	1	July 1969	TB	Coal	305	305	65 - 75%
Homer City**	2	Dec 1969	TB	Coal	307	307	65 - 75%
Homer City**	3	Dec 1977	TB	Coal	325	325	65 - 75%
Misc. Hydro	9 Units	- -	H	- -	39	39	65 - 75%
Misc. Diesels	5 Units	- -	D	Oil	13	13	0 - 30%
		Total Installed Capability			1,766	1,766	

NOTES:

* TB = Thermal Base
TI = Thermal Intermediate
TP = Thermal Peaking
H = Hydro
D = Diesel

** NYSE&G share (50 percent) of NYSE&G/PENELEC Unit

TABLE 1.1-17

NEW YORK STATE ELECTRIC & GAS CORPORATION
GENERATING STATION CAPABILITY REPORT

Proposed Additional Units (MW)

Station	Unit No.	Effective Date	Type*	Fuel	Expected Net Capability Addition Summer	Expected Net Capability Addition Winter	Anticipated Capacity Factor Range
Nine Mile Point**	2	Nov/83	N	Nuclear	194 MW	196 MW	65 - 75%
Somerset****	-	Nov/83	TB	Coal	850 MW	850 MW	65 - 75%
Jamesport***, ****	1	May/88	N	Nuclear	575 MW	575 MW	65 - 75%
Jamesport***, ****	2	May/90	N	Nuclear	575 MW	575 MW	65 - 75%
NYSE&G***, ****	1	May/91	N	Nuclear	625 MW	625 MW	65 - 75%
NYSE&G***, ****	2	May/93	N	Nuclear	625 MW	625 MW	65 - 75%

NOTES:

* TB = Thermal Base Load
N = Nuclear Base Load

** NYSE&G Share (18 percent) of joint NYSE&G/NMPC/LILCO/CHG&E/PG&E Unit

*** NYSE&G share (50 percent) of joint NYSE&G/LILCO Units

**** Article VIII Certification or NRC Construction Permit has yet to be granted

TABLE 1.1-18

NEW YORK STATE ELECTRIC & GAS CORPORATION
GENERATING STATION CAPABILITY REPORT

Units to be Retired (MW)

Station	Unit No.	Effective Date	Type	Fuel	Net 4-Hour Capability Rating Summer	Net 4-Hour Capability Rating Winter

NO STATION RETIREMENTS CONTEMPLATED AT THIS TIME

407 152

15

TABLE 1.1-19

NEW YORK STATE ELECTRIC & GAS CORPORATION

1977 HOURLY LOADS FOR
SUMMER AND WINTER PEAK LOAD DAYS

	Loads (MW)	
Hour	Summer August 29	Winter December 12
0100	1,058	1,410
0200	1,055	1,359
0300	983	1,328
0400	952	1,321
0500	961	1,345
0600	985	1,397
0700	1,085	1,593
0800	1,269	1,798
0900	1,442	1,877
1000	1,556	1,929
1100	1,656	1,927
1200	1,699	1,920
1300	1,693	1,867
1400	1,700	1,848
1500	1,684	1,828
1600	1,656	1,837
1700	1,648	1,939
1800	1,621	2,034
1900	1,569	2,012
2000	1,540	1,963
2100	1,585	1,876
2200	1,514	1,771
2300	1,388	1,611
2400	1,253	1,454

TABLE 1.1-20

NEW YORK POWER POOL HISTORICAL
PEAK LOADS AND ENERGY REQUIREMENTS

Year	Peak Load (MW) Summer	Peak Load (MW) Winter	Annual Energy Requirements (million kWh)
1968	15,499	15,211	86,354
1969	16,716	16,028	92,765
1970	17,037	16,675	97,160
1971	18,146	16,774	100,217
1972	18,943	17,709	105,114
1973	20,408	17,313	110,748
1974	19,589	17,429	107,992
1975	20,001	18,181	107,664
1976	19,262	19,065	112,000
1977	21,214	18,921	114,427

407 154

TABLE 1.1-21

NEW YORK STATE INTERCONNECTED SYSTEMS
HISTORICAL FIRM POWER PURCHASES AND SALES
AT THE TIME OF EACH CAPABILITY PERIOD PEAK DEMAND

	Summer (MW)		Winter (MW)	
Year	Purchases	Sales	Purchases	Sales
1968	90	150	340	150
1969	90	150	265	361
1970	777	632	81	361
1971	523	423	86	150
1972	390	150	322	150
1973	704	150	80	150
1974	67	150	143	150
1975	66	150	371	150
1976	279	150	38	150
1977	361	150	195	150

TABLE 1.1-22

NEW YORK STATE INTERCONNECTED SYSTEMS*,**
CAPABILITY, PEAK LOAD, AND RESERVES - SUMMER 1978 TO 1998

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Installed Net Capability (MW)											
Thermal (oil fired)	14,087	14,092	14,989	14,862	14,812	14,779	14,710	14,460	14,210	13,960	13,[illegible]10
Thermal (coal fired)	3,583	3,583	3,583	3,574	3,569	3,551	4,376	5,026	4,976	4,926	5,726
Thermal (other)	0	32	32	32	32	32	32	32	32	32	32
Thermal (gas turbines)	3,619	3,662	3,724	3,765	3,765	3,765	3,765	3,765	3,765	3,765	3,765
Thermal (diesel)	73	73	73	73	73	73	73	73	73	73	73
Thermal (nuclear)	3,694	3,715	3,792	4,580	4,561	4,548	5,628	5,628	6,745	7,945	9,222
Hydro (conventional)	4,036	4,036	4,036	4,036	4,036	4,046	4,055	4,057	4,130	4,168	4,176
Hydro (pump storage)	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Total Controlled Sources	30,092	30,193	31,229	31,922	31,848	31,	33,639	34,041	34,931	35,869	37,704
Allowance for Deratings	640	650	660	670	680	690	700	720	740	760	780
Capacity Purchases	309	804	800	800	800	800	800	800	800	800	800
Capacity Sales	150	150	150	150	150	150	150	150	150	150	150
Total Capability	29,611	30,197	31,219	31,902	31,818	31,754	33,589	33,971	34,841	35,759	37,574
Coincident Peak Load	21,210	21,690	22,200	22,770	23,400	24,050	24,750	25,5[illegible]0	26,260	27,120	27,940
Month of Seasonal Peak	July/ Aug	July/ Aug	July/ Aug	July/ Aug	July/ Aug	July/ Aug	July/ Aug	July/ Aug	July/ Aug	July/ Aug	July/ Aug
Reserve											
Actual (MW)	8,401	8,507	9,019	9,132	8,418	7,704	8,839	8,461	8,581	8,539	9,634
Actual (%)	39.6	39.2	40.6	40.1	36.0	32.0	35.[illegible]	33.2	32.7	31.9	34.5
Required (MW)	4,878	4,989	5,106	5,237	5,382	5,532	5,[illegible]92	5,867	6,040	6,238	6,426
Scheduled Maintenance (MW)	1,400	700	800	800	900	900	900	900	900	900	900
Annual Energy Requirements (Million kWh)	116,635	119,179	122,370	125,715	129,609	133,493	137,861	142,334	147,094	152,484	157,764
Load Factor Based On Annual (Peak load (%)	62.8	62.7	62.9	63.0	63.2	63.4	63.6	63.7	63.9	64.2	64.4

407 156

TABLE 1.1-22 (Cont'd)

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Installed Net Capability (MW)										
Thermal (oil fired)	13,460	13,210	12,960	12,710	12,485	12,260	12,305	11,810	11,565	11,360
Thermal (coal fired)	5,676	6,476	6,426	6,376	6,301	6,226	6,151	6,076	6,002	5,926
Thermal (other)	32	32	32	32	32	32	32	32	32	32
Thermal (gas turbines)	3,765	3,765	3,765	3,765	3,765	3,765	3,765	3,765	3,765	3,765
Thermal (diesel)	73	73	73	73	73	73	73	73	73	73
Thermal (nuclear)	9,222	10,339	11,589	11,589	12,839	14,101	15,353	16,625	16,625	16,625
Hydro (conventional)	4,176	4,178	4,180	4,191	4,216	4,241	4,241	4,241	4,241	4,241
Hydro (pump storage)	2,000	2,000	2,000	3,000	4,000	4,000	4,000	4,000	4,000	4,000
Total Controlled Sources	38,404	40,073	41,025	41,736	43,711	44,698	45,660	46,622	46,322	46,022
Allowance for Deratings	800	820	840	860	880	910	940	970	1,000	1,030
Capacity Purchases	809	800	800	800	800	800	800	800	800	800
Capacity Sales	150	150	150	150	150	150	150	150	150	150
Total Capability	38,254	39,903	40,835	41,526	43,481	44,438	45,370	46,302	45,972	45,682
Coincident Peak Load	28,740	29,580	30,380	31,210	32,050	32,910	33,760	34,660	35,590	36,530
Month of Seasonal Peak	July/ Aug	July/ Aug	July/ Aug	July/ Aug	July/ Aug	July/ Aug	July/ Aug	July/ Aug	July/ Aug	July/ Aug
Reserve										
Actual (MW)	9,514	10,323	10,455	10,316	11,431	11,528	11,610	11,642	10,382	9,112
Actual (%)	33.1	34.9	34.4	33.1	35.7	35.0	34.4	33.6	29.2	24.9
Required (MW)	6,610	6,803	6,987	7,178	7,372	7,569	7,765	7,972	8,186	8,402
Scheduled Maintenance (MW)	900	900	900	900	900	900	900	900	900	900
Annual Energy Requirements (Million kWh)	162,907	168,271	173,427	179,000	184,113	189,885	195,562	201,600	207,455	213,602
Load Factor Based On Annual Peak Load (%)	64.7	64.9	65.2	65.2	65.6	65.9	66.1	66.4	66.5	66.8

NOTE:

* This table includes capacity from generation units for which New York State Certification or NRC Construction Licenses have not been granted. This table represents the target date schedule for new generation.

SOURCE:

**1978 Report of Member Electric Systems of the New York Pool and the Empire State Electric Energy Research Corporation pursuant to Article VIII, Section 149-b of the Public Service Law(2) .

407 157

TABLE 1.1-23

NEW YORK STATE INTERCONNECTED SYSTEMS*
CAPABILITY, PEAK LOAD, AND RESERVES - WINTER 1978/79 - 1998/99

Installed Net Capability (MW)	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89
Thermal (oil fired)	14,213	15,110	15,125	15,064	15,054	15,047	14,978	14,728	14,470	14,228	13,978
Thermal (coal fired)	3,583	3,583	3,583	3,481	3,480	4,409	5,109	5,059	5,009	5,809	5.759
Thermal (other)	35	35	35	35	35	35	35	35	35	35	35
Thermal (gas turbines)	4,655	4,691	4,784	4,784	4,784	4,784	4,784	4,784	4,784	4,784	4,784
Thermal (diesel)	73	73	73	73	73	73	73	73	73	73	73
Thermal (nuclear)	3,730	3,730	4,627	4,621	4,617	5,704	5,704	5,704	8,047	8,047	9,350
Hydro (conventional)	4,040	4,040	4,040	4,040	4,050	4.059	4,061	4,134	4,172	4,180	4,180
Hydro (pump storage)	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	2,000
Total Controlled Sources	31,329	32,262	33,267	33,198	33,193	35,111	35,744	35,517	37,598	38,156	40,159
Allowance For Deteratings	644	654	664	675	685	695	705	725	745	765	785
Capacity Purchases	0	0	147	142	0	0	0	0	0	0	0
Capacity Sales	150	150	150	150	150	150	150	150	150	150	150
Total Capability	30,535	31,458	32,600	32,515	32,358	34,266	34,889	34,642	36,703	37,241	39,224
Coincident Peak Load	19,740	20,220	20,730	21,370	22,030	22,690	23,530	24,290	25,170	25,990	26,840
Month of Seasonal Peak	Dec	Dec	Dec	Dec	Dec	Dec	Dec	Dec	Dec	Dec	Dec
Reserve											
Actual (MW)	10,795	11,238	11,870	11,145	10,328	11,576	11,359	10,352	11,533	11,251	12,384
Actual (%)	54.7	55.6	57.3	52.2	46.9	51.0	48.3	42.6	45.8	43.3	46.1
Required (MW)	4,540	4,651	4.768	4,915	5,067	5,219	5,412	5,587	5,789	5,978	6,173
Scheduled Maintenance (MW)	1,800	1,800	1,900	1,900	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Annual Energy Requirements (Million kWh)	116,635	119,179	122,370	125,715	129,609	133,493	137,861	142,334	147,094	152,484	157,764
Load Factor Based On Annual Peak Load (%)	62.8	62.7	62.9	63.0	63.2	63.4	63.6	63.7	63.9	64.2	64.4

TABLE 1.1-23 (Cont'd)

Installed Net Capability (MW)	Year 1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1996/97	1997/98	1998/99	
Thermal (oil fired)	13,728	13,478	13,228	12,978	12,753	12,528	12,303	12,078	11,853	11,628
Thermal (coal fired)	6,559	6,509	6,459	6,409	6,334	6,259	6,184	6,109	6,034	5,959
Thermal (other)	35	35	35	35	35	35	35	35	35	35
Thermal (gas turbines)	4,784	4,784	4,784	4,784	4,784	4,784	4,784	4,784	4,784	4,784
Thermal (diesel)	73	73	73	73	73	73	73	73	73	73
Thermal (nuclear)	9,350	10,493	11,743	11,743	12,993	14,285	15,577	16,869	16,869	16,869
Hydro (conventional)	4,182	4,184	4,195	4,220	4,245	4,245	4,245	4,245	4,245	4,245
Hydro (pump storage)	2,000	2,000	2,000	3,000	4,000	4,000	4,000	4,000	4,000	4,000
Total Controlled Sources	40,711	41,556	42,517	43,242	45,217	46,209	47,201	48,193	47,893	47,593
Allowance For Deratings	805	826	846	866	886	916	946	977	1,007	1,037
Capacity Purchases	0	0	0	0	0	0	0	0	0	0
Capacity Sales	150	150	150	150	150	150	150	150	150	150
Total Capability	39,756	40,580	41,521	42,226	44,181	45,143	46,105	47,066	46,736	46,406
Coincident Peak Load	27,730	28,620	29,500	30,420	31,350	32,300	33,270	34,280	35,290	36,330
Month of Seasonal Peak	Dec	Dec	Dec	Dec	Dec	Dec	Dec	Dec	Dec	Dec
Reserve										
Actual (MW)	12,026	11,960	12,021	11,806	12,331	12,843	12,835	12,786	11,446	10,076
Actual (%)	43.4	41.8	40.7	38.8	40.9	39.8	38.6	37.3	32.4	27.7
Required (MW)	6,378	6,583	6,785	6,997	7,210	7,429	7,652	7,884	8,117	8,356
Scheduled Maintenance (MW)	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Annual Energy Requirements (million kWh)	162,907	168,271	173,427	179,000	184,113	189,885	195,562	201,600	207,455	213,602
Load Factor Based On Annual Peak Load (%)	64.7	64.9	65.2	65.5	65.6	65.9	66.1	66.4	66.5	66.8

NOTE:

* This table includes capacity from generation units for which New York State Certification or NRC Construction Licenses have not been granted. This table represents the target date schedule for new generation.

SOURCE:

1978 Report of Member Electric Systems of the New York Power Pool and the Empire State Electric Energy Research Corporation pursuant to Article VIII, Section 149-b of the Public Service Law(2).

407 159

TABLE 1.1-24

NEW YORK POWER POOL MEMBER SYSTEMS
SCHEDULE OF GENERATING CAPACITY ADDITIONS

Unit	Summer Capability	Target Commercial Date	Delayed Service Date	Applications Filing Date	Const Start Date
Con Edison GT Upr*	175	1978-80	1978-80	-	-
Con Edison Fos. Upr*	103	1979-80	1979-80	-	-
Oswego 6 Fos.	850	11/79	11/80	-	5/73
Indian Pt. 3 Upr	68	5/80	5/80	-	-
Indian Pt. 2 Upr	9	5/80	5/80	-	-
Shoreham Nuc.	820	9/80	5/81	5/68	8/70
Nine Mile Pt. 2 Nuc.	1,080	11/83	11/84	6/72	6/75
Somerset Fos.	850	11/83	11/85	7/74	6/79
700 MW Fos.	700	11/84	11/86	12/74	Fall/79
Sterling Nuc.	1,150	5/86	5/88	2/75	Fall/78
Greene Co. Nuc.	1,200	7/86	7/88	4/75	7/79
Lake Erie 1 Fos.	850	11/87	11/89	3/76	Fall/82
Indian Pt. 2 Upr	160	5/88	5/88	-	-
Jamesport 1 Nuc.	1150	5/88	5/90	4/74	Spring/81
Prattsville PS	1,000	6/88	6/90	3/73	Spring/81
Lake Erie 2 Fos.	850	11/89	11/91	3/76	Fall/82
Jamesport 2 Nuc.	1,150	5/90	2	4/74	Spring/81
NYSEG 1 Nuc.	1,250	5/91	5/93	/78	1983
Cornwall 1-4 PS	1,000	5/92	5/94	1/63	4/74*
NYSEG 2 Nuc.	1,250	5/93	5/95	/78	1983
Cornwall 5-8 PS	1,000	5/93	5/95	1/63	4/74*
Mid-Hudson 1	1,300	5/94	5/96	UND	UND
Nine Mile Pt. 3 Nuc.	1,300	5/95	5/97	UND	UND
Mid-Hudson 2	1,300	5/96	5/98	UND	UND

407 168

TABLE 1.1-24 (Cont'd)

NMPC Hydro Capacity (MW) Additions

Year (Nov.)	Capacity (MW)
1983	10
1984	9
1985	2
1986	73
1987	38
1988	8
1989	0
1990	2
1991	2
1992	11
1993	25
1994	25

NOTES:

* Construction suspended in July 1974 pending outcome of hearings on Hudson River fisheries

GT = Gas Turbine
Fos. = Fossil
Nuc. = Nuclear
PS = Pumped Storage Hydro
UND = Undetermined
Upr = Uprating

407 161

TABLE 1.1-25

NEW YORK STATE INTERCONNECTED SYSTEMS MONTHLY PEAK AND ENERGY LOADS FOR THE FIRST FULL YEAR OF COMMERCIAL OPERATION OF THE PROPOSED NUCLEAR UNITS

	NYSE&G 1 May 1, 1991		NYSE&G 2 May 1, 1993	
Month	Peak Loads (MW)	Energy Loads (GWh)	Peak Loads (MW)	Energy Loads (GWh)
May	24,486	13,241	25,832	14,116
June	28,284	13,613	29,839	14,325
July	30,380	15,330	32,050	16,285
August	29,651	15,694	31,281	16,640
September	27,494	13,804	29,005	14,360
October	23,879	13,528	25,191	14,574
November	27,730	14,714	29,469	15,590
December	29,500	15,825	31,350	16,740
January	29,205	16,010	31,036	17,165
February	28,143	14,443	29,908	15,367
March	26,845	15,473	28,528	16,304
April	26,255	13,760	27,901	14,735

407 162

TABLE 1.1-26

LONG ISLAND LIGHTING COMPANY
HISTORICAL
MONTHLY REQUIREMENTS
(GWH)

Month	1972	1973	1974	1975	1976	1977	1978
January		1,105	1,046	1,110	1,201	1,257	1,212
February		995	951	989	1,003	1,046	1,077
March		1,043	1,000	1,058	1,079	1,072	1,125
April		960	936	966	989	981	
May		986	972	1,011	978	1,036	
June		1,152	1,042	1,088	1,175	1,104	
July		1,315	1,294	1,308	1,231	1,346	
August		1,405	1,312	1,302	1,258	1,344	
September		1,137	1,055	1,013	1,060	1,124	
October	978	1,038	1,003	1,018	1,040	1,042	
November	1,009	998	1,008	1,002	1,065	1,059	
December	1,092	1,024	1,095	1,148	1,210	1,193	

407 163

TABLE 1.1-27

LILCO
HISTORICAL
HOURLY LOAD TABULATION

Hour Ending	Summer Peak Day	Winter Peak Day
Date:	7-21-77	12-12-77
0100	2,070	1,432
0200	1,898	1,352
0300	1,789	1,316
0400	1,723	1,310
0500	1,675	1,310
0600	1,656	1,370
0700	1,703	1,580
0800	1,937	1,822
0900	2,260	1,948
1000	2,572	2,051
1100	2,790	2,104
1200	2,915	2,107
1300	2,969	2,088
1400	3,027	2,081
1500	3,049	2,074
1600	3,063	2,082
1700	3,107	2,183
1800	3,068	2,456
1900	2,990	2,402
2000	2,884	2,308
2100	2,907	2,210
2200	2,851	2,069
2300	2,644	1,888
2400	2,360	1,613

407 164

TABLE 1.1-28

LONG ISLAND LIGHTING COMPANY
ELECTRIC SYSTEM
FORECASTED PEAK LOADS, ENERGY REQUIREMENTS AND LOAD FACTORS

	1973			1979			1980			1981			1982		
Month	Req. (MMwh)	Peak Load (Mw)	Load Factor (%)	Req. (MMwh)	Peak Load (Mw)	Load Factor (%)	Req. (MMwh)	Peak Load (Mw)	Load Factor (%)	Req. (MMwh)	Peak Load (Mw)	Load Factor (%)	Req. (MMwh)	Peak Load (Mw)	Load Factor (%)
January	1,306	2,360	68.69	1,253	2,445	68.88	1,289	2,510	69.02	1,337	2,600	69.12	1,394	2,730	68.63
Feburary	1,066	2,305	68.82	1,105	2,390	68.80	1,181	2,470	68.70	1,184	2,565	68.69	1,241	2,680	68.91
March	1,129	2,065	73.49	1,164	2,125	73.62	1,192	2,195	72.99	1,244	2,280	73.34	1,310	2,385	73.83
April	1,011	1,935	72.57	1,041	2,020	71.58	1,077	2,080	71.92	1,121	2,165	71.91	1,174	2,260	72.15
May	1,038	2,020	69.07	1,066	2,070	69.22	1,093	2,130	68.97	1,131	2,225	68.32	1,185	2,335	68.21
June	1,170	2,490	65.26	1,197	2,555	65.07	1,229	2,630	64.90	1,286	2,725	65.55	1,347	2,860	65.41
July	1,343	3,030	59.57	1,378	3,140	58.99	1,426	3,260	58.79	1,483	3,380	58.97	1,549	3,500	59.49
August	1,375	3,030	60.99	1,402	3,140	60.01	1,431	3,260	59.00	1,489	3,380	59.21	1,565	3,500	60.10
September	1,120	2,265	68.68	1,140	2,320	68.25	1,184	2,385	68.95	1,232	2,480	69.00	1,290	2,600	68.91
October	1,077	2,070	71.66	1,114	2,075	72.16	1,147	2,140	72.04	1,193	2,235	71.74	1,244	2,345	71.30
November	1,084	2,280	66.03	1,116	2,360	65.68	1,139	2,425	65.23	1,185	2,515	65.44	1,248	2,625	66.03
December	1,211	2,530	64.34	1,254	2,600	64.83	1,302	2,670	65.54	1,355	2,760	65.99	1,413	2,850	66.64
Annual	13,830	3,030	52.10	14,230	3,140	51.73	14,690	3,2[illegible]	[illegible]1.30	15,240	3,380	51.47	15,960	3,500	52.05

TABLE 1.1-29

NYSE&G - HISTORICAL WINTER PEAK LOADS AND ENERGY REQUIREMENTS
(Millions of Kilowatt Hours

Year	Winter Peak Load (MW)	Residential Heating	Residential Nonheating	Commercial	Industrial	Street and Highway Lighting	Sales For Resale	Company Requirements	Total
1965	1,055	29	1,896	1,485	1,548	79	13	600	5,650
1966	1,150	46	2,005	1,628	1,737	82	14	636	6,148
1967	1,220	73	2,144	1,784	1,770	85	17	690	6,563
1968	1,307	109	2,302	1,967	1,867	88	19	778	7,130
1969	1,404	157	2,464	2,151	1,974	91	21	821	7,679
1970	1,496	221	2,642	2,349	1,977	95	23	860	8,167
1971	1,556	290	2,780	2,520	2,045	98	23	939	8,695
1972	1,724	379	2,941	2,784	2,192	100	25	966	9,387
1973	1,701	448	3,046	3,073	2,352	102	26	913	9,960
1974	1,768	554	3,025	3,076	2,240	108	26	902	9,931
1975	1,993	649	3,144	3,238	2,221	110	25	961	10,348
1976	2,070	803	3,219	3,372	2,369	111	26	1,231	11,131

AVERAGE NUMBER OF CUSTOMERS (in Thousands)

Year	Residential Heating	Residential Nonheating	Commercial	Industrial	Other	Total
1965	1.9	443.2	60.8	1.3	0.7	507.9
1966	2.3	452.4	61.9	1.3	0.7	518.6
1967	3.4	461.3	62.7	1.3	0.8	529.5
1968	4.9	467.9	63.1	1.2	0.7	537.8
1969	6.7	476.5	63.9	1.2	0.8	549.1
1970	8.9	485.3	64.6	1.2	0.8	560.8
1971	11.5	494.0	65.7	1.2	0.8	573.2
1972	14.8	503.0	66.9	1.2	0.8	586.7
1973	18.8	511.7	68.2	1.2	0.6	600.7
1974	23.6	516.9	69.2	1.2	0.8	611.7
1975	28.4	520.0	70.0	1.2	0.8	620.4
1976	33.5	522.7	70.8	1.3	0.8	629.2

407 166

TABLE 1.1-29 (Cont'd)

NYSE&G - FORECAST OF ANNUAL ENERGY REQUIREMENTS BY CUSTOMER CLASSIFICATION
(Millions of Kilowatt Hours)

Year	Residential Heating	Residential Nonheating	Commercial	Industrial	Street and Highway Lighting	Sales for Resale	Company Requirements	Total	Load Factor(%)
1977	888	3,247	3,430	2,525	110	27	1,073	11,300	61.7
1978	1,027	3,292	3,599	2,676	107	15	1,184	11,900	61.7
1979	1,144	3,332	3,728	2,797	107	9	1,183	12,300	61.3
1980	1,292	3,561	3,922	2,869	112	9	1,235	13,000	61.3
1981	1,399	3,710	4,125	3,038	118	10	1,300	13,700	60.6
1982	1,517	3,865	4,430	3,177	123	10	1,378	14,500	60.4
1983	1,643	4,027	4,762	3,274	129	11	1,454	15,300	60.2
1984	1,780	4,196	5,089	3,359	135	11	1,530	16,100	59.9
1985	1,929	4,371	5,328	3,513	142	12	1,605	16,900	59.4
1986	2,090	4,554	5,642	3,661	149	13	1,691	17,800	59.1
1987	2,265	4,745	6,021	3,814	156	13	1,786	18,800	59.1
1988	2,454	4,943	6,368	3,977	163	14	1,881	19,800	58.9
1989	2,658	5,150	6,688	4,142	171	15	1,976	20,800	58.6
1990	2,880	5,366	7,068	4,311	179	15	2,081	21,900	58.7
1991	3,121	5,590	7,421	4,479	188	16	2,185	23,000	58.6
1992	3,382	5,824	7,827	4,654	197	17	2,299	24,200	58.7
1993	3,664	6,068	8,196	4,835	206	18	2,413	25,400	58.6
1994	3,970	6,322	8,522	5,024	216	19	2,527	26,600	58.5
1995	4,301	6,587	8,804	5,220	227	20	2,641	27,800	58.4
1996	4,660	6,862	9,131	5,424	237	21	2,765	29,100	58.4
1997	5,049	7,149	9,497	5,636	249	22	2,898	30,500	58.5
1998	5,471	7,449	9,808	5,857	261	23	3,031	31,900	58.5

407 167

TABLE 1.1-30

NEW YORK STATE ELECTRIC & GAS PEAK LOADS
(MW)

Summer (June-September)			Winter		
1976	1,578*	Actual	1976/77	2,070	Actual
1977	1,681	Actual	1977/78	2,034	Actual
1978	1,750	Est.	1978/79	2,200	Est.
1979	1,820	Est.	1979/80	2,290	Est.
1980	1,890	Est.	1980/81	2,420	Est.
1981	1,990	Est.	1981/82	2,580	Est.
1982	2,090	Est.	1982/83	2,740	Est.
1983	2,200	Est.	1983/84	2,900	Est.
1984	2,310	Est.	1984/85	3,070	Est.
1985	2,420	Est.	1985/86	3,250	Est.
1986	2,540	Est.	1986/87	3,440	Est.
1987	2,670	Est.	1987/88	3,630	Est.
1988	2,800	Est.	1988/89	3,840	Est.
1989	2,930	Est.	1989/90	4,050	Est.
1990	3,060	Est.	1990/91	4,260	Est.
1991	3,200	Est.	1991/92	4,480	Est.
1992	3,360	Est.	1992/93	4,710	Est.
1993	3,520	Est.	1993/94	4,950	Est.
1994	3,680	Est.	1994/95	5,190	Est.
1995	3,840	Est.	1995/96	5,430	Est.
1996	4,000	Est.	1996/97	5,690	Est.
1997	4,180	Est.	1997/98	5,950	Est.
1998	4,360	Est.	1998/99	6,220	Est.

NOTE:

* Highest warm weather (air conditioning) peak; the highest demand during the entire summer capability period (May-October) was a cold weather (space heat) peak.

407 168

TABLE 1.1-31

NYSE&G ELECTRIC ENERGY SALES
(Annual Growth Rates
Historic vs. Forecast)

	Residential Class	Commercial Class	Industrial Class	Total Sales
Historic Growth (1954-1976)	6.8%	8.1%	4.4%	6.4%
Forecast (1976-1998)	5.4%	5.0%	4.2%	5.0%

TABLE 1.1-32

NYSE&G - ACTUAL AND TEMPERATURE ADJUSTED WINTER PEAKS

	Actual			Adjusted		
Winter	Demand (MW)	Growth	Month	Demand (MW)	Growth	Month
1968/69	1,307	--	Dec	1,289	--	Dec
1969/70	1,404	7.4%	Dec	1,403	8.8%	Dec
1970/71	1,496	6.6%	Dec	1,485	5.8%	Dec
1971/72	1,556	4.0%	Dec	1,606	8.1%	Dec
1972/73	1,724	10.8%	Jan	1,721	7.2%	Dec
1973/74	1,701	-1.3%	Dec	1,681*	-2.3%	Jan
1974/75	1,768	3.9%	Jan	1,781	5.9%	Jan
1975/76	1,993	12.7%	Jan	1,927	8.2%	Jan
1976/77	2,070	3.9%	Dec	2,023	5.0%	Jan
1977/78	2,034	-1.7%	Dec	2,042	0.9%	Jan

NOTE:

* Includes 79 MW adjustment from daylight savings time to eastern standard time.

TABLE 1.1-33

NYSE&G - ACTUAL AND TEMPERATURE
ADJUSTED SUMMER PEAKS
(May-September)

Summer	Actual Demand (MW)	Actual Growth	Adjusted Demand (MW)	Adjusted Growth
1969	1,182	--	1,197	--
1970	1,277	8.0%	1,277	6.7%
1971	1,343	5.2%	1,370	7.3%
1972	1,424	6.0%	1,442	5.3%
1973	1,585	11.3%	1,558	8.0%
1974	1,501	-5.3%	1,493	-4.2%
1975	1,565	4.3%	1,576	5.6%
1976	1,578	0.8%	1,635	3.7%
1977	1,700	7.7%	1,681	2.8%

TABLE 1.1-34

NYSE&G - DEMOGRAPHIC ASSUMPTIONS

Year	Service Area Population*	Service Area Households**	Total Residential Customers	Gross National Product*** (Billions 1977 $)	Annual GNP Growth Over Previous Year (%)
1975	1,639,919	504,224	556,620(Actual)	1,700.7	--
1976			564,499(Actual)	1,803.3	6.03
1977			571,800(Est)	1,897.0	5.20
1978			579,600	1,995.5	5.40
1979			587,400	2,091.5	4.60
1980	1,716,710	558,832	596,400	2,133.0	1.98
1981			606,400	2,229.0	4.50
1982			617,400	2,307.0	3.50
1983			629,400	2,361.0	2.34
1984			641,400	2,408.0	1.99
1985	1,817,797	619,916	653,400	2,492.0	3.49
1986			664,400	2,572.0	3.21
1987			675,400	2,654.0	3.19
1988			686,400	2,741.0	3.28
1989			697,400	2,828.0	3.17
1990	1,888,979	665,098	708,400	2,916.0	3.11
1991			718,400	3,003.0	2.98
1992			728,400	3,093.0	2.99
1993			738,400	3,185.0	2.97
1994			748,400	3,280.0	2.98
1995	1,955,404	705,721	758,400	3,378.0	2.99
1996			768,400	3,479.0	2.99
1997			778,400	3,583.0	2.99
1998			788,400	3,690.0	2.99

SOURCES:

* State of New York, Executive Department, Economic Development Board. Preliminary Revised Population Projections by Age and Sex for New York State Counties. March 1, 1976[5].

** State of New York, Executive Department, Economic Development Board. Preliminary Revised Household Projections for New York State Counties. March 30, 1976[6].

*** McGraw-Hill Publications Department of Economics. 28th Annual Electric Industry Forecast. Electrical World, September 15, 1977, p 43-58[7].

407 172

TABLE 1.1-35

HOME APPLIANCE - CUSTOMER SATURATIONS - NYSE&G SERVICE AREA

Appliance	kWh per Home 1976	Percent of Homes With One or More Appliances			
		1960 Census	1970 Census	1977 Survey	1995 Projected
Air conditioners - room	300**	3.3	10.1	19	47
Air conditioners - central	1,300	0.7	1.7	2.5	7.6
Water heating	4,219	22.0	20	27	55
Electric ranges	700	32.0	39	48	59
Electric dryers	993	18.0	35	46	59
Gas dryers	100	8.0	17	22	24
Freezers	1,195	25.0	32	48	60
Dishwashers	363	6.0(Est.)	20	35	80
Refrigerators	1,525***	100.0	100	100	100
Clothes washers	103	85.0	80	90(Est.)	90
Televisions	515****	100.0	100	100	100
Dehumidifiers	371	--	--	20	42.5
Electric heat	15,000	0.1	1.9	8	24
Misc. and lighting	1,693	100.0	100	100	100

NOTES:

* The appliance consumptions listed do not include the estimated total 1974 energy conservation of approximately 618 kWh/year per home

** Adjusted to reflect approximately 1.3 room air conditioners per home

*** Based on 1.23 refrigerators in use per home

**** Adjusted to reflect homes with multiple televisions

407 173

TABLE 1.1-36

NEW YORK STATE ELECTRIC & GAS CORPORATION
CUSTOMER CLASS DEFINITIONS

Residential:	Sales to individually metered homes or apartments and sales to farms and religious institutions supplied under the residential rates, divided between: a. Heating: Total sales to residential customers where electricity supplies the total space heating requirement. b. Non-Heating: Total sales to residential customers where electricity does not supply the total space heating requirement.
Commercial:	Sales to commercial enterprises and government facilities not included elsewhere.
Industrial:	Sales to enterprises engaged principally in mining or manufacturing.
Street and Highway Lighting:	Sales to governmental bodies for lighting streets and highways and other public places.
Sales for Resale:	Firm sales to other utilities, such as borderline sales, that are included in the Company's peak load for which it must provide capacity.
Company Requirements:	Includes interdepartmental sales, company use, franchise requirements, and losses.

NOTE:

NYSE&G records include some master metered apartments in the residential class. For use in this report, however, these customers have been included in the commercial class. In 1976, these 8,000 customers included 18,000 individual apartments which used 77,000 MWh. Prior to 1976 these data were estimated.

407 174

TABLE 1.1-37

NEW YORK STATE ELECTRIC & GAS CORPORATION
ELECTRICALLY HEATED DWELLING UNITS

Year Actual	Added During Year New	Added During Year Conversions	Added During Year Total	Cumulative End of Year	Percent Increase	Percent Saturation
1965	628	158	786	1,959	67.0	0.43
1966	601	224	825	2,784	42.1	0.60
1967	937	364	1,301	4,085	46.7	0.86
1968	1,395	563	1,958	6,043	47.9	1.25
1969	1,419	607	2,026	8,069	33.5	1.64
1970	1,953	737	2,690	10,759	33.3	2.14
1971	2,294	731	3,025	13,784	28.1	2.68
1972	3,284	854	4,138	17,922	30.0	3.40
1973	4,678	915	5,593	23,515	31.2	4.36
1974	4,722	1,247	5,969	29,484	25.4	5.37
1975	4,223	824	5,047	34,531	17.1	6.20
1976	4,552	708	5,260	39,791	15.2	7.10
Projected						
1977	4,684	725	5,409	45,200	13.6	7.90
1978	4,250	750	5,000	50,200	11.1	8.70
1979	4,250	750	5,000	55,200	10.0	9.40
1980	5,300	1,000	6,300	61,500	11.4	10.30
1981	5,800	1,100	6,900	68,400	11.2	11.30
1982	6,400	1,200	7,600	76,000	11.1	12.30
1983	7,000	1,300	8,300	84,300	10.9	13.40
1984	7,000	1,400	8,400	92,700	10.0	14.50
1985	7,000	1,500	8,500	101,200	9.2	15.50
1986	6,600	1,600	8,200	109,400	8.1	16.50
1987	6,600	1,800	8,400	117,800	7.7	17.40
1988	6,600	2,000	8,600	126,400	7.3	18.40
1989	6,600	2,200	8,600	135,000	6.8	19.40
1990	6,600	2,400	9,000	144,000	6.7	20.30
1991	6,000	2,600	8,600	152,600	6.0	[illegible]
1992	6,000	2,800	8,800	161,400	5.8	[illegible]
1993	6,000	3,000	9,000	170,400	5.6	23.10
1994	6,000	3,000	9,000	179,400	5.3	24.00
1995	6,000	3,000	9,000	188,400	5.0	24.80

407 175

TABLE 1.1-37 (Cont'd)

Year Projected	Added During Year: New	Added During Year: Conversions	Added During Year: Total	Cumulative End of Year	Percent Increase	Percent Saturation
1996	6,000	3,000	9,000	197,400	4.8	25.70
1997	6,000	3,000	9,000	206,400	4.6	26.50
1998	6,000	3,000	9,000	215,400	4.4	27.30

407 176

TABLE 1.1-38

NEW YORK STATE ELECTRIC & GAS CORPORATION
VARIATIONS IN WINTER PEAK CAUSED BY ±10 PERCENT CHANGE IN RESIDENTIAL
ELECTRIC HEAT GROWTH RATE

Winter	Forecast	Heating Customers	Change in Forecast
78/79	2,200 MW	± 500	± 4 MW
83/84	2,900	± 4,900	± 36
88/89	3,840	± 12,000	± 88
93/94	4,950	± 20,500	± 150
98/99	6,220	± 30,000	± 220

407 179

TABLE 1.1-39

NEW YORK STATE ELECTRIC & GAS CORPORATION
VARIATIONS IN WINTER PEAK CAUSED BY ±10 PERCENT DIFFERENCE
IN RESIDENTIAL BASE LOAD GROWTH RATE

Winter	Forecast	Change in Forecast
78/79	2,200 MW	±4 MW
83/84	2,900	±25
88/89	3,840	±53
93/94	4,950	±90
98/99	6,220	±141

TABLE 1.1-40

NEW YORK STATE ELECTRIC & GAS CORPORATION
COMBINED EFFECT OF ±10 PERCENT CHANGES IN RESIDENTIAL
ELECTRIC HEAT GROWTH RATE AND RESIDENTIAL BASE LOAD
GROWTH RATE

Winter	Forecast	Change in Forecast
78/79	2,200 MW	±8 MW
83/84	2,900	±61
88/89	3,840	±141
93/94	4,950	±240
98/99	6,220	±361

407 179

TABLE 1.1-41

NYSE&G - MODEL REGRESSION COEFFICIENTS - WINTER WEEKDAYS

Hour Ending	Temperature	Morning, Evening Lighting	Temperature Lag	Base Load	Cloud Cover	Wind Temp Index	Base Load Conservation	Weekday Dummy Variables Monday	Weekday Dummy Variables Friday	Constant
1	0.145	0	-3.6	566.9	0.326	0.014	-100	NA	4	69
2	0.142	0	-3.4	532.3	0.243	0.015	- 96	NA	4	66
3	0.142	0	-3.3	510.9	0.195	0.017	- 95	NA	3	62
4	0.131	0.215	-3.4	520.6	0.093	0.021	- 99	NA	4	12
5	0.133	0.214	-3.3	524.7	0.094	0.021	-100	NA	2	5
6	0.136	0.271	-3.3	552.1	0.127	0.022	-101	NA	2	-3
7	0.140	0.472	-4.5	651.1	0.176	0.023	-104	-27	-1	-41
8	0.131	0.641	-3.9	751.5	0.428	0.012	-111	-18	-3	46
9	0.119	0.495	-3.1	767.2	0.653	0.011	-112	-1	0	105
10	0.128	0	-4.1	799.2	0.481	0.009	-102	16	0	179
11	0.121	0	-3.5	794.9	0.748	0.018	-104	26	1	194
12	0.113	0	-2.9	771.1	0.938	0.027	-105	28	-1	167
13	0.108	0	-3.4	806.8	0.966	0.033	-106	24	-2	131
14	0.101	0	-2.8	794.2	1.109	0.035	-105	19	-5	149
15	0.102	0	-2.3	777.6	1.279	0.032	-113	13	-9	157
16	0.096	0.584	-2.4	667.2	1.644	0.035	-114	10	-16	158
17	0.099	1.221	-2.2	570.6	1.886	0.031	-125	8	-27	82
18	0.112	2.120	-2.1	416.5	1.654	0.022	-138	8	-30	127
19	0.114	1.227	-1.6	646.2	1.622	0.015	-142	8	-24	128
20	0.111	1.116	-1.3	679.8	0.838	0.016	-135	4	-38	168

407 188

TABLE 1.1-41 (Cont'd)

Hour Ending	Temperature	Morning, Evening Lighting	Temperature Lag	Base Load	Cloud Cover	Wind Temp Index	Base Load Conservation	Weekday Dummy Variables Monday	Weekday Dummy Variables Friday	Constant
21	0.118	0.494	-1.7	773.7	0.358	0.012	-128	0	-44	204
22	0.135	0	-2.7	754.9	0.426	0.004	-134	0	-36	172
23	0.139	0	-2.7	709.7	0.326	0.004	-119	-4	-13	109
24	0.147	0	-3.1	651.9	0.320	0.008	-109	-3	7	50

407 189

TABLE 1.1-42

NEW YORK STATE ELECTRIC & GAS CORPORATION
JANUARY 12, 1977

Variable Name	Regression Coefficient		Variable Calculation		Estimated Contributor
Energy Conservation	-142	x	1	=	-142 MW
Winter Temperature	0.114	x	(66.7x(63-4))	=	449
Wind-Temperature Index	0.015	x	((66.7x(63-4))x52)/100	=	31
Evening Lighting	1.227	x	(230x1.555)	=	439
Winter Temperature Lag	-1.6	x	((66.7)x(9-4))/100	=	-5
Base Load Growth	646.2	x	1.555	=	1,005
Cloud Cover	1.622	x	(31x1.555)	=	78
Constant				=	128
			Estimated	=	1,983 MW
			Actual	=	2,000 MW

407 182

TABLE 1.1-43

NEW YORK STATE ELECTRIC & GAS CORPORATION
JANUARY 1985

Variable Name	Regression Coefficient		Variable Calculation		Estimated Contributor
Energy Conservation	-142	x	1	=	-142 MW
Winter Temperature	0.114	x	(134.9x(63-4))	=	907
Wind-Temperature Index	0.015	x	((134.9x(63-4))x52)/100	=	62
Evening Lighting	1.227	x	(230x2.131)	=	601
Winter Temperature Lag	-1.6	x	((134.9)x(9-4))/100	=	-11
Base Load Growth	646.2	x	2.131	=	1,377
Cloud Cover	1.622	x	(31x2.131)	=	107
Constant				=	128
			Estimated	=	3,029 MW

