SUSQUEHANNA STEAM ELECTRIC STATION

UNITS 1 & 2

ENVIRONMENTAL REPORT OPERATING LICENSE STAGE

MAY 1978

VOLUME 1

PENNSYLVANIA POWER & LIGHT COMPANY
Allentown, Pennsylvania

FOREWORD

The 20th Century's nuclear genie has emerged at a time when Earth's environment and resources have become more precious as their depletions accelerate. Geologists monitor our mineral resources and ponder figures of "proven," "probable" and "speculative" reserves. Intellectuals identify prospects of severe limitations of growth and explore alternatives to the way of life as we know it.

Pennsylvania Power & Light Company recognizes the immensity of decisions which can mean the difference between future energy supplies or energy shortages. As the role of electricity becomes more critical in servicing human needs, we, as energy providers, must continue to be forward thinking and ever aware of social and environmental considerations which must mesh with plans for energy supplies. In short, we have become, by necessity, more apt planners weighing carefully our options and impacts on spaceship Earth.

The 19th Century words of Nietzsche have as much meaning today for corporate and social decisions as for individual actions. "Man shapes his own future, and that, as well by what he does as by what he fails to do."

This Environmental Report for our Susquehanna Steam Electric Station records the steps we are taking so that we will not fail to serve future generations.

Robert K. Campbell, President
Pennsylvania Power & Light Company
April, 1978

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CHAPTER 1

PURPOSE OF THE FACILITY AND ASSOCIATED TRANSMISSION

1.0 INTRODUCTION

In January of 1978 the Pennsylvania Power & Light Company (Applicant) finalized an agreement with Allegheny Electric Cooperative, Inc. (Cooperative) for the sale of a 10% undivided interest in the two-unit (1050 MW/unit) Susquehanna Steam Electric Station (Susquehanna SES) according to the schedule below:

	Percent	MW
Applicant	90	1890
Cooperative	10	210
Total	100%	2100

Under the terms of the agreement, the two parties are owners as tenants in common. The Applicant, however, has the sole responsibility for planning, licensing, design, construction, testing, operation and maintenance of the Susquehanna SES.

The current in-service schedules for the Susquehanna units are February 1981 for Susquehanna Unit 1, and May 1982 for Unit 2.

1.1 SYSTEM DEMAND AND RELIABILITY - APPLICANT

The requirements for adding capacity are based on the anticipated loads for the system. Table 1.1-1, 1972 Projection of Applicant's Loads Capacity-Reserves, shows loads, capacities and reserves for 1972-1983 as contemplated on the Applicant's system at the time the Environmental Report - Construction Permit Phase, was submitted. For the 10 years prior to 1972, Applicant's rate of winter peak load growth had been in excess of 9% per year. Indications were that customer loads would grow at about 7% per year through the early 1980's. Based on this load growth the additional capacity of the Susquehanna SES units was anticipated to be needed beginning in 1979. The bottom of Table 1.1-1 shows generating capacity reserves that were anticipated on the Applicant's system both with and without Susquehanna SES. Also shown is the calculated reserve estimate for each year (1972-1983) as a percent of the expected annual peak load. Generating capacity reserves were projected to be only 14% in 1979 and 2% in 1981 if the Susquehanna SES were not yet in service.

Table 1.1-2, Applicant's Load-Capacity-Reserve Summary, 1971-1977 (Actual), shows actual loads and capacities for the Applicant's system in the 1971 through 1977 period (Ref. 1.1-1).

Since the Susquehanna SES units were committed, conditions have changed substantially. The oil embargo, the economic recession during 1974 and 1975, energy conservation efforts and other factors have had a significant effect on the Applicant's projections of load growth. This is evidenced by the Applicant's most recent official load projections which show a load growth band with growth rates that are substantially lower than the 7% rate estimated in 1972, and by current indications that upcoming load projections will show a load growth band that is even further reduced. As a result of these developments, the Applicant's installed capacity reserves (with Susquehanna SES) are expected to be substantially above the levels projected when the units were committed.

The Applicant's most recent load projections include four separate but related estimates. These are identified as (1) High Level, (2) Mid-Range, (3) Low Level and (4) Very Low Level. The growth rate indicated in these projections (1977-1985) is 6.4%, 5.3%, 3.8% and 2.8% respectively. (This forecast band reflects the effect of a range of variations in basic load influencing factors as discussed in Subsection 1.1.1). Tables 1.1-3 through 1.1-6, 1977 Projection of Applicant's Load/Capacity/Reserves (1978-1985), show the Applicant's future reserve position based on the preceding load estimates. These tables also show the Applicant's projected reserves assuming oil fired and hydro capacity is unavailable. Consideration of these possibilities is appropriate because of the highly uncertain nature (and relatively high cost) of the fuel supply for the Applicant's oil fired capacity, and because of the potential that license renewals will not be granted for the Applicant's hydro generation. An analysis of this kind helps establish a broad perspective for assessing the adequacy and economic practicability of the Applicant's reserve capacity.

Currently the Applicant is planning the addition of electrical facilities based on the Mid-Range projection. As previously noted, however, there are indications that the Applicant's upcoming load projections may be reduced from presently indicated levels.

While a reduction in load growth projections will affect the timing of many of the Applicant's electrical facilities, it will not change the Applicant's commitment for installing Susquehanna SES as planned. The advisability of such action was re-affirmed in a study conducted by the Applicant as late as January, 1978. This study, "An Evaluation of the Cost of Service Impact of a Delay in the In-Service Dates of Susquehanna SES" (included as Appendix A), indicated that if the Applicant's load growth were

at the Mid-Range level, and if Susquehanna SES were delayed one year, the Applicant's cost of service (all costs including capital related station costs, fuel, operating and maintenance charges, and net interchange costs) would increase by about $50 million through 1985 and by more than $900 million over a 35 year station life ($159 million - 1980 present worth). If load growth were as low as the Very Low load projection, and if the station were delayed one year, then the cost of service was found to increase by about $15 million through 1985 and by more than $850 million over a 35 year station life ($130 million - 1980 present worth).

In both of the cases described above, the projected operating cost savings that result with the Susquehanna SES in service as planned, offset to a considerable extent, the carrying charge (capital related cost) savings that accrue in the delay case during the time of the delay. Furthermore, after the delay period, annual carrying charges with the units installed as planned are expected to be considerably less than such charges would be if the units were delayed. (This occurs because the investment costs of the delayed units reflect substantially increased costs resulting from factors such as an accumulation of allowance for funds used during construction, escalation and bottling-up and restart costs). On the basis of these combined effects, it is projected that savings with Susquehanna SES installed as planned will very quickly offset (1985 or earlier) the temporary carrying charge savings associated with the delay cases, and, as previously noted, provide a substantial economic benefit over the life of the station.

In addition to the cases noted above, a variety of other delay scenarios were examined (Appendix A provides details). The results of these studies all indicated that the Applicant's cost of service would increase substantially if the Susquehanna units were delayed. Thus, it was evident in early 1978, that in spite of future load uncertainties, a failure to proceed as planned with the Susquehanna SES project would not be in the best interest of the Applicant's customers.

The economic benefits of proceeding with Susquehanna SES operation as planned have been outlined (and are detailed in Appendix A). The nature of these benefits is further illustrated by a consideration of other relevant capital and operating cost information as described in the discussion that follows.

First, if Susquehanna SES were delayed one year, for example, it is estimated that it's in-service cost would increase by nearly $200 million. As the capital cost of the station increases, there will be a corresponding cost increase for the Applicant's customers. For example, assuming a levelized annual carrying charge of 15% to recover station investment, a $200 million increase in the cost of Susquehanna SES results in an incremental

cost-of-service requirement to Applicant's customers of $27 million/year over the station life, based on the Applicant's 90% ownership of the station.

Second, since the Susquehanna SES will be the Applicant's least expensive base load station to operate, operating costs (fuel, operating and maintenance costs and net interchange energy costs, but excluding capital related station costs) are reduced as a result of its generation of energy. If, for example, operating cost differences between the Susquehanna SES and the average cost of the Applicant's coal units are at 7-8 mills/KWH (as now projected), and if the Susquehanna SES replaces energy from these units, operating savings of about $40 million/year could be realized for each Susquehanna SES unit, assuming station operation at a 70% capacity factor. Savings are projected to be $35 million/year for each unit at a 60% capacity factor, and about $45 million/year at an 80% capacity factor. It is the goal of the Applicant to achieve an 80% station capacity factor.