407 183

TABLE 1.1-44

NYSE&G - MODEL REGRESSION COEFFICIENTS - SUMMER WEEKDAYS
MAY - SEPTEMBER

Hour Ending	Temp.	Morning, Evening Lighting	Base-load	Baseload Conservation	Temperature Conservation	Weekday Dummy Variables		Monthly Dummy Variables			Constant
						Monday	Friday	May	June	July	
1	0.063	0	589.9	-41	-0.029	NA	9	-61	-19	-26	42
2	0.057	0	590.3	-56	-0.032	NA	7	-45	-15	-21	2
3	0.050	0	572.8	-65	-0.021	NA	4	-43	- 9	-21	-6
4	0.049	-0.213	562.6	-64	-0.022	NA	6	-66	-25	-34	3
5	0.047	-0.128	569.2	-61	-0.023	NA	3	-59	-19	-32	-18
6	0.043	-0.058	603.0	-59	-0.028	NA	3	-55	-23	-39	-34
7	0.037	0.784	638.7	-61	-0.021	-32	0	8	34	-21	-74
8	0.038	1.099	684.2	-75	-0.012	-24	-5	63	85	-10	100
9	0.046	0.841	711.2	-77	-0.015	- 7	-1	34	73	-20	126
10	0.058	0	773.9	-62	-0.042	14	2	-10	12	-55	186
11	0.064	0	784.7	-64	-0.037	27	3	-33	- 1	-53	212
12	0.071	0	776.0	-58	-0.045	31	2	-49	- 9	-49	227
13	0.070	0	800.3	-68	-0.032	26	0	-48	-13	-47	172
14	0.074	0	782.2	-62	-0.038	21	-4	-49	-12	-50	208
15	0.076	0	765.0	-62	-0.041	21	-8	-54	-15	-52	217
16	0.080	0	767.4	-59	-0.047	12	-13	-57	-17	-52	188
17	0.077	0	791.3	-65	-0.049	9	-22	-58	-19	-51	160
18	0.072	0	810.9	-68	-0.047	9	-24	-66	-26	-49	133
19	0.076	0.396	791.7	-72	-0.043	2	-11	-64	-11	-32	88
20	0.075	1.435	748.7	-78	-0.043	3	-15	-42	23	- 4	49

407 184

TABLE 1.1-44 (Cont'd)

Hour Ending	Temp.	Morning, Evening Lighting	Base-load	Baseload Conservation	Temperature Conservation	Weekday Dummy Variables		Monthly Dummy Variables			Constant
						Monday	Friday	May	June	July	
21	0.075	1.249	759.1	-74	-0.062	0	-27	-51	-27	-54	109
22	0.078	0	747.9	-59	-0.068	4	-30	-47	-25	-51	186
23	0.075	0	704.4	-67	-0.048	- 2	-15	-42	- 3	-22	124
24	0.068	0	660.5	-54	-0.034	- 6	2	-61	-12	-17	50

407 183

TABLE 1.1-45

NEW YORK STATE ELECTRIC & GAS CORPORATION
HISTORICAL MONTHLY PEAK LOADS AND ENERGY REQUIREMENTS
OCTOBER 1972 THROUGH MAY 1978

	1972		1973		1974		1975		1976		1977		1978	
Mo.	Peak Load (MW)	Energy (MWhx10³)	Peak Load (MW)	Energy (MWhx10³)	Peak Load (MW)	Energy (MWhx10³)	Peak Load (MW)	Energy (MWhx10³)	Peak Load (MW)	Energy (MWhx10³)	Peak Load (MW)	Energy (MWhx10³)	Peak Load (MW)	Energy (MWhx10³)
Jan	-	-	1,724	906	1,586	892	1,768	958	1,993	1,083	2,062	1,149	2,017	1,145
Feb	-	-	1,677	838	1,588	833	1,750	853	1,984	934	1,853	962	1,975	1,039
Mar	-	-	1,546	841	1,520	868	1,642	908	1,738	961	1,779	968	1,819	1,049
Apr	-	-	1,502	770	1,492	769	1,566	841	1,607	854	1,637	869	1,733	928
May	-	-	1,401	773	1,405	794	1,430	784	1,525	864	1,564	857	1,597	900
Jun	-	-	1,483	797	1,501	761	1,536	783	1,578	866	1,522	838	-	-
Jul	-	-	1,504	845	1,498	821	1,496	834	1,470	836	1,685	901	-	-
Aug	-	-	1,562	866	1,474	839	1,565	845	1,555	882	1,700	909	-	-
Sep	-	-	1,583	788	1,456	774	1,453	802	1,507	826	1,619	866	-	-
Oct	1,507	813	1,579	821	1,508	833	1,633	871	1,669	928	1,667	941	-	-
Nov	1,629	819	1,605	832	1,716	842	1,690	848	1,907	988	1,821	950	-	-
Dec	1,696	890	1,701	883	1,707	905	1,897	1,016	2,070	1,109	2,034	1,106	-	-

407 186

NYSE&G
NEW HAVEN-NUCLEAR

TABLE 1.1-46

PHYSICAL TARGET METHODOLOGY - APPLIANCE BY APPLIANCE
FORECAST FOR 1985 SUMMER PEAK

Residential

Major Appliance	Normal kW at Peak	Appliance Life	FEA-& Energy Reduction	Efficient kW at Peak	Efficient kW at Peak	Percent Saturation	kW/Customer Contribution to Peak
Conventional refrigerator					0.11	32	0.04
Frost-free refrigerator	0.20	15	26	0.18	0.18	83	0.15
Freezer	0.15	20	23	0.14	0.14	29	0.04
Color TV	0.13	12	35	0.11	0.11	166/2	0.09
B and W TV	0.05	11	65	0.04	0.04	73/2	0.01
Air conditioner - window	0.50	11	18 + 7	0.43	0.43	1.16	0.54
Air conditioner - central	3.36	15	20 + 10	3.02	3.02	16	0.48
Air conditioner - heat pump	3.36	15	20 + 10	3.02	3.02	3	0.09
Dishwasher	0.12	11	17	0.11	0.11	56	0.06
Electric dryer	0.20	14	7	0.20	0.20	59	0.12
Electric water heater	0.62	10	15	0.57	0.57	12	0.07
Electric range	0.75	12	3	0.74	0.74	55	0.41
Washing machine	0.03	11	32	0.03	0.03	88	0.03
Lighting	0.20	-	20	0.16	0.16	100	0.16
Other small appliances	0.10	15	10	0.09	0.09	100	0.09
Swimming pool pump	0.28		20	0.22	0.22	23	0.05
Microwave oven	(0.30)			(0.30)	(0.30)	10	(0.03)
Heating plant:							
Oil and gas and storage	0.05	20	20	0.04	0.04	88	0.04
Electric resistance	NA			NA	NA		NA
Electric heat pump	NA			NA	NA		NA
							2.44 kW

2.44 kW/Customer x 868,000 Customers x 1.005 Customer Adjustment Factor = 2,129 MW

407 187

TABLE 1.1-46 (Cont'd)

Commercial and Industrial

8,093 GWh Sales x 100 / 8,760 hr/year x 60% Load Factor*	= 1,540 MW
Other public authorities	= 50 MW
Time of use rates adjustment	= (193 MW)
Subtotal	= 3,526 MW
Losses at 8%	
Total Peak	= 3, 830 MW

NOTE:

* Composite Load Factor Forecast for Commercial-Industrial Class is based upon:

1. 1970-75 Electric Class of Customer Study-Normalized Load Factors for 2,000-7,000 GRP
2. Discussions with other companies concerning their experiences.

TABLE 1.1-47

LILCO
PHYSICAL TARGET METHODOLOGY - APPLIANCE BY APPLIANCE
FORECAST FOR 1995 SUMMER PEAK

Residential

Major Appliance	Normal kW at Peak	FEA-% Energy Reduction	Efficient kW at Peak	Efficient kW at Peak	Percent Saturation	kW/Customer Contribution to Peak
Conventional refrigerator				0.11	25	0.03
Frost-free refrigerator	0.24	26	0.18	0.18	93	0.17
Freezer	0.15	23	0.12	0.12	35	0.04
Color TV	0.13	35	0.08	0.08	200/2	0.08
B and W TV	0.05	65	0.02	0.02	59/2	0.01
Air conditioner - window	0.60	18 + 7	0.45	0.45	1.36	0.61
Air conditioner - central	3.36	20 + 5	2.52	2.52	20	0.50
Air conditioner - heat pump	3.36	20 + 5	2.52	2.52	7	0.18
Dishwasher	0.12	17	0.10	0.10	59	0.06
Electric dryer	0.20	7	0.19	0.19	64	0.12
Electric hot water heater	0.62	15	0.53	0.53	13*	0.07
Electric range	0.75	3	0.73	0.73	58	0.42
Washing machine	0.03	32	0.02	0.02	86*	0.02
Lighting	0.30	20	0.24	0.24	100	0.24
Other small appliances	0.20	10	0.18	0.18	100	0.18
Swimming pool pump	0.28	20	0.22	0.22	33	0.07
Microwave oven	(0.30)	-	(0.30)	(0.30)*	20	(0.06)
Heating plant:						
Oil and gas and storage	0.05	20	0.04	0.04	87	0.03
Electric resistance	NA		NA	NA		NA
Electric heat pump	NA		NA	NA		NA
						2.77 kW

2.77 kW/Customer x 956,000 Customers x 1.005 Customer Adjustment Factor = 2,661 MW

TABLE 1.1-47 (Cont'd)

Commercial and Industrial

$\frac{\text{10,386 GWh Sales x 100}}{\text{8,760 hr/year x 60\% Load Factor*}}$	= 1,976 MW
Other public authorities	= 70 MW
Time of use rates adjustment	= (332 MW)
Subtotal	= 4,375 MW
Losses at 8%	
TOTAL PEAK	= 4,760 MW

NOTE:

*Composite load factor forecast for commercial-industrial class is based upon:
(1) 1970-75 Electric class of customer study-normalized load factors for 2000-7000 GRP
(2) Discussions with other companies concerning their experiences

TABLE 1.1-48

LILCO
PHYSICAL TARGET METHODOLOGY - APPLIANCE BY APPLIANCE
FORECAST FOR 1995 WINTER PEAK

Residential

Major Appliance	Normal kW at Peak	FEA-% Energy Reduction	Efficient kW at Peak	Efficient kW at Peak	Percent Saturation	kW/Cost Contribution to Peak
Conventional refrigerator	0.10	-	0.10	0.10	25	0.03
Frost-free refrigerator	0.23	26	0.17	0.17	93	0.16
Freezer	0.15	23	0.12	0.12	35	0.04
Color TV	0.33	35	0.21	0.21	200/2	0.21
B and W TV	0.13	65	0.05	0.05	59/2	0.01
Air conditioner - window	NA		NA	NA		NA
Air conditioner - central	NA		NA	NA		NA
Air conditioner - heat pump	NA		NA	NA		NA
Dishwasher	0.12	17	0.10	0.10	59	0.06
Elec. dryer	0.17	7	0.16	0.16	64	0.10
Elec. water heater	0.72	15	0.61	0.61	13	0.08
Elec. range	0.85	3	0.82	0.82	58	0.42
Washing machine	0.03	32	0.02	0.02	86	0.02
Lighting	0.64	20	0.51	0.51	100	0.51
Other small appliances	0.20	10	0.18	0.18	100	0.18
Swimming pool pump	NA		NA	NA		NA
Microwave oven	(0.30)		(0.30)	(0.30)	20	(0.06)
Heating plant:						
Oil and gas	0.10	20	0.08	0.08	84	0.07
Elec. resistance				5.35/2	9	0.24
Elec. heat pump				5.35	7	0.37
						2.44 kW

2.44 kW/Customer x 956,000 Customers x 1.002 Cust. Adjust. Factor = 2,337 MW

TABLE 1.1-48 (Cont'd)

Commercial and Industrial

$\frac{\text{10,386 GWh Sales x 100}}{\text{8,760 Hr/year x 70\% load factor*}}$	= 1,694 MW
Other public authorities	= 89 MW
Time of use rates adjustment	= (249 MW)
Subtotal	= 3,871 MW
Losses at 8%	
TOTAL PEAK	= 4,210 MW

NOTE:

* Composite Load Factor Forecast for Commercial-Industrial Class is based upon:

1970-75 Electric Class of Customer Study-normalized Load Factors for 2000-7000 GRP
Discussions with other companies concerning their experiences.

TABLE 1.1-49

LILCO
1971-76 ELECTRIC CLASS OF CUSTOMER STUDY
APPLIANCE SATURATION STUDY
(Based on all Residential Classes Composite Response
Saturations expressed in Unit Percentage*)

	1971	1972	1973	1974	1975	1976
Average Total Residential Customers	725,722	739,183	754,396	766,612	776,178	784,359
Characteristic or Appliance	%	%	%	%	%	%
Type of Home Sampled						
Summer	3.6	3.5	2.5	2.8	2.2	1.7
Year round	96.4	96.5	97.5	97.2	97.8	98.3
Space Heating Fuel						
Electric	0.9	1.1	1.6	2.1	2.1	2.5
LILCO gas	17.3	17.6	17.6	17.6	17.8	17.5
Oil	81.8	81.3	80.1	79.2	78.9	79.2
Bottled gas	-	-	0.7	0.9	1.3	0.8
Water Heating Fuel						
Electric	5.0	5.3	5.8	6.4	6.5	6.7
LILCO gas	23.3	23.4	23.3	23.3	23.2	22.9
Oil	71.7	71.3	69.6	69.6	69.0	68.4
Bottled gas	-	-	1.3	0.7	1.3	2.0
Air Conditioning						
Window/wall	82.5	87.8	103.7	113.6	117.7	102.0
Central	7.7	8.4	9.4	11.2	10.1	11.5
Dehumidifier	9.7	11.3	7.8	19.1	10.2	16.0
Attic fan	11.7	12.8	13.8	19.5	20.4	**
Range						
Electric	45.5	46.0	46.6	51.0	49.8	47.4
Gas	55.2	54.0	55.5	50.4	52.6	52.6
Refrigerator						
Conventional electric	55.2	53.7	54.9	49.6	45.3	49.3
Frost Free Refrigerator-freezer	56.6	62.4	63.6	64.3	64.7	67.8
Freezer (separate)	29.9	25.6	30.7	26.5	26.7	27.1
Clothes Washer	81.8	83.9	85.8	86.7	86.2	83.7

407 193

TABLE 1.1-49 (Cont'd)

Characteristic or Appliance	1971 %	1972 %	1973 %	1974 %	1975 %	1976 %
Clothes Dryer						
Electric	46.1	46.0	48.8	50.8	48.5	45.5
Gas (LILCO and bottled)	18.8	17.7	17.8	18.4	16.9	19.6
Dishwasher	51.3	52.5	53.7	60.1	50.9	51.7
Television						
Black and White	117.5	1[illegible]7	115.3	105.5	101.2	92.4
Color	70.1	[illegible].5	85.6	89.0	94.0	104.8

NOTES:

* Unit Percentage = $\frac{\text{Total Units}}{\text{Total Customers}} \times 100$

** Inconclusive data

407 194

NYSE&G ER
NEW HAVEN-NUCLEAR

TABLE 1.1-50

LILCO
RESIDENTIAL CUSTOMER FORECAST
(TOTAL AND BY MAJOR SUBCLASS)

Year	Total Residential Customers	Total Residential Space & Water	Total Residential Gnr'l & Water	Residential Space & Water S.F.	Residential Space & Water Apt.	Residential Gnr'l & Water S.F.	Residential Gnr'l & Water Apt.
1978	801,845	21,446	780,399	15,873	5,573	677,559	102,840
1979	811,800	23,736	788,064	17,362	6,374	683,437	104,627
1980	821,850	27,377	794,473	19,801	7,576	688,435	106,038
1981	831,899	32,370	799,529	23,234	9,136	692,438	107,091
1982	841,949	38,661	803,288	27,657	11,004	695,452	107,836
1983	850,633	46,027	804,606	33,020	13,007	696,593	108,013
1984	859,317	53,394	805,923	38,383	15,011	695,511	110,412
1985	868,000	60,760	807,240	43,747	17,013	694,226	113,014
1986	877,600	70,592	807,008	51,046	19,546	692,412	114,596
1987	887,200	80,424	806,776	58,345	22,079	690,600	116,176
1988	896,800	90,256	806,544	65,644	24,612	688,789	117,755
1989	906,400	100,088	806,312	72,943	27,145	686,978	119,334
1990	916,000	109,920	806,080	80,242	29,678	685,168	120,912
1991	924,000	118,528	805,472	86,832	31,696	683,846	121,626
1992	932,000	127,136	804,864	93,421	33,715	682,525	122,339
1993	940,000	135,744	804,256	100,011	35,733	681,205	123,051
1994	948,000	144,352	803,648	106,600	37,752	679,886	123,762
1995	956,000	152,960	803,040	113,190	39,770	678,569	124,471
1996	961,800	161,768	800,032	120,102	41,666	675,227	124,805
1997	967,600	170,576	797,024	127,014	43,562	671,891	125,133
1998	973,400	179,384	794,016	133,926	45,458	668,561	125,455
1999	979,200	188,192	791,008	140,838	47,354	665,237	125,771
2000	985,000	197,000	788,000	147,750	49,250	661,920	126,080

NOTES:

Assume
2000 AD 1) Total - 82% S.F., 18% Apt.
2) 25% Sat. Elec Space Htg. (75% S.F., 25% Apt.)
3) Res. Non-Space Heat 84% SF, 16% Apt

407 195

TABLE 1.1-51

LILCO
LONG RANGE COMMERCIAL CUSTOMER FORECAST

Historical Data Series

Year	Residential Customers (000)	Commercial Customers
1966	658	59,817
1967	672	60,630
1968	686	61,322
1969	702	62,357
1970	715	63,445
1971	726	64,110
1972	739	64,976
1973	754	66,504
1974	767	67,435
1975	776	68,133
1976	784	69,080

Regression Equation Commercial Customers = 11,066.28 + 73.45 Residential Customers

$R^2 = 0.9926$

Projections

Year	Residential Customers (000)	Commercial Customers
1985	868	74,823
1990	916	78,349
1995	956	81,287
2000	985	83,417

407 196

TABLE 1.1-52

LILCO
DETERMINATION OF COMMERCIAL USE PER CUSTOMER ASYMPTOTE

Commercial Asymptote Development

1973 Base - Normal Use/Customer			= 69,838 kWh/Cust.
of which:	Lighting	(46%)	
	Electrical Cooling	(29%)	
	Mechanical Equip.	(16%)	
	Office Equip.	(8%)	
	Electric Space Heating	(1%)	

Fibonacci Search Asymptote = 138,486 kWh/Cust.

1) Assumed 10% Electric Space Heat Saturation already contained in asymptote (8,000 kWh/Cust.)

2) Additional 40% Saturation of Electric Space Heat: + 32,000 kWh/Cust.

3) 40% Reduction in Electric Space Heat due to widespread use of Heat Pumps:

Reduction 40% x Space Heat - kWh 40,000 = - 16,000 kWh/Cust.

4) 20% Lighting Efficiency Reduction:

Total kWh Ex Space Heat 130,486 kWh x % Lighting 46% x Efficiency Reduction 0.20 = - 12,000 kWh/Cust.

5) 20% Reduction in Electric Cooling kWh for improved insulation:

Total kWh Ex Space Heat 130,486 kWh x % Cooling 29% x Efficiency Reduction 0.20 = - 7,600 kWh/Cust.

6) 20% Reduction in Remainder of Electric Space Heat kWh due to improved insulation:

Remaining Space Heat 20,000 kWh x Efficiency Reduction 20% = - 4,000 kWh/Cust.

TABLE 1.1-52 (Cont'd)

7) 10% Reduction on Remainder of kWh usage (Mechanical Equip. & Office Equip.):

Total Ex Space Heating	x	% Misc.	x	Efficiency Reduction	=	- 3,300 kWh/Cust.
130,486 kWh		25%		10%		
Conservation and Efficiency Asymptote					=	127,586 kWh/Cust.

TABLE 1.1-53

LILCO
LOGISTICS CURVE FORECAST OF COMMERCIAL USE PER CUSTOMER

Input Data

Year	U/C (kWh)	Year	U/C (kWh)
1966	41,231	1975	67,743
1967	43,290	1976	67,298
1968	48,101	1977	69,615
1969	52,583	1978	71,056
1970	56,963	1979	72,709
1971	60,832	1980	74,662
1972	64,651	1981	76,785
1973	69,737	1982	79,645
1974	65,807		

Asymptote	127,586
Ratio of Proportionate Change to Gap	0.547461D-06
Constant of Integration	0.18863415D-01
Coefficient of Determination	0.997144
Standard Deviation	3,553.313
Sum of Absolute Deviations	46,774.0

Forecast

Year	U/C (kWh)	Year	U/C (kWh)
1983	83,035	1997	106,163
1984	85,038	1998	107,379
1985	86,996	1999	108,539
1986	88,904	2000	109,643
1987	90,760	2001	110,694
1988	92,563	2002	111,691
1989	94,309	2003	112,638
1990	95,998	2004	113,535
1991	97,629	2005	114,385
1992	99,201	2006	115,189
1993	100,712	2007	115,949
1994	102,164	2008	116,667
1995	103,556	2009	117,345
1996	104,889	2010	117,984

TABLE 1.1-54

LILCO
LONG RANGE INDUSTRIAL CUSTOMER FORECAST

Year	Historical Data Series T	Industrial Customers
1966	1	3,352
1967	2	3,797
1968	3	4,020
1969	4	4,190
1970	5	4,333
1971	6	4,398
1972	7	4,473
1973	8	4,593
1974	9	4,733
1975	10	4,858
1976	11	5,025

Regression Equation: Industrial Customers - 3,486.87 + 142.67 T
$R^2 = 0.9436$

Year	Industrial Customers
1985	6.340
1990	7,054
1995	7,767
2000	8,480

TABLE 1.1-55

LILCO
INDUSTRIAL SALES - LONG RANGE FORECAST

Year	kWh/ Customer	Customers	Sales (GWh)
1983	243,874	6,055	1,477
1984	244,345	6,198	1,518
1985	244,816	6,340	1,552
1986	245,287	6,483	1,590
1987	245,758	6,626	1,628
1988	246,229	6,768	1,671
1989	246,700	6,911	1,705
1990	247,171	7,054	1,744
1991	247,642	7,196	1,782
1992	248,113	7,339	1,826
1993	248,584	7,482	1,860
1994	249,056	7,624	1,899
1995	249,528	7,767	1,938
1996	250,000	7,910	1,983
1997	250,472	8,052	2,017
1998	250,944	8,195	2,056
1999	251,416	8,338	2,096
2000	251,888	8,480	2,136

407 201

TABLE 1.1-56

LILCO
DETERMINATION OF INDUSTRIAL USE PER CUSTOMER ASYMPTOTE

Industrial Asymptote Development

1973 Base - Normal Use/Customer		=	281,194 kWh/Cust.
of which: Lighting	(24%)		
Electric cooling	(15%)		
Mechanical equip.	(11%)		
Electric processing	(50%)		
Fibonacci Search Asymptote		=	282,808 kWh/Cust.

1) Assumed 10% space heat saturation already contained in asymptote (8,000 kWh/Cust.)

2) Additional 40% saturation in electric space heat: + 32,000 kWh/Cust.

3) 40% reduction in electric space heat due to widespread use of heat pumps:

Reduction 40% x Space Heat - kWh 40,000 = - 16,000 kWh/Cust.

4) 20% lighting efficiency reduction:

Total kWh ex space heat 274,808 kWh x % Lighting 24% x Efficiency Reduction 20% = - 13,200 kWh/Cust.

5) 20% Reduction in electric cooling kWh for improved insulation:

Total kWh ex space heat 274,808 kWh x % Cooling 15% x Efficiency Reduction 20% = - 8,200 kWh/Cust.

6) 20% reduction in remainder of electric space heating kWh for improved insulation:

Remaining space heat 20,000 kWh x Efficiency Reduction 20% = - 4,000 kWh/Cust.

407 202

TABLE 1.1-56 (Cont'd)

7) 10% reduction on remainder of kWh usage (mechanical equip. & electric processing):

Total kWh ex space heat		% Misc.		Efficiency Reduction			
274,808	x	61%	x	10%	=	- 16,800	kWh/Cust.
Conservation and Efficiency Asymptote					=	256,608	kWh/Cust.

TABLE 1.1-57

LILCO
FORECAST OF COMMERCIAL AND INDUSTRIAL ENERGY SALES - LONG RANGE

	Commercial (Non-manufacturing)				Industrial (Manufacturing & Mining)		
Year	Customers	kWh/ Customer	GWh Sales	OPA	Customers	kWh/ Customer	GWh Sales
1983	73,645	83,035	6,115	259	6,055	243,874	1,477
1984*	74,453	85,038	6,348	260	6,198	244,345	1,518
1985	75,188	86,996	6,541	259	6,340	244,816	1,552
1986	75,922	88,904	6,750	259	6,483	245,287	1,590
1987	76,583	90,760	6,951	259	6,626	245,758	1,628
1988*	77,318	92,563	7,177	260	6,768	246,229	1,671
1989	77,979	94,309	7,354	259	6,911	246,700	1,705
1990	78,713	95,998	7,556	259	7,054	247,171	1,744
1991	79,301	97,629	7,742	259	7,196	247,642	1,782
1992*	79,889	99,201	7,947	260	7,339	248,113	1,826
1993	80,403	100,712	8,098	259	7,482	248,584	1,860
1994	80,990	102,164	8,274	259	7,624	249,056	1,899
1995	81,578	103,556	8,448	259	7,767	249,528	1,938
1996*	82,019	104,889	8,627	260	7,910	250,000	1,983
1997	82,459	106,163	8,754	259	8,052	250,472	2,017
1998	82,827	107,379	8,894	259	8,195	250,944	2,056
1999	83,267	108,539	9,038	259	8,338	251,416	2,096
2000	83,708	109,643	9,178	259	8,480	251,888	2,136

NOTE:

* Adjusted for Leap Year

407 204

TABLE 1.1-58

LILCO
PEAKS, ENERGIES, AND LOAD FACTORS
1978-2000

(REVISED 1/25/78)

Year	Summer Peak (MW)	Winter Peak (MW)	Annual Energy (GWh)	Load Factor (%)
1978	3,030	2,530	13,830	52.1
1979	3,140	2,600	14,230	51.7
1980	3,260	2,670	14,690*	51.3
1981	3,380	2,760	15,240	51.5
1982	3,500	2,850	15,960	52.1
1983	3,590	2,920	16,540	52.6
1984	3,710	3,020	17,180*	52.7
1985	3,830	3,130	17,740	52.9
1986	3,940	3,240	18,400	53.3
1987	4,040	3,350	19,170	54.2
1988	4,140	3,460	19,980*	54.9
1989	4,230	3,570	20,680	55.8
1990	4,320	3,680	21,430	56.6
1991	4,410	3,790	22,130	57.3
1992	4,500	3,900	22,880*	57.9
1993	4,590	4,010	23,500	58.4
1994	4,680	4,110	24,180	59.0
1995	4,760	4,210	24,850	59.6
1996	4,840	4,310	25,560*	60.1
1997	4,920	4,410	26,120	60.6
1998	5,000	4,510	26,740	61.1
1999	5,080	4,610	27,360	61.5
2000	5,160	4,710	27,980	61.9

NOTE:

* Indicates Leap Year

407 205

TABLE 1.1-59

LILCO
HISTORICAL PEAKS AND TRENDS, SUMMER AND WINTER
AND FORECASTED GROWTH RATES

Historical

Year	Summer Actual	Summer Weather Normalized	Winter Actual	Winter Weather Normalized
1967	1,535	1,580	1,669	1,680
1968	1,860	1,830	1,798	1,820
1969	2,004	2,030	1,954	1,985
1970	2,174	2,275	2,073	2,075
1971	2,401	2,350	2,138	2,140
1972	2,620	2,610	2,268	2,345
1973	2,923	2,865	2,137	2,175
1974	2,794	2,995	2,205	2,290
1975	2,933	3,065	2,360	2,365
1976	2,719	3,000	2,494	2,422
1977	3,107	2,950	2,456	2,392

Growth in Summer Peak

Year(s)	Experienced	Weather Normalized
1967-1977	7.31%	6.44%
1978-1998	-	2.44%

Growth in Winter Peak

Year(s)	Experienced	Weather Normalized
1967-1977	3.[illegible]4%	3.60%
1978-1998	-	2.93%

407 206

TABLE 1.1-60

NYSE&G SUMMER CAPACITY PEAK LOADS AND MARGINS
WITHOUT NYSE&G 1 & 2 NUCLEAR UNITS IN SERVICE

	1978	1979	1980	1981	1982	1983	1984	1985
Installed Net Capability (MW)								
Thermal (conventional)	1,714	1,714	1,714	1,714	1,714	1,714	2,564	2,564
Thermal (GT and diesel)	13	13	13	13	13	13	13	13
Thermal (nuclear)	0	0	0	0	0	0	194	194
Hydro (conventional)	39	39	39	39	39	39	39	39
Hydro (pumped storage)	0	0	0	0	0	0	0	0
Undetermined additions	0	0	0	0	0	0	0	0
Total installed	1,766	1,766	1,766	1,766	1,766	1,766	2,810	2,810
PASNY firm purchases	758	725	724	721	716	713	709	706
Purchase from CHG&E	200	100	100	100	200	150	0	0
Proposed short term purchases	0	0	0	0	0	0	0	0
Firm sales	0	0	0	0	0	0	0	0
Total Capability (MW)	2,724	2,591	2,590	2,587	2,682	2,629	3,519	3,516
Peak Load (MW)	1,750	1,820	1,890	1,990	2,090	2,200	2,310	2,420
Month of Seasonal Peak	Aug	Aug	Aug	Aug	Aug	Aug	Aug	Aug
Reserve								
Actual (MW)	974	771	700	597	592	429	1,209	1,096
Actual (%)	55.7	42.4	37.0	30.0	28.3	19.5	53.3	45.3
Contractual agreement (MW)	473	491	510	537	564	594	624	653
Scheduled Maintenance (MW)	307	95	40	40	40	40	40	40
Annual Energy Requirements (Million kWh)	11,900	12,300	13,000	13,700	14,500	15,300	16,100	16,900
Load Factor Based On Annual Peak load (%)	61.7	61.3	61.3	60.6	60.4	60.2	59.9	59.6

407 207

TABLE 1.1-60 (Cont'd)

	1986	1987	1988	1989	1990	1991	1992	1993
Installed Net Capability (MW)								
Thermal (conventional)	2,564	2,564	2,564	2,564	2,564	2,564	2,564	2,564
Thermal (GT and diesel)	13	13	13	13	13	13	13	13
Thermal (nuclear)	194	194	769	769	1,344	1,344	1,344	1,344
Hydro (conventional)	39	39	39	39	39	39	39	39
Hydro (pumped storage)	0	0	0	0	0	0	0	0
Undetermined additions	0	0	0	0	0	0	0	0
Total installed	2,810	2,810	3,385	3,385	3,960	3,960	3,960	3,960
PASNY firm purchases	702	699	699	699	699	699	699	699
Purchase from CHG&E	0	0	0	0	0	0	0	0
Proposed short term purchases	0	0	0	0	0	0	0	0
Firm sales	0	0	0	0	0	0	0	0
Total Capability (MW)	3,512	3,509	4,084	4,084	4,659	4,659	4,659	4,659
Peak Load (MW)	2,540	2,670	2,800	2,930	3,060	3,200	3,360	3,520
Month of Seasonal Peak	Aug	Aug	Aug	Aug	Aug	Aug	Aug	Aug
Reserve								
Actual (MW)	972	839	1,284	1,154	1,599	1,459	1,299	1,139
Actual (%)	38.3	31.4	45.9	39.4	52.2	45.6	38.7	32.4
Contractual agreement (MW)	686	721	756	791	826	864	907	950
Scheduled Maintenance (MW)	40	40	40	40	40	40	40	40
Annual Energy Requirements (Million kWh)	17,800	18,800	19,800	20,800	21,900	23,000	24,200	25,400
Load Factor Based On Annual Peak load (%)	59.1	59.1	58.9	58.6	58.7	58.6	58.7	58.6

TABLE 1.1-60 (Cont'd)

	1994	1995	1996	1997	1998
Installed Net Capability (MW)					
Thermal (conventional)	2,564	2,564	2,564	2,564	2,564
Thermal (CT and diesel)	13	13	13	13	13
Thermal (nuclear)	1,344	1,344	1,344	1,344	1,344
Hydro (conventional)	39	39	39	39	39
Hydro (pumped storage)	0	0	0	0	0
Undetermined additions	0	0	0	0	0
Total installed	3,960	3,960	3,960	3,960	3,960
PASNY firm purchases	699	699	699	699	699
Purchase from CHG&E	0	0	0	0	0
Proposed short term purchases	0	0	0	0	0
Firm sales	0	0	0	0	0
Total Capability (MW)	4,659	4,659	4,659	4,659	4,659
Peak Load (MW)	3,680	3,840	4,000	4,180	4,360
Month of Seasonal Peak	Aug	Aug	Aug	Aug	Aug
Reserve					
Actual (MW)	976	819	659	479	299
Actual (%)	26.6	21.3	16.5	11.5	6.8
Contractual agreement (MW)	994	1,037	1,080	1,129	1,177
Scheduled Maintenance (MW)	40	40	40	40	40
Annual Energy Requirements (Million kWh)	26,600	27,800	29,100	30,500	31,900
Load Factor Based On Annual Peak load (%)	58.5	58.4	58.4	58.5	58.5

407 209

TABLE 1.1-61

NYSE&G WINTER CAPACITY PEAK LOADS AND MARGINS
WITHOUT NYSE&G 1 & 2 NUCLEAR UNITS IN SERVICE

	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86
Installed Net Capability (MW)								
Thermal (conventional)	1,714	1,714	1,714	1,714	1,714	2,564	2564	2564
Thermal (GT and diesel)	13	13	13	13	13	13	13	13
Thermal (nuclear)	0	0	0	0	0	196	196	196
Hydro (conventional)	39	39	39	39	39	39	39	39
Hydro (pumped storage)	0	0	0	0	0	0	0	0
Undetermined additions	0	0	0	0	0	0	0	0
Total installed	1,766	1,766	1,766	1,766	1,766	2,812	2,812	2,812
PASNY firm purchases	767	762	756	745	737	727	718	708
Purchase from CHG&E	100	100	300	200	200	0	0	0
Proposed short term purchases	0	100	50	142	0	0	0	0
Firm sales	0	0	0	0	0	0	0	0
Total Capability (MW)	2,633	2,728	2,872	2,853	2,703	3,539	3530	3520
Peak Load (MW)	2,200	2,290	2,420	2,580	2,740	2,900	3070	3250
Month of Seasonal Peak	Jan	Jan	Jan	Jan	Jan	Jan	Jan	Jan
Reserve								
Actual (MW)	433	438	452	273	37	639	460	270
Actual (%)	19.7	19.1	18.7	10.6	1.4	22.0	15.0	8.3
Contractual Agreement (MW)	396	412	436	464	493	522	553	585
Scheduled Maintenance (MW)	0	0	0	0	0	0	0	0
Annual Energy Requirements (Million kWh)	11,900	12,300	13,000	13,700	14,500	15,300	16,100	16,900
Load Factor Based On Annual Peak Load (%)	61.7	61.3	61.3	60.6	60.4	60.2	59.9	59.4

407 206

TABLE 1.1-61 (CONT'D)

	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94
Installed Net Capability (MW)								
Thermal (conventional)	2,564	2,564	2,564	2,564	2,564	2,564	2,564	2,564
Thermal (GT and diesel)	13	13	13	13	13	13	13	13
Thermal (nuclear)	196	196	771	771	1,346	1,346	1,346	1,346
Hydro (conventional)	39	39	39	39	39	39	39	39
Hydro (pumped storage)	0	0	0	0	0	0	0	0
Undetermined additions	0	0	0	0	0	0	0	0
Total installed	2,812	2,812	3,387	3,387	3,962	3,962	3,962	3,962
PASNY firm purchases	699	699	699	699	699	699	699	699
Purchase from CHG&E	0	0	0	0	0	0	0	0
Proposed short term purchases	0	0	0	0	0	0	0	0
Firm Sales	0	0	0	0	0	0	0	0
Total Capability (MW)	3,511	3,511	4,086	4,086	4,661	4,661	4,661	4,661
Peak Load (MW)	3,440	3,630	3,840	4,050	4,260	4,480	4,710	4,950
Month of Seasonal Peak	Jan	Jan	Jan	Jan	Jan	Jan	Jan	Jan
Reserve								
Actual (MW)	71	-119	246	36	401	181	-49	-289
Actual (%)	2.1	-3.3	6.4	0.9	9.4	4.0	-1.0	-5.8
Contractual Agreeement (MW)	619	653	691	729	767	806	848	891
Scheduled Maintenance (MW)	0	0	0	0	0	0	0	0
Annual Energy Requirements (Million kWh)	17,800	18,800	19,800	20,800	21,900	23,000	24,200	25,400
Load Factor Based On Annual Peak load (%)	59.1	59.1	58.9	58.6	58.7	58.6	58.7	58.6

407 201

TABLE 1.1-61 (Cont'd)

	1994/95	1995/96	1996/97	1997/98	1998/99
Installed Net Capability (MW)					
Thermal (conventional)	2,564	2,564	2,564	2,564	2,564
Thermal (GT and diesel)	13	13	13	13	13
Thermal (nuclear)	1,346	1,346	1,346	1,346	1,346
Hydro (conventional)	39	39	39	39	39
Hydro (pumped storage)	0	0	0	0	0
Undetermined additions	0	0	0	0	0
Total installed	3,962	3,962	3,962	3,962	3,962
PASNY firm purchases	699	699	699	699	699
Purchase from CHG&E	0	0	0	0	0
Proposed short term purchases	0	0	0	0	0
Firm sales	0	0	0	0	0
Total Capability (MW)	4,661	4,661	4,661	4,661	4,661
Peak Load (MW)	5,190	5,430	5,690	5,950	6,220
Month of Seasonal Peak	Jan	Jan	Jan	Jan	Jan
Reserve					
Actual (MW)	-529	-769	-1,029	-1,289	-1,559
Actual (%)	-10.4	-14.2	-18.1	-21.7	-25.1
Contractual Agreement (MW)	934	977	1,024	1,071	1,120
Scheduled Maintenance (MW)	0	0	0	0	0
Annual Energy Requirements (Million kWh)	26,600	27,800	29,100	30,500	31,900
Load Factor Based On Annual Peak load (%)	58.5	58.4	58.4	58.5	58.5

407 212

TABLE 1.1-62

LONG ISLAND LIGHTING COMPANY
CAPABILITIES, PEAK LOADS, AND MARGINS
WITHOUT NYSE&G 1 & 2

	Summer																			
	1979	1980	1981*	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Installed capacity	3874	3874	4147	4694	4694	4694	4888	4888	4888	4888	5271	5415	5798	5936	5936	5816	5691	5564	5564	5307
Added capacity		273**	547**			194				383**	192***	383**	192**							
Retired capacity											-48		-54		-120	-125*	-127		-257	-32
Net transactions	67	59	53	42	35	27	18	8												
TOTAL	3941	4206	4747*	4736	4729	4915	4906	4896	4888	5271	5415	5798	5936	5936	5816	5691	5564	5564	5375	5275
Summer peak	3140	3260	3380	3500	3590	3710	3830	3940	4040	4140	4230	4320	4410	4500	4590	4680	4760	4840	4920	5000
Required capacity	3705	3847	3988	4130	4236	4378	4519	4649	4767	4885	4991	5098	5204	5310	5416	5522	5617	5711	5806	5900
Excess/deficiency	236	359	759*	606	493	537	387	247	121	386	424	700	732	626	400	169	-53	-147	-431	-625

NOTES:

* In addition, in 1981 the Far Rockaway Unit 4 may be retired for economic reasons instead of in 1993

** Prorated reserve credit for month of startup

407 213

TABLE 1.1-63

LONG ISLAND LIGHTING COMPANY
CAPABILITIES, PEAK LOADS, AND MARGINS
WITHOUT NYSEG 1&2

	WINTER																			
	1979	1980	1981*	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Installed Capacity	4132	4132	4952	4952	4952	5148	5148	5148	5148	5148	5675	5675	6196	6196	6076	5948	5819	5819	5551	5513
Added Capacity		820			196					575		575								
Retired Capacity										-48		-54		-120	-128	-129		-268	-38	
Net Transactions	25	23	18	15	12	8	4	4												
TOTAL	4157	4975	4970*	4967	5160	5156	5152	5148	5148	5675	5675	6196	6196	6076	5948	5819	5819	5551	5513	5513
Winter Peak	2600	2670	2760	2850	2920	3020	3130	3240	3350	3460	3570	3680	3790	3900	4010	4110	4210	4310	4410	4510
Required Capacity	3705	3847	3988	4130	4236	4378	4519	4649	4767	4885	4991	5098	5204	5310	5416	5522	5617	5711	[illegible]	5900
Excess/ Deficiency	452	1128	982*	837	924	778	633	499	381	790	684	1098	992	766	532	297	202	(160)	(293)	(387)

NOTE:

* In addition, in 1981 the Far Rockaway Unit 4 may be retired for economic reasons instead of in 1993

407 214

TABLE 1.1-64

LONG ISLAND LIGHTING COMPANY
SCHEDULE OF GENERATING CAPACITY ADDITIONS AND RETIREMENTS

Month	Year	Name of Generating Unit	Type	Function	Changes Summer	Changes Winter
Sep	1980	Shoreham 1	NB	B	+820	+820
Oct	1983	Nine Mile Point 2 (18%)	NB	B	+194	+196
Nov	1988	Port Jefferson 1	ST		-48	-48
Jul	1988	Jamesport 1 (50%)	NP	B	+575	+575
Jul	1990	Jamesport 2 (50%)	NP	B	+575	+575
Nov	1990	Port Jefferson 2	ST		-48	-48
Nov	1990	Montauk 2-3-4	IC		-6	-6
May	1991	NYSE&G 1 (50%)	NP	B	+625	+625
Nov	1992	Glenwood 4	ST		-114	-114
Nov	1992	East Hampton 2-3-4	IC		-6	-6
May	1993	NYSE&G 2 (50%)	NP	B	+625	+625
Nov	1993	Southhampton 1	IC		-11	-11
Nov	1993*	Far Rockaway 4	ST		-114	-114
Nov	1994	Southhold 1	IC		-14	-16
Nov	1994	Glenwood 5	ST		-113	-113
Nov	1996	West Babylon 1&2	IC		-34	-40
Nov	1996	E.F. Barrett 1	ST		-190	-190
Nov	1996	West Babylon 3	IC		-17	-20
Nov	1996	Port Jefferson 1	IC		-16	-18
Nov	1997	Northport 1	IC		-16	-18
Nov	1997	Glenwood 1	IC		-16	-20

NOTE:

*This unit may be retired in 1981 for economic reasons

407 215

TABLE 1.1-65

LILCO
MONTHLY CAPACITY AND PEAK LOADS

Year Month	1977 Jan	1977 Feb	1977 Mar	1977 Apr	1977 May	1977 June	1977 July	1977 Aug	1977 Sept	1977 Oct	1977 Nov	1977 Dec
Installed Net Capability (MW)												
Thermal (conventional)	2,524	2,524	2,524	2,524	2,523	2,523	2,523	2,523	2,523	2,523	2,524	2,370
Thermal (GT and diesel)	1,467	1,467	1,467	1,445	1,186	1,186	1,186	1,186	1,186	1,186	1,445	1,445
Thermal (nuclear)												
Hydro (conventional)												
Hydro (pumped storage)												
Total installed	3,991	3,991	3,991	3,969	3,709	3,709	3,709	3,709	3,709	3,709	3,969	3,815
Firm purchases and sales (MW)												
PASNY	32	32	32	32	67	67	67	67	67	67	30	30
Vermont Yankee	28	28	28	28	54	54	54	54	54	54	0	0
Total capability (MW)	4,051	4,051	4,051	4,029	3,830	3,830	3,830	3,830	3,830	3,830	3,999	3,845
Peak load requirements (MW)	2,438	2,243	2,065	1,928	2,137	2,393	3,107	2,818	2,822	1,982	2,247	2,401
Energy (Million kWh)	1,257	1,046	1,072	981	1,036	1,104	1,346	1,344	1,124	1,042	1,059	1,193
IC Units	75	75	75	75	75	75			75	75	75	
Steam Units	162	162	284	284	386	386			114	386	386	
Scheduled maintenance (MW)												

407 216

TABLE 1.1-65 (Cont'd)

Year / Month	Actual					Forecast						
	1978 Jan	1978 Feb	1978 Mar	1978 Apr	1978 May	1978 June	1978 July	1978 Aug	1978 Sept	1978 Oct	1978 Nov	1978 Dec
Installed Net Capability (MW)												
Thermal (conventional)	2,563	2,743	2,743	2,753	2,729	2,729	2,729	2,761	2,761	2,761	2,761	2,761
Thermal (GT and diesel)	1,445	1,445	1,445	1,445	1,113	1,113	1,113	1,113	1,113	1,113	1,371	1,371
Thermal (nuclear)												
Hydro (conventional)												
Hydro (pumped storage)												
Total installed	4,008	4,188	4,188	4,198	3,842	3,842	3,842	3,874	3,874	3,874	4,132	4,132
Firm purchases and sales (MW)												
PASNY	30	30	30	30	69	69	69	69	69	69	28	28
Vermont Yankee	0	0	15	59	59	59	59	59	59	59	0	0
Total capability (MW)	4,038	4,218	4,233	4,287	3,970	3,970	3,970	4,002	4,002	4,002	4,160	4,160
Peak load requirements (MW)	2,456	2,265	2,130	1,978	2,145	2,490	3,030	3,030	2,265	2,020	2,280	2,530
Energy (Million kWh)	1,212	1,077	1,125	1,001	1,044	1,170	1,343	1,375	1,120	1,077	1,084	1,211
IC Units									100	100	100	
Steam Units	163	435	575	386	386	496	113	0	497	383	383	0
Scheduled maintenance (MW)												

TABLE 1.1-65 (Cont'd)

Year Month	1979 Jan	1979 Feb	1979 Mar	1979 Apr	1979 May	1979 June	1979 July	1979 Aug	1979 Sept	1979 Oct	1979 Nov	1979 Dec
Installed Net Capability (MW)												
Thermal (conventional)	2,761	2,761	2,761	2,761	2,761	2,761	2,761	2,761	2,761	2,761	2,761	2,761
Thermal (GT and diesel)	1,371	1,371	1,371	1,371	1,113	1,113	1,113	1,113	1,113	1,113	1,371	1,371
Thermal (nuclear)												
Hydro (conventional)												
Hydro (pumped storage)												
Total installed	4,132	4,132	4,132	4,132	3,874	3,874	3,874	3,874	3,874	3,874	4,132	4,132
Firm purchases and sales (MW)												
PASNY	28	28	28	28	67	67	67	67	67	67	25	25
Total capability (MW)	4,160	4,160	4,160	4,160	3,941	3,941	3,941	3,941	3,941	3,941	4,157	4,157
Peak load requirements (MW)	2,445	2,390	2,125	2,020	2,070	2,555	3,140	3,140	2,320	2,075	2,360	2,600
Energy (Million kWh)	1,253	1,105	1,164	1 041	1,066	1,197	1,378	1,402	1,140	1,114	1,116	1,254
IC Units	100	100	100	100	100	100			100	100	100	
Steam Units	114	189	383	383	383	114			497	497	497	115
Scheduled maintenance (MW)												

407 218

NYSE&G ER
NEW HAVEN-NUCLEAR

TABLE 1.1-65 (Cont'd)

Year / Month	1980 Jan	1980 Feb	1980 Mar	1980 Apr	1980 May	1980 June	1980 July	1980 Aug	1980 Sept	1980 Oct	1980 Nov	1980 Dec
Installed Net Capability (MW)												
Thermal (conventional)	2,761	2,761	2,761	2,761	2,761	2,761	2,761	2,761	2,761	2,761	2,761	2,761
Thermal (GT and diesel)	1,371	1,371	1,371	1,371	1,113	1,113	1,113	1,113	1,113	1,113	1,371	1,371
Thermal (nuclear)									820	820	820	820
Hydro (conventional)												
Hydro (pumped storage)												
Total installed	4,132	4,132	4,132	4,132	3,874	3,874	3,874	3,874	4,694	4,694	4,952	4,952
Firm purchases and sales (MW)												
PASNY	25	25	25	25	59	59	59	59	59	59	23	23
Total capability (MW)	4,157	4,157	4,157	4,157	3,933	3,933	3,933	3,933	4,753	4,753	4,975	4,975
Peak load requirements (MW)	2,510	2,470	2,195	2,080	2,130	2,630	3,260	3,260	2,395	2,140	2,425	2,670
Energy (Million kWh)	1,289	1,181	1,192	1,077	1,093	1,229	1,426	1,431	1,184	1,147	1,139	1,302
IC Units	100	100	100	100	100	100			100	100	100	
Steam Units	303	189	383	383	311	311			191	383		
Nuclear											820	820
Scheduled maintenance (MW)												

407 219

TABLE 1.1-66

LONG ISLAND LIGHTING COMPANY
SUMMER CAPACITY PEAK LOADS AND MARGINS
EXCLUDING NYSE&G 1&2

Year	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
Installed Net Capability (MW)										
Thermal (conventional)	2,209	2,167	2,167	2,167	2,508	2,523	2,523	2,523	2,523	2,523
Thermal (GT and diesel)	174	174	331	582	666	676	934	1,204	1,204	1,186
Thermal (nuclear)										
Hydro (conventional)										
Hydro (pumped storage)										
Undetermined additions										
Total installed	2,383	2,341	2,498	2,749	3,174	3,199	3,457	3,727	3,727	3,709
List purchases and sales (MW)										
Conn. L&P/Freeport	/-17		/-2	+60/-5	/-6	/+8				
O&R/Cent. Hudson			/+12		-63/-59				/+103	/+67
Con Edison/PASNY	-250/	-78/							/+33	/+54
Rockville Ctr./Vermont Yankee					-2/	-2/				
Total capability (MW)	2,116	2,263	2,508	2,804	3,044	3,205	3,457	3,727	3,863	3,830
Peak load requirements (MW)	1,860	2,004	2,174	2,401	2,620	2,923	2,794	2,933	2,719	3,107
Month of seasonal peak	July	Aug	Aug	Aug	July	Sept	July	Aug	Aug	July
Reserve										
Actual (MW)	256	259	334	403	424	282	663	794	1,144	723
Actual (%)	13.8	12.9	15.4	16.8	16.2	9.6	23.7	27.1	42.1	23.3
Desired (MW)	260	281	304	336	367	409	391	528	489	559
Scheduled maintenance (MW)	0	0	0	0	0	0	0	0	0	0
Annual energy requirements (Million kWh)	9,085	9,928	10,826	11,479	12,243	13,127	12,672	12,979	13,317	13,603
Load factor based on annual peak load (%)	55.7	56.8	56.9	54.7	53.2	51.3	51.8	50.7	55.8	50.0

TABLE 1.1-66 (Cont'd)

Year	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
<u>Installed Net Capability (MW)</u>										
Thermal (conventional)	2,761	2,761	2,761	2,761	2,761	2,761	2,761	2,761	2,761	2,761
Thermal (GT and Diesel)	1,113	1,113	1,113	1,113	1,113	1,113	1,113	1,113	1,113	1,113
Thermal (nuclear)			820	820	820	820	1,014	1,014	1,014	1,014
Hydro (conventional)										
Hydro (pumped storage)										
Undeterminated additions										
Total installed	3,874	3,874	4,694	4,694	4,694	4,694	4,888	4,888	4,888	4,888
List purchases and sales (MW)										
PASNY	69	67	59	53	42	35	27	18	8	0
Vermont Yankee	59									
Total capability (MW)	4,002	3,941	4,753	4,747	4,736	4,729	4,915	4,906	4,896	4,888
Peak load requirements (MW)	3,030	3,140	3,260	3.380	3,500	3,590	3,710	3,830	3,940	4,040
Month of seasonal peak	July	July	July	July	July	July	July	July	July	July
Reserve										
Actual (MW)	972	801	1,493	1,367	1,236	1,139	1,205	1,076	956	848
Actual %	32.1	25.5	45.8	40.4	35.3	31.7	32.5	28.1	24.3	21.0
Desired (MW)	545	565	587	608	630	646	668	689	709	727
Scheduled maintenance (MW)	113	0	82.0	383	0	0	0	0	0	0
Annual energy requirements (Million kWh)	13,830	14,230	14,690	15,240	15,960	16,540	17,180	17,740	18,400	19,170
Load factor based on annual peak load (%)	52.1	51.7	51.3	51.5	52.1	52.6	52.7	52.9	53.3	54.2

TABLE 1.1-66 (Cont'd)

Year	1988	1989	1990	1991	1992
Installed Net Capability (MW)					
Thermal (conventional)	2,761	2,713	2,713	2,665	2,665
Thermal (GT and diesel)	1,113	1,113	1,113	1,107	1,107
Thermal (nuclear)	1,589	1,589	2,164	2,164	2,164
Hydro (conventional)					
Hydro (pumped storage)					
Undetermined additions					
Total installed	5,463	5,415	5,990	5,936	5,936
List purchases and sales (MW)					
Total capability (MW)	5,463	5,415	5,990	5,936	5,936
Peak load requirements (MW)	4,140	4,230	4,320	4,410	4,500
Month of seasonal peak	July	July	July	July	July
Reserve					
Actual (MW)	1,323	1,185	1,670	1,526	1,436
Actual (%)	32.0	28.0	38.7	34.6	31.9
Desired (MW)	745	761	778	794	810
Scheduled maintenance (MW)	0	0	0	0	0
Annual energy requirements (Million kWh)	19,980	20,680	21,430	22,130	22,880
Load factor based on annual peak load (%)	54.9	55.8	56.6	57.3	57.9

TABLE 1.1-67

LILCO
WINTER CAPACITY PEAK LOADS AND MARGINS
EXCLUDING NYSE&G 1&2

Year	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
Installed Net Capability (MW)										
Thermal (conventional)	2,231	2,184	2,184	2,184	2,521	2,524	2,524	2,524	2,524	2,563
Thermal (GT and diesel)	197	197	386	684	839	817	1,142	1,467	1,467	1,445
Thermal (nuclear)										
Hydro (conventional)										
Hydro (pumped storage)										
Undetermined additions										
Total installed	2,428	2,38[illegible]	2,570	2,868	3,360	3,341	3,666	3,991	3,991	4,008
List Purchases and Sales (MW)										
Freeport/Rockville Ctr.	-17/			/-1	-1/-2	/-1				
Con. Edison/PASNY	-250/							/+20	/+32	/+30
Vermont Yankee								30	28	
Total Capability (MW)	2,161	2,381	2,570	2,867	3,357	3,340	3,666	4,041	4,051	4,038
Peak Load Requirements (MW)	1,798	1,954	2,073	2,138	2,268	2,137	2,205	2,360	2,494	2,456
Month of Seasonal Peak	Jan	Dec	Dec	Dec	Dec	Dec	Dec	Jan	Dec	Jan
Reserve*										
Actual (MW)	363	427	497	729	1,089	1,203	1,461	1,681	1,557	1,582
Actual (%)	20.2	21.9	4.0	34.1	48.0	56.3	66.3	71.2	62.4	64.4
Desired (M)W	252	274	290	299	318	299	309	1,101	714	1,210
Scheduled Maintenance (MW)	0	0	0	0	0	0	0	0	0	0
Annual Energy Requirements (Million kWh)	9,085	9,928	10,826	11,479	12,243	13,127	12,672	12,979	13,317	13,603
Load Factor Based on Annual Peak load (%)	55.7	56.8	56.9	54.7	53.2	51.3	51.8	50.7	55.8	50.0

TABLE 1.1-67 (Cont'd)

Year	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Installed Net Capability (MW)										
Thermal (conventional)	2,761	2,761	2,761	2,761	2,761	2,761	2,761	2,761	2,761	2,761
Thermal (GT and diesel)	1,371	1,371	1,371	1,371	1,371	1,371	1,371	1,371	1,371	1,371
Thermal (nuclear)			820	820	820	1,016	1,016	1,016	1,016	1,016
Hydro (conventional)										
Hydro (pumped storage)										
Undetermined additions										
Total installed	4,132	4,132	4,952	4,952	4,952	5,148	5,148	5,148	5,148	5,148
List Purchases and Sales (MW)										
PASNY	28	25	23	18	15	12	8	4	0	0
Total Capability (MW)	4,160	4,157	4,975	4,970	4,967	5,160	5,156	5,152	5,148	[illegible],148
Peak Load Requirements (MW)	2,530	2,600	2,670	2,760	2,850	2,920	3,020	3,130	3,240	3,350
Month of Seasonal Peak	Dec	Dec	Dec	Dec	Dec	Dec	Dec	Dec	Dec	Dec
Reserve										
Actual (MW)	1,630	1,557	2,305	2,210	2,117	2,240	2,136	2,022	1,908	1,798
Actual(%)	64.4	59 [illegible]	86.3	80.1	74.3	76.7	70.7	64.6	58.9	53.7
Desired (MW)	455		481	497	513	526	544	563	583	603
Scheduled Maintenance (MW)	115	0	0	0	0	0	0	0	0	0
Annual Energy Requirements (Million kWh)	13,830	14 [illegible]30	14,690	15,240	15,960	16,540	17,180	17,740	18,400	19,170
Load Factor Based on Annual Peak load (%)	52.1	51.7	51.3	51.5	52.1	52.6	52.7	52.9	53.3	54.2

407 224

TABLE 1.1-67 (Cont'd)

Year	1988	1989	1990	1991	1992
Installed Net Capability (MW)					
Thermal (conventional)	2,713	2,713	2,665	2,665	2,551
Thermal (GT and diesel)	1,371	1,371	1,365	1,365	1,359
Thermal (nuclear)	1,591	1,591	2,166	2,166	2,166
Hydro (conventional)					
Hydro (pumped storage)					
Undetermined additions					
Total installed	5,675	5,675	6,196	6,196	6,076
List Purchases and Sales (MW)					
Total Capability (MW)	5,675	5,675	6,196	6,196	6,076
Peak Load Requirements (MW)	3,460	3,570	3,680	3,790	3,900
Month of Seasonal Peak	Dec	Dec	Dec	Dec	Dec
Peserve					
Actual MW	2215	2105	2516	2406	2176
Actual %	64.0	59.0	68.4	63.5	55.8
Desired MW	623	643	662	682	702
Scheduled Maintenance (MW)	0	0	0	0	0
Annual Energy Requirements (Million kWh)	19,980	20,830	21,430	22,130	22,880
Load Factor Based on Annual Peak load (%)	54.9	55.8	56.6	57.3	57.9

NOTE:

* Starting in 1975, reserve is based on previous summer requirements

407 225

NYSE&G ER
NEW HAVEN-NUCLEAR

TABLE 1.1-68

LILCO
GENERATING STATION CAPABILITY REPORT

Existing Units (MW)

Station	Unit No.	Installation Date	Type	Fuel	Net 4-Hour Capability Rating Summer	Net 4-Hour Capability Rating Winter
Northport	1	1967	T	O	383	383
Northport	2	1968	T	O	383	383
Northport	3	1972	T	O	383	383
Northport	4	1977	T	O	[illegible]	383
Port Jefferson	1	1948	T	O	48	48
Port Jefferson	2	1950	T	O	48	48
Port Jefferson	3	1958	T	O	190	190
Port Jefferson	4	1960	T	O	190	190
Glenwood	4	1952	T	O	114	114
Glenwood	5	1954	T	O	113	113
E. F. Barrett	1	1956	T	O	190	190
E. F. Barrett	2	1963	T	O	190	190
Far Rockaway	4	1953	T	O	114	114
E. F. Barrett	G1	1970	G	O	15	18
E. F. Barrett	G2	1970	G	O	15	18
E. F. Barrett	G3	1970	G	O	15	18
E. F. Barrett	G4	1970	G	O	15	18
E. F. Barrett	G5	1970	G	O	15	18
E. F. Barrett	G6	1970	G	O	15	18
E. F. Barrett	G7	1970	G	O	15	18
E. F. Barrett	G8	1970	G	O	15	18
E. F. Barrett	G9	1971	G	O	40	47
E. F. Barrett	G10	1971	G	O	40	47
E. F. Barrett	G11	1971	G	O	40	47
E. F. Barrett	G12	1971	G	O	40	47
Glenwood	G1	1967	G	O	16	20
Glenwood	G2	1972	G	O	49	54
Glenwood	G3	1972	G	O	49	54
Northport	G1	1967	G	O	16	18
Port Jefferson	G1	1966	G	O	16	18
Holbrook	G1	1974	G	O	47	61
Holbrook	G2	1974	G	O	47	61
Holbrook	G3	1974	G	O	47	61
Holbrook	G4	1974	G	O	47	61
Holbrook	G5	1974	G	O	47	61
Holbrook	G6	1975	G	O	50	64
Holbrook	G7	1975	G	O	50	64
Holbrook	G8	1975	G	O	50	64

407 226

TABLE 1.1-68 (Cont'd)

Existing Units (MW)

Station	Unit No.	Installation Date	Type	Fuel	Net 4-Hour Capability Rating Summer	Net 4-Hour Capability Rating Winter
Holbrook	G9	1975	G	O	50	64
Holbrook	G10	1975	G	O	50	64
Shoreham	G1	1971	G	O	48	61
W. Babylon	G1	1966	G	O	17	21
W. Babylon	G2	1966	G	O	17	21
W. Babylon	G3	1966	G	O	17	21
W. Babylon	G4	1971	G	O	46	60
Southold	G1	1964	G	O	14	16
Southampton	G1	1963	G	O	11	14
Montauk	D2	1962	D	O	2	2
Montauk	D3	1961	D	O	2	2
Montauk	D4	1961	D	O	2	2
E. Hampton	D2	1962	D	O	2	2
E. Hampton	D3	1962	D	O	2	2
E. Hampton	D4	1962	D	O	2	2
E. Hampton	G1	1970	G	O	20	24

NOTES:

T-Thermal Conventional
G-Gas Turbine
D-Diesel
O-Oil

407 227

TABLE 1.1-69

LILCO
GENERATING STATION CAPABILITY REPORT

Proposed Additional Units (MW)

Station	Unit No.	Effective Date	Type	Fuel	Expected Net Capability Addition Summer	Expected Net Capability Addition Winter
Mitchel Gardens	1	Aug 1978	T	SW	16	16
Mitchel Gardens	2	Aug 1978	T	SW	16	16
Shoreham	1	Sept 1980	N	N	820	820
Nine Mile Point*	2	Oct 1983	N	N	194	196
Jamesport**	1	July 1988	N	N	575	575
Jamesport**	2	July 1990	N	N	575	575
NYSE&G**	1	May 1991	N	N	625	625
NYSE&G**	2	May 1993	N	N	625	625

NOTES:

* 18 percent - LILCO's share of Niagara Mohawk's, Nine Mile Point, Unit No. 2

** 50 percent - Joint ownership with New York State Electric & Gas

N=Nuclear

T=Thermal Conventional

SW=Solid Waste

407 226

TABLE 1.1-70

LILCO
GENERATING STATION CAPABILITY REPORT

Units to be Retired (MW)

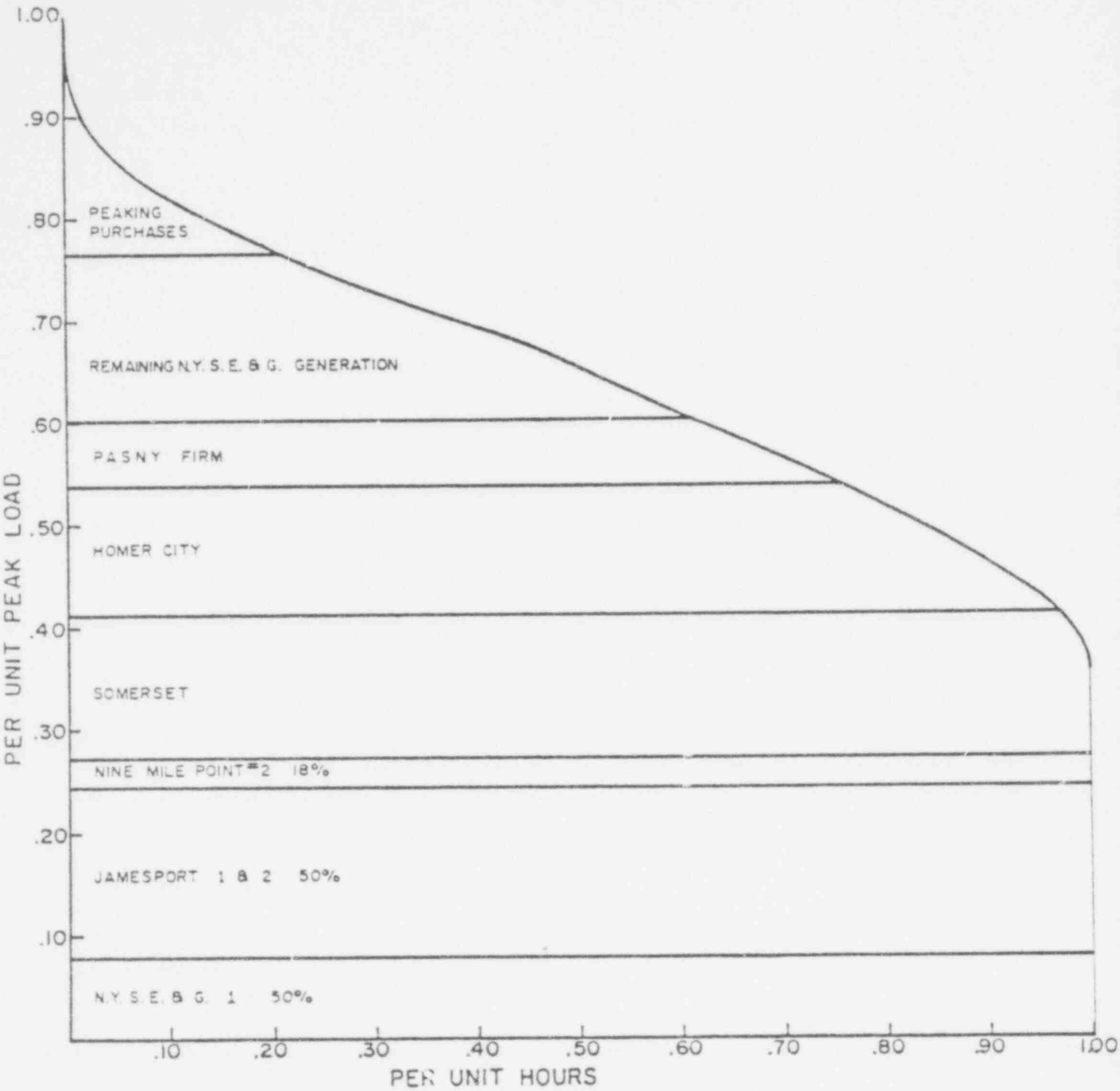
Station	Unit No.	Effective Date	Type	Fuel	Net 4-Hour Capability Rating Summer	Net 4-Hour Capability Rating Winter
Port Jefferson	1	Nov 1988	T	O	48	48
Port Jefferson	2	Nov 1990	T	O	48	48
Montauk	2	Nov 1990	D	O	2	2
Montauk	3	Nov 1990	D	O	2	2
Montauk	4	Nov 1990	D	O	2	2
Glenwood	4	Nov 1992	T	O	114	114
East Hampton	2	Nov 1992	D	O	2	2
East Hampton	3	Nov 1992	D	O	2	2
East Hampton	4	Nov 1992	D	O	2	2
Far Rockaway*	4	Nov 1993	T	O	114	114

NOTES:

* This unit may be retired in 1981 for economic reasons

D - Diesel
O - Oil
T - Thermal Conventional

407 229

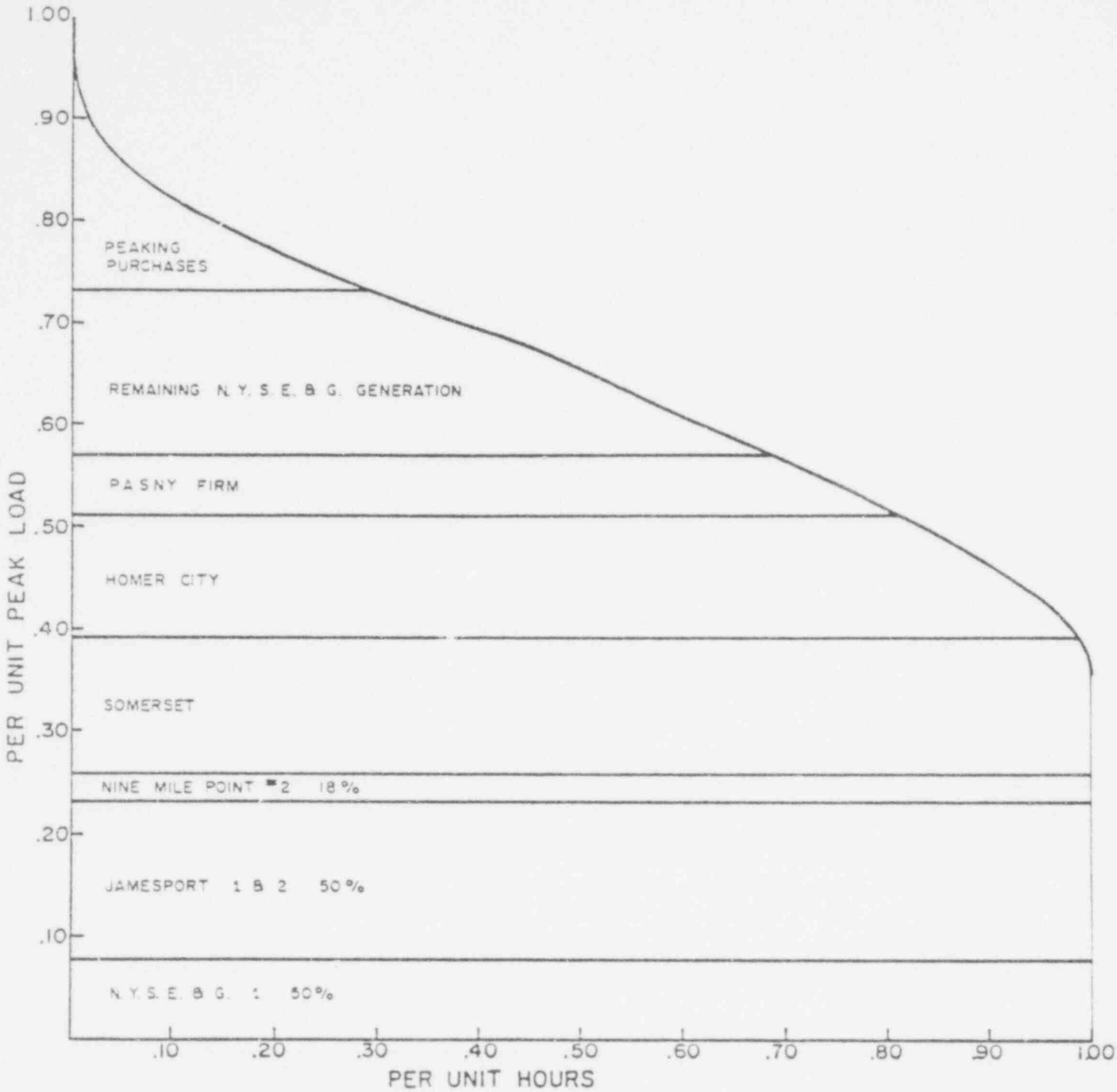


407 230

FIGURE 1.1-1 NEW HAVEN SITE

NYSE & G ANNUAL LOAD DURATION CURVE, MAY 1991 TO MAY 1992

NEW YORK STATE ELECTRIC & GAS CORPORATION
ENVIRONMENTAL REPORT – NUCLEAR

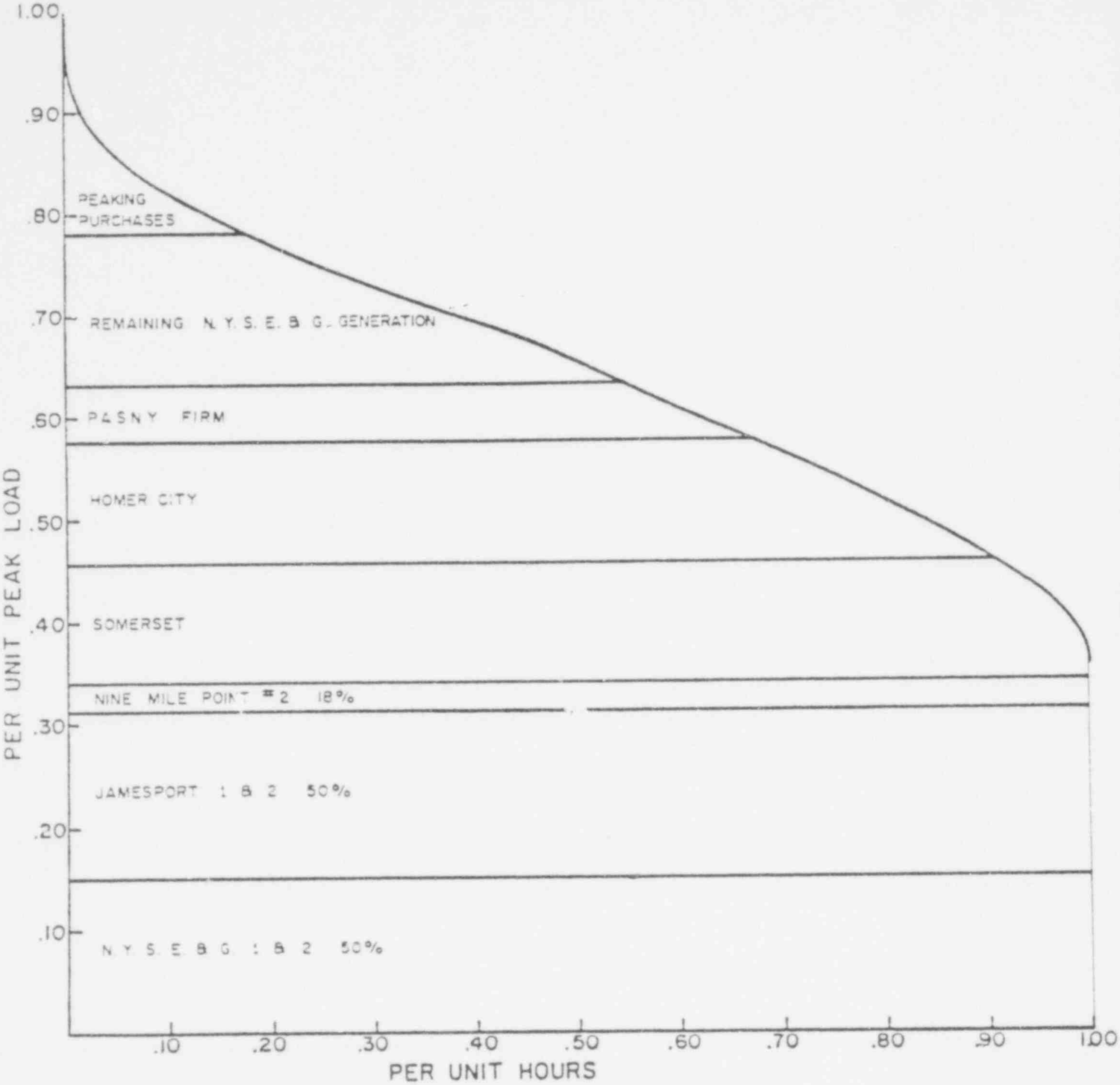


407 231

FIGURE 11-2 NEW HAVEN SITE

NYSE & G ANNUAL LOAD DURATION CURVE, MAY 1992 TO MAY 1993

NEW YORK STATE ELECTRIC & GAS CORPORATION
ENVIRONMENTAL REPORT — NUCLEAR

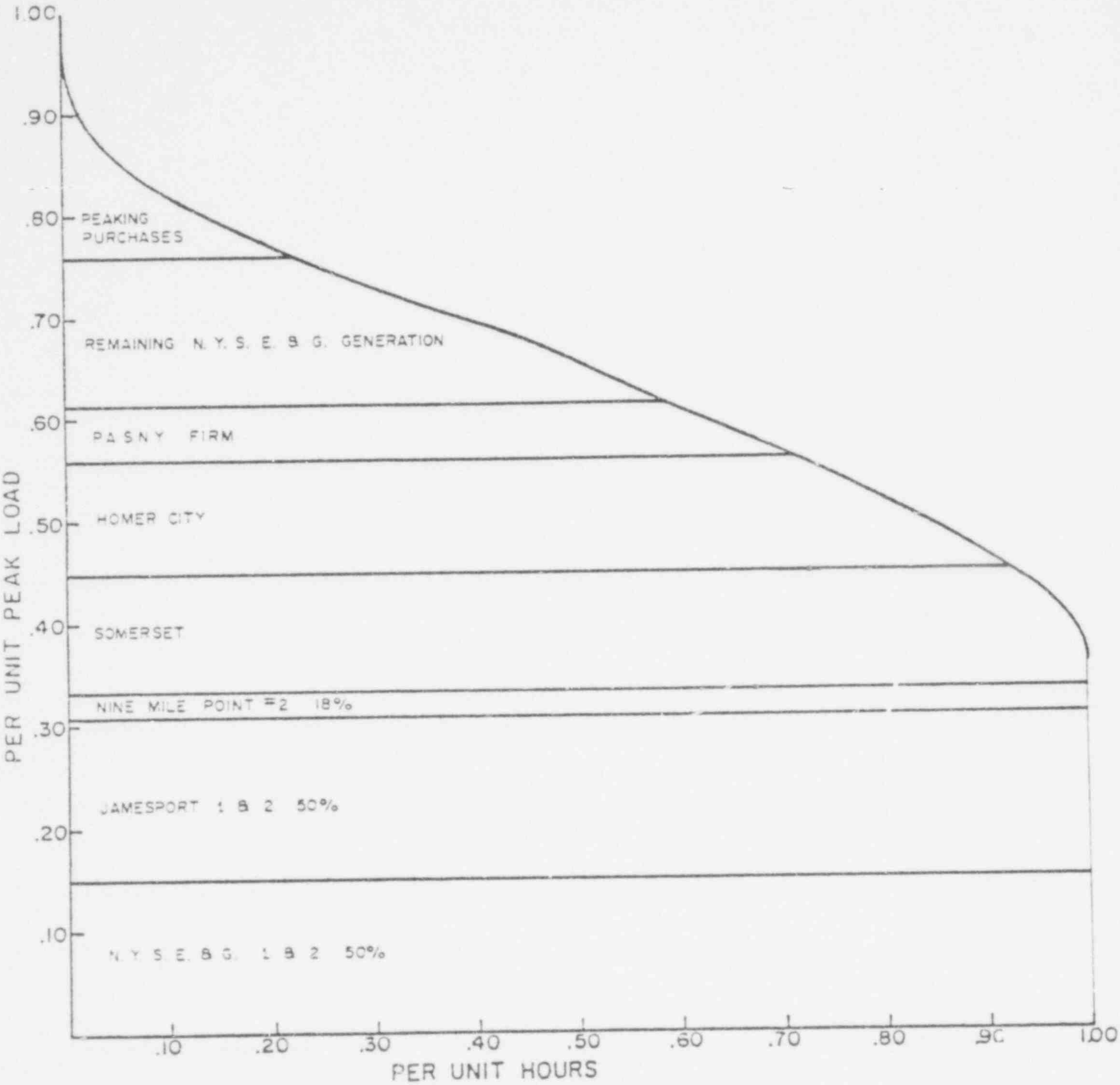


407 232

FIGURE 1.1-3 NEW HAVEN SITE

NYSE & G ANNUAL LOAD DURATION CURVE, MAY 1993 TO MAY 1994

NEW YORK STATE ELECTRIC & GAS CORPORATION
ENVIRONMENTAL REPORT — NUCLEAR



407 233

FIGURE 1.1-4 NEW HAVEN SITE

NYSE & G ANNUAL LOAD DURATION CURVE, MAY 1994 TO MAY 1995

NEW YORK STATE ELECTRIC & GAS CORPORATION
ENVIRONMENTAL REPORT – NUCLEAR

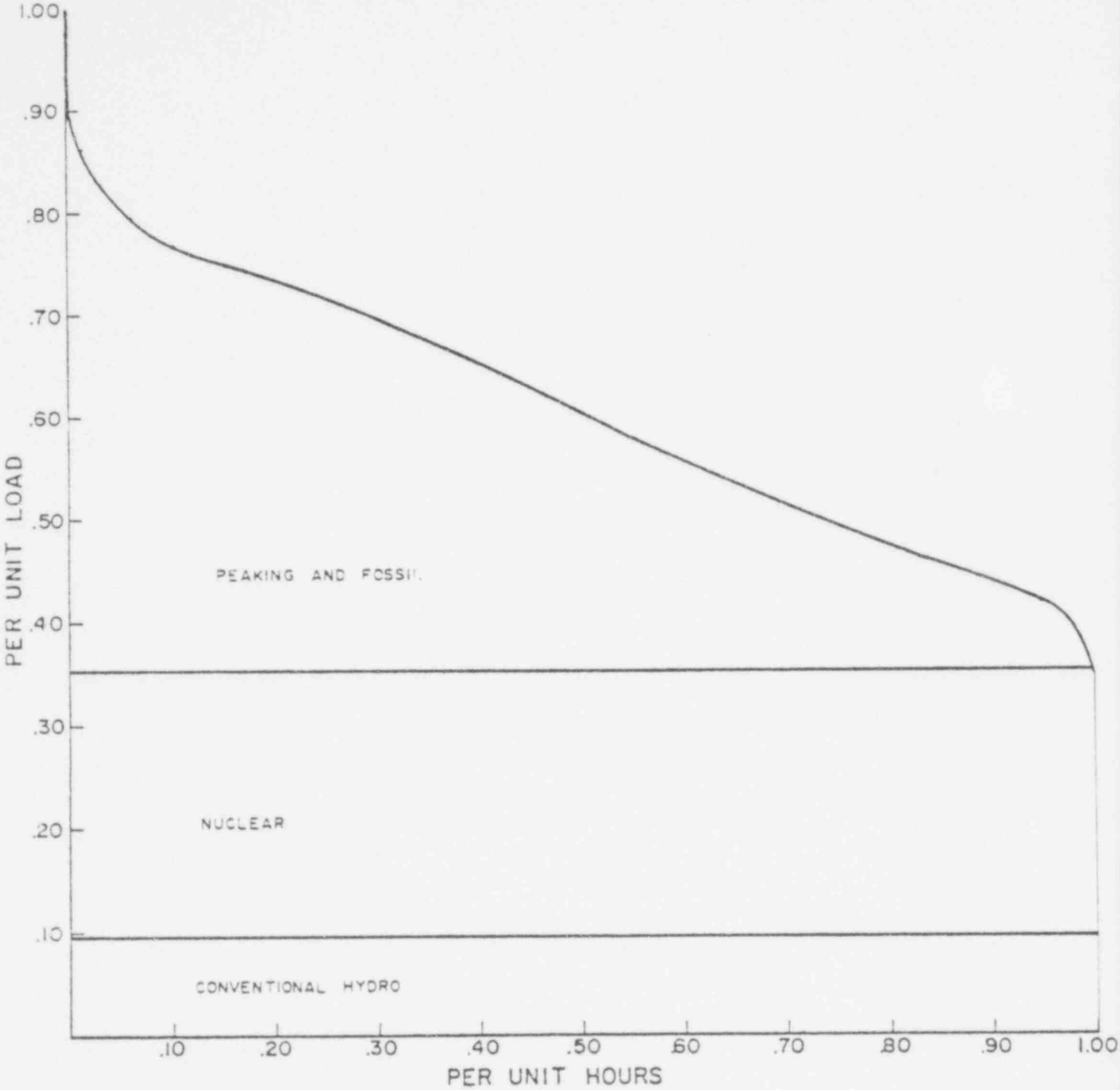


FIGURE 1.1-5 NEW HAVEN SITE

NYPP ANNUAL LOAD DURATION CURVE, MAY 1991 TO MAY 1992

NEW YORK STATE ELECTRIC & GAS CORPORATION
ENVIRONMENTAL REPORT — NUCLEAR

407 234

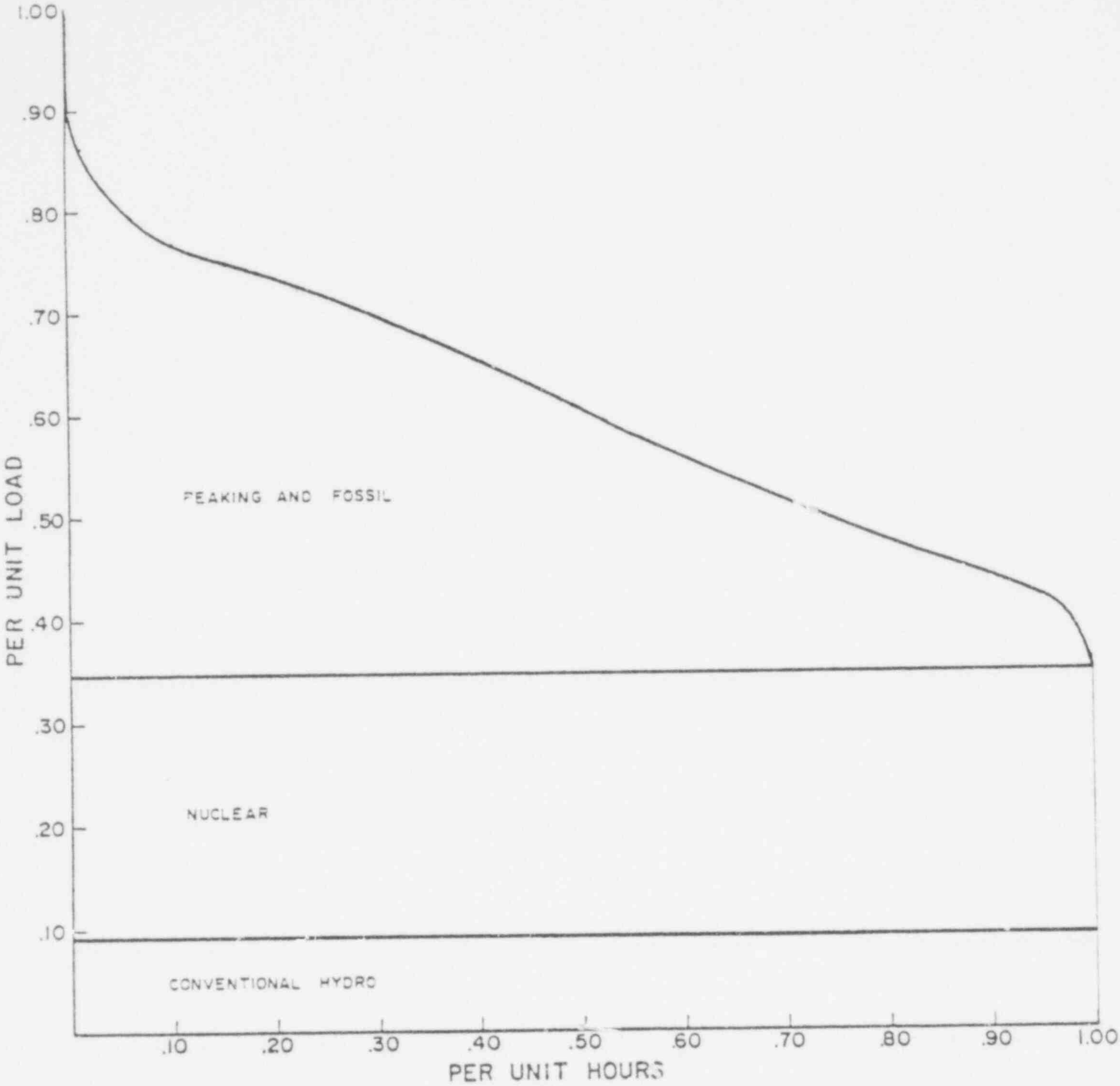


FIGURE 1.1-6 NEW HAVEN SITE

NYPP ANNUAL LOAD DURATION CURVE, MAY 1992 TO MAY 1993

NEW YORK STATE ELECTRIC & GAS CORPORATION
ENVIRONMENTAL REPORT – NUCLEAR

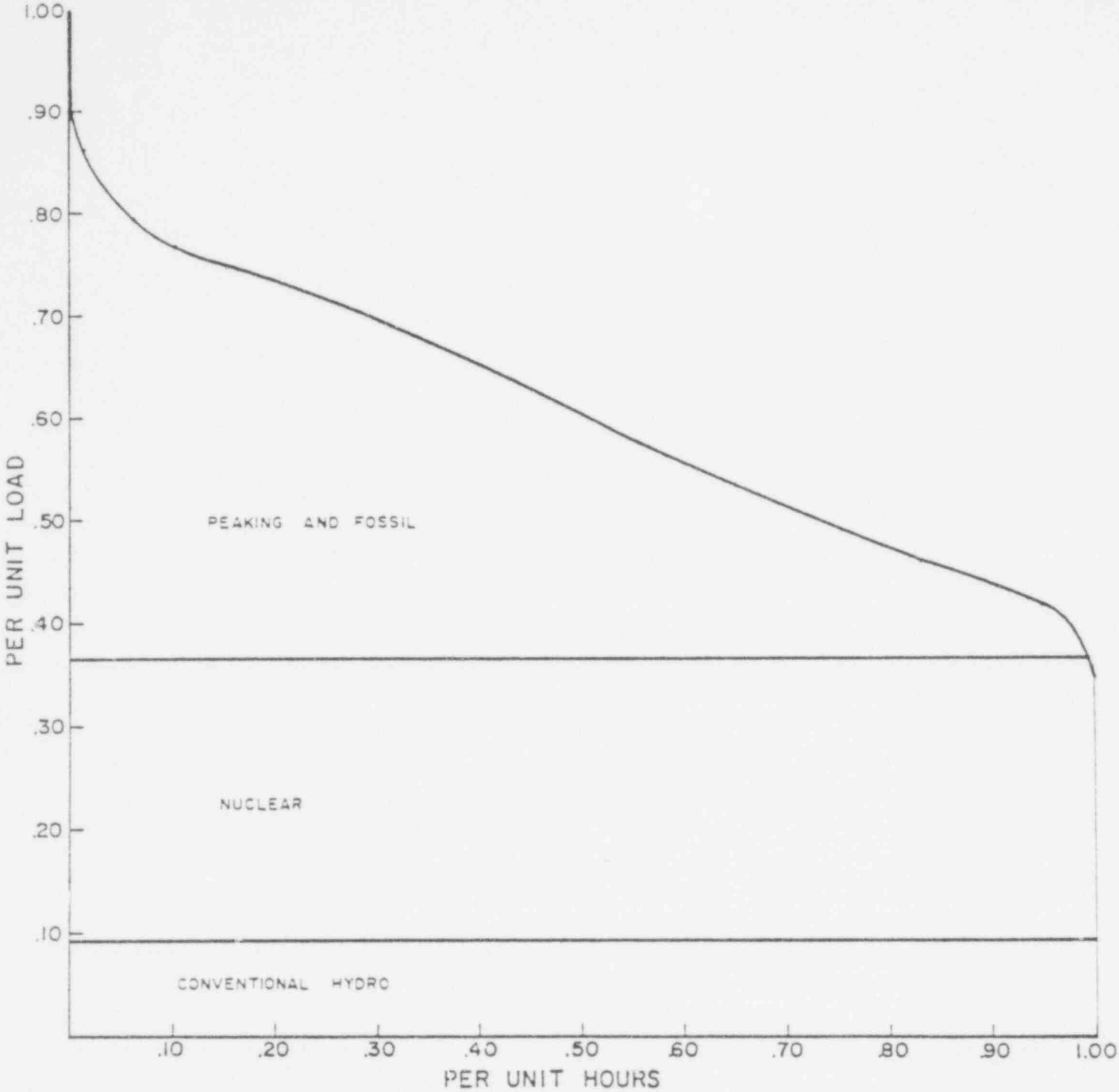
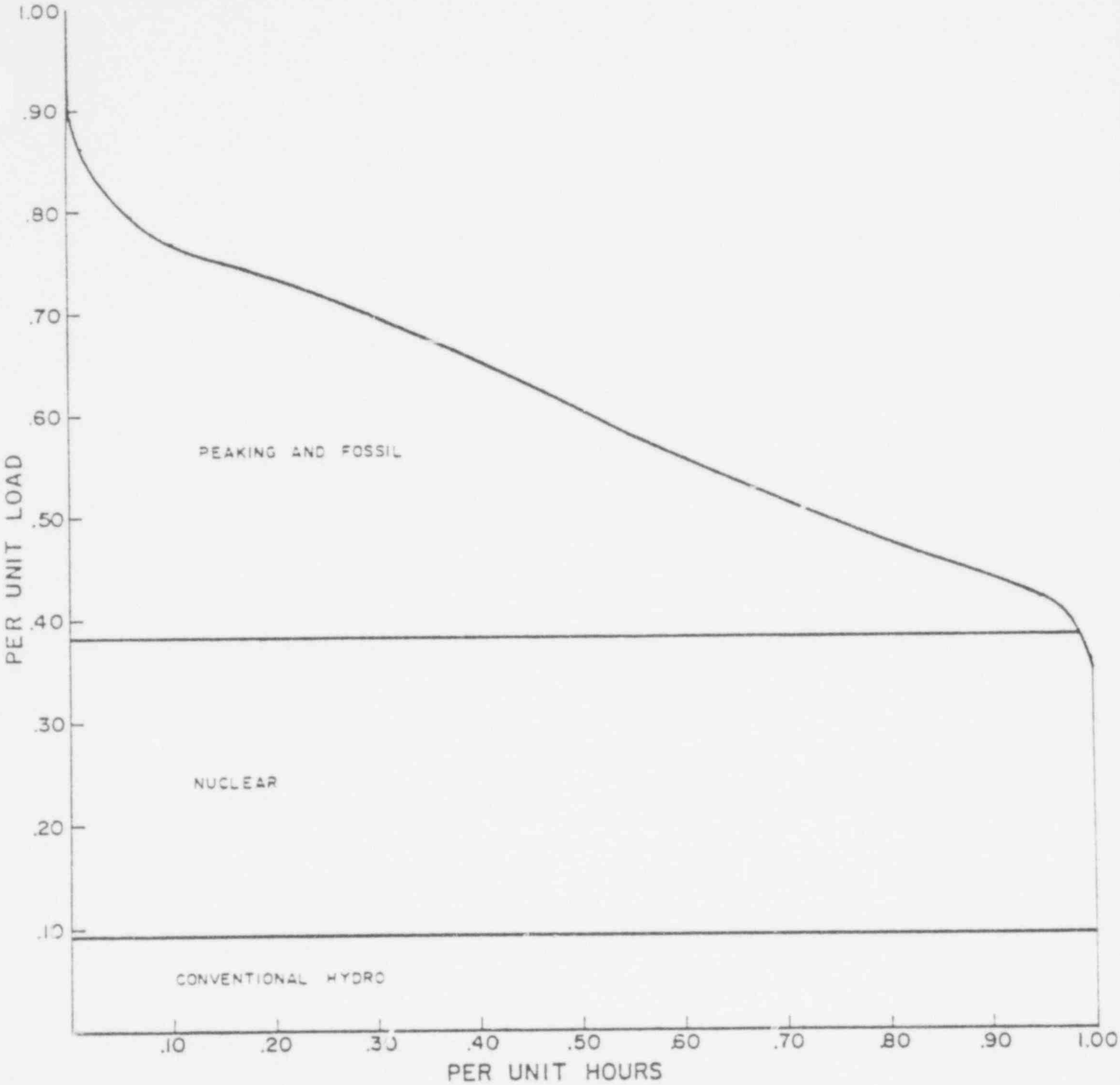


FIGURE 1.1-7 NEW HAVEN SITE

NYPP ANNUAL LOAD DURATION CURVE, MAY 1993 TO MAY 1994

NEW YORK STATE ELECTRIC & GAS CORPORATION
ENVIRONMENTAL REPORT -- NUCLEAR

407 236



407 237

FIGURE 11-8 NEW HAVEN SITE

NYPP ANNUAL LOAD DURATION CURVE, MAY 1994 TO MAY 1995

NEW YORK STATE ELECTRIC & GAS CORPORATION
ENVIRONMENTAL REPORT — NUCLEAR

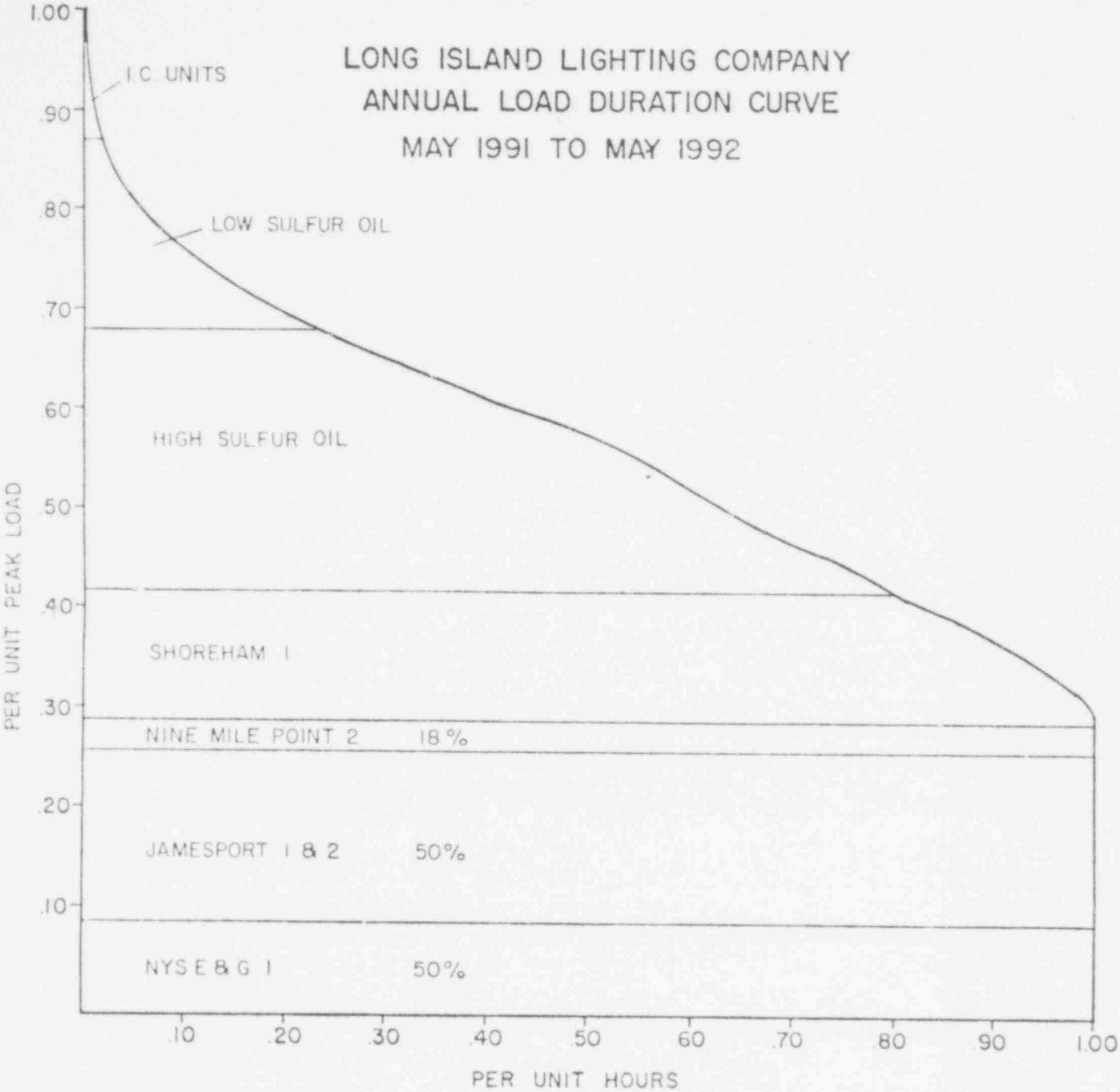


FIGURE 1.1-9 NEW HAVEN SITE

LILCO ANNUAL LOAD DURATION CURVE, MAY 1991 TO MAY 1992

NEW YORK STATE ELECTRIC & GAS CORPORATION
ENVIRONMENTAL REPORT — NUCLEAR

407 238

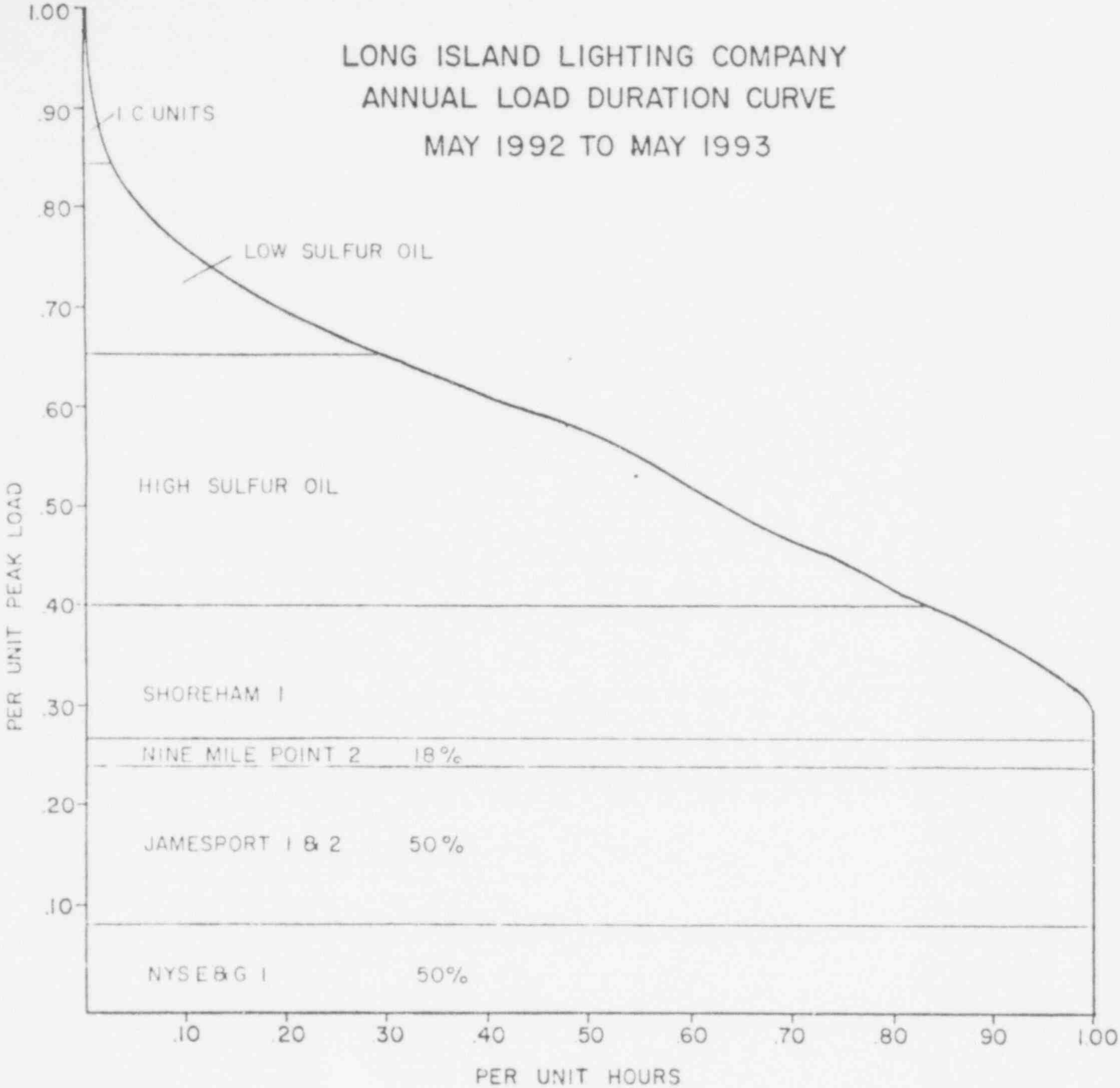


FIGURE 1.1-10 NEW HAVEN SITE

LILCO ANNUAL LOAD DURATION CURVE, MAY 1992 TO MAY 1993

NEW YORK STATE ELECTRIC & GAS CORPORATION
ENVIRONMENTAL REPORT – NUCLEAR

407 239

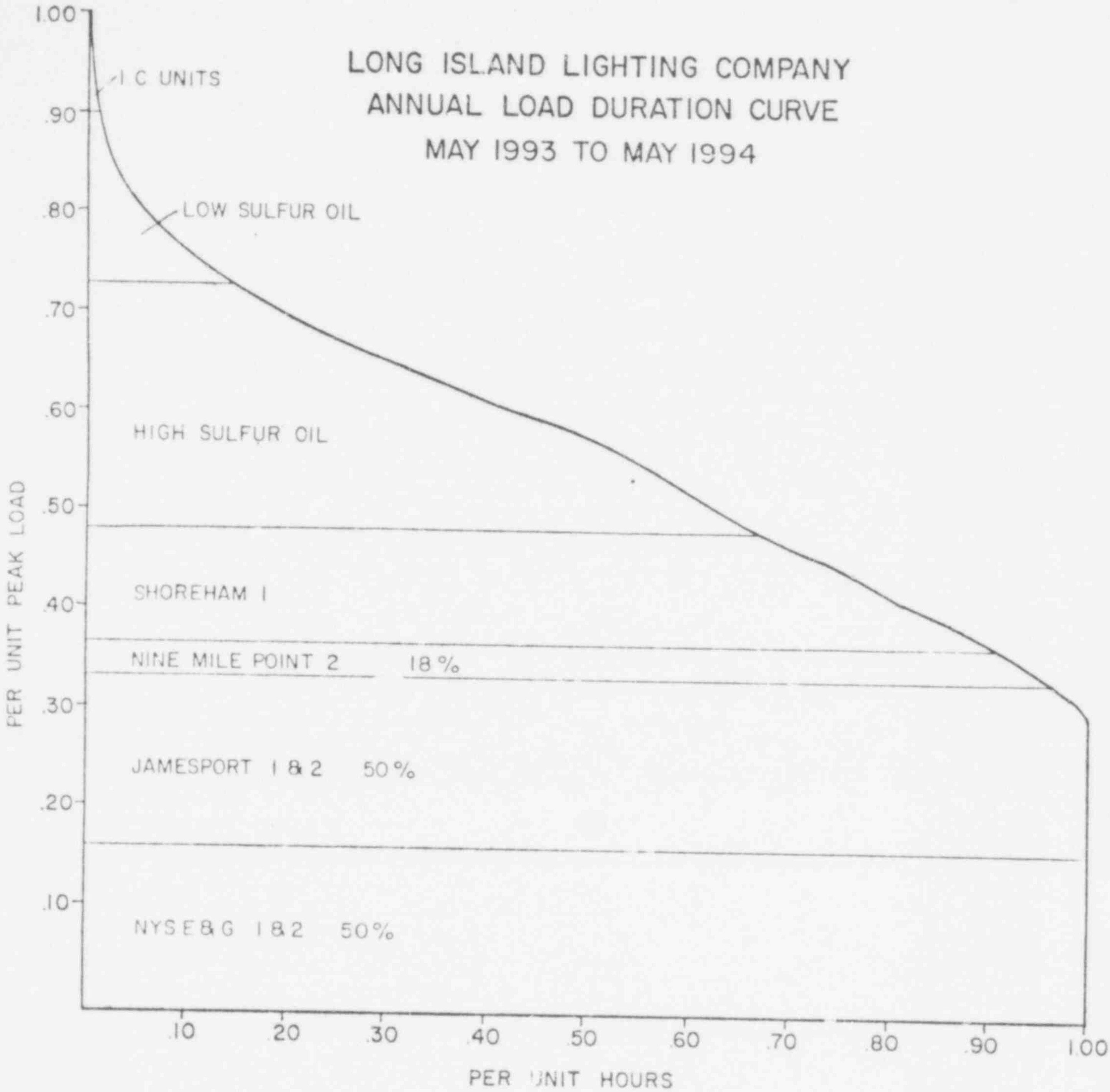


FIGURE 1.1-11 NEW HAVEN SITE

LILCO ANNUAL LOAD DURATION CURVE, MAY 1993 TO MAY 1994

NEW YORK STATE ELECTRIC & GAS CORPORATION
ENVIRONMENTAL REPORT — NUCLEAR

407 240

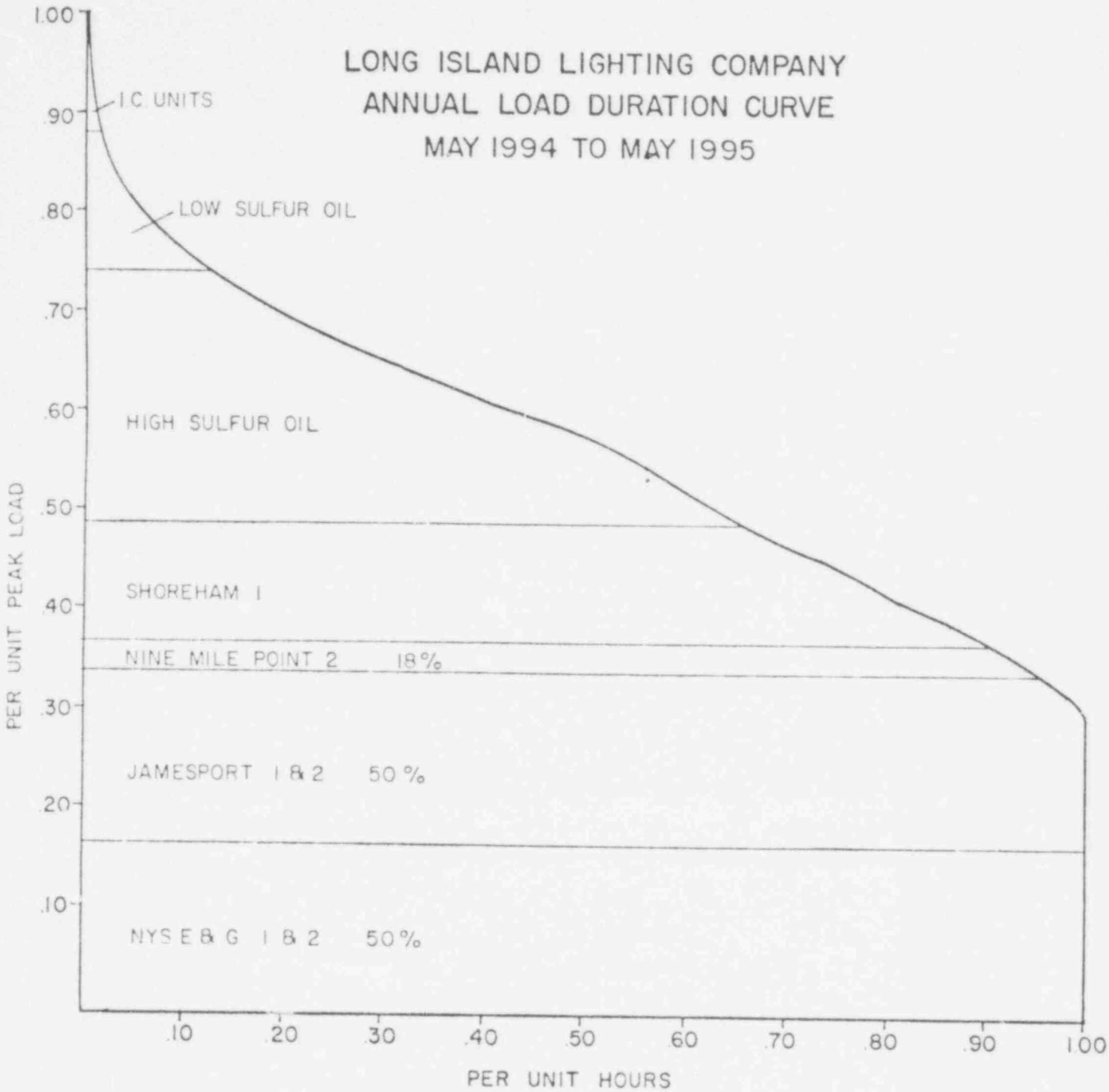


FIGURE 1.1-12 NEW HAVEN SITE

LILCO ANNUAL LOAD DURATION CURVE, MAY 1994 TO MAY 1995

NEW YORK STATE ELECTRIC & GAS CORPORATION
ENVIRONMENTAL REPORT – NUCLEAR

407 241

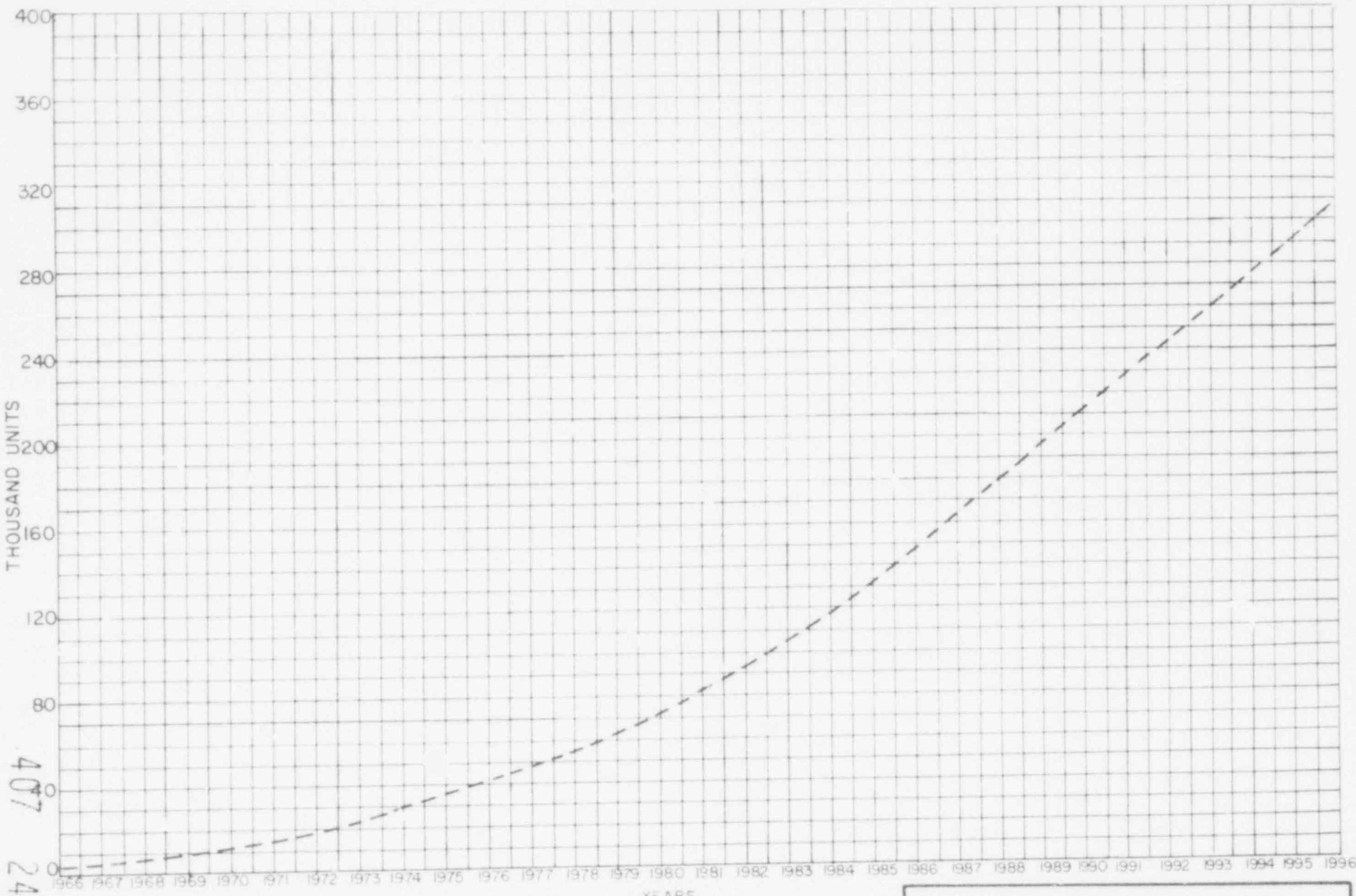


FIGURE 1.1-13 NEW HAVEN SITE

NYSE&G FORCAST-ELECTRICALLY HEATED DWELLING UNITS

NEW YORK STATE ELECTRIC & GAS CORPORATION
ENVIRONMENTAL REPORT – NUCLEAR

407 242

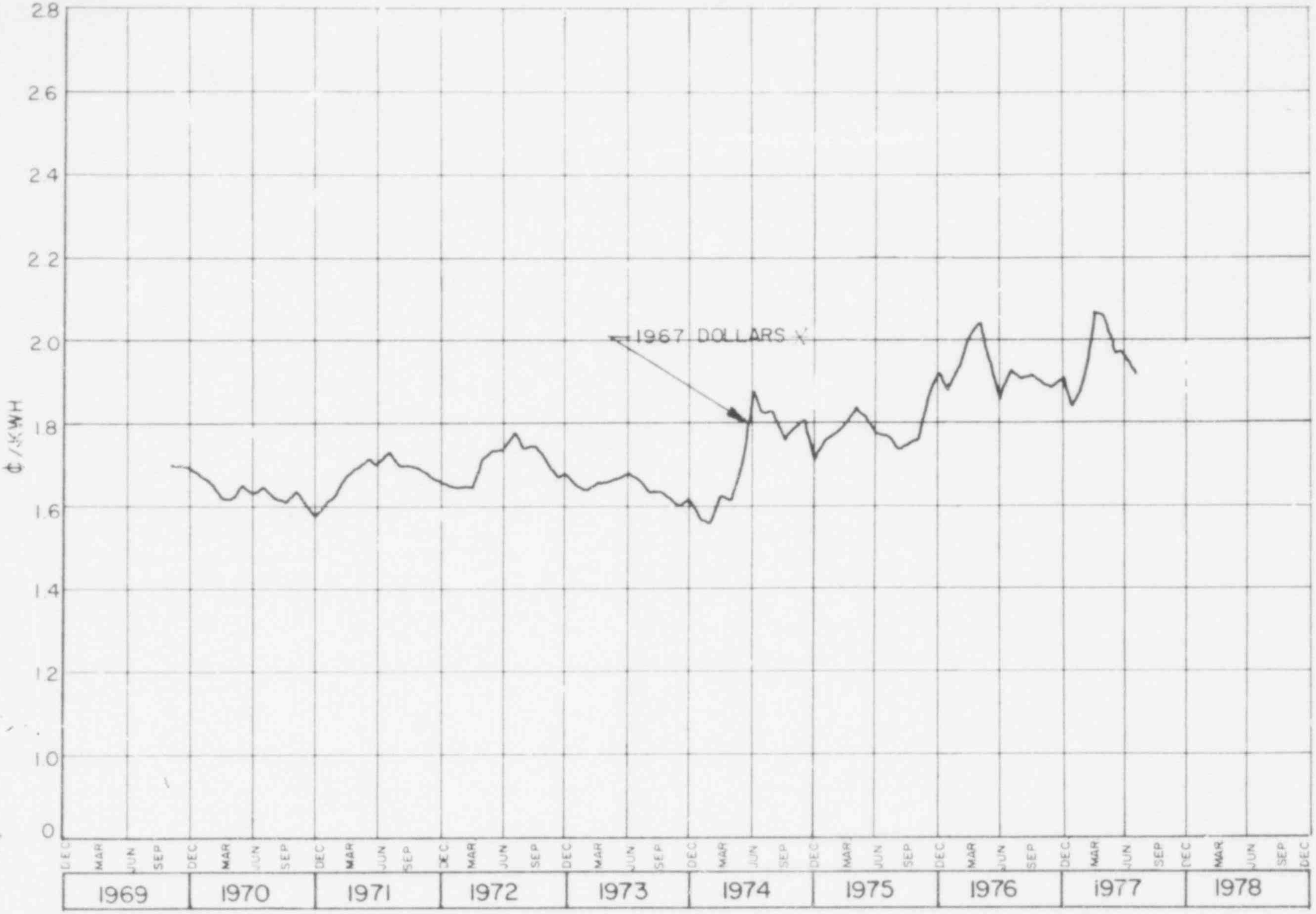


FIGURE 1.1-14 NEW HAVEN SITE

NYSE&G AVERAGE PRICE PER KWH FOR ALL SALES

NEW YORK STATE ELECTRIC & GAS CORPORATION
ENVIRONMENTAL REPORT — NUCLEAR

407 243

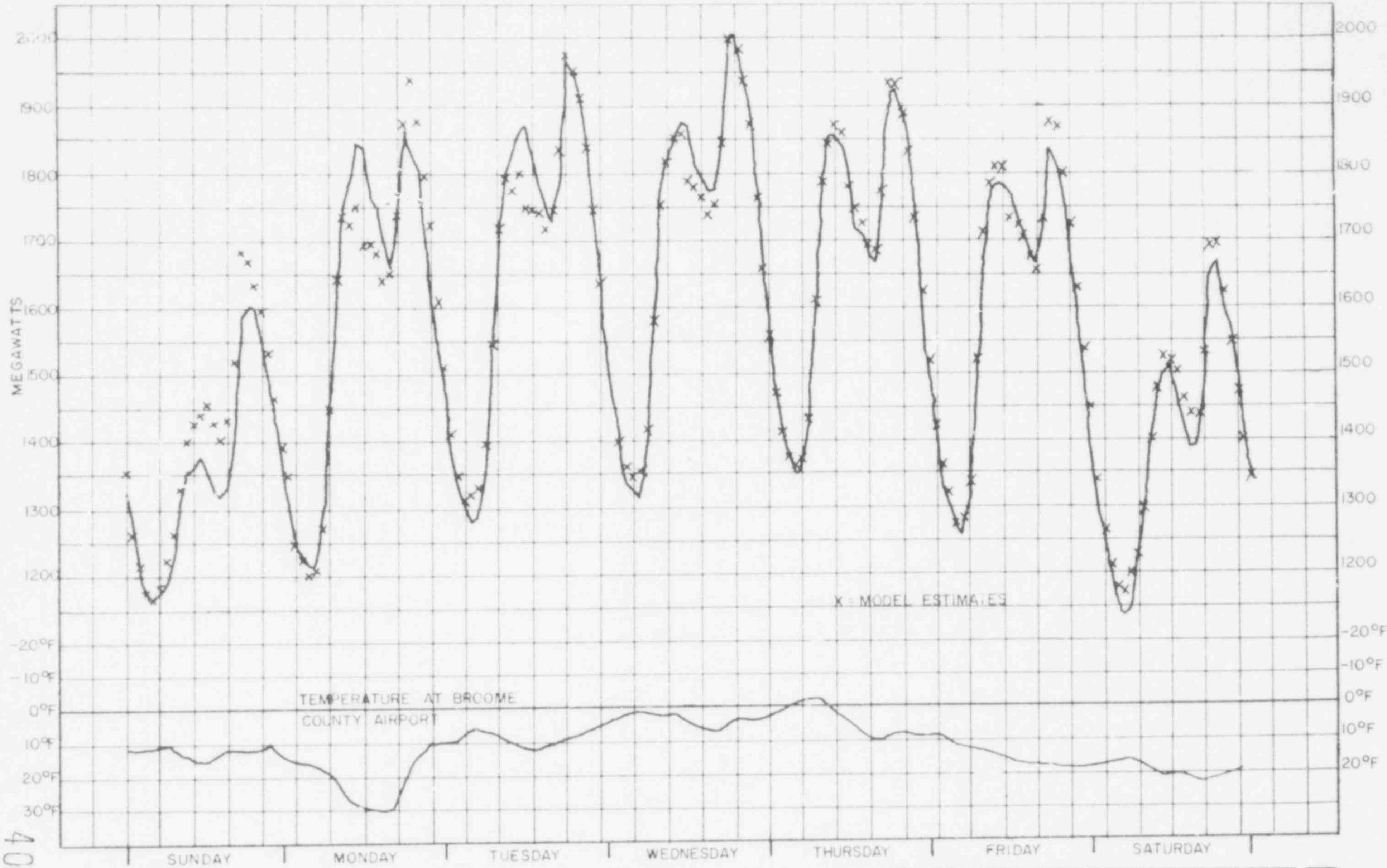
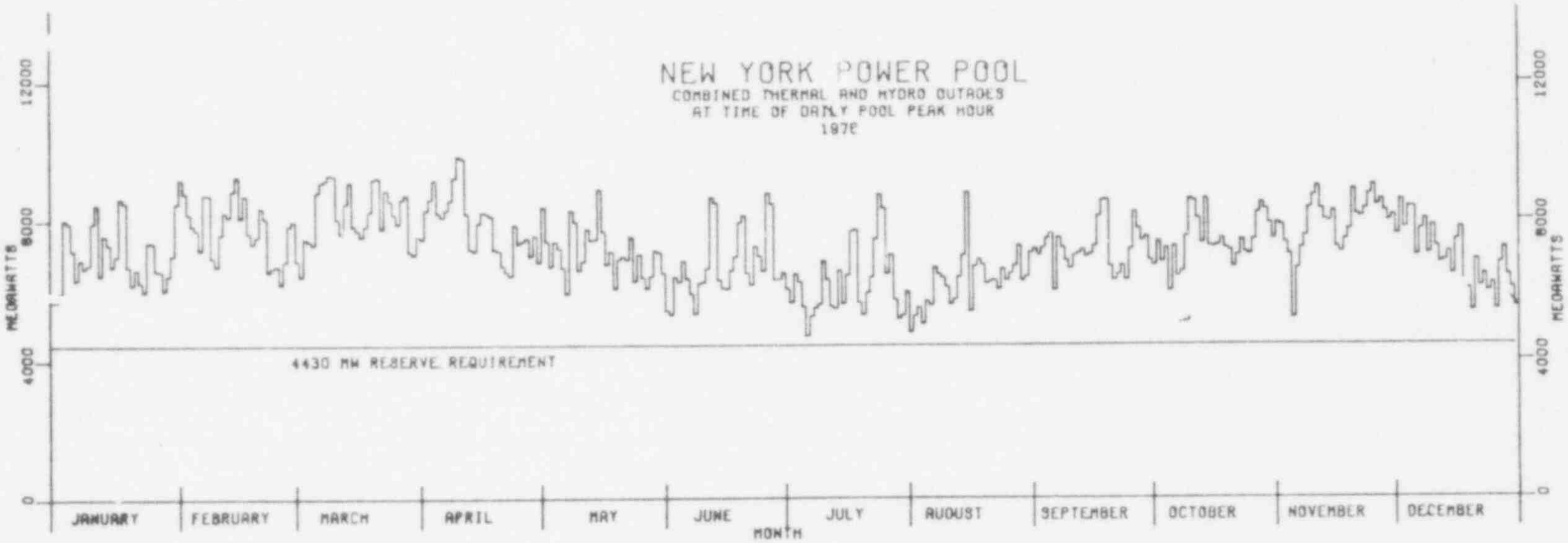


FIGURE 1.1-15 NEW HAVEN SITE

NYSE & G HOURLY DEMANDS COMP. WITH MODEL EST. 1/9/77 TO 1/15/77

NEW YORK STATE ELECTRIC & GAS CORPORATION
ENVIRONMENTAL REPORT – NUCLEAR

407 244



407 245

FIGURE 1.1-16 NEW HAVEN SITE

NYPP COMBINED THERMAL AND HYDRO OUTAGES

NEW YORK STATE ELECTRIC & GAS CORPORATION
ENVIRONMENTAL REPORT – NUCLEAR

1.3 CONSEQUENCES OF DELAY

The projected inservice dates for the proposed NYSE&G 1 & 2 project are May 1991 and May 1993, respectively. Tables 1.1-60 and 1.1-61 show an increasing NYSE&G deficiency as each year passes without the plant in service. If no purchases of capacity were possible in that time period as indicated by the scenario presented in Table 1.1-3, NYSE&G would be forced to implement NYPP emergency operating procedures. This would result in a policy of voltage reductions and rotating blackouts (brownouts) to an extreme of total blackouts, such as those experienced by major cities in recent years, with their attendant traumatic consequences.

The effect on the statewide system depends on whether other generating units become operational prior to the projected inservice date of the NYSE&G units and interim steps are taken by the NYPP members to assure the availability of adequate capacity. The effect could range from severe limitations on the use of electricity by NYSE&G's customers and possibly by customers of other utilities; to uneconomic generation due to a poor generation mix; to little or no effect if other units of appropriate size are placed in service during the interim period. The large number of possible variables make it impossible to project a reasonable estimate of the effect of a delay in the inservice date of the proposed plant on the statewide generating and transmission system other than the economic consequences previously discussed.

As the NYPP member systems reported in the 1978 submission of 149-b in Volume I, Exhibit 14, "...the NYPP members have developed a generation planning strategy that will (1) insure adequate capacity for reliable and economic operation under several possible contingencies and (2) diversify fuel sources as rapidly as can be practicably accomplished."

The NYPP planning strategy insures a reliable supply under either of the following occurrences, but not both simultaneously:

1. Load growth higher than presently forecast by NYPP members, all scheduled completion dates achieved,probable requirements for cooling towers and allowance for probable capacity deratings. The higher load growth was based on the forecast independently prepared for NYPP by the National Economic Research Associates (NERA).

2. Delay in completion dates, load growth as forecast by NYPP members, probable requirements for cooling towers and allowance for probable capacity deratings. The delay used for this contingency for units not yet under construction was two years and for units presently under construction, one year.

The target dates, listed in Table 1.1-24, reflect planning for the foregoing contingencies.

If the NYSE&G 1 & 2 nuclear units, proposed by this application, should be delayed beyond their presently scheduled inservice dates, NYSE&G's electric customers would be forced to absorb higher production costs due to the necessity to purchase from higher cost, oil-fired units to meet their needs. LILCO electric customers would be forced to absorb the higher production costs from the operation of high cost, oil fired units. In addition, this increased use of oil-fired generation would cause an increase in US oil requirements which is in contravention of governmental policy to reduce US oil consumption. Therefore, the proposed NYSE&G 1 & 2 nuclear units are consistent with national energy policy and are in the bests interests of the Applicants' electric customers and the electric consumers of New York State as a whole.