To verify this potential for operating savings, a more detailed analysis recognizing Applicant's participation in the Pennsylvania-New Jersey-Maryland Interconnection (PJM) was made (the Applicant's relationship with PJM is described in Subsection 1.1.2). This analysis compared (1) Applicant's operating costs with Susquehanna Unit #1 as scheduled versus costs assuming a one year delay of the unit, and (2) Applicant's operating costs in 1983 with Susquehanna Units 1 & 2 as planned versus costs without Susquehanna SES in service by that time. Extremely conservative conditions were assumed, i.e., that load/energy requirements for the Applicant and for PJM would be at 1977 levels (no future load growth) and that currently planned PJM capacity would be installed as scheduled. Using these assumptions, and other relevant load and capacity data in conjunction with the Applicant's Long-Range Production Cost Model, cost differences were determined. On the basis of this analysis (assuming a station capacity factor of 70%), it is estimated that the Applicant's operating costs increase by about $55 million with a one year delay of Unit #1 (from February 1981 to February 1982) and by about $120 million in 1983 if both Susquehanna SES units are not in service. If the Susquehanna SES capacity factor were 60%, these costs differences are projected to be about $45 million and $100 million, respectively. At an 80% capacity factor these values are estimated to be $65 million and $ 135 million.

If less conservative conditions are assumed, i.e., PJM loads grow as projected and if the Applicant's loads grow at the rate indicated by the Mid-Range projection, then Applicant's system operating costs are estimated to increase by about $90 million if Susquehanna Unit #1 were delayed one year, and by about $250 million in 1983 (without Susquehanna Units 1 and 2), assuming the Susquehanna SES units operate at a 70% capacity factor. At a 60%

capacity factor for Susquehanna SES these cost differences are estimated to be $75 million, and $215 million, respectively. The cost differences at an 80% capacity factor are estimated to be $105 million and $285 million.

In addition to the significant monetary savings that are indicated for getting Susquehanna SES in service as scheduled, operation of the station provides a substantial contribution to the overall national interest by reducing the need for consuming large amounts of oil. For example, it is estimated that in the early 1980's the Susquehanna SES (operated at a 70% capacity factor) will reduce oil consumption on PJM by 10-15 million barrels per year.

It should be noted that in addition to these benefits, operation of the Susquehanna SES as planned reduces the potential impact of several possibilities that could adversely affect the Applicant's load/capacity/reserve situation in the early 1980's.

First, there is the possibility that the future supply of oil for the Applicant's (and PJM's) units will be limited. This can be particularly significant since, prior to the installation of the Susquehanna SES, approximately one-third of the Applicant's capacity is oil-fired. Also more than 40% of PJM's capacity is expected to be oil-fired in 1981. If operation of such capacity is limited, other available capacity for the Applicant and for PJM could be inadequate to supply customer peak loads. In addition to this possibility there is also the potential for coal supply problems, as the recent coal miners' strike has painfully demonstrated. Coal fired generation will comprise more than 60% of the Applicant's capacity prior to the installation of the Susquehanna SES, and PJM's capacity is expected to be about one-third coal fired in 1981. Recognizing these conditions, it is apparent that the addition of nuclear capacity in a system such as the Applicant's (consisting almost entirely of coal and oil generation) represents a prudent step toward a balanced and diversified system.

In addition to the preceding, it should also be noted that because of licensing unertainties there is a potential that the Applicant could lose up to 222 MW of existing hydro capacity in the near term future.

While the likelihood of the possibilities that have been noted is difficult to assess, there is the potential that the Applicant's reserves in the early 1980's could, in some cases, be inadequate to meet customer load requirements. Installation of the Susquehanna SES as planned provides a margin of safety that reduces the potential impact of such exposures.

On the basis of the preceding, it is the Applicant's view that operation of the Susquehanna SES as planned is in the best

interest of the Applicant, it's customers and PJM. Such operation provides substantial operating cost savings, eliminates increased station in-service costs that would result if station operation were deferred, conserves substantial quantities of oil, and in addition, provides a supplemental margin of service reliability for unforeseen contingencies.

Conservation

Historical Conservation Activities

In January, 1972, the Applicant announced a new corporate policy committing it to an active program for conservation of energy resources and rejecting the previous concept of supporting growth. This determination resulted from a concern over our Nation's dwindling energy reserves as well as concerns in the financial, environmental and consumer areas.

The oil embargo of 1973-1974 confirmed the validity of the Applicant's decision and resulted in the adoption of widespread conservation programs throughout the industry.

In August 1974, another corporate statement by the Applicant entitled "New Approaches for New Conditions" emphasized the earlier commitment to conservation, and, in particular, established a load growth reduction goal of 1,000 MW by 1985 from conservation efforts, with an additional 1,000 MW from pricing, economics and other effects.

Implementing the various programs required to support these new corporate objectives, involved a significant departure from previous promotionally-oriented efforts. This new approach required identifying significant areas of impact for conservation efforts, developing various program materials and activities, training and motivation of personnel, enlisting the aid of industry allies and most important-communicating these concerns to consumers and securing their cooperation and support.

Conservation Programs and Results

As a winter-peaking utility, the Applicant experiences its peak load on one of the colder days in January or February. A major contribution to this peak load is the electrically-heated homes and businesses on the system. Although there is no promotion of such loads by the Applicant, a significant number of new electrically-heated structures are being connected each year. In the residential market, approximately 53% of the new dwelling units are electrically heated. Hence, electric heating represents a substantial portion of continuing load growth.

Residential - It was apparent that the most immediate contribution toward the Applicant's goals could be made by improving the thermal qualities of new homes and through more careful sizing and use by customers of the heating systems being installed. Hence, the new homes market became the focus of initial conservation efforts. A recent analysis made by the Applicant of the economic feasibility of higher insulation levels clearly indicates the benefits of such insulation levels in new homes. In addition, the electric water heater was identified as a significant item on which to direct conservation efforts.

Extensive programs were initiated with builders and prospective home owners to effect load and energy savings. In addition, a broad consumer education and information program was conducted to encourage implementation of energy conservation measures in all areas, not only space heating and water heating, but also air conditioning, appliance selection and general usage.

An Energy Efficiency Home Award Program was instituted to encourage builders to construct homes to meet our thermal standards. The results which might be obtained from such improvements were demonstrated by the Applicant's Energy Conserving Research Home at Schnecksville, Pennsylvania. This house, using improved thermal construction and a heat pump, demonstrated that energy savings of 40% or more can be effected. Also tested in this home was the use of solar heating to supplement the heat storage supplying the heat pump. Results of this test showed that for this latitude, solar space heating is not presently cost effective.

More recently, five Bicentennial Homes have been completed throughout the service area. These houses incorporate the latest developments in insulation and efficient energy use and were opened to the public in order to demonstrate immediately viable energy conservation measures such as insulation sheathing, heat pumps and the use of solar supplementary water heating combined with heat storage. In the case of solar water heating this application may prove to be cost-effective in the near future.

Industrial & Commercial Programs

For the last five years an extensive load and energy management effort has also been conducted with industrial and commercial customers. The Applicant has worked with such customers to organize energy management teams which have now been established within approximately 1,080 customer operations. These teams are making energy surveys of their respective operations and are developing on-going plans for reducing loads and energy usage. In addition, a broad informational and assistance program has been conducted for this entire group of customers, involving meetings, seminars, distribution of a variety of conservation

materials and consulting services. Outstanding customer efforts have been recognized through the Applicant's Energy Management Award Program. These Awards are presented to customers who have made significant energy conservation changes or investments in their businesses or operations in cooperation with the Applicant's energy management program resulting in significant documented demand and energy savings.

A number of major conferences and workshops were held to inform and guide influential decision-makers in making appropriate energy decisions on new facilities and to institute effective energy management programs in their businesses. These meetings involved industry executives, architects and engineers, education administrators and municipal officials.