407 249

TABLE OF CONTENTS

CHAPTER 2

THE SITE AND ENVIRONMENTAL INTERFACES

407 248

TABLE OF CONTENTS (Cont'd)

407 249

TABLE OF CONTENTS (Cont'd)

407 250

TABLE OF CONTENTS (Cont'd)

407 259

TABLE OF CONTENTS (Cont'd)

TABLE OF CONTENTS (Cont'd)

407 253

TABLE OF CONTENTS (Cont'd)

407 254

TABLE OF CONTENTS (Cont'd)

TABLE OF CONTENTS (Cont'd)

TABLE OF CONTENTS (Cont'd)

TABLE OF CONTENTS (Cont'd)

407 258

LIST OF TABLES

407 259

LIST OF TABLES (Cont'd)

407 260

LIST OF TABLES (Cont'd)

LIST OF TABLES (Cont'd)

407 262

LIST OF TABLES (Cont'd)

407 263

LIST OF TABLES (Cont'd)

LIST OF TABLES (Cont'd)

407 265

LIST OF TABLES (Cont'd)

407 266

LIST OF TABLES (Cont'd)

407 267

LIST OF TABLES (Cont'd)

LIST OF TABLES (Cont'd)

407 269

LIST OF TABLES (Cont'd)

LIST OF TABLES (Cont'd)

407 299

LIST OF TABLES (Cont'd)

LIST OF TABLES (Cont'd)

407 273

LIST OF TABLES (Cont'd)

407 274

LIST OF TABLES (Cont'd)

407 275

LIST OF TABLES (Cont'd)

LIST OF TABLES (Cont'd)

LIST OF TABLES (Cont'd)

407 278

LIST OF TABLES (Cont'd)

LIST OF TABLES (Cont'd)

407 280

LIST OF TABLES (Cont'd)

LIST OF TABLES (Cont'd)

407 282

18

LIST OF TABLES (Cont'd)

LIST OF TABLES (Cont'd)

407 289

LIST OF TABLES (Cont'd)

407 285

LIST OF TABLES (Cont'd)

LIST OF TABLES (Cont'd)

LIST OF TABLES (Cont'd)

407 280

LIST OF TABLES (Cont'd)

407 289

LIST OF TABLES (Cont'd)

407 290

LIST OF TABLES (Cont'd)

407 291

LIST OF FIGURES

407 290

LIST OF FIGURES (Cont'd)

LIST OF FIGURES (Cont'd)

407 294

LIST OF FIGURES (Cont'd)

LIST OF FIGURES (Cont'd)

LIST OF FIGURES (Cont'd)

407 297

LIST OF FIGURES (Cont'd)

407 298

LIST OF FIGURES (Cont'd)

LIST OF FIGURES (Cont'd)

407 300

LIST OF FIGURES (Cont'd)

407 301

LIST OF FIGURES (Cont'd)

407 302

LIST OF FIGURES (Cont'd)

407 303

LIST OF FIGURES (Cont'd)

LIST OF FIGURES (Cont'd)

407 305

CHAPTER 2

THE SITE AND ENVIRONMENTAL INTERFACES

2.1 GEOGRAPHY AND DEMOGRAPHY

2.1.1 Site Location and Description

2.1.1.1 Specification of Location

The site is in the Town of New Haven, Oswego County, New York, approximately [illegible] mi east of the City of Oswego and 30 mi north of Syracuse. Figure 2.1-1 shows the general site location. The site is located approximately 2 mi south of Lake Ontario on gently sloping terrain, approximately 340 ft above mean sea level (msl). The site is located within an area bounded by Mason Road and State Route 104B to the north and northwest, State Route 104 to the south, Tollgate Road to the east and approximately 1,900 ft east of County Route 6 to the west.

The coordinates of the center of the containment structures for Units 1 and 2 are:

	Geographic Coordinates	Zone UTM* Grid	NYS Coordinate System-Central Zone
Unit 1	43 deg-29'-3" N Lat	N4815200m	N1269630.00
	76 deg-17'-46" W Long	E395200m	E576240.00
Unit 2	43 deg-28'-58" N Lat	N4815000m	N1269139.47
	76 deg-17'-41" W Long	E395300m	E576602.61

* Universal Transverse Mercator

2.1.1.2 Site Area

The site area map (Figure 2.1-2) is a detailed topographic map showing the identification, location, and orientation of the principal station structures. This figure also indicates the exclusion area and proposed site boundaries. All of the property within the site boundary will be owned by NYSE&G. The area within the site boundary is approximately 1,294 acres. There will be no industrial, recreational, or residential structures, railways, or navigable waterways within the site boundary. Lee Road, passing through the site area, will be owned and controlled by NYSE&G.

2.1.1.3 Boundaries for Establishing Effluent Release Limits

The restricted area coincides with the exclusion area (Figure 2.1-2) and will be posted and controlled for the purposes of protection of individuals from exposure to radiation and radioactive materials. The radiation dose to

407 306

individuals outside of the restricted area will be within the limits defined in 10CFR20 and 10CFR50, Appendix I.

The exclusion area boundary is formed by two half circles drawn from the centerline of each containment, connected by tangent lines. The radius of each half circle is defined as the shortest distance from the centerline of Unit 2 to Route 104. Section 2.1.1.2 discusses the property within this boundary. Figure 2.1-1 shows the orientation of the restricted area boundary to the surrounding region, including lakes and rivers.

The only potentially radioactive gaseous effluent release point is the ventilation vent (Figure 2.1-2). Table 2.1-1 gives the distance from the ventilation vent to the restricted area boundary (as a function of direction) for each unit.

2.1.2 Population and Population Distribution

U.S. Census Data from 1970 and projected future populations of sectors defined by distance and direction from the proposed site are presented in the sections and tables that follow. Mileage and radii have been measured from the site center, the midpoint of the line drawn between the two containment structures of the station.

Population projections for all sectors are identified by compass direction and distance from the site. The area within 50 mi was divided by concentric circles to the site at distances of 1, 2, 3, 4, 5, 10, 20, 30, 40, and 50 mi from the site center, and these annular rings were, in turn, divided into 22.5-deg sectors corresponding to the 16 points of the compass and oriented to true north. The geographic relationship of these sectors to counties, towns, and villages in the area is shown in Figures 2.1-3 and 2.1-4.

The methodologies used to project population growth by sector are discussed in Section 6.1.4.2.1.

2.1.2.1 Population Within 10 Mi of the Site

Average population densities within the 10-mi radius surrounding the site are low. The area is principally classified as rural-residential in the state inventory of land uses[1]. In 1970, this area had an estimated 105 persons per sq mi, about 28 percent of the average for the state of New York[2]. Portions of one city and all or part of nine townships in Oswego County lie within a 10-mi radius of the site: The City of Oswego, the Towns of Albion, Palermo, Hastings, Mexico, New Haven, Parish, Richland, Scriba, and Volney. None of these communities had more than 5,000 inhabitants in 1970, except for the City of Oswego, which had a population of 20,913, and the Town of Richland, which had 5,324 residents. The largest settlement in Richland is Pulaski, about 10 percent of whose population is within the 10-mi radius. The 1970 population of Pulaski was 2,480. Population concentrations within 10 mi of the site are shown in Figure 2.1-3 and in Table 2.1-2.

407 301

The settlements nearest to the proposed facility are the town center of New Haven, which was estimated to have 402 inhabitants in 1970[3], and the Hamlet of Texas, which had an estimated 1970 population of 392[3]. The center of New Haven is approximately 0.9 mi west-southwest of the site; and Texas is located 3 mi northeast. The closest community of more than 500 persons is Mexico. The town center of Mexico, which is 4 mi east-southeast of the proposed site, had an estimated 1,555 residents in 1970[3].

The largest community within 10 mi is the City of Oswego, which is just under 10 mi west and southwest of the site. About 20 percent of the built-up area of the city falls within the 10-mi radius. The only other significant settlements within 10 mi, as shown in Table 2.1-2, are the Villages of Mexico and Pulaski, as noted above. Both had less than 2,500 people in 1970[4].

The population of the 314 sq mi area within 10 mi of the proposed site is projected to the first year of each unit's commercial operation and to each subsequent census decade through 2030 in Tables 2.1-4 through 2.1-9. Projected population densities are also shown. About one-quarter of the 314 sq mi is covered by Lake Ontario.

The total 1970 population of the area within 10 mi was 24,397, as shown in Table 2.1-3. The rural and lightly settled character of the area within 10 mi is evidenced by the scattered nature and small size of most settlements. Most of these settlements are unincorporated areas, and have less than 200 people. Their locations can be seen in Table 2.1-3 by noting the higher density sectors. They tend to be east and west, or northwest of the site. To the south, the land tends to be marshy and lightly settled. To the north is Lake Ontario. A population "corridor" extends from Fulton, 12 mi south-southwest, along the Oswego River north through Minetto to the City of Oswego. Population densities within 10 mi, as shown in Table 2.1-3, are generally in the 50 to 150 people per sq mi range. Higher concentrations are localized in the scattered, small communities in the area.

Population and land use projections do not suggest any significant change in existing settlement patterns[5]. The 10-mi area is generally outside the economic influence of Syracuse, a fairly vigorous middle-sized city 30 mi south southeast of the site. The long term population growth rate for all of Oswego County is about 1.5 percent annually[6]. Between 1970 and 1991 the population within a 10-mi radius is projected to increase by about 10,000 people, from 24,397 to 34,[illegible]5, as shown in Tables 2.1-3 and 2.1-4. This is about a 40 percent increase over the 21 year period. Projected increases to 2030, as shown in Tables 2.1-5 through 2.1-9, are at approximately the same rate, with the total increasing to 56,362.

The age distribution of the population within 10 mi for the years of station mid-life (2011 to 2014) is presented in Table 2.1-10. The age cohorts shown are those used by New York State in projecting population[7]. The New York State projections are the basis for the population projections in this document.

2.1.2.2 Population Between 10 and 50 Mi of Site

The area beyond 10 mi but within 50 mi of the proposed site comprises approximately 7,536 sq mi in New York State and Canada. Eleven counties in the State of New York and three counties in the Province of Ontario, Canada lie wholly or partially inside 50 mi. The area in this range includes all or parts of Cayuga, Cortland, Jefferson, Lewis, Madison, Oneida, Onondaga, Ontario, Oswego, Seneca, and Wayne Counties, New York; and parts of Frontenac, Lennox and Addington, and Prince Edward Counties, Ontario. About one-quarter of the area within 50 mi of the site is occupied by Lake Ontario, to the north, northeast, and northwest. The parts of Canada lying in the 50 mi range are either islands (Amherst, Wolfe) or peninsulas (Picton) in the lake.

The two largest cities in this 7,536 sq mi area are the City of Syracuse, approximately 30 mi south-southeast of the site, and the City of Rome, about 44 mi east-southeast. In 1970, Syracuse had a population of 197,297; and Rome had a population of 50,148. Both cities are centers of standard metropolitan statistical areas (SMSAs), as defined by the United States Bureau of the Census. The Syracuse SMSA includes Oswego, Madison, and Onondaga Counties, which in part lie within 50 mi of the proposed site. The Utica-Rome SMSA includes Oneida County, parts of which are within the 50-mi radius. In 1970, the population of the Syracuse SMSA was 636,507, and the Utica-Rome SMSA was 340,670. Table 2.1-11 presents 1970 populations for all communities of 50,000 persons or more within 50 mi of the site.

Population projections for Oswego County, which includes the area roughly 20 mi around the site, do not predict any significant changes in existing settlement patterns(*). The principal areas of population growth within the county are along the Fulton-Minetto-Oswego Corridor, 10 to 12 mi west and southwest of the site, and along the southern edge of the county in the Townships of Shroeppel and Hastings around the Villages of Phoenix and Central Square, respectively, 15 to 20 mi south and southeast of the site. Central Square and Phoenix are adjacent to the northern suburbs of Syracuse, and experience population pressures in relation to the continuing growth of the Syracuse SMSA.

Tables 2.1-12 through 2.1-18 give estimated populations and population densities from 1970 through 2030 for each of 64 sectors in the area between 10 and 50 mi from the site. The population between 10 and 50 mi is expected to grow about 1 percent annually from 819,797 in 1970 to 1,023,299 in the first year of commercial operation, and to 1,289,499 by 2030.

Table 2.1-19 projects age distributions of the population between 10 and 50 mi from the site for the midpoint of the operational life of the proposed facility, based on the age cohorts used by the New York Economic Development Board. The 1970 age distributions of the 11 counties in the State of New York were similar to those of the three counties in the Province of Ontario, and in the absence of comparable age cohort distributions for Canada, it was assumed that this relationship would continue. A discussion of age projection methodologies is in Section 6.1.4.2.

407 309

2.1.2.3 Transient Population

The transient population is defined as those people who work, go to school, reside part-time, or engage in recreational activities in the area and who are not permanent residents. This does not include those people who are just passing through the area. The transient population within 10 mi of the site is highest on a summer weekend day. The estimated total transient population for a summer weekend is approximately 11,370, which includes the hotel/motel, industrial, institutional (other than schools), and recreational transient population. In contrast, the winter peak would be on a weekday, including hotel/motel, industrial, and all institutional transient population. The winter transient population is estimated to be approximately 2,230. To give a conservative estimate of the transient population, the subsequent discussion is based on the summer weekend population.

The number of nonresidents using these facilities (Figure 2.1-5 and Table 2.1-20) is based on different considerations for each type of facility. As the highest transient population was found to be on summer weekends, the analysis includes industries, hotels, motels and cottages, and recreational facilities. For industries, estimates of the places of residence of employees were obtained from company personnel[8]. It was assumed that all hotel and motel users would be transients. Local authorities estimate that about 20 percent of all users of summer cottages along the lake are nonresidents[13,14]. Health care and correctional facilities have no transient population. This is because the method of counting population used by U.S. Bureau of Census includes all occupants of these facilities as residents. For recreational facilities estimates are based on an analysis of the type of use and user. This analysis is, in turn, based on facility capacity figures published by New York State Department of Parks and Recreation[9].

Estimates for capacities of the recreational facilities within 10 mi are derived from state sources[10]. It should be noted that the state's estimates for capacity are based on surveys of peak day usage, and also take into account the physical size of the facility and its potential for maximum use. This approach probably produces fairly high estimates of users. Actual usage figures are generally not available.

Estimates of the proportion of transient users at each recreational facility were based on a consideration of three factors: New York State estimates of the proportion of in-county and out-of-county users for different recreational uses (e.g., boating, camping, picnicking, etc.); the character of the individual facility (e.g., number and types of recreation available); whether the facility was of a local character (e.g., town park) or a regional character (e.g., major state beach).

Recreators comprise the major transient population group. Of the 11,367 transients, 10,614 or about 93 percent are transients using the recreational facilities. The hotels and motels account for 301 transients, or about 2.6 percent of the total, and industries within 10 mi account for 452 transients, or about 4 percent of the total summer transient population.

407 310

The transient population nearest to the site is the Demster Grove Campground, a cluster of 32 privately owned cabins. As many as 67 people visit their cabins at any one time. Sixty-one of these people are transients[12].

Cottages along the lakefront contribute significantly to the area's transient population. The nearest cottages are about 2 mi north of the site. Those cottages are a portion of the approximately 570 cottages along the lakefront between Selkirk Shores State Park to the south and Oswego to the west, each roughly 10 mi distant.

The nearest major recreation facility is at Dowie Dale Beach, about 2.75 mi north-northeast of the site, with a capacity estimated by the state of 1,268, with an estimated 670 nonresident users. The largest recreation facility within 10 mi is at Selkirk Shores State Park, 10 mi northeast, with a capacity estimated by the state of 3,376, with an estimated 2,465 nonresident users. Waterfront facilities including beaches, summer cottages, and boat rental facilities are the predominant recreational facilities within 10 mi.

There are four major employers within the 10-mi radius that attract a significant number of nonresidents. These include the two nuclear power plants at Nine Mile Point, about 6 mi northwest of the site; the Alcan Aluminum plant east of Oswego, about 8 mi northwest of the site, and a division of the Mead Corporation, 10 mi northeast of the site, in Pulaski. The total workforce within 10 mi of the site is 1,289, 65 percent of which are transients. The Miller Brewing Company is just beyond the 10-mi radius in Volney, and employs 1,500.

There are no health or correctional facilities within 10 mi of the site.

Transients tend to be concentrated along the lakefront, especially to the northeast of the site, where major beaches are located.

The peak transient population as a whole is about 47 percent of the 1970 permanent population of 24,397. This relatively high percentage reflects a fairly heavy recreational use in comparison to the size of the local population. Given the nature of these uses, it can be expected that this level of use is most likely to occur during a few hot summer weekends, and that during much of the year the transient population will be substantially smaller and located more heavily in schools and industries.

Estimates of increases in different portions of the transient population are not available. Because the largest portion of this population is recreation-related, it would be reasonable to assume a growth rate roughly comparable to the population as a whole. Generally, industry in the region is not expected to grow out of proportion to the population (Section 2.2.2.6).

The number of available hotel/motel accommodations in relation to the number of people currently using the area's recreational facilities is fairly small, suggesting that most nonresidents come from within driving distance, or use camping areas. No plans exist for these recreational facilities to be changed in any way in the future that might increase the demand for hotel/motel lodging. Consequently, no large increase in hotal/motel construction is anticipated.

In light of these predictions, future transient populations should be assumed to remain at about the same percentage of the population as is currently the case. As most of the transients found within 10 mi of the site during the peak (summer) are users of recreational areas, the expected residence time is assumed to be 8 hours.

2.1.3 Uses of Adjacent Lands and Waters

2.1.3.1 Site Area

The site is located in the northern part of Oswego County, approximately 9 mi east of Oswego and 30 mi north of Syracuse. The site will occupy approximately 1,294 acres, situated 2 mi from the south shore of Lake Ontario, and approximately 0.5 mi east of the town center of New Haven.

Figure 2.1-1 shows the site in relation to principal roads, settlements, and bodies of water within approximately 5 mi of the site. Figure 2.1-6 presents a composite of onsite land uses.

2.1.3.2 Present and Projected Land Use

2.1.3.2.1 Onsite Land Use

The site area encompasses 1,294 acres and is chiefly characterized by second-growth woods and brush. Forest lands occupy more than 56 percent of the total acreage. Land in agricultural uses accounts for an additional 42 percent of the site acreage. Businesses and residences take up a small fraction of the total onsite acreage, 18 acres or about 1 percent. Two easements or rights-of-way cross the site; these 100 ft wide corridors comprise approximately 43 acres, or less than 3 percent of the total acreage onsite (Sections 2.1.3, and 2.1.5). Table 2.1-21 lists onsite land uses by general LUNR classification for the proposed station site in the Town of New Haven. Specific onsite land uses are analyzed separately in subsequent sections. Both in Table 2.1-21 and subsequent sections, data on land use is updated from the state 1968 land use and natural resources inventory on the basis of aerial photography of the proposed site undertaken in 1978.

2.1.3.2.1.1 Industrial and Commercial Land Use

Five full-time and six part-time businesses are currently located onsite as described in Table 2.1-22 and Figure 2.1-6. Onsite business properties employ no full or part-time help other than immediate family members.

Onsite commercial enterprises operating on a full-time basis include a used car sales place, two auto repair facilities, a grocery store, and a cattle dealer/car towing operation. Total gross sales of the full-time onsite businesses were estimated by their owners to be approximately $78,000 in 1977.

The part-time businesses include three cattle dealers, a used car sales operation, a seller of topsoil, and a small scale construction operation. Part-time business proprietors estimated total gross sales in 1977 at less than $21,000. All part-time businessmen maintain full time employment elsewhere.

2.1.3.2.1.2 Farm/Commercial Forest

A total of 580 acres, or 48.4 percent of land onsite is classified as prime farmland. Prime farmland is defined as having the special combination of soil quality, location, growing season, and moisture supply needed to economically produce sustained high quality and/or high yields of a specific crop when treated and managed according to acceptable farming methods. A total of 111,151 acres of prime farmland are found in Oswego County. Onsite prime farmland accounts for only 0.5 percent of the county-wide total. Two hundred and twenty-five acres of prime farmland lie with the construction area of the station. Thus, 38.8 percent of prime farmland onsite, and 0.2 percent of prime farmland in Oswego County will be altered by station construction.

Approximately 75 acres, or 6 percent of total site acreage, is classified as being of "statewide importance". Farmlands of statewide importance include those that are "nearly prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods." Approximately 59,199 acres of statewide importance farmland are found in Oswego County, 0.1 percent of which are located within site boundaries. A total of 27 acres, or 0.05 percent of county SWI farmland lie within the construction area of the proposed station.

Although some unique farming occurs in Oswego County in the form of muck farming and fruit production, none lies within site boundaries.

All or portions of 14 farms lie within the site boundaries. The 13 farms with land onsite cover a total of 1,182 acres, 627 of which are currently actively farmed. Relevant information pertaining to each farm with land onsite is presented in Table 2.1-23.

Three onsite farms are incorporated in the New Haven agricultural district. The total (assessed) value of farmland found onsite is $27,500(14). The active farmland onsite is disaggregated as follows: 263 acres of hay, 50 acres of field corn, 288 acres of pasture grass, 6.5 acres of fruit/vegetable production, and 20 acres of oats. Yields are representative of the state averages which are 2.23 tons of hay per acre; 77.0 bushels of grain corn per acre; and 52.0 bushels of oats per acre(15).

Farmers that grow only field crops generally do so to prevent the land from going to brush. Consequently, they tend to either give away their harvest to neighboring farms with livestock, or to sell it for 5¢ a bale. The five farms that raise livestock grow their own feed, which is occasionally supplemented by crops grown by neighboring farmers. With an occasional exception, all field crops grown onsite are used as feed for cattle.

407 313

Most crop farmers own, rent, or borrow from a neighbor the following pieces of equipment: tractors, plows, cultivators, disks, hay/corn wagons, drags, and manure spreaders. In addition, dairy farmers own milking equipment. Those farmers owning equipment typically have 10 to 13 pieces. All farmers fertilize their crops with manure. Several farmers supplement their manure supply with commercial fertilizer, in undetermined amounts. There is no irrigated land onsite.

Onsite farmers do not depend on their farms as their sole or primary source of income. Farms described as semicommercial sell livestock or agricultural products in such small amounts, i.e., two beef cattle per year, that this income is only supplementary to their primary source. Most farms are operated by family members. As Table 2.1-23 illustrates, only four individuals are employed on a part-time basis by farms onsite. These individuals are hired seasonally, at planting and harvesting time.

As noted in Table 2.1-23, several farms have fruit/vegetable gardens. None of the produce is sold commercially, and is usually consumed on the premises. Garden fruits and vegetables grown are as follows: potatoes, onions, parsnips, radishes, squash, carrots, sweet corn, tomatoes, cherries, apples, pears, plums, blueberries, and apricots.

Farm production on noncommercial farms has tended to diminish in recent years, as indicated during interviews[14], because of declining interests by farmers in active farming. Farms are often maintained for land value rather than production value.

2.1.3.2.1.3 Residential Land Use

There are 39 residential properties located within the boundaries of the site (Figure 2.1-6). The total number of dwellings is 53, including 23 mobile homes as of June, 1978. These residences are situated on approximately 50 acres, or nearly 4 percent of the total site. Access to most homes is from roads on the site perimeter, State Routes 104 and 104B, County Road 6, Mason Road, and Tollgate Road, all in the Town of New Haven, but 21 dwelling units and mobile homes are located on Lee Road which traverses the site diagonally southeast to northwest. In 1977, these homes had a combined assessed valuation of approximately $58,700[16]. The values of residential properties are given in Table 2.1-24. Tax registers do not report valuations for owners of mobile homes on rented land, and therefore only land owners are included in Table 2.1-24. The resident population of the site is 198 persons.

2.1.3.2.1.4 Public and Recreational Land Uses

There are no public land uses at the proposed station site. Properties which are partially or entirely within the proposed site are privately owned, do not contain recreational attractions or facilities, and do not have areas to which the general public has regular access. No part of the site is an active hunting area, as discussed in Section 2.1.3.5.

407 319

2.1.3.2.1.5 Easements and Rights-of-Way

The proposed site is traversed by two rights-of-way. The first is an abandoned rail bed, formerly a branch line of the New York Central, now the property of the Penn Central Railroad. The right-of-way occupies a corridor which is 10,200 ft long and 100 ft wide with an orientation roughly southeast-northwest. The right-of-way is characterized by a rounded roadbed from which tracks and ties have been removed. In many places, the right-of-way is indistinct and overgrown. The second right-of-way is an easement for a 115 kV powerline formerly owned by Northern New York Utilities, and is now owned by Niagara Mohawk Power Corporation. The transmission corridor crosses the site area on a northeast-southwest axis for a distance of 8,500 ft with an average width of 100 yards(17). The powerline easement, unlike the rail right-of-line, is in use and maintained. The geographic relationship of the two corridors to the rest of the site is shown in Figure 2.1-7.

2.1.3.2.1.6 Taxes

In 1977, a total of 82 individuals and corporations owning land at the site were assessed property taxes which totaled $19,985.22. Amounts ranged from $.65 to $629.28. Table 2.1-25 details the total taxes paid by the Mexico Academy and Central School District, and the Town of New Haven Fire Protection District(18) for the 5 years, 1973 to 1977. As shown, property taxes collected by Oswego County in 1977 on properties within the proposed site equaled $8,620.54. Lesser amounts were paid to the Mexico Academy and Central School District, Town of New Haven Fire Protection District. Table 2.1-26 presents taxes assessed against each owner of property within the proposed site for the 5 year period, 1973 to 1977. Properties sold and divided prior to 1977 are shown under both the names of present owners and the names of previous owners. Properties sold and not divided, or otherwise altered in size, are shown under the names of present owners, only.

2.1.3.2.1.7 Site Mapping and Photography

A site vicinity map (Figure 2.1-6) is discussed in Section 2.1.3.2.1 above, and the LUNR map (Figure 2.1-9) for 5 mi is discussed in Section 2.1.3.2.3.2. The vertical aerial mosaic (Figure 2.1-8) and oblique aerial photographs (Figures 2.1-10 through 2.1-14) appear in Sections 2.1.3.2.3.1 and 2.1.3.2.3.3, respectively. Photographs of the site from representative visually sensitive and intensive land uses (Figures 2.6-1 through 2.6-15) appear in Section 2.6.3. Prints of aerial photos of the site and surrounding area out to 1,200 ft are included as Figure 3.1-1 in Section 3.1.

2.1.3.2.1.8 Projected Land Use

Land uses onsite (Figure 2.1-6) are principally rural-residential, as described in the preceeding sections.

The character of future developments within 1 and 5 mi, as described in Sections 2.1.3.2.2.5 and 2.1.3.2.3.11, are unlikely to exert pressure that will change the current pattern of onsite land uses. These uses are mainly

407 315

agricultural and low-density rural residential, including onsite home development.

Agriculture in the site vicinity has shown little tendency to expand, and the absence of commercial farms onsite suggests that it is unlikely that active farming will intensify onsite.

2.1.3.2.2 Land Use within 1 Mi

2.1.3.2.2.1 LUNR Inventory

The land uses between the site boundary and 1 mi beyond are shown in Figure 2.1-9 which portrays the LUNR classifications within 5 mi of the site. Table 2.1-27 lists the acreage for the major land use categories within 1 mi of the site boundary.

Forest land and agricultural land are almost evenly distributed within 1 mi of the site boundary and represent approximately 43 percent and 48 percent, respectively, of the total area usage. Water resources and scattered residential and commercial development make up the rest. Water resources, principally wooded wetlands, represent approximately 3 percent of the area land use with other water resources amounting to less than 1 percent. Residential land uses account for approximately 5 percent of the total land use in the area, while commercial uses represent a fraction of area use. Extractive industry also represents a small fraction of land use within 1 mi of the site.

2.1.3.2.2.2 Zoning and Land Use Regulations

The site area is not zoned and no zoning regulations exist for the town of New Haven. The town does have a Flood Hazard Area Zoning Ordinance, as well as building permit and subdivision regulations in flood-prone areas, both passed on July 8, 1975. These local regulations operate in conjunction with the U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Program, which provides for the purchase, by New Haven residents within designated flood hazard zones, of federally subsidized flood insurance. The designated flood-prone zones occur in low-lying areas in the general vicinity of the site and one such zone, along Butterfly Creek, bisects the site[18].

A significant percentage of farmland found within 1 mi of the site is incorporated into the Mexico Agricultural District. The Mexico Agricultural District was initiated in an effort to promote agriculture in the Mexico-New Haven area, as well as preserving current agricultural uses. By keeping the taxes on agricultural lands lower than those for other uses, and restricting agricultural land takings, the agricultural district regulation provides a means of controlling present and future land use in the area (Section 2.1.3.2.3.5).

There is, in addition, a zoning regulation for the town of Mexico approximately 1 mi to the east of the site. The town zoning ordinance was adopted on May 5, 1976, and establishes land use districts throughout the town of Mexico. These districts encompass agricultural, residential, planned development, commercial, and industrial land use in the town overall[19]. For the area of the Town of Mexico within 1 mi of the proposed site boundary, the zoning classification is Agricultural A. Under this classification permitted uses include: agricultural uses, single- and two-family dwellings, schools and religious institutions, home occupations, accessory uses, camps, and mobile homes. Other uses are permitted by special permit of the Town Board. Uses not permitted include junkyards and dumps, as well as unsuitable manufacturing operations, unless allowed by special permit. Mobile homes are permitted and must be sited in accordance with local standards.

Existing land use plans for Oswego County through the year 2000, prepared by the Oswego County Planning Board in August 1976 and June 1977, designate the site area as proposed for Public Utility purposes. The land area within 1 mi of the site is designated more generally as rural-agricultural, forest-wetland, and medium-density residential use in this plan. A copy of the Oswego County Land Use Plan, 1985 and 2000, June 1977, is available. Also examined was the Planning and Development Standards for Oswego County, August 1976, prepared by the Oswego County Planning Board. Like New Haven, many communities in the county have not undertaken recent planning or zoning. Hence there are relatively few relevant plans or regulations.

Review of these documents and plans, in conjunction with discussions with local officials and planners, indicate no proposed changes to existing land use regulations which would alter the current land use and zoning designations for the site and nearby area[20].

The area onsite and surrounding the town of New Haven can be developed with few restrictions on type or manner of land usage. The diverse and sometimes conflicting land uses currently onsite and in the area reflect the lack of zoning in New Haven. Zoning in the town of Mexico does regulate land use and would be expected to continue to influence development there according to the mix of land use types enumerated above. No restrictions on compatible land uses within districts exist in Mexico, including mobile homes and mobile home parks by special permit, and it is expected that construction of the plant may increase some development in the area. Demand for housing, in particular, would result in increased housing and mobile home development in the area.

2.1.3.2.2.3 Airports, Seaplane Bases, and Air Control Zones

A private airstrip with two based planes is located on the site north of State Route 104. This strip will be removed prior to plant operation. No other private or commercial airports, landing strips, or seaplane bases are located within 1 mi of the site.

2.1.3.2.2.4 Recreation

The only recreational facility within 1 mi of the site is the New Haven Town Park. Maintained by the Town of New Haven, this park has a picnic area and playing field.

407 317

Hunting occurs presently on and near the site although the general level of hunting activity is relatively low due to the proximity of residential areas. A discussion of hunting onsite appears in Section 2.1.3.5.

2.1.3.2.2.5 Projected Land Use

The area within 1 mi of the site is rural-residential. Active farming, especially dairying, is vigorous, especially to the northeast and southeast of the site (Section 2.1.3.2.3.5). The town center of New Haven is less than 1 mi from the site. It is a rural hamlet with six commercial businesses serving local residents. These businesses consist of two bars, two automotive service stations, and two stores.

Given the lack of growth in the number of farms and the moderate rate of population growth within 1 mi of the site, it is unlikely that there will be significant changes in the character of this area. However, just to the south of the site, along State Route 104, there are plans for expansion of an existing mobile home community. An estimated 12 such homes already exist on one site. The owner has plans for accommodating approximately 35 more on an adjacent lot[21].

The area east of the site is part of a county agricultural district. The town of Mexico, within which most of the district is located, is one of the more intensively farmed areas in the county (Section 2.1.3.2.3.5). This part of the 1 mi region, therefore, is expected to continue to be strongly agricultural.

There are no publicly announced proposed construction projects of $500,000 or more within 1 mi of the site boundary.

2.1.3.2.3 Land Use Within 5 Mi

2.1.3.2.3.1 Vertical Aerial Mosaic

The natural and manmade features of the site area within a 5-mi radius of the proposed facility location are shown in the vertical photomosaic presented in Figure 2.1-8. The character of the site and surrounding area are depicted in the photomosaic. The residential, industrial, and commercial areas as well as transportation networks and water bodies within a 5-mi radius are also depicted.

The vertical and aerial photography and photomosaic work were done by Lockwood Mapping, a professional mapping company headquartered in Rochester, NY. Aerial photos were taken in April and May of 1978 at an approximate altitude of 12,000 ft above ground level, using a lens with a 6-in focal length giving the required scale of 1:24,000, or 2,000 ft to the inch.

2.1.3.2.3.2 LUNR Inventory

Figure 2.1-9 displays the land uses within 5 mi of the proposed site. Chief among these are forest lands and agricultural uses which account for most of the land use in the area. Residential land uses as well as industrial and commercial uses are scattered throughout the 5-mi area. Water resources and the shoreline of Lake Ontario are also within this area.

2.1.3.2.3.3 Oblique Photography

A visual description of the surrounding 360-deg area from the approximate location and elevation of the highest point of the proposed facility to the horizon is presented in Figures 2.1-10 through 2.1-14. These oblique photographs were taken by Lockwood Mapping of Rochester, NY, in April and May of 1978 from an aircraft at an altitude of approximately 500 ft, which corresponds to the height of the cooling towers. Each photograph is documented to show the compass direction and orientation which applies.

2.1.3.2.3.4 Industrial and Commercial Land Use

The New Haven area economy is generally based on agriculture. The region is lightly settled (Section 2.1.3.2.3.6) and has few attractions or advantages for industry, although it is well served by good highways (Section 2.1.3.2.3.9). The largest employer in New Haven is Duell's Sawmill and Pallet Shop. The only other significant industry in the 5-mi area is a BWB Foods, Inc., food-processing plant in Mexico which produces canned baked beans, and employs 25 people. Mexico also is the site of a small weekly newspaper plant and a small casket company[22].

Within Oswego County, significant industrial activities are mostly located in the 10 to 20 mi range from the site, except for two nuclear power plants at Nine Mile Point, 6 to 7 mi northwest of the site. Oswego City is a significant industrial center, 10 to 12 mi west; Fulton, 12 mi southeast of Oswego, also has a number of larger industries. Volney, 12 mi south of the site, is the home of a Miller Brewing Company plant with 1,500 employees, and significant industrial activity also occurs in Pulaski, 11 mi northeast of the site.

Commercial development within 5 mi of the site is primarily rural, low density, and oriented to local populations. This development is located intermittently along the major traffic arteries in the area, principally State Routes 104 and 104B. Existing commercial development is mixed with residential and other land uses, and does not occur as either strip development or small shopping center development. Some small-scale retail activity in the form of gift shops, roadside produce stands, restaurants and taverns depend upon revenues from the substantial summer recreation population (Section 2.1.2.3). There may be increased interest over the next decade in a regional retail shopping center in the Village of Mexico, where present commercial development is limited to local food and general supply stores. Continuing population growth in Mexico is exerting increasing pressure on these existing facilities (Section 2.1.3.2.3.6). Other commercial activity in the 5-mi area consists primarily of local retail outlets in the Hamlets of New Haven and Texas.

2.1.3.2.3.5 Farm/Commercial Forest

Within 5 mi of the proposed station, the most intense agricultural activity is found in the northeastern and southeastern quadrants covering parts of both New Haven and Mexico townships as displayed in Table 2.1-28. Active farms also operate to the west, and to the north between the site and Lake Ontario.

More than 75 percent of all commercial farming within the 5-mi area is dairying (comprised of 1,230 cows). Of the 40 commercial farms, 31 are wholly or primarily dairy operations. In addition, there are six orchards and fruit farms, two vegetable farms, and one farm producing mainly field crops[23].

Dairying is a larger proportion of agricultural activity around New Haven than elsewhere in Oswego County. Only 28 percent of all farms in Oswego County were dairying operations in 1974[24], as opposed to 77 percent around New Haven. The proportion of total land area in farmland in New Haven, however, is close to the county average. In 1972, 47.7 percent of all county land was in commercial farms. In the township of New Haven, the comparable figure is 47.6 percent, in the township of neighboring Mexico, however, it is 58.0 percent, one of highest in the state[24].

The most intensely farmed areas in the site vicinity to the east and southeast are within the Mexico Agricultural District. A county agricultural district is a grouping of local farmers formed under authority of state law and county ordinance. Its purpose is to encourage agriculture by keeping the taxes on agricultural land lower than those for other uses, and restricting agricultural land takings. The formation of such a district in the area suggests a local desire to maintain the strength of the agricultural sector. The relatively high proportion of land in commercial agricultural use noted above is also indicative of the strongly agricultural character of the area just to the east of the site.

2.1.3.2.3.6 Residential

The 5-mi area falls largely into the townships of New Haven and Mexico. Small portions are also in Palermo, Volney, and Scriba. The area is generally rural-residential, with substantial farming activities, particularly in the eastern quadrants (Section 2.1.2.2.3.5).

The 1970 population of the 5-mi area was 5,995. The population density was about 100 persons per sq mi, which is about 30 percent of the New York State average, and slightly less than the county-wide average of 104[2]. The general character of settlement in the area is low-density, single family residential and mobile homes, strung out along rural roads.

The principle population center in the 5-mi area is the village of Mexico with a 1970 population of 1,555. Other population concentrations within 5 mi are the town center of New Haven, 1970 population 402, and Texas, 1970 population 392. None of these towns are expected to grow more rapidly than the rest of the county, that is, at the rate of about 1.5 percent annually[5].

The areas of principal population pressures in the county are to the west along the Fulton-Minetto-Oswego growth corridor, and to the south in Phoenix and Central Square (Section 2.1.2.1).

2.1.3.2.3.7 Institutional

Six institutional facilities are located within 5 mi of the proposed site. Four of these are schools in the Mexico Central School District. The nearest facility is the New Haven Elementary School, 1.2 mi west of the site. Kindergarten through Grade 5 are housed in this building, which had a 1976 occupancy (pupils and staff) of 374[25]. The remaining three Mexico district schools are located to the east-southeast of the site: the Mexico Elementary School houses Kindergarten through Grade 4 and had an occupancy of 576 in 1976, the Fravor Road School had a 1976 occupancy of 778 in Grades 5 through 7, and the Mexico Junior-Senior High School, the largest facility in the 5 mi area, had an occupancy of 1,233 in 1976. The Mexico Junior-Senior High School is located 3.5 mi east-southeast of the proposed plant. A bond issue for expansion and alteration of elementary and high school facilities in the Mexico School District was passed in May 1978. Construction is scheduled to be complete by September 1979. Total enrollment and polar grid sector locations for these schools are listed in Table 2.1-29.

A fifth educational facility, a Board of Cooperative Education Services School is located 2.4 mi southeast of the site center. Enrollment at this school was 1,163 in 1976. Students attend this school from all over Oswego County, on a part-time basis, so that enrollment is about twice the occupancy at any one time.

The Spencer Home, a 17 bed private proprietary home for adults administered by the Department of Social Services, is located approximately 1.9 mi west of the site.

No other institutional facilities are known to exist within 5 mi of the site.

2.1.3.2.3.8 Recreation

Water-related activities characterize the recreational uses within 5 mi of the site. Camping, fishing, boating, and swimming are the principal activities. Three major recreational sites with combined capacities of over 2,500 people exist within 5 mi of the site[26]. The largest of these is Dowie Dale Beach, located 2.25 mi north-northeast of the site. The combined capacity of the camping, fishing, picnicking, swimming, boating, and trail activities at this site is 1,268 people. Flatrock Campsite is a commercial camping and recreation area 2.5 mi northeast of the site with a capacity of 657 people. The third, a state-maintained launching area, is located at Mexico Point, 2.8 mi east-northeast of the site.

In addition to public recreational areas, there are over 300 private summer cottages located along the shore of Lake Ontario within 5 mi of the site, many owned by local residents[13,14].

Private marinas, public launching ramps, and summer cottages contribute to the substantial recreational boating in eastern Lake Ontario and Mexico Bay. Recreational boaters passing by the site may originate from locations beyond the 5-mi radius. Over 130 pier and anchorage moorings are located at marinas within 10 mi of the site and several public launching ramps exist in the area[26]. In addition, there are boats at many of the over 570 cottages located within 10 mi of the site along the shores of Lake Ontario. The launching area nearest to the site is the privately owned Catfish Creek Marina. An average of 25 small fishing boats are kept there. The only other harbor in the area is the Mexico Point Harbor, at the mouth of th Little Salmon River, 2.8 mi from the site. Here, the previously mentioned state-maintained launching ramp at Mexico Point provides public access to the small harbor and to Lake Ontario.

Recreational fishing is popular on Lake Ontario. Fishing activity is described in Section 2.1.3.4.2.

The Leatherstocking Club, a private hunting club, is located 2.75 mi west of the site center[2?]. Members hunt primarily for partridge, rabbits, and red squirrel. Hunting of ducks by club members also occurs along Lake Ontario. A detailed description of hunting in the area is found in Section 2.1.3.5.3.

There are three special wildlife-use areas within 5 mi of the site. They consist of two Onondaga Audobon Society sanctuaries (Noyes Woods and Derby Hill), and one privately owned waterfowl hunting area (Butterfly Swamp).

The Noyes Woods Sanctuary is located on the east side of Nine Mile Point near the intersection of Nine Mile Point Road and Lake Road. This tract consists of about 50 acres of beech-maple-hemlock forest bordered by abandoned apple orchards and pine plantations[22].

The Derby Hill Sanctuary is located about one quarter of a mile off the southeast corner of the Lake Ontario shoreline along Sage Creek Road. This strategic point on the Lake Ontario shore has become famous in recent years for the diurnal raptor observations which are made there, particularly during spring migration. When warm southerly winds carry migrating birds to the lake shore, many individual birds funnel eastward past Derby Hill before resuming their northward flight.

Butterfly Swamp is located along the Lake Ontario shoreline to the north of the site. It is currently under private ownership and being leased for hunting by the Butterfly Swamp Waterfowl Association. It is also being considered by the state as a future wildlife preserve.

Bird watching areas are located at the ends of many roads which lead to the Lake Ontario shoreline. Shore Oaks and Demster Beach are two such areas.

In addition to the recreational activities described, three playing fields and/or playgrounds provide local public recreational activities within 5 mi of the site[26]. The nearest of these is the New Haven Town Park, located less than 1 mi west of the site, and described in Section 2.1.3.2.1.4.

407 322

Hotchkiss Field provides court and field games 4.5 mi east-southeast of the site and a commercial picnic area and playground is found 5 mi northwest at the Nine Mile Point Nuclear Station.

Table 2.1-30 lists the recreational facilities within 5 mi of the site.

2.1.3.2.3.9 Transportation

Numerous two-lane state and country roads are found within 5 mi of the site. Principal regional routes are State Route 104, running east-west adjacent to the southern site boundary, State Route 104B, an east-west road adjacent to the northern site boundary, and State Route 3, which passes through the village of Mexico in a north-south direction. Access to communities on the shores of Lake Ontario is provided by spur roads from County Route 1, and various other county roads cross the area within 5 mi of the site, including County Routes 6 and 29, which are important north-south routes. Table 2.1-31 describes the major roads providing access to the site.

There are no active rail lines within 5 mi of the site[27]. However, there is a line just outside the 5-mi radius, which, at its closest point, passes 5.75 mi west of the site. This line runs from the City of Oswego past the Alcan Aluminum, Ltd. facility to the two power-generation facilities located on Lake Ontario at Nine Mile Point. The line is traveled by 10 freight trains weekly, averaging 20 cars each and is used by Alcan and Nine Mile Point Nuclear Station. There is also a line about 8 mi east of the site, from Syracuse to Massena, which carries 32 trains weekly of about 100 cars each. Another 12 local trains per week with 20 cars each run on this line from Messena as far as Pulaski, which is about 10 mi northeast of the site. At present, no passenger rail service is available in Oswego County.

Shipping channels into and out of the port of Oswego extend due north of that port for 25 mi into Lake Ontario. They do not come closer than 10 mi to the location of the station intake structures. There are no locks and no commercial docks or anchorages within 5 mi of the site[28].

No commercial airports, landing strips, or seaplane bases are located within 5 mi of the site. The nearest commercial airport, located 10 mi southwest of the site, is the Oswego County airport near Fulton. A private landing strip is located north of State Route 104 on the site; a second strip is located in the Village of Mexico, 3.25 mi east-southeast of the site center.

2.1.3.2.3.10 Zoning and Land Use Regulations

Within 5 mi of the site, zoning occurs in both the Town and Village of Mexico. The Town of New Haven ha no zoning ordinance. The zoning ordinance of the town of Mexico would not affect the proposed use of the New Haven site but would regulate potential secondary development including residential and commercial uses resulting from the construction of the station[19]. As discussed in Section 2.1.3.2.2.2, residential uses including mobile homes in Agriculture A Districts and mobile home parks by special permit are permitted

407 323

in the town. Other land uses are permitted throughout the town according to established-use districts.

Special ordinances apply in the Village of Mexico which is a municipality incorporated under the laws of New York State. The Village of Mexico zoning ordinance was adopted on May 17, 1957, and establishes residential, business, and industrial districts within the village. These uses must conform to standards enumerated in the ordinance, but otherwise no restriction on development in general exists. The proposed station would not be affected by these zoning ordinances. Development in the area would be expected to continue in much the same fashion as it has to date.

2.1.3.2.3.11 Projected Land Use

The general character of the area within 5 mi of the site is rural-agricultural. Recreational uses related to Lake Ontario are also significant. There are no economic, demographic, or political forces at work that are likely to change the character of these land uses, at least through the period of plant construction and initial operation.

Agriculture is fairly vigorous in the 5-mi area, and although it has not increased in intensity in recent years, neither has it declined significantly (Section 2.1.3.2.3.5). Agriculture is expected to continue to be a significant economic activity within the 5-mi radius[5].

Industrial growth in Oswego County has been concentrated to the west-southwest, along the Oswego River, including Fulton, Minetto, and Oswego City. Significant industrial growth is also taking place to the south in the Oneida Lake Valley towns of Phoenix and Central Square. These latter two towns are growing in part in response to continuing growth in the Syracuse SMSA, the northern fringe of which includes Phoenix and Central Square (Section 2.1.3.2.3.4). It is the county's policy, as expressed in its 1985 to 2000 Land Use Plan, to continue to concentrate industrial growth in these two regions of the county. It is therefore unlikely that any significant industrial growth will occur within the Towns of New Haven and Mexico, which comprise the 5-mi area. These two towns offer few advantages for industrial location, including an absence of public water and sewer services outside the Village of Mexico.

The area just beyond 5 mi to the northwest of the site is a region of some industrial activity. This includes two existing nuclear power plants and a third under construction. In addition, the Alcan Corporation has a large manufacturing facility about 2 mi west of the generating station area near Nine Mile Point. The County Land Use Plan, however, does not foresee further industrial expansion in this part of the Town of Scriba, but rather further development just west within the City of Oswego.

Residential growth within 5 mi of the site is expected to be most intense in the town of Mexico, 3 to 5 mi southwest of the site. Mexico is classified as one of six "intermediate growth centers" in the county's year 2000 growth plan. Zoning ordinances in Mexico restrict mobile home development, but there

407 324

is no such restriction in New Haven. In consequence, a good deal of the new residential use in New Haven has been mobile homes. Many of these tend to be in small clusters strung out along county roads. In the absence of zoning regulations, which are not now being considered in New Haven, this pattern of low-density residential development can be expected to continue in New Haven, while Mexico will continue to expand gradually as a rural town center. Overall, the rate of population growth in the area is moderate, and will not in itself create any new development pressures in the 5-mi radius (Section 2.1.2.1).

Recreational use of the area is fairly vigorous, with boating and fishing on Lake Ontario and entering tributaries the main attractions (Section 2.1.3.2.3.8). A number of wildlife preserves and a Rod and Gun Club exist in the area. The Butterfly Swamp, Little Salmon River area, 2 to 3 mi northeast of the site, is projected to become a wetlands wildlife preserve. Income from recreational uses contributes to the area's economy, but there are few unique recreational attractions in the 5 mi around the site, and so it is unlikely that recreational use will itself spur significant development. The area around Salmon River and Pulaski, 10 to 20 mi northeast of the site, is a far more vigorous area for sport fishing and tends to attract more recreational income than the New Haven area.

While there are many summer cottages along the lakefront within 5 mi of the site, these are only part of an almost continuous stretch of such development extending beyond Selkirk on the northeast and Oswego on the west. Thus, there appears to be nothing unique about this area of the Lake Ontario shore.

In general, therefore, there are no forces at work which would lead to significant changes in the current character and development pattern of the 5-mi region around the site. There are also no recent trends that would lead to abnormal changes in population or industrial patterns.

2.1.3.2.4 Institutional Land Use Within Air Quality Area of Impact

The Air Quality Impact Area extends in a 15 mi radius around the site center. The cities of Oswego and Fulton are the major population centers located within this area. Other population centers included are the villages of Mexico, Parish, and Pulaski, and a small portion of the Village of Altmar.

The institutional population within this area is found primarily in schools, with smaller numbers of people in health care institutions as described in Table 2.1-32 and Figure 2.1-15. Public and private/parochial elementary and post-secondary educational institutions are found within the area of air quality impact. In the elementary and secondary schools there is a total of 19,712 people, including students currently enrolled and full-time teachers. Nine thousand-three-hundred-thirty-three people, including students, faculty, and nonprofessional personnel are presently located in the post-secondary educational institutions found with 15 mi of the site center.

407 325

The health care institutions include 2 hospitals and 17 community residential care facilities. The former have an occupancy of 170 patients, the latter of 731 patients.

The total of all people in institutional facilities within the Air Quality Impact Area is 29,996. Approximately 56 percent of this total is found in the City of Oswego, located 10 to 15 mi west and west-southwest of the site. The second largest concentration of people, about 18 percent, is found in the City of Fulton, 10 to 15 mi southwest and south-southwest of the site center. Smaller significant concentrations are found 3 to 4 mi east-southeast and in the northeast sector.

2.1.3.3 Agricultural Land Use

2.1.3.3.1 Centerline Distances

Table 2.1-33 displays the nearest onsite residence, milk cow, and vegetable garden within 5 mi of the site for each of the 16 compass points as measured from the reactor centerline. The nearest site boundary is located 0.4 mi due west of the centerline of the first proposed operational unit. The nearest residences beyond the site boundary are found 0.5 mi south, south-southwest, southwest, and west of the site center. The nearest farms are located 1.0 mi northwest and north-northwest of the centerline.

Table 2.1-33 indicates that dairy farming is the most predominant agricultural activity occurring around the site. No commercial farms are located within 5 mi of the site in the north-northeast, south, and west-northwest sectors as shown. Commercial farms are found just beyond 5 mi south and west-northwest of the site center. Five mi in a north-northeast direction falls into Lake Ontario.

2.1.3.3.2 Dairy Farm Operations

Dairy farming is the predominant agricultural activity occurring within a 50-mi radius of the station. Annual milk production within 50 mi of the site is disaggregated by sector in Table 2.1-34. Dairy farming tends to be concentrated in the most viable agricultural areas, as dairy and cattle farmers are dependent on an abundant and available food supply for their livestock. Within the 50-mi radius, the more intensive agricultural areas, and hence higher concentrations of dairy farming, are located within portions of Jefferson, Lewis, Oneida, Oswego, and Onondaga Counties, as represented in the following sectors: 10 to 20 mi NNE, NE, S, and SSW; 20 to 30 mi ESE, SSW, and SW; 30 to 40 mi SE and SW; and 40 to 50 mi NNE, SE, and SSW.

Over the 50-mi range, the NE and SE sectors display the largest amount of milk production annually. The NE sectors cover land in Oswego, Jefferson, and Lewis Counties; the SE sectors cover land in Oswego and Oneida Counties. The sectors indicating no commercial milk production are in the W, WNW, NW, and NNW sectors beyond 3 mi which correspond to Lake Ontario. Thus, with only one exception, all of the sectors beyond 10 mi produce milk commercially.

407 326

Virtually all of the milk that is produced within the 50-mi radius is sold commercially. Milk produced in New York State is bought and sold primarily in the New England market, which is composed of New York and the New England states. Less than 1 percent of the milk produced annually is consumed raw[29]. An estimated 55 percent of the milk provided in the assessment region is consumed as fluid milk[29]. The remaining 45 percent is used to manufacture other dairy products such as cheese and ice cream[30].

2.1.3.3.3 Agricultural Production and Distribution within 50 Mi

The raising of beef cattle is considerably less frequent within the 50-mi radius of the proposed site than dairying. Annual meat production within the 50-mi radius is disaggregated by sector in Table 2.1-35. A significant amount (62 percent) of the beef sold commercially in the assessment area is produced in the larger SE to SSW sectors, which cover portions of Onondaga, Oneida, and Cayuga Counties. The production of beef is most intensive in the SSE and SW sectors. Virtually all of the beef that is produced within 20 mi is raised in Oswego County, which represents 6 percent of the total annual harvest of beef for the 50-mi area.

The sectors displaying no annual production of meat-beyond 10 mi for the W, WNW, and NNW sectors and the N sector beyond 3 mi-fall within Lake Ontario.

The bulk of beef cattle in New York State is located in counties that do not fall within a 50-mi radius of the proposed reactor at New Haven.

Truckfarm production is relatively unevenly distributed throughout the 50-mi radius, as indicated in Table 2.1-36. Ninety-three percent of the fruits and vegetables sold commercially are produced in the SE to SW sectors, which cover portions of Oswego, Oneida, Onondaga, and Cayuga Counties. These sectors are located in the eastern Finger Lakes Region of New York State. The most intensive truckfarming production occurs within the outer southern and southwestern sectors, which fall within Onondaga County.

Oswego County, as represented in the sectors within 20 mi of the site, contributes to 13 percent of the total annual harvest of fruits and vegetables sold commercially within 50 mi of the proposed site.

Though truckfarm production is relatively evenly distributed within 5 to 20 mi, the distribution becomes highly concentrated in several of the SE to SW sectors, as one moves further from the site.

2.1.3.3.4 Grazing Seasons, Feeding Regimes, Production of Forage Crops

Table 2.1-37 displays data which indicates that grain corn is the most abundant field crop grown within 50 mi of the site. Oats and wheat are harvested in significantly less amounts. Similarly, corn silage is the predominant forage crop produced, as displayed in Table 2.1-38. It should be noted that grain corn and corn silage yield significantly more per square meter than do oats, wheat, hay, or sorghum.

407 329

Grazing practices for cattle and other livestock are shown by sector in Table 2.1-39. The grazing season for cattle and other livestock runs approximately 5 months a year from May to October. Slight variations occur from county to county, as indicated in Table 2.1-40. The average density of pasture grass per square meter for a 50-mi radius around the proposed site is displayed in Table 2.1-38.

2.1.3.4 Fishing Within 50 Mi

2.1.3.4.1 Commercial Fishing

The only commercially fished body of water receiving station discharge from the proposed site is Lake Ontario. The principal fishing area and the chief port of landing, within 50 mi of the station, is Chaumont Bay, lying about 20 mi south-southeast of the source of the St. Lawrence River, and approximately 40 mi north of the site. Primary species landed at Chaumont Bay are bullheads, eels, rock bass, sunfish, and perch. Principal species of the open lake fished by U.S. fishermen are smelts, yellow and white perch, and eels. Principal species harvested in Canadian waters are perch, carp, bullhead, sunfish, eels, and white perch.

The total catch reported for 1977 on Lake Ontario (Canadian side) was 1,116,085 kg, and 93,957 kg for the United States (on the United States side) for a total of 1,210,042 kg for the entire lake[31]. Table 2.1-41 displays the levels of commercial fish harvest for both shores of Lake Ontario from 1974 through 1977. However, official estimates of future harvests have not been made.

The decline in the U.S. catch between 1974 and 1977 can be explained by two factors: a low price level for lake fish in general has resulted in reduced catches of sunfish and white perch in particular. Also, partial restrictions on the taking of eels and on the fishing season for bullheads in the Chaumont Bay area account for reductions in catches of these species.

Because of contamination caused by Mirex, a ban was instituted on commercial and recreational fishing of certain species by United States fishermen. The ban was established through a directive issued by the New York State Department of Environmental Conservation affecting Sections 11-0305 and 11-0317 of the New York Environmental Conservation Law. The directive specifically affected salmon, trout and other lakefish such as pike, bass, and eels. Since there is no commercial fishery in salmon and trout, the principal commercial fish species affected was eel. The ban on eel has been partially rescinded recently so that eels can be taken commercially for export only. Other principal commercial species such as smelt, perch, and bullheads were not affected by the ban and are still being fished commercially.

Fishing activity for these latter species is occurring in the vicinity of the Nine Mile Point area and Oswego Harbor. There is also gillnetting activity at Stoney Point and Southwick Beach for yellow perch, and open water trawling for smelt and alewives. There may be an increase in trawling activity for smelt and herring to make up for the reduction necessitated by the ban on eel. Even with the partial ban in effect, experimental commercial fishing for eels with electro-fishing equipment is occurring and white perch and white bass are being harvested with power lift netting methods. Less intense commercial fishing is occurring at Henderson Harbor and the mouth of Catfish Creek. The current feeling of fisheries experts is that future catches should stabilize or increase slightly as the fishing ban is removed further[32].

The steady increase in Canadian catches are due to several factors. The salmon stocking that occurred in 1971 and 1972 produced a harvestable crop by 1975 and 1976. Canadians were allowed to set gillnets for white perch and take restricted incidental catches of salmon. These incidental catches have been quite large. Also, in recent years gillnet sizes for perch have been reduced so that additional amounts of smaller perch can be caught. Therefore an increased tonnage of larger perch has been realized. In addition to these regulatory changes, the Canadian industry has been heavily subsidized by the government in recent years. As a result, the overall Canadian catch has increased steadily and is expected to remain at relatively high levels in the future.

Still, New York State officials do not characterize Lake Ontario as a significant commercial fishery[33].

Discussions with industry experts[34] suggest that approximately 50 percent of the commercial catches are consumed in local markets and approximately 10 percent are consumed in nonlocal markets. The remainder is not consumed by humans.

There is no known harvest of seaweed or other aquatic vegetation being conducted in waters affected by the proposed power station's discharge. For a discussion of fish farms or hatcheries, which have some affect on the commercial fishing, refer to Section 2.1.3.4.3.

2.1.3.4.2 Sport Fishing

Statistics on the level of recreational fishing from U.S. and Canadian sources are unavailable. Table 2.1-42 presents information on the level of catches attributable to recreational fishermen from New York State on Lake Ontario. In 1973, the only year for which data are available, New York sport fishermen landed a total of 1,709,200 kg of fish as shown in Table 2.1-42. To arrive at the estimated figure of 3,418,400 kg of fish for the total lake's recreational catch the New York State total was doubled. This approximation is based on the fact that, although New York has less shoreline than Canada, it has a denser shoreline population, resulting in a larger number of people involved in sport fishing. Doubling the New York catch, figures would tend, if anything, to overstate the sport fish catch and the amount of food potentially affected by the proposed station.

No official projections of future landings exist for this body of water, but three trends suggest increases in future recreational catches. First, fishing is becoming a more popular sport as a result of an increased emphasis on leisure time activities. Second, area population and regional tourism are

407 329

both projected to increase (Section 2.1.2.1). Third, the recent ban on taking sport fish from Lake Ontario was lifted in the spring of 1978. Hence, the supply of indigenous game fish is now considered edible. All of the above forces are likely to result in an increased sport fish harvest in Lake Ontario.

Currently, fishing success on the lake is generally considered to be good. Major fished species sought on Lake Ontario by sport fishermen include yellow and white perch, largemouth bass, calico bass, smallmouth bass, sunfish or pumpkinseeds, bullhead, trout, and salmon. Sodus Bay, about 40 mi west of the site, where panfish and bullhead are the predominant catch, is a principal sport fishing area where good catches are made regularly.

Trout and salmon represent a special attraction to Ontario sports fishermen. Trout and salmon are taken in tributaries and shallow areas in the spring and to a lesser extent in the fall. During peak recreational fishing periods, rainbow trout or steelhead, brown trout and lake trout, coho salmon, chinook salmon, and to a lesser extent other salmon species are also taken. During the hotter months trout and salmon disperse to the deeper, colder portions of the lake.

The station discharge will have no discernable effect on sport fishing in the lake as a whole.

Discussions with industry experts reveal that approximately 70 percent of the recreational fish caught are consumed by people residing locally and another 10 percent is consumed by nonlocal fishermen[34,35].

2.1.3.4.3 Fish Farms

No fish farms or similar aquaculture activity within 50 mi of the discharge location of the station use waters from the receiving water body (Lake Ontario). Fish stocking, both direct and indirect, does occur in Lake Ontario, and brown, brook and rainbow trout species are stocked in many of the lake's small tributaries. Coho and other salmon species have been stocked directly in the lake regularly since 1968 with great success.

2.1.3.5 Hunting Within 50 Mi

Game hunting onsite is extremely low. Onsite hunting is limited due to the lack of wildlife and close proximity of residential areas in and adjacent to the town center of New Haven. Deer hunting was not observed on the site during the first 2 days of the 1976 regular deer season and Department of Environmental Conservation data indicates that only two deer were reported taken in New Haven Township in 1976[36]. In fact, Oswego County had among the lowest harvest tallies for counties in New York for that year, with only 0.5 bucks taken per sq mi of deer range. The deer harvest in the nine counties comprising the surrounding 50-mi region was in the middle third of reported buck kill for all counties in the state, and also in the middle third for figures on buck kill per sq mi of deer range for New York State in 1976.

Total deer kill for the region was 3.5 percent of the state total[36]. Table 2.1-43 lists regional harvest of game by species.

Small-game hunters were not observed on the site during hunter surveys conducted on three Saturdays during the 1977 small-game season (Section 2.2.1). Five local residents were observed hunting on the site in November of 1976 while field surveys were being conducted. Contact with three of these individuals indicated they were hunting legal small game, and usually harvested grouse and rabbit on the site. Ruffed grouse, cottontail rabbit, and American woodcock are the most abundant game species found on-site, and gray squirrel, ring-necked pheasant, raccoon, and red and gray fox also inhabit the area. Some trapping may occur by onsite streams and ponds.

The Leatherstocking Club is close by, located 2.75 mi west of the site center on State Route 104[37]. It has about 50 members who hunt on the 235 acre club property, primarily for partridge, rabbit, and red squirrel, and to a lesser extent for deer, duck, geese, and woodcock. Duck hunting is done by members primarily along the shore of Lake Ontario, with the first season beginning October 14, and the second season beginning during December in Oswego Harbor. There are 2,500 pheasants on the club property, which disperses them to 15 county gun clubs in the area in late June. Small yields of muskrat, fox, and raccoons are taken from the limited fur trapping done by club members. No fishing occurs on the gun club property.

2.1.3.6 <u>Offsite Access Corridors</u>

Proposed railroad access to the site will require a new rail spur connecting from the existing Conrail line west of the site to the twin reactor units onsite. This rail spur will require approximately 5 mi of new track on an abandoned right-of-way corridor (Section 4.1.1). It will serve principally as means of transporting certain plant components shipped by barge to a barge slip at Nine Mile Point and brought by rail over an existing rail line to the new rail spur.

The plant makeup and blowdown lines will run north approximately 2 mi to Lake Ontario (Section 4.1.1).

2.1.3.7 <u>Water Use</u>

2.1.3.7.1 <u>Ground Water Supply</u>

Ground water is the primary source of water for domestic, commercial, and industrial uses in the vicinity of the site. Because of the rural-residential character of the area, most of the water withdrawn is for domestic purposes. There are no public or private water supply systems in the Town of New Haven, which encompasses the site. Residents of New Haven and surrounding rural areas depend on privately owned wells and springs. Local and state governments possess no information regarding the number, capacity, or condition of individual wells or springs in the vicinity of the site. Well survey data for the site area are described in Section 2.1.3.9. It should be noted that the quality of water obtained from underground formations in the

407 339

area is often poor[38]. High water tables have caused septic tank failures in Oswego County, resulting in pollution of acquifers. Though such pollution is generally a local condition, the level of contaminants has become noticeable due to high concentrations of septic systems in these areas[38].

At the site, a temporary supply of potable water will be supplied from an onsite well during the first 2 years of construction. A water pipeline from Lake Ontario to an onsite treatment plant will be constructed during this time and will supply necessary water for the remainder of the construction period. During operation of the plant, potable water will be obtained from a permanent intake on the makeup line which draws water from Lake Ontario. A discussion of the ground water hydrology of the site is presented in Section 2.4.2.

2.1.3.7.2 <u>Surface Water Supply</u>

Most municipal and industrial water supply agencies in central New York rely on surface water resources. There are numerous public and private systems operating within a 50-mi radius of the proposed generating station. These systems tap Lake Ontario, the major water resource of the region, and tributaries of the lake, as well as other sources, such as the Finger Lakes or their feeder streams. The New York State Department of Environmental Conservation has classified Lake Ontario as a Class A Special (International Boundary Waters). The best useage is as a "source of water supply for drinking, culinary or food processing, primary contact, recreation, and any other uses." This classification is reflected in the fact that Lake Ontario is used as a source of drinking water for communities within 50 water mi of the discharge point, which have a total population of 107,700 in 1978[44,45]. The water taken from Lake Ontario must be filtered and chlorinated to assure potable water quality, but the lake remains a very large reservoir of treatable drinking water. Pollution results from the discharge of wastewater and sewerage in the metropolitan areas which border the lake, for example Rochester and Toronto[46]. Lake Ontario also suffers from indirect pollution coming from Lake Erie and Buffalo.

The nearest intake for a municipal agency is the shared facility of the City of Oswego and the Metropolitan Water Board of Onondaga County, which together serve approximately 93,000 users in Oswego and Onondaga Counties[39,40]. The intake is located on Lake Ontario, approximately 11 mi west of the site, and it provides an average of 45 mgd to the two agencies[39,41]. This water is supplied to domestic, commercial and industrial users.

The City of Oswego provides water on a regular basis to several large users as well as to thousands of business and residences. These include the Alcan plant in the town of Scriba and the State University of New York at Oswego. The Metropolitan Water Board of Onondaga County likewise supplies potable water to industries in the Syracuse area and to a few users outside Onondaga County, such as the Miller Brewing Company's facility in the Town of Volney.

The Oswego Water Department also provides potable water to two power plants in Scriba, although both plants also have their own intakes on Lake Ontario to obtain water for open cycle cooling systems. The James A. FitzPatrick Nuclear

407 332

Generating Station of the Power Authority of the State of New York pumps an average of 259.2 mgd from Lake Ontario for open cycle cooling[4]. The Niagara Mohawk Power Corporation's Nine Mile Point No. 1 power plant pumps an average of 180.0 mgd of Lake Ontario water at an adjoining location[4] for open cycle cooling. Consumptive water use for once through cooling systems is a minimal amount of the total water flow. Intakes for both plants are located 5.9 and 6.2 mi, respectively, west-northwest of the proposed site, and 3.6 and 4.1 water mi west of the planned intake structure.

It should be noted that water withdrawn for open cycle cooling does not constitute a direct consumptive use. The water withdrawn from the lake is warmed by passage through the power plant's condensor and then immediately returned to the lake. The only consumptive use associated with this process is indirect and results from a very minor increase in evaporation of lake water.

The center of the site is 2.0 mi south of Lake Ontario. The facility will withdraw lake water for makeup to the closed cycle cooling system. The average consumptive watar use by the station will be approximately 52 cfs.

Table 2.1-44 and Figure 2.2-16 present data for all municipal and industrial water systems drawing on Lake Ontario within a distance of 50 mi of the planned intake structure. These systems serve users in Cayuga, Jefferson, Onondaga, Oswego, and Wayne Counties with a total average withdrawal of approximately 500 mgd. This figure represents approximately 60 mgd average municipal use, and approximately 440 mgd for open cycle cooling by the Nine Mile Point Number One Generating Station, and the James A. FitzPatrick Nuclear Generating Station. Thus, the two existing nuclear generating stations located in the town of Scriba account for 88 percent of surface water withdrawals. Among the smaller towns and villages which draw upon Lake Ontario, water withdrawals fluctuate by season, with demand greater in the months June to December due to summer vacationer visitation and autumn food processing.

The seasonal difference in withdrawals from the lake by current uses is estimated to be 10 mgd, and is not significant in relation to total water availability.

There are no general projections regarding future withdrawals from Lake Ontario for industrial uses. The Niagara Mohawk Power Corporation's second nuclear-fueled unit at Nine Mile Point, a closed cycle cooling plant, is now under construction. It will not withdraw large quantities of water from the lake, but, because of evaporation in cooling towers, will consume more water per MW than consumed per MW by presently operating once through systems. It is assumed that present users will withdraw water at approximately the same rates of use as at present. Municipal withdrawals will increase along the 50-mi stretches of shore east and west from the proposed intake as local populations grow and per capita rates of water use increase. By 2020, residential and commercial uses within this radius will require approximately 200 mgd, an increase of 235 percent from the 60 mgd figure for current use.

407 333

This will be chiefly due to increased development in the Syracuse Standard Metropolitan Statistical Area, which is a major user of water from the Lake.

2.1.3.8 Ground Water

Throughout central New York State, ground water is a major source of water for domestic, agricultural, and industrial needs. Although secondary to surface water in quantity consumed, ground water supplied approximately 70 percent of Oswego County's total 1970 population of 100,897[70,73,74].

The use of ground water in Oswego County is through both public water systems and individually owned wells or springs. Out of the nine existing municipally owned public systems, seven utilize ground water (Table 2.1-45) and two systems, Oswego and Cleveland, utilize surface water. Ground water consumption in the seven systems presently amounts to 5.32 mgd or 35 percent of the total water consumed in public systems. This is used primarily for domestic purposes and supplies approximately 25,140 people[72]. Industrial consumption accounts for only 30 percent of the ground water used[70]. Figure 2.1-17 shows the location of each public system with respect to the site.

The remainder of Oswego County's populace not connected to public water supplies, approximately 46,000 people, must rely on individually owned supplies. These are primarily drilled or dug wells; however, water is occasionally drawn directly from a spring or nearby stream. Water demands on individual supplies in Oswego County can vary from 100 gpd for small families up to 4,000 gpd for the larger farms[71].

Ground water use in the site vicinity is entirely by individual supplies. The extent of this use was determined by a well survey completed as part of the New Haven site study in February 1978. This study covered an area within a 1.5-mi radius of the proposed site. Table 2.1-46 summarizes the survey data and Figure 2.1-18 locates each well.

The survey showed that approximately 60 percent of the owners have drilled wells (6-inch or 8-inch diameter), 40 percent have dug wells (36-inch to 48-inch diameter) and only a few have driven wells. The drilled wells range up to 142 ft deep and usually draw water from the top 30 ft of the Oswego sandstone. Dug wells vary from 10 to 40 ft in depth and are predominantly in glacial till. A few dug wells in the village of New Haven benefit from a local deposit of outwash sands and gravels. In addition to wells, three owners draw water directly from Butterfly Creek, one owner uses a spring, and four have spring fed ponds used only for watering livestock.

The total average daily ground water consumption by the wells within the survey area is roughly 150,000 gpd, based conservatively on 500 gpd per family plus 3,000 gpd for the few large dairy farms (Well Nos. 123 and 246). There is no known use of ground water for irrigation in the vicinity.

The area that could be affected by any station effluents would be along the northerly ground water flow path between the site and Lake Ontario. The

407 334

nearest wells along this path are of both the drilled and dug varieties (Nos. 230, 233, 241, 242, 243, 244) and will be over one-half mi from the station structures. In addition to the above wells, the area potentially affected by effluents also includes the seasonal lakeside communities of Demster Beach and Hickory Grove, 2.3 mi to the north. There are no public ground water systems down gradient of the site nor do any of the northerly flowing streams which pass through the site (Catfish and Butterfly Creeks) approach any public system. The nearest system is in the Town of Mexico which is supplied by three wells located almost 5 mi to the southeast of the site. Sections 4.1.8 and 5.6.3 analyze the extent of potential station influence on the local individual wells in greater detail.

The possibility of present or future ground water consumption exceeding the annual recharge is improbable. Within the 7 sq mi area encompassed by the well survey, the annual ground water recharge is approximately 1,131,400,000 gal, based on a mean annual precipitation of 36.85 inches (Section 2.3.1.3.4) 75-percent loss due to surface water runoff and evapotranspiration[71,72]. This large recharge could not easily be exceeded by the future consumption. Based on an estimated population of 3,141 for New Haven in the year 2000[5] and assuming a conservative per capita use of 200 gallons per capita daily, the average daily consumption would be only 0.63 mgd or 20 percent of the ground water recharge. Another factor which ensures low future consumption in the site vicinity is that the low yields of the underlying aquifers (Section 2.4.2) limit all local wells to the small domestic variety. Large industrial or public water systems could not be developed in the immediate site area without depending heavily upon a surface water source to supply their needs.

2.1.3.9 Floods

Section 2.4 describes streams in the site area and their watersheds.

These streams flow in a northerly direction and are perennial with a marsh or swamp as source. Butterfly Creek has a drainage area of 6.3 sq mi above the site, with 0.42 sq mi in swamp or marsh. The average slope of Butterfly Creek is 49 ft per mi.

The tributary of Catfish Creek, which lies immediately to the west of the site, and is identified as tributary Fw in this report, has a drainage area of 1.4 sq mi above the site, of which 0.15 sq mi is swamp or marsh. The average slope of this stream is 95 ft per mi.

Another tributary of Catfish Creek flows through the site and will be diverted to near the site's western boundary. The drainage area of the diverted stream above the site is 1.3 sq mi, with the source being a 50-acre marsh located 1/2 mi south of the site. The diversion channel has a trapezoidal cross section and is designed for a 100-year flood flow. Approximately the first 1,700 ft to the north of State Route 104 drop quickly to below site grade with a slope of 24 ft per 1,000. This section is lined with concrete or riprap and has a 20-ft bottom width and 2:1 side slopes.

The next approximately 2,300 ft are a lined (riprapped or concrete) channel with a 50-ft bottom width and 5:1 side slopes. The remainder of the channel, before it rejoins the existing stream bed at the northwest corner of the site, is grassed with a 60-ft bottom width and a 10:1 side slope. The bottom slope of these channel segments are 2.9 ft per 1,000. The channel diversion facilitates the development of the site by removing the source of flooding. There is no net area saved from flooding since the area gained by relocating the stream approximately equals that required for the diversion channel.

Table 2.1-47 gives the 50- and 100-year recurrence interval flood flows. These were obtained from runoff predictions of 50- and 100-year precipitation events through the use of the HEC-1 computer program[75]. The Clark unit hydrograph[76] procedure was used with the time of concentration and storage coefficients presented in Table 2.1-48. These values were obtained through a conservative modification of regression equations presented in USGS water supply paper, "Model Hydrographs"[77]. Rainfall amounts were not reduced to account for initial loss or infiltration.

The 50- and 100-year floods produced nearly the same degree of flooding on these streams. Figure 2.1-19 shows the water levels for the 100-year flood. Figures 2.1-20, 2.1-21, and 2.1-22 show the water surface profiles for these streams.

2.1.4 References for Section 2.1

1. New York State Office of Planning. Point and Area Data Overlays. Land Use and Natural Resources Inventory Project. Albany, NY, 1974.

2. U.S. Department of Commerce, Bureau of Census. County and City Data Book, 1972. Washington, DC, 1973.

3. New York State Department of Transportation. Planimetric Maps, 2.5 Minute Series. Albany, NY, 1974.

4. U.S. Department of Commerce, Bureau of Census. 1970 Census of the Population, Number of Inhabitants: New York. Washington, DC, August 1971.

5. Oswego County Planning Board. Oswego County, 1985 and 2000. Land Use Plan. Fulton, NY, June 1977.

6. New York State Economic Development Board. Official Population Projections for New York State Counties. Albany, NY, 1977.

7. Michael Whalen, Personal Communication, Statistics/ Canada, March 1978.

8. Approximately 25 telephone calls were made to schools and industries to determine place of residence for students - staff and employees.

9. New York State Department of Parks and Recreation. Park Capacities. New York Statewide Outdoor Recreation Plan. Albany, NY, January 1977.

10. New York State Department of Parks and Recreation. Forecast of Outdoor Recreation in New York State, 1970-1990. Albany, NY, June 1973.

11. U.S. Department of Commerce, Bureau of the Census. Procedural History. 1970 Census of the Population and Housing. Washington, DC, June 1976.

12. Board and Harrington Realty, Personal Communication, 166 West First St., Oswego, NY, April 20, 1978.

13. Mr. Al Hawkings, Personal Communication, Director, Oswego County Planning Department, April 1978.

14. Examinatic of local tax records, May 1978.

15. New York State Department of Agriculture and Markets, Crop Reporting Service. Agricultural Statistics, 1976. Albany, NY, July 1977.

16. All Onsite Farmers, Personal Communication, May 1978.

17. Edward Rohrbacker, Personal Communication, Engineer, Niagara Mohawk Power Corporation, March 16, 1978.

18. Ordinance: "Protection of Construction Areas Susceptible to Floods," Town of New Haven, NY. July 8, 1975.

19. "Land Use Ordinance" Town of Mexico, NY, May 17, 1976.

20. Robert E. Doyle, Personal Communication, Senior Planner, Oswego County Planning Board, Fulton, NY, March 3, 1978.

21. Harbridge House, Inc., Field Survey, May 2, 1978.

22. Oswego County Planning Board. Personal Communication, Fulton, NY, 1977.

23. Oswego County Planning Department. Commercial Farmland in Oswego County (Map). Fulton, NY, 1972.

24. U.S. Dept. of Commerce, Bureau of the Census. New York State and County Data. 1974 Census of Agriculture. Washington, DC, April 1978.

25. Dr. John J. Steglmeier, Personal Communication, Director: Information Center on Education, New York State Department of Education, Albany, NY, 1978.

26. New York State Parks and Recreation Department. Park Capacities. Outdoor Recreation Facilities Inventory. Albany, NY, September 29, 1976.

27. Richard B. Hosmer, Personal Communication, Associate Rail Transportation Specialist, Rail Operations Assistance Section, New York State Department of Transportation, Albany, NY, February 6, 1978.

407 337

28. Executive Petty Officer Anderson, Personal Communication, U.S. Coast Guard, Oswego, NY, March 10, 1978.

29. Richard H. Van Alstyne, Personal Communication, Supervisor of Enforcement, Division of Milk Control. New York State Department of Agriculture and Markets, March 3, 1978.

30. Mr. Johnson, Personal Communication, Milk Control Commission, Massachusetts Department of Food and Agriculture, Boston, Mass, March 8, 1978.

31. John Carr, Personal Communication, Great Lakes Liaison Officer, National Marine Fisheries Service, 1977.

32. Clifford Creek, Personal Communication, New York Department of Environmental Conservation, Cortland, NY, May 12, 1978.

33. Dean Burton, Personal Communication, New York Department of Environmental Conservation, Cape Vincent Fisheries Station, May 12, 1978.

34. Paul Jacobs, Personal Communication, Board of Directors, National Seapal, Inc. (Major Canadian-American Fish Processing Company) May 1978.

35. ·ert Martin, Personal Communication, Sports Fishing Institute, ·shington, DC, 1978.

36. New York State Department of Environmental Conservation. 1976 New York Dee: ·ake by Town and County. Albany, NY, 1976.

37. Robert Schneider, Personal Communication, Provident, Leatherstocking Rod and Gun Club, New Haven, NY, May 1978.

38. Central New York Water Quality Management Program, Section 5.26. Oswego County Component, Syracuse, NY. 1978.

39. Correspondence from City of Oswego Water Department, Syracuse, NY, 1978.

40. Correspondence from Metropolitan Water Board of Onondaga County. Syracuse, NY, 1978.

41. Energy Information Office, Personal Communication, Niagara Mohawk Power Corp., Fulton, NY, March 7, 1978.

42. Summary of Oswego County Water Supply Report. Boston, Brown, Clyde and Loguidice, Consulting Engineers, North Syracuse, NY, 1967.

43. Onondaga County Comprehensive Public Water Supply Study. O'Brien and Gerr, Consulting Engineers. Syracuse, NY, 1968.

44. New York State Department of Health, Bureau of Public Water Safety. Inventory, Community Water Systems with Sources, 1974. Albany, NY, 1974.

407 338

45. J.W. Squires. Letters to the Editor of January 21, 1875, reprinted in "Looking Back...", Mexico Independent, Mexico, NY, October 27, 1976 and November 3, 1976.

46. U.S. Department of the Interior, Heritage Conservation and Recreation Service. National Register of Historic Places: Annual Listing of Historic Properties (Vol 43, No. 26, Federal Register, Part III), Washington DC, February 7, 1978.

47. Historic Site Inventory. St. Lawrence-Eastern Ontario Commission, 1974.

48. Phillip C. Kwiatkowski, Personal Communication, Director, Oswego County Historical Society. February 1978.

49. U.S. Department of Commerce, Bureau of the Census. Guide to Local Population Projections, Technical Paper Number 23. Washington, DC.

50. U.S. Department of Commerce. Bureau of the Census. Census of Housing, 1970. Washington, DC. Where data for Towns are not available, countywide vacancy rates were applied.

51. William Kelleher, Personal Communication, Planner, Central New York Regional Planning and Development Board, Syracuse, NY, February 1978.

52. Carmen Malcro, Personal Communication, Urban Planner, Department of Community Development, Syracuse, NY, February 1978.

53. Howard Wallace, Personal Communication, Realtor. King, Wallace, and Wilkinson Associates, Oswego, NY, February 1978.

54. Doug Irwin, Personal Communication, Irwin Real Estate, Mexico, NY, February 1978.

55. Transient accommodation availability calculated using vacancy rates and average size units as listed in Table 8.2.2-2.

56. U.S. Dept. of Commerce, Bureau of the Census. Urban Division Systems, Inc. Based on 1970 Census of the Population, Washington, DC, 1972.

57. N.Y. State Department of Transportation. Planimetric Maps, 7.5 Minute Series. Albany, NY, 1974.

58. John Cavale, Personal Communication, Oswego City School District, November 1977.

59. Telephone Conversation with the Superintendent: Oswego City School District, February 1978.

60. New York State Department of Commerce. Division of Economic Research and Statistics, Albany, NY, February 1978.

407 339

61. Individual noted owners in locality, Personal Communication, February 1978.

62. Office of the Superintendent, Personal Communication, Mexico Central School District, NY.

63. Cooperative Extension Associations, Agricultural Division; New York State Agricultural Agents, NY, 1977-78 (Counties within 50 mi).

64. U.S. Department of Agriculture. Oswego County Agricultural Stabilization and Conservation Service, Washington, DC.

65. Leslie Brown, Personal Communication, Data Information Center, National Marine Fisheries Service, Verified by Ballard, May 15, 1978.

66. Joan Ridgley, Personal Communication, Fisheries Statistician; Commercial Fisheries Branch, Ministry of Natural Resources, Province of Ontario, Canada, May 16, 1978.

67. Howard Bitmer, Personal Communication, Area Coordinator: Statistics Branch, U.S. Department of Commerce, Detroit, Michigan, May 16, 1978.

68. Brown, T. 1973 New York State Angler Study, Department of National Resources, Cornell University, Ithaca, NY, 1973.

69. NY State Department of Health. Division of Sanitary Engineering, Albany, NY.

70. Barton, Brown, Clyde, and Loguidice. Report on the Oswego County Water Supply Study. Oswego County Water Agency, Oswego County, NY, 1967.

71. Kantrowitz, I.H. Groundwater Resources in the Eastern Oswego River Basin, New York. New York State Conservation Department Water Resources Commission, Basin Planning Report ORB-2. 197[illegible].

72. Lawrence Crisafalli, Personal Communication, Oswego County Health Department, January 1978.

73. Oswego County Planning Board. Central New York Water Quality Management Program. Oswego County Component, Chapter 5, Unpublished, Draft Completed in September 1977.

74. Oswego Country Planning Board. Oswego County Data. Oswego County, NY, 1977.

75. U.S. Army Corps of Engineers. HEC-1 Flood Hydrograph Package, Computer Program 72.3-X6-L2010, Hydrologic Engineering Center, Davis, Calif, January 1973.

76. Clark, C.O. Storage and the Unit Hydrograph Trans. American Society of Civil Engineers, Vol. 110, 1945, p 1419-1488.

77. Mitchell, W.D. Model Hydrographs, USGS Water Supply Paper 2005, Washington DC, 1972

407 341

TABLE 2.1-1

DISTANCES FROM THE RELEASE POINTS TO
THE RESTRICTED AREA BOUNDARY

Direction*	Unit 1 Ventilation Vent (ft)	Unit 2 Ventilation Vent (ft)
N	2,790	3,260
NNE	2,790	3,060
NE	2,790	2,820
ENE	2,880	2,790
E	3,110	2,790
ESE	3,300	2,790
SE	3,390	2,790
SSE	3,380	2,790
S	3,260	2,790
SSW	3,060	2,790
SW	2,820	2,790
WSW	2,790	3,380
W	2,790	3,110
WNW	2,790	3,300
NW	2,790	3,390
NNW	2,790	3,380

NOTE:

* With respect to true north

407 342

TABLE 2.1-2

1970 POPULATION OF SETTLEMENTS WITHIN 10 MILES OF THE SITE*

Settlement*	County	Mileage from Site	Direction from Site	1970 Population
New Haven	Oswego	0.9	W, WSW, WNW	402
Texas	Oswego	3.0	NE	392
Mexico (Village)	Oswego	4.0	ESE	1,555
Oswego (City)	Oswego	8.6	W	20,923
Parish (Village)	Oswego	10.0	ESE	634
Pulaski (Village)	Oswego	9.9	NE	2,480

NOTE:

* City, town or village center or hamlet with more than 400 inhabitants in 1970.

SOURCES:

References 3 and 4

407 343

TABLE 2.1-25

SUMMARY OF 1973-1977 PROPERTY TAXES*
PAID BY ONSITE LAND OWNERS

Year	County	School District	Town	Fire District	Total
1973	3,655.99	3,208.09	3,872.57	239.73	$10,976.38
1974	4,004.02	3,679.51	4,203.84	259.10	12,146.47
1975	5,112.46	4,341.41	4,525.79	276.09	14,255.75
1976	7,144.34	5,535.43	4,480.81	383.17	17,543.75
1977	8,784.70	6,520.84	4,653.47	404.78	20,363.79

NOTE:

*Figures include unpaid taxes of Penn Central Railroad.