The Applicant has developed an Energy Management Training Course which was presented in 1977 to approximately 135 representatives of Industrial & Commercial customers and will be presented to approximately 150 more in 1978. Assistance was also given to several government agencies in developing energy management programs for their facilities and also in revising various codes and regulations, such as the School Plant Guide, to make them more energy-effective.

Energy Management Savings

Table 1.1-7, Estimated Energy Management Savings-Applicant, shows a summary of estimated load and energy savings resulting from the Applicant's conservation programs and related customer efforts.

It is the view of the Applicant that the effectiveness of such efforts has resulted in large part from the fact that recent energy price increases have provided new dimensions for investing in energy saving devices and approaches.

Program for Energy/Demand Management in Applicant's Facilities

An extensive energy/demand management effort has been conducted for Applicant's own facilities. Energy management teams have been established at all major service centers and generating plants. Surveys have been conducted of all of these facilities to identify opportunities for demand and energy reductions. Those measures which could be done readily have been initiated. Others requiring major changes or investment are being scheduled in accordance with availability of funds, timing with other changes, and the magnitude of savings involved.

Savings from the efforts noted above are estimated to have been about 30,000 MWH (since 1974) for the Applicant's General Office buildings and Division service centers. Energy savings for these facilities in 1977 are estimated to have been more than 9,000

MWH, or an approximate 17% reduction in energy use. Peak demand in 1977 is estimated to have been reduced by about 7,500 KW, or approximately 30%, as a result of conservation efforts.

Energy savings at generating stations have also been realized, however, measurement of these savings is difficult because of normal variations in station use over time. It is estimated, however, that annual energy savings of about 1,800 MWH result from Applicant's conservation efforts at its power plants.

Energy Conservation Plans for the Future

In attempting to determine appropriate future energy/demand management strategies the Applicant has created a Corporate Energy Planning Council to evaluate alternatives and recommend long term action plans. This group consists of a cross-section of management representatives from all disciplines.

The following summary outlines the Applicant's planned conservation program including activities for energy and demand management (Ref. 1.1-2). Many of the programs noted are already underway while others are in the developmental stage, and in some cases, must be accepted by regulatory authorities (i.e. Pennsylvania Public Utility Commission) or enabled by appropriate legislation. Encompassed in the Applicant's program are the following strategies:

1. Strengthen efforts to attain conservation goals through voluntary measures.

2. Adopt mandatory tariff rules to enforce compliance.

3. Introduce experimental time-of-day and residential demand rates and other pricing policies.

4. Continue to evaluate demand management techniques invclving direct and indirect utility control of customer loads.

To begin implementation of portions of this program, the Applicant has stepped up its efforts to encourage voluntary acceptance of conservation goals by:

1. Recommending to builders and developers to further increase insulation in new construction.

2. Conducting home energy audits for existing homes, providing assistance to customers in obtaining qualified installers and in securing loan assistance as required. The Applicant's present Home Survey Program is being focused upon dwellings with central electric heat

systems as representing the greatest potential load savings.

3. Recommending low-wattage water heaters.

4. Encouraging exterior insulation of water heaters.

5. Increasing energy conservation awareness in commercial/industrial applications.

6. Reinforcing existing conservation efforts, i.e., Energy Management teams, etc.

7. Encouraging use of more efficient applicances.

8. In addition to the above programs developed by the Applicant, identification and support will be provided as a member of the utility industry program National Energy Watch (NEW) developed by Edison Electric Institute. Essentially this program identifies closely with Applicant's own programs.

To better assure the success of its conservation goals, the Applicant filed several new tariff provisions on April 6, 1978. One provision requires (subject to regulatory approval) that after April 1, 1979 new residential, commercial, or industrial buildings must meet or exceed insulation standards specified by the Applicant before electric service will be connected. The new standards require, for example, that insulation in all new single homes be installed to meet or exceed the following thermal resistance levels:

	MINIMUM LEVELS
Ceiling	R 30
Walls	R 16
Floor	R 19
Storm Windows or Double Glazing	Required
Insulated Door	R 4

These required minimum levels are similar to those recently released by the National Association of Home Builders and the Farmers' Home Administration.

For commercial and industrial buildings, the tariff requires that new structures be insulated to ASHRAE 90-75 standards -- the standards developed by the American Society of Heating,

Refrigerating, and Air Conditioning Engineers and the criteria recommended by code-making groups for adoption by municipalities in their building codes.

In order to develop data with respect to not only the load growth reduction potential in a variety of new rate designs, but also to test their impact on the consumer, the Applicant has included experimental rate and pricing proposals with its filing. These include provisions to encourage off-peak storage systems for both domestic hot water use and space heating purposes through residential demand schedules and time-of-day rates. Information gathered from these experiments will be used in developing future strategies to use pricing as an economic incentive (or disincentive) to accomplish conservation and energy management goals. The tariff filing also include a prohibition of master metering, recognizing the potential wastefulness of this method. Also, the tariff filing clarifies that there will be no restrictions upon electric heating customers using renewable energy sources such as wind or solar as supplemental energy.

Plans are included to continue research efforts in developing meaningful data regarding solar energy and windmill energy assisted systems, as well as a variety of off-peak storage configurations. It is anticipated that appropriate incentives will be required to obtain successful response to off-peak storage ideas. The following Applicant and independent research projects and experiments are planned or under way:

1. Appliance interlock with water heaters.
2. Residential curtailable load.
3. Supplemental energy storage system.
4. Solar supplemental water heating.
5. Constant energy hydronic space heating.
6. Wind and solar energy applications.
7. Industrial Cogeneration.

The impact of certain of the previously described programs is at the present time somewhat unclear. It is the Applicant's intent to continue to update these programs, where appropriate, as more and better data becomes available, and thereby increase the potential for overall program effectiveness.

Effects of Prices on Consumption of Electrical Energy

The future growth rate of electrical energy consumption depends not only on changes in the price of electricity but also on

changes in real consumer income, and changes in the price/supply of competing fuels, particularly oil and natural gas. The analyses of these relationships has always been a complex task, however, in recent years it has become almost futile to attempt to make such evaluations. This has resulted because responses by government that impinge on the market have made discernment of underlying trends and patterns very difficult, and similarly make the value of future projections seriously constrained. Factors such as the governments call for patriotic conservation, legislated performance standards for equipment and buildings, price regulation and supply regulation all make current elasticity studies of limited value. When a better understanding of the impact of these basic influences is achieved, and when the national energy policy is clarified, then more realistic studies of elasticity relationships may be possible.

Recognizing these serious shortcomings, various groups have attempted, nevertheless, to evaluate the price elasticity of electrical demand. These evaluations (Ref. 1.1-3) have indicated a long run price elasticity of demand generally in the range of -1 to -2, i.e., if electricity price increases 1% then electricity usage will decrease in the range of 1% to 2%. It is the Applicant's view that these values provide an indication of possible future price/demand relationships, but that external forces and controls could seriously alter their applicability.

The Applicant's System

The Applicant is the second largest electric company in the Commonwealth of Pennsylvania with an electric service area covering approximately 10,000 square miles in central eastern Pennsylvania and a population of 2.3 million (about 20% of the Commonwealth's population). This system covers 22% of the Commonwealth area, which is larger than the land area of New Jersey and Delaware combined. The Applicant derives about 99% of its operating revenues from supplying electric service; the remainder comes from supplying steam heat service in the City of Harrisburg.

During 1977, about 41% of electric operating revenue from energy sales was derived from residential customers; 29% from industrial customers; 27% from commercial customers; and 3% from others. Typical classes of industrial customers, from the standpoint of total electric operating sales revenues, were: 1) textile mill products and apparel, 2.2%, 2) metals products other than steel manufacturing, 7.2% and 3) steel manufacturing, 4.2% (Ref. 1.1-4).

The generating capacity of the Applicant's system, as of March 1978, totaled 6546 MW net winter capability. This is composed of five steam electric plants, two hydroelectric plants, and a number of combustion turbines and diesel generators. The total

capacity of the Applicant's system includes a 12.34% share of the Keystone and an 11.39% share of the Conemaugh Mine Mouth Generating Plants, both located outside the Applicant's territory in western Pennsylvania and operated on behalf of the owners by the Pennsylvania Electric Company. Also included is the capacity available under a long-term contract from the hydroelectric plant of the Safe Harbor Water Power Corporation, in which the Applicant has a 33 1/3% stock ownership. Table 1.1-8 Applicant's Installed Capacity as of March 1978, is a list of the Applicant's generating stations.