SOURCE:

Reference 14

40/ 344

TABLE 2.1-26

PROPERTY TAXES PAID BY LANDOWNERS AT SITE, 1973-1977

No.	Owner	Year	Property Taxes Assessed: County	School District	Town	Fire District	Comment
1	Adams, Wilda	1973	$ 33.04	$ 29.24	$ 35.68	$ 2.00	15 acres of a 58-acre property estimated to be within site
		1974	32.96	30.05	35.36	2.00	
		1975	37.28	31.60	[illegible]	2.00	
		1976	47.28	36.80	29.20	2.60	
		1977	54.72	40.35	28.52	2.60	
2	Alfred, Ranslo and Carol	1973	$ 24.78	$ 21.94	$ 26.76	$ 1.50	15 acres of a 20-acre property estimated to be within site
		1974	24.72	22.52	26.52	1.50	
		1975	27.96	23.70	24.90	1.50	
		1976	35.46	27.60	21.90	1.95	
		1977	41.15	30.26	21.39	1.95	
3	Ariola, Ralph and Patricia	1973	$ 90.86	$ 80.44	$ 98.12	$ 5.50	
		1974	98.88	90.14	106.08	6.00	
		1975	111.84	94.79	99.60	6.00	
		1976	141.84	110.41	87.60	7.80	
		1977	164.16	121.06	85.56	7.80	
4	Bailey, William	1974	$107.12	$ 97.66	$114.92	$ 6.50	Purchased portion of Hayden Evans property in 1973; see Evans below; see also Henderson
		1975	111.84	102.69	99.60	6.00	
		1976	153.66	119.61	94.90	8.45	
		1977	177.84	131.14	92.69	8.45	
5	Bickford, Charles	1975	$ 93.20	$ 78.59	$ 83.00	$ 6.00	Purchased portion of Harvey Webster property in 1974; see Webster below
		1976	141.84	110.41	87.60	7.80	
		1977	164.16	121.06	85.56	7.80	
6	Bond, Theodore and Roberta	1975	$111.84	$ 94.79	$ 99.60	$ 6.00	Obtained portion of Theodore and Clarice Bond property in 1974; see Bond below
		1976	165.48	128.81	102.20	9.10	
		1977	232.56	171.50	120.21	11.05	

407 345

TABLE 2.1-26 (Cont'd)

			Property Taxes Assessed				
No.	Owner	Year	County	School District	Town	Fire District	Comment
7	Bond, Theodore and Clarice	1973	$239.54	$212.05	$258.68	$ 14.50	
		1974	238.96	217.85	256.36	14.50	
		1975	260.96	221.17	232.40	1[illegible].00	
		1976	330.96	257.63	204.40	18.20	
		1977	287.2[illegible]	211.85	149.73	13.65	
8	Buda, Arthur and Regina	1975	$ 18.64	$ 15.80	$ 16.60	$ 1.00	Purchased portion of Daniel Cunningham property in 1974; see Cunningham below; see also Dann
		1976	106.38	82.81	65.70	5.85	
		1977	136.80	100.88	71.30	6.50	
9	Bullock, Estate of Lyle	1973	$ 66.08	$ [illegible].30	$ 71.36	$ 4.00	
		1974	65.92	60.10	70.72	4.00	
		1975	83.88	71.09	74.70	4.50	
		1976	106.38	82.81	65.70	5.85	
		1977	123.12	90.79	64.17	5.85	
10	Butterfield, Dennis and Shirley	1977	$136.80	$104.93	$ 71.30	$ 6.50	Purchased portion of Fanny Yablonski property in 1977; see Yablonski below
11	Byers, Gary	1975	$ 74.56	$ 63.19	$ 66.40	$ 4.00	Purchased portion of George and Trudy Herman property in 197[illegible]; see Herman below
		1976	94.56	73.61	58.40	5.20	
		1977	150.48	110.97	78.43	7.15	
12	Cunningham, Daniel	1973	$ 74.34	$ 65.19	$ 80.28	$ 4.50	Sold remainder of Daniel Cunningham property in 1977 to Albert Dann, as shown below; see also Buda above
		1974	74.16	67.21	79.56	4.50	
		1975	83.88	71.09	74.70	4.50	
		1976	123.18	82.81	62.53	5.85	

407 346

TABLE 2.1-26 (Cont'd)

No.	Owner	Year	County	School District	Town	Fire District	Comment
			Property Taxes Assessed				
13	Curcie, John and Louise with Evelyn	1973	$ 82.60	$ 72.86	$ 89.20	$ 5.00	
		1974	140.08	127.70	150.28	8.50	
		1975	205.04	173.78	181.60	11.00	
		1976	260.04	202.42	159.60	14.30	
		1977	191.52	171.50	99.82	9.10	
14	Dann, Albert	1977	$205.20	$151.32	$106.95	$ 9.75	Purchased portion of Daniel Cunningham property in 1976; see Cunningham above
15	Dashnau, Sidney and Mary	1977	$ 54.72	$ 40.36	$ 28.52	$ 2.60	Purchased portion of Fanny Yablonski property in 1976; see Yablonski below
16	Evans, Hayden	1973	$156.94	$138.40	$169.48	$ 9.50	Sold to William Bailey and George and Dora Henderson in 1974; see Bailey above; also Henderson below
17	Fidler, Walter and Fern	1975	$ 27.96	$ 23.70	$ 24.90	$ 1.50	Purchased portion of Lillian Hargrave property in 1974; see Hargrave below
		1976	59.10	46.01	36.50	3.25	
		1977	136.80	100.88	71.30	6.50	
18	Fisher, Thomas and Sophie (prior to 1976: Anderson, Donald and Mary)	1973	$ 57.82	$ 50.99	$ 62.44	$ 3.50	
		1974	16.48	15.02	17.68	1.00	
		1975	18.64	15.80	16.60	1.00	
		1976	23.64	18.40	14.60	4.55	
		1977	136.80	100.88	71.30	6.50	

407 341

TABLE 2.1-26 (Cont'd)

No.	Owner	Year	Property Taxes Assessed: County	School District	Town	Fire District	Comment
19	Fitzsimmons, John and Beatrice	1973	$305.62	$269.52	$327.98	$ 29.90	
		1974	346.08	315.50	335.80	29.90	
		1975	428.72	363.35	38[illegible].80	23.00	
		1976	543.72	423.25	37[illegible].28	21.00	
		1977	629.28	464.05	33[illegible].04	18.50	
20	Hargrave, Lillian	1973	$148.68	$160.26	$16[illegible].56	$ 11.00	Subject to exemptions and abatements
		1974	148.32	165.26	159.12	11.00	
		1975	149.08	132.39	132.80	10.00	
		1976	189.08	147.22	116.80	13.00	
		1977	218.88	161.41	114.08	13.00	
21	Harrison, Frederick and Mary Jane	1975	$ 18.64	$ 15.80	$ 16.60	$ 1.00	Purchased portion of Kenneth Leary property in 1974; see Leary below
		1976	165.48	128.81	102.20	9.10	
		1977	191.52	141.23	99.82	9.10	
22	Henderson, Gearge and Dora	1974	$ 57.68	$ 52.58	$ 61.88	$ 3.50	Purchased portion of Hayden Evans property in 1973; see Evans above
		1975	65.24	55.29	58.10	3.50	
		1976	82.74	64.41	51.10	4.55	
		1977	95.76	70.62	49.91	4.55	
23	Hermann, George and Trudy	1973	$132.16	$116.60	$142.72	$ 8.00	
		1974	131.84	120.19	141.44	8.00	
		1975	149.12	126.38	132.80	8.00	
		1976	189.12	147.22	116.80	10.40	
		1977	218.88	167.39	114.08	10.40	
24	Hoenow, Thomas and William, with Richard Leonoe	1973	$ 74.34	$ 65.19	$ 80.28	$ 4.50	18 acres of a 19-acre property estimated to be within site
		1974	131.84	120.19	141.44	8.00	
		1975	158.44	134.28	141.10	6.50	
		1976	212.76	165.62	131.40	11.70	
		1977	246.24	167.89	128.34	11.70	
25	Holland, Robert	1973	$107.38	$ [illegible].16	$115.96	$ [illegible].50	
		1974	131.84	12[illegible]8	141.44	8.00	
		1975	167.76	142.[illegible]	149.40	9.00	
		1976	212.76	165.6[illegible]	131.40	11.70	
		1977	246.24	181.58	128.34	11.70	

407 348

TABLE 2.1-26 (Cont'd)

No.	Owner	Year	County	School District	Town	Fire District	Comment
26	Ingersoll, Nellie (prior to 1977: Craker, Arthur and Myrtle; prior to 1976: Ward, Glenn and Joyce)	1973	$ 49.56	$ 43.86	$ 53.52	$ 3.00	
		1974	57.68	52.58	61.88	3.50	
		1975	65.24	59.90	50.10	3.50	
		1976	200.94	156.41	124.10	11.05	
		1977	123.12	90.79	64.17	5.85	
27	Lazzaro, Joseph	1973	$177.61	$157.18	$191.80	$ 10.75	55 acres of a 66.5-acre property estimated to be within site
		1974	190.81	173.95	204.70	11.58	
		1975	243.81	195.97	205.93	12.41	
		1976	309.79	228.28	181.00	16.13	
		1977	339.40	250.28	176.90	16.13	
28	Leary, Gregory	1976	$ 11.82	$ 9.20	$ 7.30	$ .65	Purchased portion of Kenneth Leary property in 1975; see Leary below
		1977	13.68	10.09	7.13	.65	
29	Leary, Kenneth	1973	$ 33.04	$ 29.24	$ 35.68	$ 2.00	
		1974	32.96	30.05	35.36	2.00	
		1975	27.96	23.70	24.90	1.95	
		1976	35.46	27.60	21.90	1.95	
		1977	41.04	30.26	21.39	1.95	
30	Linduski, Raymond	1974	$ 65.92	$ 60.10	$ 70.72	$ 4.00	Purchased portion of Wayne Watson property in 1973; see Watson below
		1975	74.56	63.19	66.40	4.00	
		1976	94.56	73.61	58.40	5.20	
		1977	109.44	80.70	57.04	5.20	
31	Miller, Edgar	1973	$156.94	$138.89	$169.48	$ 9.50	
		1974	156.56	142.73	167.96	9.50	
		1975	195.72	165.88	174.30	10.50	
		1976	248.22	193.22	153.20	13.65	
		1977	287.28	211.85	149.73	13.65	
32	Miller, Steven	1973	$107.38	$ 95.03	$115.96	$ 6.50	
		1974	107.12	97.66	114.92	6.50	
		1975	121.16	102.69	107.90	6.50	
		1976	153.66	119.61	94.90	8.45	
		1977	177.84	131.14	92.69	8.45	

407 349

TABLE 2.1-26 (Cont'd)

No.	Owner	Year	Property Taxes Assessed: County	School District	Town	Fire District	Comment
33	Niagara Mohawk Power Corp.	1973	$ 11.03	$ 9.67	$ 11.91	$ .67	
		1974	13.98	12.75	15.00	.85	
		1975	15.57	13.40	14.08	.85	
		1976	20.06	15.61	12.39	1.10	
		1977	23.21	17.12	12.10	1.10	
34	Penn Central Railroad	1973	$ 12.98	$ 11.38	$ 14.01	$ .79	Taxes unpaid in most years.
		1974	16.48	15.02	17.64	1.00	
		1975	18.64	15.80	16.60	1.00	
		1976	23.64	18.40	14.60	1.30	
		1977	27.36	20.18	14.26	1.30	
35	Raymond, Foster	1973	$ 82.60	$ 73.10	$ 79.20	$ 5.00	
		1974	90.64	82.63	97.24	5.50	
		1975	102.52	86.89	91.30	5.50	
		1976	130.02	101.21	74.30	7.15	
		1977	150.48	110.97	78.43	7.15	
36	Roland, Robert	1973	$ 37.17	$ 32.90	$ 40.14	$ 2.50	3 acres of a 6-acre property estimated to be within site
		1974	45.32	41.32	48.62	2.75	
		1975	51.26	43.45	45.65	2.75	
		1976	65.01	50.61	40.15	3.58	
		1977	75.24	55.49	39.21	3.58	
37	Sullivan, Gary	1973	$123.90	$109.65	$133.80	$ 7.50	
		1974	123.60	112.68	132.60	7.50	
		1975	139.80	118.49	124.50	7.50	
		1976	177.30	138.02	109.50	9.75	
		1977	2[illegible].20	151.32	106.95	9.75	
38	Sharowski, Elmer	1977	$ 68.40	$ 50.44	$ 35.65	$ 3.25	Purchased portion of John Curcie property in 1976; see Curcie above
39	Shumway, Donald	1976	$ 11.82	$ 9.20	$ 7.30	$ .65	Purchased portion of Joseph Shumay property in 1975; see Shumay below
		1977	136.80	100.88	71.30	6.50	

407 360

TABLE 2.1-26 (Cont'd)

No.	Owner	Year	Property Taxes Assessed: County	School District	Town	Fire District	Comment
40	Shumay, Joseph	1973	$ 90.86	$ 80.41	$ 98.12	$ 5.50	
		1974	98.88	90.14	106.08	6.00	
		1975	111.44	94.79	99.60	6.00	
		1976	141.84	110.41	87.60	7.80	
		1977	191.52	141.23	99.82	9.10	
41	Smith, Lois	1973	$ 57.82	$ 51.17	$ 62.44	$ 3.50	
		1974	65.92	60.10	70.72	4.00	
		1975	74.56	63.19	66.40	4.00	
		1976	94.56	73.61	58.40	5.20	
		1977	109.44	80.70	57.04	5.20	
42	Thomas, Ruth	1973	$148.68	$131.58	$160.56	$ 9.00	
		1974	181.28	165.26	194.48	11.00	
		1975	205.04	173.78	182.60	11.00	
		1976	260.04	202.42	160.60	14.30	
		1977	300.96	221.94	156.86	14.30	
43	Vrooman, Henry	1973	$132.16	$116.96	$142.72	$ 8.00	
		1974	148.32	135.22	159.12	9.00	
		1975	167.76	142.18	149.40	9.00	
		1976	212.76	165.62	131.40	11.70	
		1977	314.64	233.02	163.99	14.95	
44	Watson, Wanda	1973	$ 66.08	$ 58.30	$ 71.36	$ 4.00	1 acre of a 1.5-acre property estimated to be within site
		1974	65.92	60.10	70.72	4.00	
		1975	74.56	63.19	66.40	4.00	
		1976	94.56	73.61	58.40	5.20	
		1977	109.44	80.70	57.04	5.20	
45	Watson, Wayne	1973	$278.40	$246.38	$237.17	$ 21.62	
		1974	276.63	252.21	240.56	21.62	
		1975	310.02	262.74	268.53	16.63	
		1976	393.18	306.07	296.78	16.79	
		1977	455.05	335.55	300.64	16.85	
46	Watts, Carl and Joanne	1973	$ 24.78	$ 21.93	$ 26.76	$ 1.50	
		1974	24.72	22.54	26.52	1.50	
		1975	18.64	15.80	16.60	1.00	
		1976	23.64	18.40	14.60	1.30	
		1977	27.36	20.18	14.26	1.30	

407 351

TABLE 2.1-26 (Cont'd)

No.	Owner	Year	Property Taxes Assessed: County	School District	Town	Fire District	Comment
47	Watts, Jerald and Mireille	1975	$ 27.96	$ 23.70	$ 24.90	$ 1.50	Purchased portion of Jerald Watts property in 1974; see Watts above
		1976	35.46	27.60	21.90	1.95	
		1977	41.04	30.26	21.39	1.95	
48	Webster, Harvey	1973	$107.38	$ 95.03	$115.96	$ 6.50	
		1974	107.12	97.66	114.92	6.50	
		1975	121.16	102.69	107.90	6.50	
		1976	153.66	119.61	94.90	8.45	
		1977	177.84	131.14	92.69	8.45	
49	Whaley, Damon and Harriet	1975	$ 93.20	$ 78.99	$ 83.00	$ 5.00	55 acres of a 95-acre property estimated to be within site
		1976	204.96	[illegible]	126.58	11.27	
		1977	237.21	174.93	123.63	11.27	
50	Woolson, Charles	1973	$ 66.08	$ 58.48	$ 71.36	$ 4.00	
		1974	82.40	75.12	88.40	5.00	
		1975	93.20	78.99	83.00	5.00	
		1976	118.20	92.01	73.00	6.50	
		1977	164.16	121.06	85.56	7.80	
51	Woolson, Dennis and Diane	1976	$ 94.56	$ 73.61	$ 58.40	$ 5.20	Purchased portion of Wayne Watson property in 1975; see Watson above
		1977	116.80	100.88	71.30	6.50	
52	Woolson, Lyle	1973	$ 57.82	$ .00	$ 62.44	$ 3.50	
		1974	57.68	52.58	61.88	3.50	
		1975	74.56	63.19	66.40	4.00	
		1976	94.56	73.61	58.40	5.20	
		1977	109.44	80.70	57.04	5.20	
53	Woolson, Ronald	1973	$ 66.08	$ 58.30	$ 71.36	$ 4.00	
		1974	74.16	67.21	79.56	4.50	
		1975	83.88	71.09	74.70	4.50	
		1976	106.38	82.81	75.70	5.85	
		1977	123.12	90.79	64.17	5.85	

407 352

TABLE 2.1-26 (Cont'd)

No.	Owner	Year	Property Taxes Assessed County	School District	Town	Fire District	Comment
54	Yablonski, Fanny	1973	$173.46	$153.51	$187.32	$ 10.50	
		1974	173.04	157.75	185.64	10.50	
		1975	195.72	165.88	174.30	10.50	
		1976	248.22	193.22	153.30	13.65	
		1977	287.28	211.85	149.73	13.65	

SOURCE:

Reference 14

407 353

TABLE 2.1-27

SUMMARY OF LAND USE WITHIN ONE MILE OF THE SITE
(BASED ON LUNR CLASSIFICATION)

General Category	LUNR Classification	Acreage	Percentage
Agriculture land	Cropland - Ac	1,745	24.5
	Pasture - Ap	68	1.0
	Orchard - Ao	130	1.8
	Inactive agricultural land - Ai	1,474	20.7
	Subtotal	3,417	48.0
Forest land	Forest brushland - Fc	3,023	42.5
	Plantation forest - Fp	22	0.3
	Subtotal	3,045	42.8
Water resources	Wooded wetlands - Ww	205	2.9
	Marshes, shrub wetlands, and bogs - Wb	35	0.5
	Artificial ponds - Wc	7	0.1
	Subtotal	247	3.5
Residential lands	Medium density - Rm	80	1.1
	Low density - Rl	241	3.4
	Rural hamlet - Rr	52	0.7
	Subtotal	373	5.2
Commerical areas	Strip development - Cs	3	0.04
Extractive industry	Sand and gravel pits - Eg	18	0.26
Public and semi-Public lands	Public and semipublic land use - P	13	0.2
	TOTAL	7,116	100.0%

407 354

TABLE 2.1-27 (Cont'd)

<u>SOURCE</u>:

Reference 1

407 355

TABLE 2.1-28

FARMS WITHIN 5 MILES OF THE SITE

Type of Operation	Size (No. of Producing Units)	Sectors in Which Operation is Represented
Dairy	Medium	1-2 NNW; 2-3 NNW
Fruit	Large	1-2 NNW; 2-3 NNW
Fruit	Medium	1-2 N
Dairy	Medium	1-2 ESE; SE
Dairy	Medium	1-2 SE; SSE
Dairy	Medium	2-3 NE
Dairy	Medium	2-3 ENE
Dairy	Medium	2-3 SE
Dairy	Medium	2-3 SSE
Dairy	Medium	2-3 SSE
Dairy	Medium	2-3 SSE
Dairy	Medium	3-4 ENE
Dairy	Medium	3-4 E; 4-5 E
Dairy	Medium	3-4 E; 4-5 E
Fruit	Medium	3-4 E
Fruit	Medium	3-4 E
Fruit	Large	3-4 E
Dairy	Medium	3-4 ESE
Fruit and dairy	Large	3-4 SE; 3-4 SSE
Fruit and dairy	Medium	3-4 SSE
Fruit	Medium	3-4 SSE
Dairy	Medium	3-4 SSE
Dairy	Medium	3-4 SSE
Dairy	Medium	3-4 SSE
Muck	--	3-4 WSW
Muck	--	3-4 WSW
Dairy	Medium	3-4 SW, SSW; 4-5 SW, SSW
Dairy	Medium	4-5 W
Crop and poultry	Medium	4-5 W; 4-5 WSW
Dairy	Large	4-5 NE; 4-5 ENE
Dairy	Medium	4-5 ENE
Dairy	Medium	4-5 E
Dairy	Medium	4-5 E
Dairy	Medium	4-5 ESE
Dairy	Medium	4-5 ESE
Dairy	Medium	4-5 SE
Dairy	Medium	4-5 SE
Dairy	Medium	4-5 SSE

TABLE 2.1-28 (Cont)

LEGEND:

Dairy - Medium: 25 Milk Cows and/or 75 Beef Cattle

Dairy - Large: 50+ Milk Cows and/or 150+ Beef Cattle

Fruit - Medium: 20-69 Acres of Tree Fruit and/or 4 acres of Small Fruit

Fruit - Large: 70+ Acres of Tree Fruit and/or Over 10 Acres of Small Fruit

Crop - Medium: 30 Acres

Poultry - Medium: 5,000 birds

SOURCE:

Reference 23

407 359

TABLE 2.1-29

IDENTIFICATION AND DESCRIPTION OF INSTITUTIONAL FACILITIES WITHIN 5 MILES OF THE STATION, 1977

Map Code*	Educational Facilities	Location	Enrollment and Staff**
31	New Haven Elementary School	1.2 W	374
33	Mexico Elementary School	3.5 ESE	576
34	Mexico Junior/Senior High School	3.5 ESE	1,233
35	Fravor Road School	2.7 ESE	778
41	BOCES School	2,4 SE	1,163
	Correctional Facilities	None	
	Health Care Facilities		
41A	Spencer Home	1.9 W	25
		Total	4,149

NOTES:

* Refer to Figure 2.1-15

** 1976-1977 enrollment, teachers, administrative and support staff.

SOURCES:

References 25 and 62

407 358

TABLE 2.1-30

IDENTIFICATION AND DESCRIPTION OF RECREATIONAL FACILITIES WITHIN 5 MILES OF THE STATION, 1975

Map Code	Facility	Location by Polar Grid Sector	Capacity*	Brief Description
	Oswego County			
1	Dowie Dale Beach	2.75 NNE	1,268	Camping, Fishing, Picnicking, Swimming: Marina, Boat Rentals, Trails
	Catfish Creek Marina	2.6 NE	270	Marina
2	Little Can Trout Hatchery	2.75 S	40	Commercial; Fishing
3	Leather Stocking Club	2.75 W	N/A	Private; Meeting place for rod and gun club
5	Mexico Point State Marina	2.8 NE	580	New York State Department of Parks and Recreation; Fishing, Marina
6	Flat Rock Camp Site	2.5 NE	657	Commercial, Camping, Fishing, Picnicking, Swimming, Trails, Games
7	Audubon Society	3.8 NE	N/A	Natural Science Area, Non-Profit
14	Chedmardo Farm	5.0 NE	1,879	Commercial; Camping, Fishing, Picnicking
18	Hotchkiss Field	4.5 ESE	N/A	Court and Field Games
21	New Haven Town Park	0.4 W	N/A	Department of Education, Court and Field Games, Picnics, Non-Profit
22	Nine Mile Point Nuclear Station	6.0 NW	82	Commercial; Picnicking and Playground
	Total		15,502	

NOTE:

* Utilizes methodology described in SCORP Technical Paper 2, Recreation Capacities and Current Use, involving calculation of relative capacities (considering combined effects of all facilities at an area) as opposed to absolute area capacity.

SOURCE:

Reference 9

407 359

TABLE 2.1-31

PRIMARY ACCESS ROUTES, CAPACITIES AND VOLUMES
1977; 1989

Route Segments	Between	Estimated 1977 Capacity *	Normal Growth 1989 Traffic Volume **	1989 Volume Capacity	Comment	Estimated Design Hour Volume ***
I81	NY49 and NY69	3,000+	1,635	0.55	Generally high quality, four lane divided	
I81	NY69 and US104	3,000+	1,205	0.40	Grade separated roadway	
I81	US104 and Conn Rte 2	3,000+	1,315	0.44		
NY3	US104 and Conn Rte 8	450	390	0.45	High quality two lanes with 6+ ft shoulder	
NY3	Conn Rte 8 and NY48	3,050+	655	0.22	Good four lane without shoulder (11 ft lanes)	
NY3	NY48 and NY176	575	795	2.31	Two lane, parking both sides	
NY3	NY176 and Conn Rte 6	1,250	1,096	1.46	Two lane, some limit on passing, 4 ft shoulder	
NY3	Conn Rte 6 and NY49	1,225	255	0.34	Two lane, some limit on passing, 4 ft shoulder	
NY3	NY49 and NY264	1,225	200	0.27	Two lane, some limit on passing, 4 ft shoulder	
NY3	NY264 and Conn Rte 35	1,050	495	0.78	Two lane, less shoulder, with merge and curve	
NY264	NY3 and NY49	1,200	190	0.27	Two lane with shoulder	
NY264	NY49 and Conn Rte 6	1,200	80	0.11	Two lane with shoulder	
NY481	Syracuse and NY264	3,000+	520	0.17	Inters[illegible]ghway standards	
NY481	NY264 and Conn Rte 57	3,000+	380	0.13	Interstate highway standards	
Conn Rte 57	NY481 and NY3	3,000+	994	0.33	Four lane and some turn lanes	
US104	Conn Rte 34 and NY3	1,350	365	0.45	Two lane with 6 ft shoulder, generally good sight distance	

TABLE 2.1-31 (Cont'd)

Route Segments	Between	Estimated 1977 Capacity *	Normal Growth 1989 Traffic Volume **	1989 Volume Capacity	Comment	Estimated Design Hour Volume ***
US104	NY3 and Conn Rte 85	1,400	255	0.30	Two lane with 6 ft shoulder, generally good sight distance	
US104	Conn Rte 85 and NY104A	1,400	255	0.30	Two lane with 6 ft shoulder, generally good sight distance	
US104	NY104A and Oswego	1,350	588	0.73	Two lane with 6 ft shoulder, generally good sight distance	
US104	Oswego Center*	2,850*	2,735	0.96	Four lane, nominal shoulder, in town location	
US104	Oswego and NY104B*	1,350	575	0.71	Two lane with 6 ft shoulder, generally good sight distance	
US104	NY104B and Conn Rte 6	1,350	310	0.38	Two lane with 6 ft shoulder, generally good sight distance	
US104	Conn Rte 6 and Conn Rte 43	1,300	415	0.53	Two lane with 6 ft shoulder, generally good sight distance, with more curves and no passing, assume parking entrance in line	
US104	Conn Rte 43 and Mexico	1,175	255	0.36	Two lane with 6 ft shoulder, generally good sight distance, less passing permitted	
US104	Mexico Center	450*	725	1.61	Two lane, parking and driveways both sides	
US104	Mexico and I81	1,300	200	0.26	Two lane, 4 ft shoulders generally good sight distance	
NY104B	US104 and Conn Rte 6	1,375	245	0.30	Two lane, 4 ft shoulders generally good sight distance	
NY104B	Conn [illegible] Conn [illegible]	1,375	245	0.30	Two lane, 4 ft shoulders generally good sight distance, assume parking entrance in line	
NY104B	Conn Rte [illegible] and NY3	1,375	220	0.27	Two lane, 4 ft shoulders generally good sight distance, assume parking entrance in line	

407 369

TABLE 2.1-31 (Cont'd)

Route Segments	Between	Estimated 1977 Capacity *	Normal Growth 1989 Traffic Volume **	1989 Volume Capacity	Comment	Estimated Design Hour Volume ***
Conn Rte 64	Conn Rte 35 and Conn Rte 6 ***	975	55	0.09	Two lanes, short section	
Conn Rte 64	Conn Rte 35 and Eggleston Rd. ***	875	55	0.10	Two lanes, very little passing area	
Eggleston Rd.	Conn Rte 64 and US104 ***	1,200	55	0.07 residential	Two lane, good shoulder, buildup	
Conn Rte 43	US104 and Lee Rd. ***	925	35	0.06	Two lane, poor riding surface, nominal shoulder	363
Conn Rte 43	Lee Rd. and Mason Rd. ***	925	35	0.06	Two lane, poor riding surface, nominal shoulder	
Conn Rte 43	Mason Rd. and NY104B ***	925	35	0.06	Two lane, poor riding surface, nominal shoulder	407
Conn Rte 58	US11 and US104 ***	1,175	470	0.67	Two good lanes, some residential buildup	

NOTES:

* Level of Service D, two-way value, except where indicated *, which shows directional value.

** Number shown is design hour volume estimate for two-way capacities; design hour volume is multiplied by 1.67 for V/C analysis.

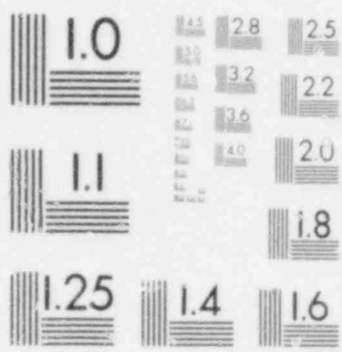
*** No base volume count data available; estimated 1976-1977 volume used.

Key:
I = Interstate Road
US = Federal Road
NY = State Road
CR or Conn Rte = County Road

TABLE 2.1-31 (Cont'd)

Route Segments	Between	Estimated 1977 Capacity *	Normal Growth 1989 Traffic Volume **	1989 Volume Capacity	Comment	Estimated Design Hour Volume ***
NY3	NY104B and NY13	1,375	590	0.72	Two lane, 4 ft shoulders generally good sight distance, assume parking entrance in line	
NY3	NY104B and Mexico	1,300	260	0.33	Two lane, 4 ft shoulders generally good sight distance, assume parking entrance in line	
NY13	NY3 and US11	1,175	605	0.86	Two lane, poor shoulder, reduced passing area	362
US11	Pulaski	400*	575	1.44	Town center, two lane, parking permitted	407
Conn Rte 2	US11 and I81	1,100	605	0.92	Two lane plus turns at I81	
NY69	Mexico and US11	575	70	0.19	Two lane, poor surface, poor shoulder	
NY69	US11 and I81	825	320	0.65	Two lane, reduced shoulder and sight distance	
NY69	I81 and Conn Rte 26	600	145	0.41	Two lane, poor shoulder and sight distance	
Conn Rte 6	NY481 and NY3 ***	1,225	200	0.27	Two high quality lanes, good percent passing area	
Conn Rte 6	NY3 and Conn Rte 4 ***	1,175	135	0.19	Two lane, less passing lanes	
Conn Rte 6	Conn Rte 4 and Conn Rte 51 ***	1,100	105	0.16	Two lane, less passing lanes	
Conn Rte 6	Conn Rte 51 and US104 ***	1,100	70	0.10	Two lane, less passing lanes	
Conn Rte 6	US104 and NY104B	1,175	70	0.10	Two lane, less passing lanes, assume parking access in line	
Conn Rte 35	NY3 and Conn Rte 4 ***	1,025	70	0.11	Two lanes, 11 ft + 3 ft shoulder	
Conn Rte 35	Conn Rte 4 and Conn Rte 64 ***	875	55	0.10	Two lanes, 11 ft, nominal shoulder, poor surface	

IMAGE EVALUATION
TEST TARGET (MT-3)



6″

TABLE 2.1-32

INSTITUTIONAL FACILITIES WITHIN AIR QUALITY AREA OF IMPACT (15 MILE RADIUS)

Map Code	Facility	Location by Polar Grid Sector	1977-1978 Enrollment/ Occupancy
	Public Schools		
	Mexico Central School District		
1.	New Haven Elem. School	1-2N	361
2.	Fravor Road School	2-3 ESE	760
3.	Mexico Elem. School	3-4 ESE	526
4.	Mexico Jr./Sr. High School	3-4 ESE	1,275
6.	Palermo Elem. School	5-10 SSE	350
	Altmar-Parish-Williamstown Central School District		
7.	Altamr-Parish-Williamstown High School	10-15 SE	614
8.	Altmar-Parish-Williamstown Middle School	10-15 SE	474
9.	Parish Elem. School	10-15 SE	387
	Fulton City Schools		
10.	Erie St. School	10-15 SSW	186
11.	Fairgrieve School	10-15 SSW	573
12.	Fulton Jr. High School	10-15 SSW	767
13.	G. Ray Bodley High School	10-15 SSW	1,583
14.	J. E. Lanigan School	10-15 SSW	555
15.	Oak Street School	10-15 SSW	198
16.	State Street School	10-15 SSW	137
17.	Volney Elem. School	10-15 SSW	520
18.	Philips Street Elem. School	10-15 SW	260
19.	Walradt Street School	10-15 SW	87

408 001

TABLE 2.1-32 (Cont'd)

Map Code	Facility	Location by Polar Grid Sector	1977-1978 Enrollment/ Occupancy
	Public Schools (Cont'd)		
	Oswego City Schools		
20.	Minetto Elem. School	10-15 SW	577
21.	Charles E. Riley Elem. School	10-15 WSW	643
22.	Fitzhugh Park Elem. School	10-15 WSW	632
23.	Kingsford Park Elem. School	10-15 WSW	439
24.	Leighton Elem. School	10-15 WSW	464
25.	Oswego Middle School	10-15 WSW	941
26.	Oswego Sr. High School	10-15 WSW	1,834
	Pulaski Central School District		
27.	Pulaski Jr./Sr. High School	5-10 NE	778
28.	Pulaski Elem. School	5-10 NE	854
			16,772
	Parochial and Private Schools		
29.	Fulton Catholic School	10-15 SSW	185
30.	Dexterville SDA Church School	10-15 SSW	24
31.	St. Mary's School	10-15 W	328
32.	Bishop Cunningham High School	10-15 W	410
33.	St. Pauls Academy	10-15 W	265
34.	Campus School	10-15 W	288
	Other Schools		
5.	Board of Cooperative Education School	3-4 ESE	1,440
			2,940
	Colleges and Universities		
35.	State University of New York at Oswego	10-15 W	9,383
			9,383
	Hospitals		
36.	A. L. Lee Memorial Hospital	10-15 SSW	64
37.	Oswego Hospital	10-15 W	106
			170

408 002

TABLE 2.1-32 (Cont'd)

Map Code	Facility	Location by Polar Grid Sector	1977-1978 Enrollment/ Occupancy
	Community-Based Residences		
38.	Harr-Wood Nursing Home	10-15 W	120
39.	Hillcrest Nursing Home	10-15 W	80
40.	Hillcrest Nursing Home and Health Related Facility	10-15 W	40
41.	Old Ladies Home of Oswego	10-15 W	21
42.	Oswego Hospital	10-15 W	38
43.	Pontiac Nursing Home	10-15 W	80
44.	Sprencer Home for Adults	10-15 W	17
45.	St. Luke Nursing Home Company, Inc.	10-15 W	120
46.	Vale Haven Home for Adults	10-15 W	30
47.	The Evergreen Home for Adults	10-15 NE	24
48.	Maple Manor	10-15 NE	26
49.	Andrew Michaud Nursing Home	10-15 SSW	81
50.	Hutchings Psychiatric Center	10-15 SSW	8
51.	Mansfield Home for Adults	10-15 SSW	12
52.	Haridan Manor Home for Adults	10-15 SSW	16
53.	Oswego County Opportunities, Home 1	10-15 SSW	10
54.	Oswego County Opportunities, Home 2	10-15 SSW	8
			731
	TOTAL INSTITUTIONAL POPULATION		29,996

408 003

TABLE 2.1-33

NEAREST OFFSITE RESIDENCE, MILK COW, AND VEGETABLE GARDEN AS MEASURED FROM REACTOR CENTERLINE, BY SECTOR*

Sector	Nearest Residence or Vegetable Garden (within 5 mi)	Nearest Farm (within 5 mi)	Type of Farm
N	0.8	1.5	Fruit
NNE	0.98	None	
NE	1.25	2.25	Dairy
ENE	1.2	2.5	Dairy
E	1.1	3.0	Fruit
ESE	1.25	1.75	Dairy
SE	0.98	1.5	Dairy
SSE	0.65	1.5	Dairy
S	0.5	None	
SSW	0.5	4.0	Dairy
SW	0.5	4.0	Dairy
WSW	0.58	3.0	Truck
W	0.5	4.75	1 Dairy
			1 Crop
WNW	0.75	None	
NW	0.65	1.0	Dairy
NNW	0.8	1.0	Dairy

NOTE:

* Nearest milk cow is defined as nearest farm; nearest vegetable garden is defined as nearest residence

NYSE&G ER
NEW HAVEN-NUCLEAR

TABLE 2.1-34

ANNUAL MILK PRODUCTION IN LITERS WITHIN 50 MILES OF THE STATION, BY SECTOR

Sector	Miles										
	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	Total
N	*	12,282	*	*	*	*	*	*	*	*	12,282
NNE	*	*	8,184	*	*	*	1,290,000	3,010,000	1,720,000	4,300,000	10,328,184
NE	*	*	*	*	28,644	555,445	1,519,997	1,385,574	6,475,620	89,929,125	100,164,405
ENE	*	*	20,636	28,374	36,973	555,445	640,965	*	146,810	44,048,125	45,478,328
E	*	*	9,592	28,661	38,253	316,910	356,219	3,692,720	9,680,420	40,341,700	54,464,475
ESE	6,141	18,423	*	9,592	28,661	334,345	427,581	6,573,741	16,068,760	25,298,880	48,766,124
SE	*	12,282	139,563	61,413	9,592	152,081	865,343	424,750	98,592,120	63,279,830	163,536,974
SSE	*	12,282	139,563	61,413	9,592	152,081	865,343	64,500	355,670	25,785,120	27,445,564
S	*	*	*	*	*	152,081	1,226,363	449,350	1,280,880	1,280,880	4,389,554
SSW	*	*	*	8,184	*	76,038	2,607,501	5,245,900	27,577,790	41,785,040	77,300,453
SW	*	*	*	7,202	9,166	82,588	805,800	8,396,920	226,150	12,642,400	22,170,226
WSW	*	*	*	16,374	8,184	24,563	500,231	39,910	93,125	319,275	1,001,662
W	*	*	*	*	20,471	24,563	*	*	*	*	45,034
WNW	*	*	*	*	*	*	*	*	*	*	*
NW	3,100	9,299	*	*	*	*	*	*	*	*	12,399
NNW	12,282	20,471	*	*	*	*	*	*	*	*	32,753
Total	21,523	85,039	317,538	221,213	189,536	2,426,140	11,105,343	29,283,365	162,488,345	349,010,375	555,148,417

NOTE:

* Denotes no farmland contained within sector.

SOURCES:

References 15, 24, and 63

408 005

TABLE 2.1-35

ANNUAL MEAT PRODUCTION IN KILOGRAMS WITHIN 50 MILES OF THE STATION, BY SECTOR

Sector	Miles 0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	Total
N	*	*	428	*	*	*	*	*	*	99,660	100,088
NNE	*	*	285	*	*	*	27,180	10[illegible],720	163,080	208,380	507,645
NE	*	*	*	*	998	19,361	52,981	112,051	123,895	426,050	735,336
ENE	*	*	719	989	1,289	19,361	22,342	*	12,460	371,230	4[illegible],390
E	*	*	334	999	1,333	11,046	12,416	32,303	69,310	22,240	[illegible]
ESE	214	642	*	334	999	11,654	14,904	79,414	56,875	65,230	23[illegible]
SE	214	642	281	387	1,664	4,995	10,459	4,266	521,630	1,049,220	1,55[illegible]
SSE	*	428	4,865	2,141	334	5,301	30,163	10,420	51,640	818,570	923,[illegible]
S	*	*	*	*	*	5,301	42,746	72,030	185,280	181,650	487,007
SSW	*	*	*	285	*	2,650	90,888	330,690	597,960	815,400	1,837,873
SW	*	*	*	2,332	2,968	2,879	28,087	202,810	122,450	222,110	583,636
WSW	*	*	*	571	285	856	17,436	21,610	5,120	172,865	218,743
W	*	*	*	*	714	856	*	*	*	*	1,570
WNW	*	*	*	*	*	*	*	*	*	*	*
NW	108	324	*	*	*	*	*	*	*	*	432
NNW	428	714	*	*	*	*	*	*	*	*	1,142
	964	2,750	6,912	8,038	10,584	84,260	349,602	974,314	1,909,700	4,452,605	7,799,729

NOTE:

* Denotes no farmland contained within sector

SOURCES:

References 15, 24, and 63

408 006

TABLE 2.1-36

ANNUAL TRUCK FARM PRODUCTION IN KILOGRAMS WITHIN 50 MILES OF THE STATION, BY SECTOR

Sectors	Miles 0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	Total
N	*	6,943	*	*	*	*	*	*	*	*	6,943
NNE	*	*	4,626	*	*	*	*	*	*	*	4,626
NE	*	*	*	*	16,192	313,991	859,248	54,027	*	*	1,243,458
ENE	*	*	11,665	16,040	20,901	313,991	362,335	*	*	*	724,932
E	*	*	5,422	16,202	21,624	179,148	201,369	30,221	*	*	453,986
ESE	3,467	10,415	*	5,422	16,202	189,004	241,710	241,710	*	*	707,930
SE	3,467	10,415	4,554	6,289	26,981	31,011	169,628	36,016	7,329,540	*	7,667,901
SSE	*	6,943	78,894	34,717	5,422	85,971	489,175	4,450,731	971,685	4,080	6,127,618
S	*	*	*	*	*	85,971	683,258	4,960,350	11,435,985	1,902,600	19,068,164
SSW	*	*	*	4,626	*	42,984	1,474,010	3,873,150	*	*	5,394,770
SW	*	*	*	42,984	42,984	46,687	455,515	*	*	10,261,720	10,849,980
WSW	*	*	*	9,256	4,626	13,885	282,778	*	*	*	310,545
W	*	*	*	*	11,572	13,885	*	*	*	*	25,457
WNW	*	*	*	*	*	*	*	*	*	*	*
NW	1,753	5,258	*	*	*	*	*	*	*	*	7,011
NNW	6,943	11,572	*	*	*	*	*	*	*	*	18,515
Total	15,630	51,546	105,161	135,536	166,504	1,366,528	5,219,026	13,646,205	19,737,210	12,168,400	52,611,746

NOTE:

* Denotes no farmland contained within sector

SOURCES:

References 15, 24, and 63

408 007

TABLE 2.1-37

TOTAL FIELD CROPS PRODUCED WITHIN
50 MILES OF THE STATION

Type	Quantity (kg)	Yield (kg/sq m)
Oats	7,141,750	0.3
Grain Corn	40,348,891	1.0
Wheat	3,397,500	0.3

SOURCES:

References 15, 22, 24, 63, 64

408 008

TABLE 2.1-38

TOTAL HARVESTED FORAGE CROPS PRODUCED WITHIN 50 MILES OF THE STATION

Type	Quantity (kg)	Yield (kg/m^2)
Corn Silage	773,719,490	4.1
Hay	288,490,698	1.0
Sorghum (kg/m^2)	25,630,740	2.0
Pasture Grass Density	N/A	0.7

SOURCES:

References 15, 22, 24, 63, 64

408 009

TABLE 2.1-39

GRAZING PRACTICES WITHIN 50 MILES

	0 to 10	10 to 20	20 to 30	30 to 40	40 to 50
N	S,H,P,GC				H,P
NNE	S,H.P,GC	CS,H,HS,P	CS,H,HS,P	CS,HS,H,P	CS,HS,H,P
NE	S.H,P,GC	CS,HS,H,P	H,P	P,H,CS	P,CS,HS
ENE	S,H,P,GC	CS,HS,H,P	H,	P,S,GC	P,S,GC
E	S,H,P,GC	S,H,P,GC	P,[illegible]C,S	P,GC,S	P,GC,S
ESE	S,H,P,GC	S,H,P,GC	P,GC,S	P,GC,S	P,GC,S
SE	S,H,P,GC	S,H,P,GC	P,GS,S	P,GS,S	P,GC,S
SSE	S,H,P,GC	S,H,P,GC	NG	NG	P,GC,H
S	S,H,P,GC	S,H,P,GC	NG	NG	P,GC,H
SSW	S,H,P,GC	S,H,P,GC	NG	S,H	S,H
SW	S,H,P,GC	S,H,P,GC	S,H	NG	P,S,GC
WSW	S,H,P,GC	S,H,P,GC	NG	NG	
W	S,H,P,GC	*	*	*	*
WNW	S,H,P,GC	*	*	*	*
NW	S,H,P,GC	*	*	*	*
NNW	S,H,P,GC	*	*	*	*

NOTES:

*: Asterisk denotes Lake Ontario
S: Silage
CS: Corn Silage
HS: Hay Silage
GS: Green Chop
H: Hay
P: Pasture
NG: No Grazing

SOURCE:

Reference 63

408 010

TABLE 2.1-40

GRAZING SEASONS WITHIN 50 MILES

	0 to 10	10 to 20	20 to 30	30 to 40	40 to 50
N	5/15 - 10/15				5/1 - 10/31
NNE	5/15 - 10/15	5/1 - 10/31	5/1 - 10/31	5/15 - 10/15	5/1 - 10/31
NE	5/15 - 10/15	5/15 - 10/15	5/1 - 10/31	5/15 - 10/15	5/1 - 10/31
ENE	5/15 - 10/15	5/15 - 10/15	5/15 - 10/15	5/15 - 10/15	5/15 - 10/15
E	5/15 - 10/15	5/15 - 10/15	5/1 - 10/31	5/15 - 10/15	5/1 - 10/31
ESE	5/15 - 10/15	5/15 - 10/15	5/1 - 10/31	5/1 - 10/31	5/1 - 10/31
SE	5/15 - 10/15	5/15 - 10/15	5/1 - 10/31	5/1 - 10/31	5/1 - 10/31
SSE	5/15 - 10/15	5/15 - 10/15	NGS**	5/15 - 10/10	5/15 - 10/15
S	5/15 - 10/15	5/15 - 10/15	NGS**	5/15 - 10/10	5/15 - 10/10
SSW	5/15 - 10/15	5/15 - 10/15	NGS**	5/15 - 10/10	5/15 - 10/1
SW	/15 - 10/15	5/15 - 10/15	5/15 - 10/15	5/15 - 10/15	5/15 - 10/1
WSW	5/15 - 10/15	5/15 - 10/15	NGS	5/15 - 10/15	5/15 - 10/15
W	5/15 - 10/15	*	*	*	*
WNW	5/15 - 10/15	*	*	*	*
NW	5/15 - 10/15	*	*	*	*
NNW	5/15 - 10/15	*	*	*	*

NOTES:

* Denotes Lake Ontario

** NGS: no grazing season

SOURCE:

(63) Cooperative Extension Associations, Agricultural Division, New York State Agricultural Agents, (counties within 50 miles), NY, 1977-1978.