Section 401 of the Pennsylvania Public Utility Law (66 PS 1171), states that a utility shall furnish and maintain adequate, efficient, safe and reasonable service and facilities for the accommodation, convenience and safety of its customers, employees and the public. The section further provides that such service shall be reasonably continuous and without unreasonable interruption or delay. To meet this responsibility, the Applicant continuously monitors trends in residential, commercial and industrial electric power demands on its system and develops plans for the expansion of the generating capacity to meet projected future demands.

The PJM Interconnection

The Applicant's bulk power system is operated as a part of the PJM Interconnection, which consists of the following electric utility systems (companies not indented are signatories to the PJM Interconnection Agreement; those shown indented participate under agreements with the preceding signatory company):

1. Public Service Electric and Gas Company
2. Philadelphia Electric Company
3. Atlantic Electric Company
4. Delmarva Power & Light Company
5. Pennsylvania Power & Light Company
6. Luzerne Electric Div. - UGI Corporation
7. Baltimore Gas and Electric Company
8. Jersey Central Power & Light Company
9. Metropolitan Edison Company
10. Pennsylvania Electric Company
11. Potomac Electric Power Company

The Interconnection is one of the world's largest fully integrated power pools and the eleven companies serve approximately 21 million people in a 50,000 square mile territory (Ref. 1.1-5).

The PJM Interconnection functions to provide an established degree of service reliability in a more economical manner and with better utilization of resources than would be possible if individual companies operated as isolated power systems. Power pooling is advantageous because larger, more economical units can be installed and operation of generating stations can be scheduled more efficiently with member companies sharing the resulting savings. Mutual support is provided during periods of equipment outage and non-coincident peak loads. An important aspect of this coordinated operation is that deficiency of capacity in any one company can be met by short-term purchases from the others, to the extent that excess power is available. Should PJM, as a whole, be deficient and unable to obtain sufficient power from other areas, all PJM companies would share in any voltage reduction, load curtailment or other measures necessary to maintain service.

In 1977, nuclear capacity on the PJM represented only 14% of the Interconnection's total capacity. However, a number of additional nuclear facilities are planned for the years to come. The projected change in PJM net capacity between 1977 and 1981 is 4445 MW and 69% of this total (3060 MW) is expected to be nuclear. Even with these capacity additions, only 19% of PJM's total capacity is expected to be nuclear by 1981 (Ref. 1.1-6).

1.1.1 LOAD CHARACTERISTICS-APPLICANT

The Applicant is a winter peaking company while the PJM Interconnection is a summer peaking power pool.

1.1.1.1 Applicant's Loads

The past annual peak load demands are shown in Table 1.1-9, Applicant's Historical Peak Load and Energy Sales Data, (Ref. 1.1-1). Values are shown for the period 1966-1977. The growth rate for energy was 6.8% per year during this period while the growth rate of winter peak load was 7.1%. This reflects the increased saturation of electric heat installations during this period. Summer peak loads increased 5.9% per year.

Applicant's projections of future system loads include four separate, but related estimates. These are identified as (1) High Level, (2) Mid-Range, (3) Low level and (4) Very Low level.

This forecast band reflects the effect of a range of variations in basic load influencing factors such as economic conditions and relative fuel prices. Projections of this kind are appropriate because of the uncertainties surrounding future economic conditions and energy-supply relationships. Peak demands and kwh sales (1977-1985) for these projections are shown in Table 1.1-10, 1977 Projection of Applicant's Sales and Peak Loads.

PJM Loads

Past and future peak loads and energy requirements are shown in Tables 1.1-11 and 1.1-12, PJM Historical and Forecasted Peak Load and Energy Data, respectively (Ref. 1.1-6 through 1.1-8). Peak loads shown for PJM are for the summer period.

Load Duration Curves

Annual load duration curves (1981 and 1982) for the four load projections previously described appear in Figures 1.1-1 through 1.1-16, Applicant's Generation Mix - Percentage of Peak Load With and Without Susquehanna SES. These curves provide an indication of the relationship of Applicant's installed capacity (amount and type) to the projected 1981-1982 system energy and capacity requirements. On these curves, loads and capacity are expressed in terms of a decimal fraction of the system winter peak load. The capacity shown is arranged based on relative operating costs, with capacity having the lowest operating cost appearing nearest the base line of the load duration curve. Also, the generation capabilities indicated reflect total installed capacity ratings and do not include provision for scheduled maintenance or forced outages. Consideration of these factors would reduce the capacity available for serving the indicated loads at various times throughout the year.

Based on the curves described above (and the previous discussion of operating costs in Section 1.1) it is the view of the Applicant that the Susquehanna SES will provide a solid base of low cost generation that will enable substantial operating savings.

Figures 1.1-17 through 1.1-20, PJM Generation Mix in Percentage of Peak Load, show similar data for the PJM Interconnection for 1981 and 1982 based on the PJM Load and Capacity Forecast of June 1, 1977.

1.1.1.2 Demand Projections-Applicant

Details of the Applicant's most recent long-range projections of Energy sales and peak loads are included in Appendix B1. As previously noted, however, a substantial re-examination of these projections is underway, and it is expected that load growth rates somewhat lower than indicated by these estimates will result.

The information provided in Appendix B1 relates to the High, Mid-Range (referred to as "Expected" in the Appendix) and Low load projections. The Very Low projection is not included in the discussion of Appendix B1 since this estimate was not based on the indicated methodology, but rather was developed to provide a basis for internal studies of the effect of a possible substantial moderation in load growth. The need for considering such a projection is based on the relatively low load growth experienced by PJM in recent years. The Applicant's next regular long range load projection is expected to include consideration of such a scenario.

Section I of Appendix B1 contains a brief overall summary of the three previously indicated projections, including highlights of both the peak load and energy estimates, as well as exogenous forecasts and assumptions used as basic inputs to the forecasting process.

Section II presents the forecast parameters in more detail. The forecast methodology is discussed initially followed by reviews of the major demographic, macroeconomic, pricing and energy availability assumptions that were incorporated. Next the forecasts for service area employment are analyzed and the roles of conservation and major new loads in the forecast process are explained.

Section III contains the energy forecast details of the major residential, commercial and industrial subgroups. Each is analyzed in a discussion covering the forecasted energy levels and implied growth. Factors and variables pertinent to the forecasts are also reviewed.

Selected forecast tabulations appear in Section IV.

Monthly Data

Monthly KWH data from October 1972 through December 1977 is shown in Table 1.1-13, Applicant's Historical Monthly KWH Sales (Ref. 1.1-9). The Applicant's forecasts of monthly KWH data for the period October 1972 through December 1978 is shown in Table 1.1-14, Applicant's Forecast Monthly KWH Sales. The Applicant does

not make peak load forecasts on a monthly basis but only for the summer and winter seasons.

Forecasting Methods

In Appendix B2, Applicant's Forecasting Methodology, KWH Sales and Peak Loads, the Applicant's forecasting methods are discussed. These methods, developed with the professional support of Data Resources, Inc. (DRI) provide the structural framework for the Applicant's most recent official load growth projections. The Applicant, however, is continuing to refine and develop its forecasting methods and it is expected that upcoming load projections will be based on a somewhat different methodology than described in Appendix B2.

Appendix C shows the Applicant's response (December 14, 1973) pursuant to Nationwide Fuel Emergency, FPC Order No. 496, November 23, 1973.

1.1.1.3 Power Exchanges-Applicant

Past and expected future net power exchanges at the time of the annual peak are shown in Table 1.1-15, Forecasted Power Exchanges Between the Applicant and PJM. Future projections assume that all of the Applicant's generating capacity, less an allowance for forced outages, are in service at the time of the peak. However, the Applicant's capacity is dispatched on an Interconnection basis. This means that the lowest cost units on the PJM Interconnection are used to supply the Interconnection load as a whole. Therefore it is possible that some of the Applicant's units will not run at the time of the Applicant's peak because lower cost generation could be available from other PJM companies.

1.1.2 SYSTEM CAPACITY-APPLICANT

The generation needs of the Applicant are primarily dependent on its projected load forecast, its capacity obligation as a part of the PJM Interconnection, and on the overall economics of maintaining a reserve level that will minimize total system costs.

In order to share in the benefits of Interconnection operation, certain obligations must be met by each of the members of the PJM Interconnection. Basically, each member of the Interconnection co-operates with the other members in the coordinated planning and operation of the bulk power supply facilities of its system

so as to obtain the greatest practical degree of reliability and economy available from the pooling of the respective electric system facilities. Each member installs or otherwise arranges for sufficient generating capacity to carry its allocated share of the forecast capacity requirements of the Interconnection. Currently, the designated PJM reserve requirement is 20% of the forecasted peak load of the PJM Interconnected system which occurs during the summer.

During the early 1970's, and at the time the Susquehanna SES was committed, the Applicant's share of the PJM installed reserve requirement was estimated to be about 18% over its winter peak load. Revised PJM arrangement (effective June 1974), however, reduced the Applicant's allocated share of the PJM installed capacity obligation to about 5% over its winter peak. In allocating the overall PJM capacity obligation to the member companies, this new arrangement recognizes and gives credit to the fact that the Applicant is a winter peaking company in a summer peaking power pool. In addition, the new arrangement also consider such factors as the relative forced and maintenance outage characteristics of the Applicant/PJM units, and the relative ability of the Applicant to accommodate unit maintenance recognizing the nature of it's system load shape.

While Applicant's PJM reserve obligation is currently about 5% over its winter peak load, it should be noted that this reserve level is based on reliability considerations only, and that such reserve levels do not necessarily produce minimum system costs. Factors such as the existing fuel mix of generation and the capital and operating costs of capacity to be added are, for example, important elements in determining the appropriate relationship between system reserves and system costs. If new capacity with relatively low operating costs (such as nuclear capacity) can be used to replace substantially higher priced energy (such as that generated by oil fired capacity), then such additions may be economically attractive from a total system cost basis, even though short term reserves are higher than required for reliability purposes.

Reserve capacity above that required for reliability may also be desirable for a system with units that are relatively large in relation to system size (in 1982 with Susquehanna SES in service, more than 2/3 of Applicant's total capacity of about 8,500 MW will be provided by its seven largest units, each rated at 700 MW or more). This reserve capacity (particularly in a system with a relatively low reserve requirement such as may be possible for power pool members) can enable low cost coverage for large unit outages and help limit the necessity for relatively high priced energy imports (if available) from others. In the Applicant's case, the cost of such imports depends in large part on PJM's available capacity and fuel costs. Because a large portion of PJM's capacity is oil fired, it is likely that in many cases, PJM

energy sales to the Applicant (for the conditions described) would be from relatively high operating cost oil fired generation.

The previously noted factors, i.e., the existing capacity mix, the capital and operating costs of capacity to be added, the size of units relative to system size, and PJM conditions (as well as other factors such as load growth uncertainties and construction cost escalation rates) all influence the relative desirability of various Applicant reserve levels. Recognizing these influences, it is evident that any consideration of system reserve levels for the Applicant must necessarily include a combined evaluation of the economic impact of these factors in conjunction with the previously described system reliability constraints.

The capacity requirements of the Interconnection that were noted earlier were based on reliability principles and standards for the Mid-Atlantic Area Council (MAAC). These standards state that sufficient megawatt generating capacity shall be installed to insure that in each year for the MAAC system the probability of occurrence of load exceeding the available generating capacity shall not be greater, on the average, than one day in ten years. Among the factors considered in the calculation of the probability are the characteristics of the loads, the probability of error in load forecast, the scheduled maintenance requirements for generating units, the forced outage rates of generating units, limited energy capacity, the effects of connections to other pools and network transfer capabilities within the MAAC systems. Based on these factors PJM has designated a reserve objective of 20%.

As previously indicated, Applicant's share of the PJM reserve requirement currently is about 5% over its winter peak. There is, however, the possibility that this reserve requirement could increase toward the current PJM reserve requirement of 20%. If PJM summer peaking companies tend toward winter peaking as more electric heating loads are substituted for gas and oil, then the Applicant's credit for peak load diversity will be reduced and its capacity obligation could approach the 20% requirement of PJM. In addition there are indications that future PJM conditions may be such that higher PJM reserve levels (more than 20%) will be required to meet currently specified reliability levels. If the PJM reserve requirement increases as a result of such conditions it is expected that an equivalent and direct change in the Applicant's capacity obligation will occur.

1.1.2.1 System Capabilities-Applicant

Table 1.1-16, System Capacity-Applicant and PJM, shows system capabilities for the Applicant and PJM from 1972 through 1985. Capacities from 1972 through 1977 are actual values and those from 1978 through 1985 are projected based on present plans.

Table 1.1-17, All Equipment on PJM System, lists all generating units on the PJM Interconnection together with all projected additions through 1985. Also shown are all sales and purchases, retirements and reratings. Each generator is categorized by type. Nuclear and most coal units are considered base capacity, some coal and all oil fired units are considered intermediate, and combustion turbines and pumped storage are peaking capacity.

Table 1.1-18, Applicant's Projected Unit Capacity Factors 1978-85 Periods, shows estimated capacity factors for each of the Applicant's stations. Since all units on the Interconnection are dispatched on an economic basis, it is expected that similar types and sizes of units have similar capacity factors.

1.1.3 Generating Unit Outages Scheduling Procedure-Applicant

In scheduling outages the basic considerations are to maintain a high level of service reliability and to the extent possible, minimize overall system costs. This generally means that all outages would be scheduled during the spring and fall periods. However, there are many constraints that make compromises to this policy necessary.

For example, unit outages must be timed to levelize the work load since only a limited amount of manpower is available for outage related work. An attempt is made to schedule outages for outdoor units closer to the summer season to avoid severe weather, and to coordinate maintenance with major equipment modifications that require unit outages. Schedules must also consider transmission line loading limitations on the interconnection due to construction work on lines or other abnormal conditions. Unit outage schedules must also meet statutory requirements for boiler insurance inspection intervals.

In general, not all these items can be met and some compromise is necessary. The long range schedule is often offset by forced outages which cause necessary short range changes. If a failure occurs at a unit which is anticipated to result in an extended outage, an attempt is made to perform the normal annual outage work at that time.

1.1.3.1. Minimum System Reserve Requirement-Applicant

The Applicant plans to meet its capacity obligation as a member of PJM, through installation of capacity and/or purchases of capacity from others. The capacity obligations of each member of PJM are determined from an allocation of the PJM reserve requirement.

The PJM minimum reserve requirement is determined by the PJM Management Committee following their review of probabilistic analyses of the capacity required to achieve a standard reliability level (a loss of load probability of one day in 10 years). Currently a PJM capacity obligation of 20% reserve over the PJM annual summer peak has been designated.

The analyses consider (1) forced and scheduled outage rates, (2) daily peak loads and their potential variations and (3) interconnections with neighboring pools.

1.1.4 EXTERNAL SUPPORTING STUDIES-APPLICANT

As discussed previously in Subsection 1.1.3, studies to assess the adequacy and expected reliability of power supply are performed on a total PJM Interconnection basis.

As a result of these studies the PJM Management Committee has adopted a 20% reserve objective.

1.1.5 REFERENCES

1.1-1 Pennsylvania Power & Light Company Profile Statistical Review.1966-1976.

1.1-2 A Study into the Design and Impact of an Energy and Demand Management Program, July 1977.

1.1-3 The Demand for Electricity: A Survey, by L. D. Taylor in Bell Journal of Economics, Vol. 6, No. 1, Spring 1975.

1.1-4 Report of Operations, Pennsylvania Power & Light Co., December 1977.

1.1-5 Pennsylvania-New Jersey-Maryland Interconnection - 1976 (Booklet).

1.1-6 Load/Capacity/Reserve Statistics - PJM and Surrounding Pools, August 1977.

1.1-7 Load & Capacity Forecast, Pennsylvania-New Jersey-Maryland Interconnection, June 1, 1977.

1.1-8 Yearly Reports on Interconnection Operation 1966 through 1976.

1.1-9 Pennsylvania Power & Light Company Electric Sales Statistics Total Energy Sales.

1.2 OTHER OBJECTIVES-APPLICANT

There are no objectives for this facility other than the production of electricity.