TABLE 2.1-41

TOTAL COMMERCIAL FISH HARVESTED FROM LAKE ONTARIO BY SPECIES, IN KILOGRAMS, FROM THE U.S. SIDE AND THE CANADA SIDE, RESPECTIVELY

	1974		1975		1976		1977	
	U.S.	Canada	U.S.	Canada	U.S.	Canada	U.S.	Canada
Bowfin	---	2,268	---	3,400	*		---	
Bullhead	33,116	332,492	22,634	348,926	8,482		20,831	
Burbot	---	---	---	---	---		3	
Carp	7,258	136,428	726	413,862	2,263		850	
Catfish	1,814	10,386	454	28,874	1,225		627	
Crappie	3,175	6,350	1,542	---	1,406		1,179	
Rock bass	6,350	12,701	6,713	102,122	3,266		5,484	
Cohoe salmon	---	---	---	---	---		---	
Eels common	23,133	100,698	13,603	369,544	16,103		---	
Lake herring	*	14,519	46	26,717	---		---	
Lake trout	---	484	---	2,078	---		---	
Lake whitefish	---	---	---	4,930	---		---	
Freshwater drum (sheepshead)	454	1,814	227	7,861	136		203	
Northern pike	*	9,525	---	17,801	---		---	
Round whitefish	---	---	---	2,598	---		---	
Shad	---	---	---	---	---		14	
Smelt	3,175	46,720	8,528	104,058	5,579		5,976	
Sturgeon	---	454	---	614	---		---	
Suckers	2,732	6,804	1,179	8,647	1,860		1,035	
Sunfish	6,350	92,534	6,169	299,054	3,084		4,114	
White bass	*	1,814	---	12,204	91		93	

408 012

TABLE 2.1-41 (Cont)

	1974		1975		1976		1977	
	U.S.	Canada	U.S.	Canada	U.S.	Canada	U.S.	Canada
Whitefish	*	7,257	---	---	---		---	
White perch	36,741	131,543	15,876	380,979	20,503		31,041	
Yellow perch	22,226	327,064	27,488	598,946	23,814		22,166	
Yellow pike	454	1,361	136	5,132	181		---	
Unclassified, for Animal Food	---	15,876	---	38,736	---		---	
Total**	146,965	1,072,303	105,506	2,776,833	87,997	1,321,633.4	93,957	1,116,085

NOTE:

* Denotes catches of less than 500 pounds (2,265 kg).

** Totals may not add due to rounding

SOURCES:

References 65, 66, 67

408 013

TABLE 2.1-42

SPORT FISHING CATCH BY SPECIES ON LAKE ONTARIO

Species	Number of Fish Landed	Weight (kg)
Perch	1,834,000	364,000
Smallmouth bass	483,600	219,400
Largemouth bass	99,200	56,300
Panfish	1,669,300	236,600
Bullhead	1,022,600	347,900
Other	1,428,000	485,000
Total New York State	6,536,800	1,709,200
Total Canada	6,536,800	1,709,200
Total Lake Ontario	13,073,600	3,418,400

SOURCES:

References 35, 68

TABLE 2.1-43

ANNUAL HARVEST OF GAME BY SPECIES
WITHIN 50 MILES OF PROPOSED SITE, 1976

	Deer	Beaver	Otter	Fishes
Cayuga	478	53	*	---
Jefferson	139	324	35	14
Lewis	315	1,299	74	113
Madison	468	66	---	---
Oneida	216	203	11	52
Onondaga	663	49	1	---
Oswego	384	268	4	40
Seneca	159	10	---	---
Wayne	274	69	---	---
TOTAL	3,141	2,863	125	219

NOTE:

* None of this species harvested in county cited

SOURCE:

Reference 36

408 015

TABLE 2.1-44

IDENTIFICATION AND DESCRIPTION OF PUBLIC AND PRIVATE WATER SUPPLY SYSTEMS DRAWING FROM LAKE ONTARIO WITHIN 50 MILES ACROSS WATER FROM THE STATION DISCHARGE STRUCTURE

Map* Code	Name of System	Water Miles from Discharge	Direction from Site by Major Compass Point	Average Withdrawal Rate 1977 (mgd)	Type of Use
1	Williamson Water District Williamson, N.Y.	47	WSW	3.0	Domestic and Process
2	Village of Sodus Sodus, N.Y.	42	WSW	0.3	Domestic, Institutional, and Process
3	Village of Sodus Point Sodus Point, N.Y.	39	WSW	0.2	Domestic
4	Village of Wolcott Wolcott, N.Y.	32	WSW	0.1	Domestic
5	City of Oswego	11.3	W	10.0	Domestic
6	Metropolitan Water Board of Onondaga County Syracuse, N.Y.	11.3	W	35.0	Boiler Makeup, Domestic and Process
7	Niagara Mohawk Power Corp. Scriba, N.Y.	6	WNW	180.0	Cooling
8	Power Authority of the State of New York Scriba, N.Y.	6	WNW	259.2	Cooling
9	Village of Sacketts Harbor	33	NNE	0.2	Domestic
10	Chaumont Water District Chaumont, N.Y.	39	NNE	0.7	Domestic
11	Village of Cape Vincent Cape Vincent, N.Y.	43	NNE	0.2	Domestic

NOTE:

* See Figure 2.1-16.

SOURCES:

References 17 and 69.

TABLE 2.1-45

PUBLIC GROUND WATER SYSTEMS

Water System	Approximate Distance to Site (mi)	Population Served (date)	Avg.Daily Consumption (gal)	Well Number	Diameter and Well Type	Well Depth (ft)	Yield (gpm)	Comments
Mexico	5.5	1,650 (1977)	468,000	1	30 in drilled	34	460	Sand and gravel aquifer
				2	30 in drilled	34	460	Sand and gravel aquifer
				3	30 in drilled	34	370	Sand and gravel aquifer
Pulaski	13.0	2,700 (1976)	250,000					Three springs
Fulton	14.0	15,000 (1976)	2,800,000	1		41	360	Sand and gravel aquifer
				2		33	150	Sand and gravel aquifer
				3		35	500	Sand and gravel aquifer
				4		40	500	High sulfur content; sand and gravel aquifer
				5		33	300	High sulfur content; sand and gravel aquifer
				6		30	350	High sulfur content; sand and gravel aquifer
				7		30	350	High sulfur content; sand and gravel aquifer
				8		35	400	Out of service
				9		67	450	Sand and gravel aquifer
				10		85	230	Wells No. 10 through
				11		92	230	No. 13 purchased
				12		60	230	from Great Bear
				13		103	698	Spring Co.

408 017

TABLE 2.1-45 (Cont)

Water System	Approximate Distance to Site (mi)	Population Served (date)	Avg. Daily Consumption (gal)	Well Number	Diameter and Well Type	Well Depth (ft)	Yield (gpm)	Comments
Central Square	15.5	1,080 (1976)	120,000	1	18 ft dug	21	150	
				2	3 ft dug	25	150	
Phoenix	16.5	2,600 (1976)	550,000	1				No information available on Well No. 1
				2	6 in drilled	50	340	
Orwell	16.5	250 (1976)	25,000	3	20 in drilled	65	950	Spring
Sandy Creek-Lacona	17.0	1,860 (1976)	375,000					Have two wells and a springfed reservoir for an emergency supply. No information available on wells.
Hannibal School District	18.0	2,050 (1977)	12,000	1	Unknown	18	105	Used only by students and staff

SOURCES:

References 70, 72, and 73

TABLE 2.1-46

INDIVIDUAL WATER SUPPLY SYSTEMS*

Well** No.	Owner	Surface*** Elevation (ft above msl)	Well Depth (ft)	Diameter (in)	**** Comments*****
1	Unknown				No information available
2	Barbara Clifford	432		approx. 36	Dug well
3	David VonHoltz	436	40	36	Dug well; water level 2 ft deep
4	Douglas Hoover	430	12	48	Dug well; hard water; occasionally goes dry
5A	Leroy Robarge	432	35	36	Dug well; hard water
5B	Leroy Robarge	432	55	6	Hard water
6	Laura Bullock	434	140	6	Salty water; hydrogen sulfide odor; water level approx. 70 ft deep
7	Kenneth Sherman	428	14[illegible]	6	Hard water; water level 70 ft deep; bedrock approx. 120 ft deep; 7 gpm yield
8	Ronald Phelps	420	12	36	Dug well; water level 10 ft deep
9	Richard Phelps, Jr.	428		36	Dug well; hard water
10	John Petty				No Well; uses well No. 9
11	Paul Alexander, Sr.	418	20	36	Dug well; hard water; hydrogen sulfide odor water level 14 ft deep
12	Douglas Shumway	430	approx. 15	36	Dug well, hard water
13	John Phelps	424	15	36	Dug well; hard water; water level 10 ft deep
14	Linda Hoyt	430		36	Dug well
15	William Branshaw	430		36	Dug well
16	Marjorie Thayer	435	11	36	Dug well; water level 8 ft deep
17	Louise Gero				No information available
18	Elin Ware	425	65	6	Hard water
19	Eileen Darrow	424	14	36	Dug well; water level 12 ft deep

408 019

TABLE 2.1-46 (Cont'd)

Well** No.	Owner	Surface*** Elevation (ft above msl)	Well Depth (ft)	Diameter (in)	**** Comments*****
20	Unknown				No information available
21	Donald Wilcox	426	90	6	Hard water
22	Anne Philo				No information available
23	Violet Sherman	424	20	36	Dry well; hard water; water level approx. 12 ft deep
24	Unknown				No information available
25	James Morris	424	109	6	Hard water; water level 50 ft deep
26	National Bank of Northern New York	424			Hard water; used by few people only
27	Ella LaPage	418	35	6	
28	Unknown				No information available
29	Irene LiCourt	416	40	6	Hard water; bedrock 22 ft deep
30	Victor Parmenter	416	65	6	Hard water; water level 30 ft deep
31	Helen Keefe	416	65	6	
32A	Richard Yager	412	60	6	Hard water
32B	Richard Yager	412	100	6	Hard water
33	Ranalo Alfred	412	92	6	
34	Alfred Drake				No information available
35	Allan Campney	398	12	6	Dug well; water level 11 ft deep; occasionally goes dry in summer
36	Thomas Benz	388	75	6	Driven well; bedrock [illegible] ft deep; 1 gpm yield
37	Paul Inget	380	10	36	Dug well; hard water
38	William Whitford	362	approx. 40	6	Public supply (Gay 90's Tavern)
39A	Wayne Myers	334	20	approx. 36	Hard water; water level approx. 10 ft deep

TABLE 2.1-46 (Cont'd)

Well** No.	Owner	Surface*** Elevation (ft above msl)	Well Depth (ft)	Diameter (in)	**** Comments*****
39B	Wayne Myers	334	20	approx. 36	Hard water; water level approx. 10 ft deep
40	Edward Mazzoli	334			Spring; no seasonal variation
41	Clara Glenister	324	40	6	
42	George Mazzoli	326	42	6	Hard water; water level 17 ft deep; bedrock 10 ft deep; 5 gpm yield
43	Carl Cronk	326	22	36	Dug well; hard water
44	Jeffrey Rank	320	32	6	Driven well; hard water; bedrock 29 ft deep; 0.5 gpm yield
45	Woodrow Clemons	306	10	36	Dug well; hard water; water level 5 ft deep
46	James Reynolds	308	35	6	
47	Clemons Plumbing & Heating Co.				Unoccupied
48	New Haven Grange Hall #52				No well
49	Anita Bullard	302	15	36	Dug well; hard water; water level 10 ft deep
50A	John Ruf	314	15	36	Dug well; hard water; water level 8 ft deep
50B	John Ruf	314	55	6	Also used for livestock
51	Arthur Holliday				No information available
52A	James Sprague	310		36	Dug well; occasionally goes dry
52B	James Sprague	310		6	Occasionally goes dry
53	Unknown				No information available
54A	Charles Ferris	316	95	6	Water level 22 ft deep; bedrock 17 ft deep; 1.5 gpm yield
54B	Charles Ferris	316	90		Not in use

TABLE 2.1-46 (Cont'd)

Well** No.	Owner	Surface*** Elevation (ft above msl)	Well Depth (ft)	Diameter (in)	**** Comments*****
55	George Bigelow	316	65	6	Hard water; water level 50 ft deep; bedrock 14 ft deep; 3 gpm yield
56A	Clay Ladd	318	14	36	Dug well; water level 3 ft deep
56B	Clay Ladd	318	20	36	Dug well
57	Unknown				Uses well No. 56
58	Ernest Demar	308	approx. 115	6	Hard water; water level 80 ft deep
59	Stuart Demar	298	8	36	Dug well; hard water; water level 5 ft deep
60	Bertha Tucker	304	40	6	Hard water; water level 30 ft deep
61	Charles Dings, Jr.	300	8	36	Dug well; hard water; water level 7 ft deep
62A	Wayne Cowley	300	42	6	Hard water; 40 gpm yield
62B	Wayne Cowley	300			Dug well; not in use
63	James Searles	306	32	6	Water level 22 ft deep; bedrock 8 ft deep
64	Richard DeLong	300	24	6	
65A	Kenneth Searles	304	45	6	Hard water; water level 8 ft deep
65B	Kenneth Searles	304			Spring-fed pond used by livestock
66A	Kenneth Allen	304	20	6	Hard water
66B	Kenneth Allen	304	Unknown	36	Dug well; water level 12 ft deep
67	Mossman Leishman	300	27	36	Dug well; water level 27 ft deep
68	Margo Plumley	298	15	6	Hard water; water level 7 ft deep
69	William Evanchik	298	30	6	Hard water; water level 20 ft deep
70A	Richard Askew	296	95	6	Hard water; water level 20 ft deep
70B	Richard Askew	296	Unknown		Dug well
71	Fred Herse	426	39	6	Supplies three families; water level 10 ft deep

TABLE 2.1-46 (Cont'd)

Well** No.	Owner	Surface*** Elevation (ft above msl)	Well Depth (ft)	Diameter (in)	**** Comments*****
72	Jerome Harrington	426	90		Also used for . .ore (eight people)
73	Joan Waterbury	428	100		
74	Ronald Van Buren	430			No information available
75A	Secil Brown	430			Well went dry
75B	Secil Brown	430			No information available
76	Bertha Emerson				No information available
77	Allen Lum				Supplies both parsonage and church
78	Charles Campney	428	45	36	Dug well; also used for farm
79	United Methodist Church(Apartment)	432	66		Hard water; used by four families
80A	New Haven Fire Station	422	55	6	Used for drinking and fire trucks; water 20 ft deep; sand and gravel aquifer; 40 gpm yield
80B	New Haven Fire Station	422	12		Dug well; not in use
81	Richard Grierson	422	42		
82	Harold Burdick	422	66	6	Approx. 1 gpm yield
83	Michael Gross				No information available
84	Kenneth Hager	418	121		7 gpm yield
85	Harold Fisher	418	approx. 42		
86	Robert Hibbert	420	45		Hard water
87	Fred Wilbur	420	approx. 15		Dug well
88	Mervin Clark	410	16		Dug well; occasionally goes dry in summer
89	R. Roland	410	12	30	Dug well

TABLE 2.1-46 (Cont'd)

Well** No.	Owner	Surface*** Elevation (ft above msl)	Well Depth (ft)	Diameter (in)	**** Comments*****
90	Tom Pilon	414	approx. 20	36	Dug well
91	Floyd Burton	418	20	36	Dug well
92	Richard Widell	420	90		
93	Unknown				
94	Walter Fisher	420	38		
95	Lawrence Rector	424	60		Dug to 25 ft deep and then drilled to 60 ft deep; water contains iron
96	T. Hoenow	425			Dug well used by three families; hard water
97	Albert Tyrell	434	95		
98	Ruth Thomas	430	90	6	Well draws from overburden; approx. 10 gpm yield
99	Norm Fischer	435	80	6	Hard water
100	Ted Bond, Jr.	418	142		Approx. 4 gpm yield
101A	Ted Bond, Sr.	406	85		Hard water; not in use
101B	Ted Bond, Sr.	400	34	6	Hard water; not in use
101C	Ted Bond, Sr.	400	approx. 14		Dug well; not in use
101D	Ted Bond, Sr.	406	approx. 18		Not presently in use
101E	Ted Bond, Sr.				Spring-fed pond; used for livestock
102A	Richard McDermott	408	approx. 100	6	Hard water
102B	Richard McDermott	408			Dug well; used for washer
102C	Richard McDermott	406			Dug well; not presently in use
103	Rita Gorman	416	150		
104	Audrey Daniels	402	95		Approx. 15 gpm yield
105	Frank Elmhirst	416	approx. 112		Hard water; bedrock approx. 75 ft deep;

TABLE 2.1-46 (Cont'd)

Well** No.	Owner	Surface*** Elevation (ft above msl)	Well Depth (ft)	Diameter (in)	**** Comments*****
					approx. 5 gpm yield
106	Frank Elmhirst	408	85		Also used for farm
107	Jess Lamb	384			Hard water
108	Jim Bullock	394	10		Dug well
109	Pat Eagen	414	72		
110	Robert Holland	414	60	6	Water contains iron; water level 5 ft deep; sand and gravel aquifer; 15 gpm yield
111A	Tom Fisher	428	86	8	Water level 60 ft deep; also used for farm; bedrock 85 ft deep; 4 gpm yield
111B	Tom Fisher	428	28		Dug well; also used for farm
112A	Ralph Selden	404	approx. 28		Dug well
112B	Ralph Selden	408	18		Dug well; used for livestock
112C	Ralph Selden	402	14		Dug well; used for livestock
113A	John Fitzsimmons	408	49	6	Hard water; 10 gpm yield
113B	John Fitzsimmons	408	18		Dug well; occasionally goes dry
113C	John Fitzsimmons	412	approx. 18		Dug well; used for livestock; occasionally goes dry
114A	John Fitzsimmons	358	approx. 20		Dug well; hard water
114B	John Fitzsimmons	356	approx. 25		Dug well; hard water
115A	Foster Raymond	366	approx. 35		Dug well; hard water
115B	Foster Raymond				Water from Butterfly Creek; used domestically but not for drinking
116	Pauline Griffin				Water from Butterfly Creek; used domestically but not for drinking
117	Douglas Egglestone				No information available

408 025

TABLE 2.1-46 (Cont'd)

Well** No.	Owner	Surface*** Elevation (ft above msl)	Well Depth (ft)	Diameter (in)	**** Comments*****
118	Wayne Watson	350	20		Dug well; also used for farm
119	Fred Shepard	368	20		Vacant residence
120	Bob Thayer				No information available
121	Jim Clark	368	16	36	Dug well; water contains iron
122	Jim Tighe	424	25		Dug well
123A	Gary Clark	404	30		Dug well; also used for farm
123B	Gary Clark	404	125		Salty water; also used for farm
123C	Gary Clark	404	approx. 30		Dug well; also used for farm; occasionally goes dry
123D	Gary Clark	404			Spring-fed pond; used for livestock
124	Raymond Linduski	364	approx. 70		
125	Joe Watson				Uses Well No. 261
126	Burton Bogart	325	14	40	Dug well; water level 6 ft deep; bedrock 14 ft deep
127	Arthur Gorton	326	approx. 120		Slightly salty water; hydrogen sulfide odor
128	Robert Riordan	330			Slight hydrogen sulfide odor
129	Unknown				No information available
130	Lillian Hargrave	340	approx. 70		
131A	Donald LaPage	320	9	48	Dug well; water level 6 ft deep; also two other dug wells, but not used and no information available
131B	Donald LaPage	320	125		Salty water; hydrogen sulfide odor; not in use
132A	Edgar Miller	340	75	6	Bedrock 75 ft deep; also used for farm
132B	Edgar Miller	340	16		Dug well; hydrogen sulfide odor

408 026

TABLE 2.1-46 (Cont'd)

Well** No.	Owner	Surface*** Elevation (ft above msl)	Well Depth (ft)	Diameter (in)	**** Comments*****
133	John Rathbun	332	63	6	
134	Walter Yablonski	322	26	48	Dug well; water level 6 ft deep
135	Lyle Woolson	328	26	6	
136	Steve Yablonski	328	28	8	Hydrogen sulfide odor
137	John Filkins	316	68		
138	Flawrence Woolson	314	approx. 70	6	Slightly hard, hydrogen sulfide odor
139	Dale Dusharm	308	63	6	Hydrogen sulfide odor; bedrock approx. 35 ft deep; 3 gpm yield
140	Ron Woolson	306	50	6	Slight hydrogen sulfide odor; water 12 ft deep; bedrock approx. 38 ft deep; 10 to 12 gpm yield
141	Robert McGaha	300	54	6	Supplies two families; water approx. 50 ft deep
142	Forrest Woodward	304	40		Hydrogen sulfide odor
143	Jerome Nurse	298	48	6	Hydrogen sulfide odor; water approx. 40 ft deep; bedrock 35 ft deep; 15 to 20 gpm yield
144	Unknown				No information available
145	Unknown				Vacant residence
146	Myrtle Cummins	304	57		Hydrogen sulfide odor
147	Charles O'Connor	300	Unknown		Hydrogen sulfide odor
148	Bernard Hutchins	304	35	6	Supplies two mobile homes; bedrock 25 ft deep; 12 gpm yield
149	Dwight Cutler	310	54	6	Water level approx. 20 ft deep
150	Lilho Lehtonen	306		30	Dug well
151	Betty Gregory	302	42	6	Hydrogen sulfide odor
152	Unknown				Vacant residence

TABLE 2.1-46 (Cont'd)

Well** No.	Owner	Surface*** Elevation (ft above msl)	Well Depth (ft)	Diameter (in)	**** Comments*****
153	Curtis Gregory	302	52	6	Water level 20 ft deep; bedrock 52 ft deep; 4 to 5 gpm yield
154	John Burrows	272	12	60	Dug well; water level 2 ft deep
155	Unknown				Vacant residence
156	Lawrence Rogers	280	50	6	Water level 9 ft deep; bedrock approx. 15 ft deep; 10 gpm yield
157A	Lawrence Rogers	276	22	36	Dug well; water level approx. 10 ft deep
157B	Lawrence Rogers	276	16	36	Dug well
158	Lawrence Rogers	274	24	6	Water level [illegible] ft deep; bedrock less than 24 ft deep; 12 gpm yield
159	Earl Skininski, Sr.	272	65	6	
160	Lawrence Rogers	[illegible]	26	6	Supplies three families; bedrock less than 27 ft deep; 8 to 10 gpm yield
161	Raymond Michaels	272	18	36	Dug well
162	Unknown				No information available
163	Cherry Bowman	288		36	Dug well
164	Unknown				No information available
165	John Barker	305	approx. 30	36	Dug well; water level is 3 to 4 ft below surface
166	Gary Butler	290	45	6	Bedrock greater than 45 ft deep
167	Louis French	280			Dug well
168	Anthony Lee	268	approx. 97		Slight hydrogen sulfide odor
169	Elsworth Smith	270	32	8	Slight hydrogen sulfide odor, water approx. 8 ft deep; bedrock approx. 20 ft deep
170	Robert Babbitt	284	12	48	Dug well; also used for livestock
171	Unknown				No information available

TABLE 2.1-46 (Cont'd)

Well** No.	Owner	Surface*** Elevation (ft above msl)	Well Depth (ft)	Diameter (in)	**** Comments*****
172	Joseph Hayden	306	53		Supplies two families; bedrock less than 53 ft deep; 18 gpm yield
173	Donald Searles	300	40	6	5 gpm yield; owner has two other wells, but not in use
174	Unknown				No information available
175	Unknown				No information available
176	Unknown				No information available
177	Gary Byers	308	approx. 14	48	Dug well
178	Ralph Ariola	302	37	6	Hydrogen sulfide odor; bedrock 14 ft deep; 1 gpm yield
179	Trudy Hermann	302	approx. 30		
180	Sidney Dashnau	314	approx. 25	36	Dug well; water level 3 ft deep
181	Unknown				No information available
182	Allen Smith	316	55	6	Supplies two families
183	Helen Berry	306	42	6	Bedrock approx. 35 ft deep; approx. 20 gpm yield
184	Dennis Butterfield	310	55	8	
185	Charles Bentley	302	50	6	Slight hydrogen sulfide odor; supplies two families
186	Allen Smith	324		6	
187	Hugh Houston		70	6	Strong hydrogen sulfide odor; supplies three families; 15 gpm yield
188	Ronald Abbott	360	16	48	Dug well
189	Nancy Denny	360	108	6	Hydrogen sulfide odor
190	Harriet Watson				Uses water from Butterfly Creek
191	Leonard Magrisi	422	40	8	Supplies two families

408 029

TABLE 2.1-46 (Cont'd)

Well** No.	Owner	Surface*** Elevation (ft above msl)	Well Depth (ft)	Diameter (in)	**** Comments*****
192	Hubert Conine	424	50		
193	Leo Fischer	424	130		
194	Fred Snyder	426	45		Supplies two families
195	Rev. William Hart	426	approx. 90		Slightly hard water
196A	Robert Strong	432	90	6	Hard water
196B	Robert Strong	432	approx. 30		Hard water
107	Town of New Haven	432	45	6	Not used for drinking; oil in water
198	Lola Lambrinos	430	170		Hard water
199	John Rhinehart	432	approx. 50	6	Hardware supply store; used by 2 employees; gravel aquifer; 7 to 8 gpm yield
200	Phyllis Oot	430	approx. 80		Supplies three families
201	Town of New Haven	430	45		Not used for drinking; oil in water
202A	Harold Denny	432	61		Public water supply (tavern)
202B	Harold Denny	432	35		Dug well
203	Parish Oil Co.	432	approx. 45	6	Not used for drinking; oil in water
204	Ivan Vincent	432	50		
205	New Haven Elementary School	430	36	24	Dug well; public water supply (340 students)
206	V.F.W. Veterans Hall	432	approx. 20	6	Dug well; not in use
207	Ann Sidwell	430	100		Water contains iron and hydrogen sulfide odor
208A	Alberta Rowe	436	15		Dug well; occasionally goes dry

408 030

TABLE 2.1-46 (Cont'd)

Well** No.	Owner	Surface*** Elevation (ft above msl)	Well Depth (ft)	Diameter (in)	**** Comments*****
208B	Alberta Rowe	436	15		Dug well
209	Keith Egnew	422	73	6	Bedrock approx. 60 ft deep; 7 gpm yield
210	Gordon Schipper	424	85	8	Water contains slight iron and hydrogen sulfide odor; approx. 75 ft deep; 3 gpm yield
211	Helena Rhinehart	114	12	48	Dug well
212	John Short				No information available
213	David Hertzler	398	approx. 45		Hard water
214	Lee DeCastor	390	46		Bedrock 45 ft deep; approx. 10 gpm yield
215	Christene Rhinehart	404	approx. 20		Dug well; occasionally goes dry
216A	Floyd Prosser	416	90	8	
216B	Floyd Prosser	416	40	48	Dug well
217	Pat Knopp	415	100	6	Bedrock 66 ft deep; 1 gpm yield
218	Pat Knopp	410	12	36	Dug well; water has high iron content; greater than 5 gpm yield
219	Donna [illegible]aker	390	approx. 50	48	Dug well; occasionally goes dry
220	George Wiltse	400	approx. 20		Dug well; hard water
221A	Frederick Shieffer	370	approx. 20	36	Dug well
221B	Frederick Shieffer	380	Unknown	36	Dug well; not in use
222	Kenvyn Richards	385	60	6	Driven well; approx. 10 gpm yield
223	Fred Bennett	365	90	6	
224	Unknown				No information available
225	Unknown				No information available
226	Unknown				No information available

TABLE 2.1-46 (Cont'd)

Well** No.	Owner	Surface*** Elevation (ft above msl)	Well Depth (ft)	Diameter (in)	**** Comments*****
227	Unknown				No information available
228A	Damon Whaley	344	10	48	Dug well; also used for livestock
228B	Damon Whaley				Spring-fed pond supplies livestock
229	Kenneth Earnshaw	326	30	6	Water level 20 ft deep
230	Wilda Adams				Vacant residence
231	Gary Sullivan	322	90		
232	Fred Harrison	316	27	6	Hard water; bedrock approx. 19 ft deep; 30 gpm yield
233A	Mabel Babbitt	320	57	8	
233B	Mabel Babbitt	320	20	48	Dug well; used for livestock
234A	Lois Smith	322	20	48	Dug well; hard water
234B	Lois Smith	322	48	6	Occasionally goes dry
235	Joseph Lazzaro	302	44	8	Water level 8 ft deep; bedrock 1 ft deep
236A	Joseph Lazzaro	308	18		Dug well
236B	Joseph Lazzaro	304	15	48	Dug well
237	Joseph Hayden	302	27	8	Water level 27 ft deep; 40 gpm yield
238	Joseph Lazzaro	300	15	48	Dug well; has gone dry only once
239	Elaine Lazzaro	300	40	8	Bedrock 18 ft deep
240A	Page Adams	302	48		Dug well
240B	Page Adams	306	45		
241	Victoria Lee	322	90		Supplies eight families (mobile homes)
242	Victoria Lee	322	28	48	Dug well; hard water; well in gravel
243	Charles MacDougall	328			

TABLE 2.1-46 (Cont'd)

Well** No.	Owner	Surface*** Elevation (ft above msl)	Well Depth (ft)	Diameter (in)	**** Comments*****
244	Victoria Lee	320	30		
245	Lee Adams	300	approx. 27		
246	Robert Sutton	334	40	6	Slightly hard water; also used for 72 cows
247A	Kenneth Larkin	310	46	8	Water level approx. 20 ft deep; bedrock 40 ft deep; 10 gpm yield
247B	Kenneth Larkin	310	15		Dug well; not in use
248A	Steve Miller	332	80	6	Hard water; supplies three families
248B	Steve Miller	332	18		Two dug wells; not in use
249	Arthur Buda	330	16	36	Dug well; hard water
250	Robert Bailey	332			Dug well; also used for livestock
251	Harvey Webster	334	58		
252	Walter Fidler				No information available
253	Charles Bickford	336	9	36	Dug well
254	Lillian Hargrave	330	70	6	
255A	John Curcie		12	36	Dug well; water level 2.5 ft deep in February
255B	John Curcie		12	48	Dug well
255C	John Curcie		12	48	Dug well
255D	John Curcie		10	48	Dug well; occasionally goes dry
256	Donald Shumway		12	36	Dug well
257	Joe Shumway	352	79	6	Supplies two families; bedrock 59 ft deep; approx. 2 gpm yield
258	David Vrooman	350	9	48	Dug well; not used for drinking
259	Charles Woolson	352	53	6	Water level 15 ft deep; bedrock 40 ft deep; 40 gpm yield

TABLE 2.1-46 (Cont'd)

Well** No.	Owner	Surface*** Elevation (ft above msl)	Well Depth (ft)	Diameter (in)	**** Comments*****
260A	Henry Vrooman	352	97	6	Water level 21 ft deep; bedrock 55 ft deep
260B	Henry Vrooman	348	23		Not in use
261	Joseph Watson	346	56	6	Supplies two families (mobile homes); 4 gpm yield
262	Dennis Woolson	350	57	6	15 gpm yield

NOTES:

* All values except surface elevation are supplied by owner or driller and do not reflect actual field measurements.

** Well number corresponds to numbered location in Figure 2.1-18.

*** Surface elevation taken from USGS topographic map. Datum is mean sea level.

**** Well type is drilled unless otherwise noted.

***** Well use is primarily domestic unless otherwise noted.

TABLE 2.1-47

RUNOFF PREDICTIONS OF 50- AND 100-YEAR PRECIPITATION

Stream	Flood Flow 50-Year (cfs)	100-Year (cfs)
Butterfly Creek	1,710	1,820
Tributary FW - Catfish Creek	600	640
Diverted Stream - Catfish Creek	350	370

TABLE 2.1-48

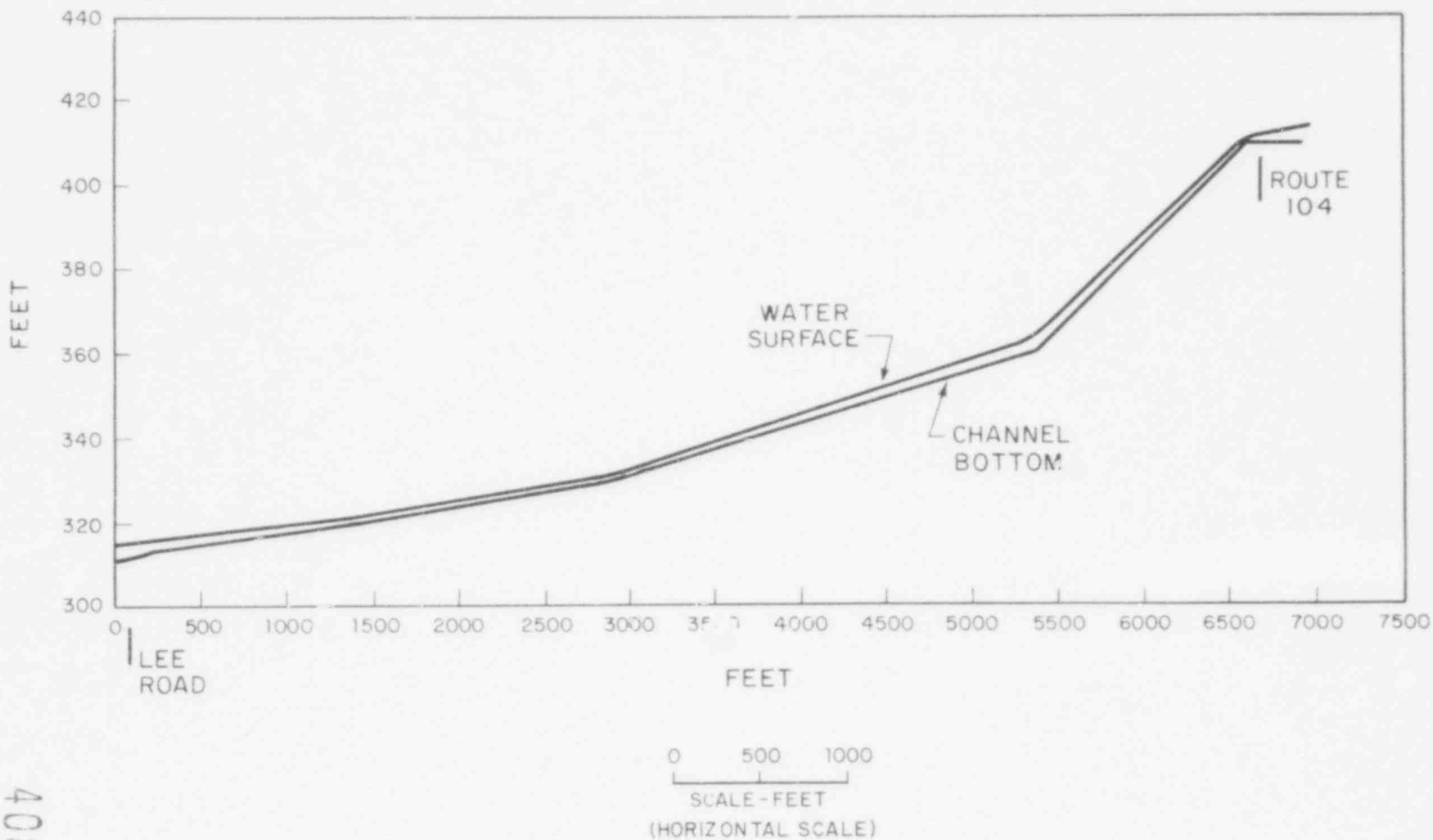
PREDICTIONS OF CONCENTRATION TIME AND STORAGE COEFFICIENT

Stream	Time of Concentration (hr)	Storage Coefficient (hr)
Butterfly Creek	1.6	4.9
Tributary FW - Catfish Creek	0.8	2.4
Tributary FE* - Catfish Creek	1.1	4.1

NOTE:

* Prior to diversion

408 036

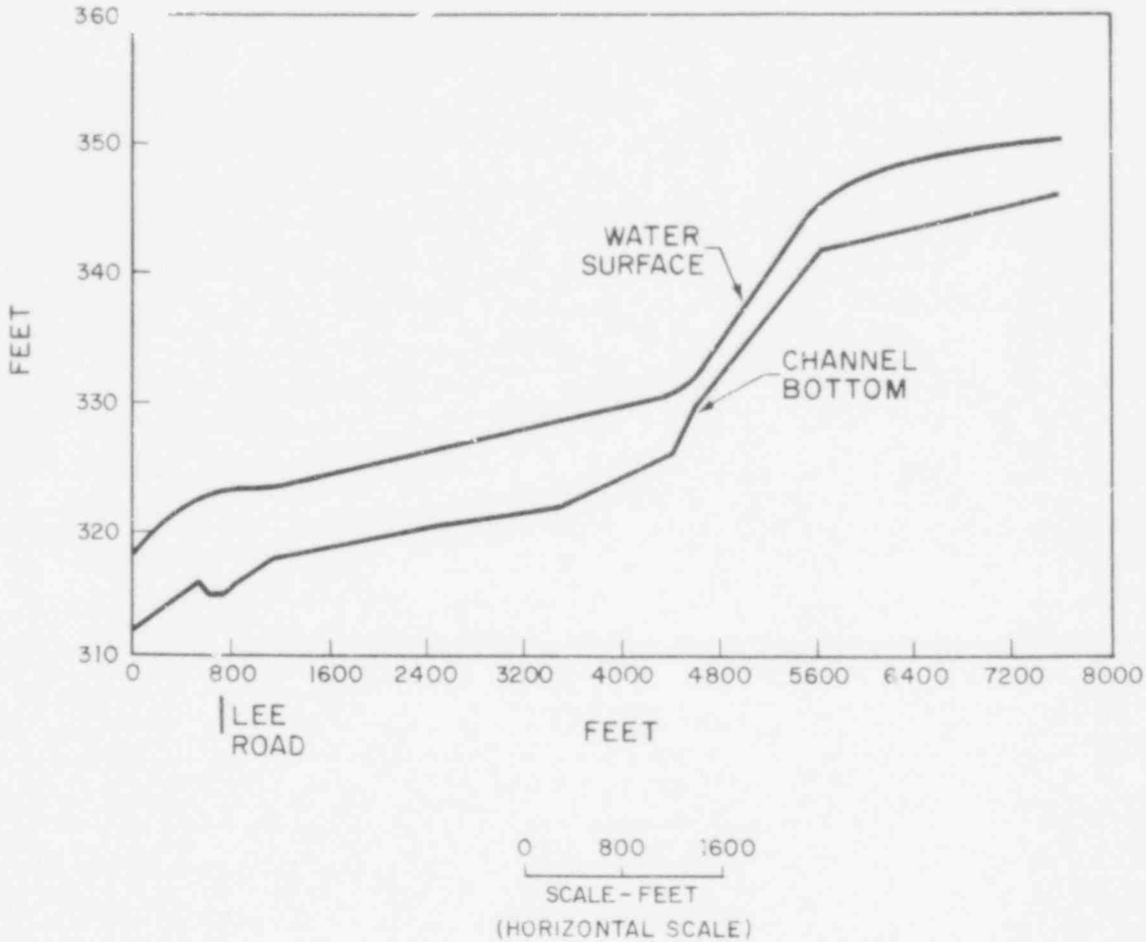


408 037

FIGURE 2.1-20 NEW HAVEN SITE

WATER SURFACE PROFILE
100 YEAR FLOOD
TRIBUTARY FW-CATFISH CREEK

NEW YORK STATE ELECTRIC & GAS CORPORATION
ENVIRONMENTAL REPORT

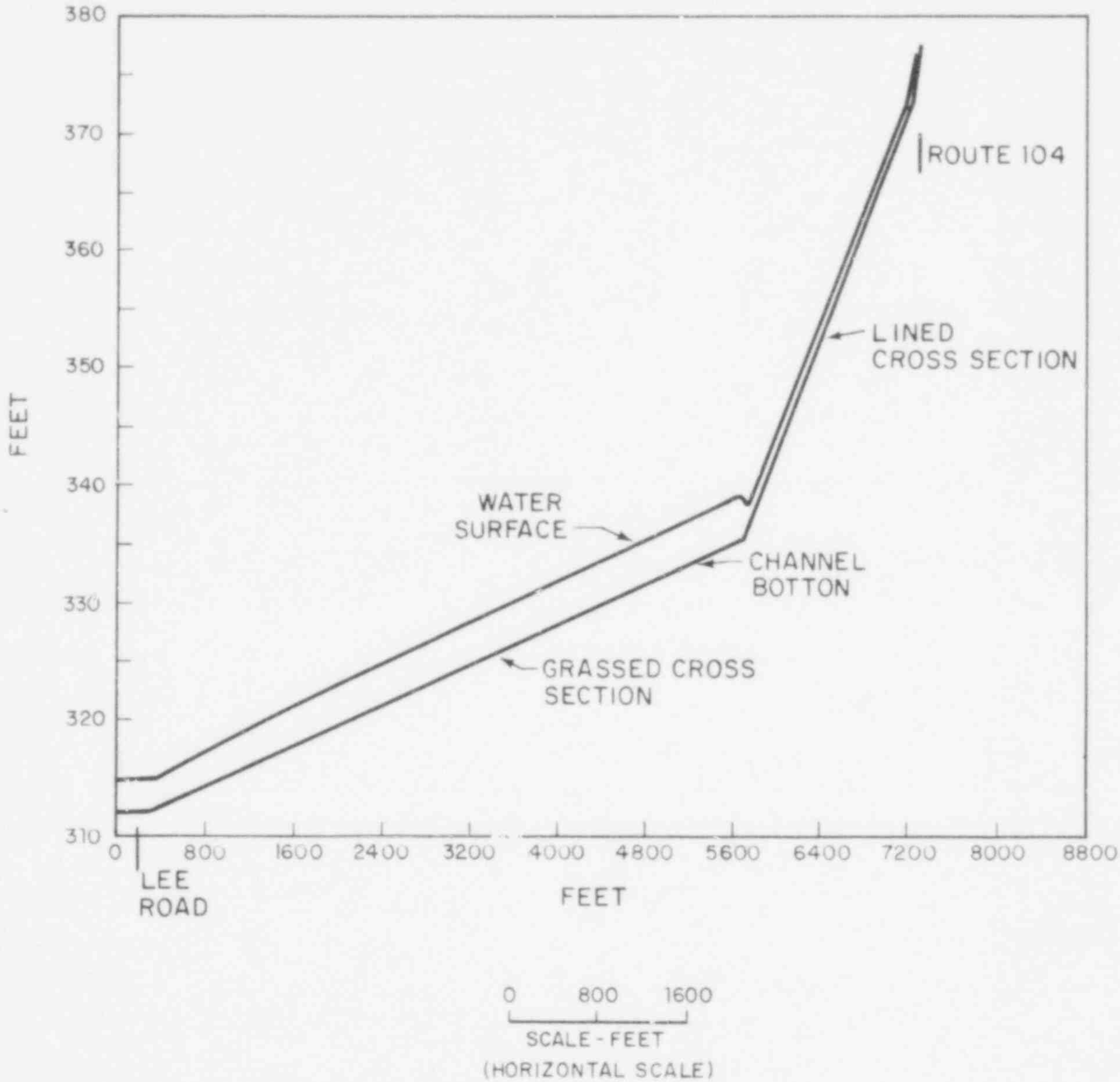


408 038

FIGURE 2.1-21 NEW HAVEN SITE

WATER SURFACE PROFILE
100 YEAR FLOOD
BUTTERFLY CREEK

NEW YORK STATE ELECTRIC & GAS CORPORATION
ENVIRONMENTAL REPORT



408 039

FIGURE 2.1-22 NEW HAVEN SITE

WATER SURFACE PROFILE
100 YEAR FLOOD
DIVERTED STREAM

NEW YORK STATE ELECTRIC & GAS CORPORATION
ENVIRONMENTAL REPORT