1.3 CONSEQUENCES OF DELAY-APPLICANT

Some slippage and delay in the operation of the Susquehanna SES has occurred since beginning the project. Further delays from the current in-service schedules, however, are highly undesirable.

Operating cost savings that result from operation of the station as planned have been indicated in Section 1.1, System Demand and Reliability. For example, if Susquehanna Unit 1 were delayed one year, Applicant's operating costs are projected to increase by an amount in the range of $35 million to $105 million. In 1983, operating costs without both Susquehanna units are projected to increase in the range of $70 million to $285 million. Also as detailed in Section 1.1 and Appendix A, delays from current in-service schedules for the station are likely to add substantially to the Applicant's overall cost of service over the life of the station. For example, if both of the Susquehanna units were delayed one year, and if load growth were as low as the Very Low load projection, then the Applicant's cost of service was estimated to increase by about $850 million ($130 million - 1980 present worth) over an assumed 35 year station life.

In addition to the preceding, it has also been noted that station operation will conserve oil, provide advantages of a diversified capacity mix, and provide a supplemental margin of service reliability for the Applicant's customers and for PJM. Table 1.3-1, Effect of Delay of Susquehanna SES on Applicant's System Reserves, provides reserve information in terms of the previously described load projections.

On the basis of the considerations outlined above, it is the Applicant's view that a delay in the operation of the Susquehanna units is not in the best interest of the Applicant's customers, and that there is a substantial incentive to operate the station as currently scheduled.

SUSQUEHANNA SES-ER-OL

TABLE 1.1-1

1972 PROJECTION OF APPLICANT'S LOADS - CAPACITY-RESERVES[1]

Year	1971 (actual)	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Winter Peak-MWe	3294	3640	3870	4110	4410	4730	5100	5400	5700	6000	6400	6800	7300
Capacity Changes:													
Fossil[2]	--	765	750	--	800	--	800	--	--	--	--	--	--
C.T.&D.[3]	--	--	--	--	--	--	--	--	--	--	--	--	--
Nuclear	--	--	--	--	--	--	--	--	1120	--	1120	--	--
Reratings	--	26	--[4]	--	--	--	--	--	--	--	--	--	--
Retirements	--	(134)	--	--	--	--	--	--	--	--	--	--	--
Total Capacities													
Fossil[2]	2733	3390	4140	4140	4940	4940	5740	5740	5740	5740	5740	5740	5740
C.T.&D.	541	541	541	541	541	541	541	541	541	541	541	541	541
Hydro	146	146	146	146	146	146	146	146	146	146	146	146	146
Nuclear	--	--	--	--	--	--	--	--	1120	1120	2240	2240	2240
Firm Purch.	76	76	76	76	76	76	76	76	76	76	76	76	76
Total - MWe	3496	4153	4903	4903	5703	5703	6503	6503	7623	7623	8743	8743	8743
Reserve Over Winter Peak:													
With Susquehanna													
MWe Capacity	--	--	--	--	--	--	--	--	--	--	2343	1943	1443
% of Load	--	--	--	--	--	--	--	--	--	--	37	29	20
Without Susquehanna													
MWe Capacity	202	513	1033	793	1293	973	1403	1103	803	503	103	(297)	(797)
% of Load	6	14	27	19	29	21	28	20	14	8	2	(4)	(11)

(1) Projections indicated in Environmental Report - Construction Permit Stage (7/72)
(2) Combustion turbine and diesel
(3) Susquehanna Units
(4) ( ) signifies a negative number

Note: Applicant's actual experienced peak load growth rate in the ten year period prior to 1971 was as follows: 1961-66, 9.0%; 1962-67, 9.7%; 1963-68, 10%; 1964-69, 11.2%; 1965-70, 11.8%; 1966-71, 9.6%; and 1961-71, 9.3%.

SUSQUEHANNA SES-ER-OL

TABLE 1.1-2

APPLICANTS LOAD - CAPACITY - RESERVE SUMMARY, 1971-1977 (ACTUAL)

Year	1971	1972	1973	1974	1975	1976	1977
Winter Peak MWe	3294	3598	3662	3772	4122	4514(1)	4431
Capacity Changes:							
Fossil	--	720	750	--	820	--	820
C.T.&D.	--	--	--	--	--	--	--
Nuclear	--	--	--	--	--	--	--
Reratings	--	26	45	(10)	(4)	--	9
Retirements	--	(134)	--	--	--	--	--
Total Capacities:							
Fossil	2733	3345	4140	4132	4956	4956	5785
C.T.&D.	541	541	541	539	539	539	539
Hydro	146	146	146	146	146	146	146
Nuclear	--	--	--	--	--	--	--
Firm Purchase	76	76	76	76	76	76	76
Total-MWe	3496	4108	4903	4893	5717	5717	6546
Reserve Over Winter Peak:							
MWe Capacity	202	510	1241	1121	1595	1203	2115
% of Load	6	14	34	30	39	27	48

1. Corrected to allow for 5% voltage reduction. Actual recorded peak was 4425 MW.

TABLE 1.1-3
1977 PROJECTION OF APPLICANT'S LOADS-CAPACITY-RESERVES
(HIGH LOAD PROJECTION)

Year	1978	1979	1980	1981	1982	1983	1984	1985
Winter Peak MWe	4960	5320	5670	6100	6480	6840	7200	7570
Capacity Changes								
Fossil (Oil)	--	--	--	--	--	--	--	--
Nuclear	--	--	--	945(1)	945(1)	--	--	--
Hydro.	--	--	--	--	--	--	--	63(2)
Reratings	--	--	--	--	--	--	--	--
Total Capacities								
Fossil (Coal)	4145	4145	4145	4145	4145	4145	4145	4145
Fossil (Oil)	1640	1640	1640	1640	1640	1640	1640	1640
CT & Diesel	539	539	539	539	539	539	539	539
Hydro(3)	146	146	146	146	146	146	146	209
Nuclear	--	--	--	945	1890	1890	1890	1890
Firm Purchase (Hydro) (4)	76	76	76	76	76	76	76	76
Capacity Transactions(5)	(41)	(50)	(110)	(65)	(31)	(62)	(93)	(125)
Total MWe	6505	6496	6436	7426	8405	8374	8343	8374
Reserve over winter peak:								
With Susquehanna								
MWe Capacity	--	--	--	1326	1925	1534	1143	804
% of Load	--	--	--	22	30	22	16	11
Without Susquehanna								
MWe Capacity	1545	1176	766	326	(65)	(436)	(807)	(1126)
% of Load	31	22	14	5	(1)	(6)	(11)	(15)
With Susquehanna But Without Oil & Hydro Generation								
MWe Capacity	--	--	--	(1075)	(476)	(867)	(1258)	(1660)
% of Load	--	--	--	(18)	(7)	(13)	(17)	(22)
Without Susquehanna Oil & Hydro Generation								
Mwe Capacity	(856)	(1225)	(1635)	(2075)	(2466)	(2837)	(3208)	(3590)
% of Load	(17)	(23)	(29)	(34)	(38)	(41)	(45)	(47)

Note: See Footnotes Following Table 1.1-6.

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TABLE 1.1-4
1977 PROJECTION OF APPLICANTS LOADS-CAPACITY-RESERVES
(MID-RANGE LOAD PROJECTION)

Year	1978	1979	1980	1981	1982	1983	1984	1985
Winter Peak MWe	4820	5050	5310	5690	5990	6280	6560	6850
Capacity Changes								
Fossil (Oil)	--	--	--	--	--	--	--	--
Nuclear	--	--	--	945(1)	945(1)	--	--	--
Hydro	--	--	--	--	--	--	--	63(2)
Reratings	--	--	--	--	--	--	--	--
Total Capacities								
Fossil (Coal)	4145	4145	4145	4145	4145	4145	4145	4145
Fossil (Oil)	1640	1640	1640	1640	1640	1640	1640	1640
CT & Diesel	539	539	539	539	539	539	539	539
Hydro(3)	146	146	146	146	146	146	146	209
Nuclear	--	--	--	945	1890	1890	1890	1890
Firm Purchase (Hydro)(4)	76	76	76	76	76	76	76	76
Capacity Transactions(5)	(41)	(50)	(110)	(65)	(31)	(62)	(93)	(125)
Total MWe	6505	6496	6436	7426	8405	8374	8343	8374
Reserve over winter peak:								
With Susquehanna								
MWe Capacity	--	--	--	1736	2415	2094	1783	1524
% of Load	--	--	--	31	40	33	27	22
Without Susquehanna								
MWe Capacity	1685	1446	1126	736	425	124	(167)	(406)
% of Load	35	29	21	13	7	2	(3)	(6)
With Susquehanna But Without Oil & Hydro Generation								
MWe Capacity	--	--	--	(665)	14	(307)	(618)	(940)
% of Load	--	--	--	(12)	1	(5)	(9)	(14)
Without Susquehanna, Oil & Hydro Generation								
Mwe Capacity	(716)	(955)	(1275)	(1665)	(1976)	(2277)	(2568)	(2870)
% of Load	(15)	(19)	(24)	(29)	(33)	(36)	(39)	(42)

NOTE: See Footnotes Following Table 1.1-6

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TABLE 1.1-5

1977 PROJECTION OF APPLICANTS LOADS-CAPACITY-RESERVES

(LOW LOAD PROJECTION)

Year	1978	1979	1980	1981	1982	1983	1984	1985
Winter Peak MWe	4650	4720	4910	5170	5390	5650	5920	6050
Capacity Changes								
Fossil (Oil)	--	--	--	--	--	--	--	--
Nuclear	--	--	--	945(1)	945(1)	--	--	--
Hydro	--	--	--	--	--	--	--	63(2)
Reratings	--	--	--	--	--	--	--	--
Total Capacities								
Fossil (Coal)	4145	4145	4145	4145	4145	4145	4145	4145
Fossil (Oil)	1640	1640	1640	1640	1640	1640	1640	1640
CT & Diesel	539	539	539	539	539	539	539	539
Hydro(3)	146	146	146	146	146	146	146	209
Nuclear	--	--	--	945	1890	1890	1890	1890
Firm Purchase (Hydro)(4)	76	76	76	76	76	76	76	76
Capacity Transactions(5)	(41)	(50)	(110)	(65)	(31)	(62)	(93)	(125)
Total Mwe	6505	6496	6436	7426	8405	8374	8343	8374
Reserve over winter peak:								
With Susquehanna								
MWe Capacity	--	--	--	2256	3015	2724	2423	2324
% of Load	--	--	--	44	56	48	41	38
Without Susquehanna								
MWe Capacity	1855	1776	1526	1256	1025	754	473	394
% of Load	40	38	31	24	19	13	8	7
With Susquehanna But Without Oil & Hydro Generation								
MWe Capacity	--	--	--	(145)	614	323	22	(140)
% of Load	--	--	--	(3)	11	6	1	(2)
Without Susquehanna Oil & Hydro Generation								
MWe Capacity	(546)	(625)	(875)	(1145)	(1376)	(1647)	(1928)	(2070)
% of Load	(12)	(13)	(18)	(22)	(26)	(29)	(33)	(34)

NOTE: See Footnotes Following Table 1.1-6.

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TABLE 1.1-6
1977 PROJECTION OF APPLICANTS LOADS-CAPACITY-RESERVES
(VERY-LOW LOAD PROJECTION)

Year	1978	1979	1980	1981	1982	1983	1984	1985
Winter Peak MWe	4530	4580	4720	4890	5050	5230	5420	5500
Capacity Changes								
Fossil (Oil)	--	--	--	--	--	--	--	--
Nuclear	--	--	--	945(1)	945(1)	--	--	--
Hydro	--	--	--	--	--	--	--	63(2)
Reratings	--	--	--	--	--	--	--	--
Total Capacities								
Fossil (Coal)	4145	4145	4145	4145	4145	4145	4145	4145
Fossil (Oil)	1640	1640	1640	1640	1640	1640	1640	1640
CT & Diesel	539	539	539	539	539	539	539	539
Hydro(3)	146	146	146	146	146	146	146	209
Nuclear	--	--	--	945	1890	1890	1890	1890
Firm Purchase (Hydro)(4)	76	76	76	76	76	76	76	76
Capacity Transactions(5)	(41)	(50)	(110)	(65)	(31)	(62)	(93)	(125)
Total MWe	6505	6496	6436	7426	8405	8374	8343	8374
Reserve over winter peak:								
With Susquehanna								
MWe Capacity	--	--	--	2536	3355	3144	2923	2874
% of Load	--	--	--	52	66	60	54	52
Without Susquehanna								
MWe Capacity	1975	1916	1716	1536	1365	1174	973	944
% of Load	44	42	36	31	27	22	18	17
With Susquehanna But Without Oil & Hydro Generation								
MWe Capacity	--	--	--	135	954	743	522	410
% of Load	--	--	--	3	19	14	10	7
Without Susquehanna, Oil & Hydro Generation								
MWe Capacity	(426)	(485)	(685)	(865)	(1036)	(1227)	(1428)	(1520)
% of Load	(9)	(11)	(15)	(18)	(21)	(23)	(26)	(28)

NOTE: See Footnotes Following Table 1.1-6

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FOOTNOTES FOR TABLES 1.1-3 THRU 1.1-6

(1) Each 1050 MW Susquehanna unit is owned (as tenants in common) by the Applicant (90%/945 mw) and the Cooperative (10%/105 mw).

(2) 1985 in-service date is dependent upon FERC approval of Safe Harbor Water Power License Application (submitted April 1977) in 1980, the expiration date of the current license.

(3) Applicants hydro plants are operating under iterim FERC annual licenses pending final action on applications for long-term licenses.

(4) Firm purchase with Safe Harbor Water Power Corporation for one-third of the capacity of the Safe Harbor plant. As noted in (2) above, the current Safe Harbor License expires in 1980.

(5) The transactions indicated reflect the effect of capacity arrangements with the Cooperative, and an estimate of the effect of power supply arrangements with Luzerne Electric Division (LU) of UGI Corporation. (Arrangements for the Applicant's supply of power to LU are being finalized, however, Applicant's official load projections have not yet been revised to include these arrangements. For purposes of this report a preliminary estimate of the effects of the LU power supply agreement has been used, and such effects are reflected herein as a reduction in the Applicant's capacity.)

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TABLE 1.1-7

ESTIMATED ENERGY MANAGEMENT SAVINGS - APPLICANT

	Residential		Ind. & Com.		Annual Total	
Date	KW(10^3)	KWH(10^6)	KW(10^3)	KWH(10^6)	KW(10^3)	KWH(10^6)
1974	5.4	7.2	35.3	105.9	40.7	113.1
1975	27.7	37.0	76.3	146.6	104.0	183.6
1976	41.5	54.0	46.6	167.6	88.0	221.5
1977	44.3	57.6	56.7	75.0	101.0	132.6
TOTAL	118.9	155.8	214.9	495.1	333.7	650.8

TABLE 1.1-8

APPLICANT'S INSTALLED CAPACITY AS OF MARCH 1978
NET MW

	STATION	NET CAPABILITY -- MW SUMMER	WINTER
Hydro			
1.	Holtwood HES(1)	102	102
2.	Wallenpaupack HES(1)	44	44
3.	Safe Harbor(2) (Applicant's Share)	76	76
	Total Hydro	222	222
Coal			
4.	Brunner Island	1429	1464
5.	Montour	1495	1515
6.	Sunbury	362	389
7.	Martins Creek Units #1 & #2	298	300
8.	Holtwood	72	73
9.	Keystone (Applicant's Share)	207	210
10.	Conemaugh (Applicant's Share)	194	194
	Total Coal	4057	4145
Oil			
11.	Martins Creek Units #3 & #4	1640	1640
12.	Diesels	22	22
13.	Combustion Turbines	394	517
	Total Oil	2056	2179
	TOTAL INSTALLED CAPACITY	6335	6546

(1) These plants are operating under interim FERC annual licenses pending final action on Applications for long-term licenses.

(2) The FERC license for Safe Harbor expires in April 1980.

TABLE 1.1-9

APPLICANT'S HISTORICAL PEAK LOAD AND ENERGY SALES DATA

Year	Winter Peak[1] Load MW	Summer Peak Load MW	Energy Sales KWH (10^6)
1966	2085	1888	10,157
1967	2326	1984[2]	10,967
1968	2514	2210	12,081
1969	2850[2]	2430[2]	13,531
1970	3238[2]	2540	14,683
1971	3294	2661	15,685
1972	3598	2952	17,013
1973	3662	3252	18,865
1974	3772	3128	18,963
1975	4122	3368	19,113
1976	4514[2]	3385	20,354
1977	4431	3545	20,926
Growth Rates 1966-1977	7.1%	5.9%	6.8%

1. Winter peak values shown for 1967 to 1977 were reached early in subsequent year.

2. Peaks are those which would have occurred if load curtailment or voltage reduction measures had not been in effect. Actual peaks, some of which occurred at different times than the adjusted peaks shown above: 1976 Winter - 4425; 1970 Winter - 3157; 1969 Summer - 2339; 1969 Winter - 2812; 1967 Summer - 1943.

TABLE 1.1-10
1977 PROJECTION OF APPLICANTS SALES AND PEAK LOADS

	High			Mid-Range			Low			Very Low		
Year	Total Sales KWHx10^6	Winter Peak Load MW	Summer Peak Load MW	Total Sales KWHx10^6	Winter Peak Load MW	Summer Peak Load MW	Total Sales KWHx10^6	Winter Peak Load MW	Summer Peak Load MW	Total Sales KWHx10^6	Winter Peak Load MW	Summer Peak Load MW
1977	21,475	4600	3720	21,082	4520	3650	20,925	4480	3620	20,690	4420	3570
1978	22,789	4960	3920	21,763(1)	4820	3810	21,353	4650	3680	21,010	4530	3620
1979	24,792	5320	4250	23,535	5050	4030	21,983	4720	3760	21,480	4580	3680
1980	26,387	5670	4500	24,697	5310	4210	22,840	4910	3890	22,120	4720	3780
1981	28,469	6100	4800	26,535	5690	4470	24,131	5170	4070	23,080	4890	3920
1982	30,123	6480	5050	27,857	5990	4670	25,051	5390	4200	23,780	5050	4030
1983	31,723	6840	5310	29,111	6280	4870	26,188	5650	4380	24,630	5230	4170
1984	33,264	7200	5540	30,314	6560	5050	27,357	5920	4560	25,500	5420	4310
1985	34,917	7570	5810	31,588	6850	5260	27,909	6050	4650	25,910	5500	4380

(1) Value indicated reflects latest projection of 1978 KWH Sales and updates the value indicated in Appendix B1 of this report, Applicant's Long Range Forecast of Energy Sales and Peak Loads.

TABLE 1.1-11

PJM HISTORICAL PEAK LOAD AND ENERGY DATA

Year	Summer Peak Load MW	Energy KWH (10^6)
1966	17,852	97,183
1967	19,100[1]	102,595
1968	21,590[1]	112,773
1969	23,988[1]	122,316
1970	24,816[1]	130,504
1971	25,666[1]	136,208
1972	27,852	145,158
1973	30,993	155,362
1974	29,065	151,274
1975	28,969	151,439
1976	29,264	159,679
1977	32,180	163,363

[1] Peaks are those that would have occurred if load curtailment and voltage reduction measures had not been in effect. Actual peaks some of which occurred at different times than the adjusted peaks shown above: 1971-25,529; 1970-23,838; 1969-22,862; 1968-21,206; 1967-18,355.

TABLE 1.1-12

PJM FORECASTED PEAK LOAD AND ENERGY DATA(1)

Year	Summer Peak Load MW	Energy KWH (10^6)
1978	33,890	175,018
1979	35,440	184,025
1980	37,060	193,047
1981	38,660	202,189
1982	40,270	211,288
1983	41,940	220,913
1984	43,650	230,684
1985	45,400	240,612

(1) Values indicated are based on PJM Interconnection Load and Capacity Forecast of June 1, 1977.

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TABLE 1.1-13
APPLICANT'S HISTORICAL MONTHLY KWH SALES

Month	1972 KWH (10^6) Actual	1973 KWH (10^6) Actual	1974 KWH (10^6) Actual	1975 KWH (10^6) Actual	1976 KWH (10^6) Actual	1977 KWH (10^6) Actual
January	-	1729.4	1726.5	1815.7	1959.0	2178.8
February	-	1639.7	1642.8	1770.0	1896.9	2057.6
March	-	1649.0	1649.7	1772.9	1766.9	1856.9
April	-	1493.7	1584.5	1694.5	1684.0	1715.8
May	-	1426.2	1417.7	1478.8	1552.5	1592.8
June	-	1567.9	1428.6	1434.1	1535.7	1537.1
July	-	1565.8	1474.0	1421.0	1529.3	1537.5
August	-	1650.7	1559.6	1513.6	1546.2	1619.3
September	-	1639.4	1611.7	1511.0	1564.2	1628.1
October	1373.3	1460.2	1581.3	1494.9	1609.1	1636.3
November	1447.8	1478.7	1547.1	1492.0	1762.6	1652.8
December	1604.8	1564.5	1739.9	1715.0	1947.3	1913.1

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TABLE 1.1-14

APPLICANT'S FORECAST MONTHLY KWH SALES(1)

Month	1972 KWH (10^6) Forecast	1973 KWH (10^6) Forecast	1974 KWH (10^6) Forecast	1975 KWH (10^6) Forecast	1976 KWH (10^6) Forecast	1977 KWH (10^6) Forecast	1978 KWH (10^6) Forecast
January		1706.1	1903.9	1863.2	1990.4	2108.3	2168.8
February		1696.8	1785.0	1734.8	1854.4	1849.1	2086.7
March		1676.4	1768.8	1765.2	1862.6	1953.7	2005.2
April		1618.7	1734.7	1703.9	1768.2	1846.7	1853.1
May		1496.6	1581.7	1483.6	1586.1	1585.6	1651.9
June		1568.0	1526.6	1618.0	1524.1	1566.2	1593.7
July		1577.2	1537.8	1622.6	1520.9	1583.8	1585.5
August		1614.1	1569.6	1719.3	1622.9	1677.5	1681.1
September		1622.7	1589.7	1723.5	1649.1	1669.3	1655.5
October	1315.8	1469.3	1643.6	1600.4	1700.5	1657.2	1620.8
November	1330.7	1523.4	1692.3	1613.3	1714.4	1677.0	1799.7
December	1543.6	1733.3	1946.9	1878.2	1986.4	1908.0	2061.2

(1)All forecasts were made in prior year.

TABLE 1.1-15
FORECASTED POWER EXCHANGES BETWEEN APPLICANT AND PJM

Net MW Power Sale (Purchase) at Peak
For Various Load Projections

Year	High	Mid-Range	Low	Very Low
1978	1101	1180	1221	1281
1979	732	872	1042	1162
1980	351	621	951	1091
1981	(71)	289	689	879
1982	338	748	1268	1548
1983	799	1289	1889	2229
1984	412	972	1602	2022
1985	25	665	1305	1805

Actual power sales (purchases) at peaks since 1972 are as follows:

1972 - (241), 1973-- (958), 1974 - (381), 1975 - 256, 1976 - 1422, 1977 - (210)

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TABLE 1.1-16

SYSTEM CAPACITY-APPLICANT AND PJM

Year	Applicant's Summer Capacity MW	PJM Summer(1) Capacity MW
1972	*4001	*33864
1973	*4682	*35879
1974	*4492	*37215
1975	*4692	*40245
1976	*5512	*41636
1977	*6301	*44362
1978	6294	45754
1979	6285	47269
1980	6275	47234
1981	7215	48807
1982	8194	50501
1983	8163	53198
1984	8132	54974
1985	8100	57434

* Actual

(1) PJM capacity values for 1978-1985 period are based on PJM Load and Capacity Forecast of June 1, 1977.

Table 1.1-17

ALL EQUIPMENT ON THE PJM SYSTEM, WITH THE USING OF COMBUSTION TURBINE - OIL FIRED

NAME	LOCATION	DATE MO. YR.	SUMMER DEP. CAP.	WINTER DEP. CAP.
BAYONNE #1	BAYONNE, N.J.	6/ 3/70	19,000	24,000
BAYONNE #2	BAYONNE, N.J.	6/12/70	19,000	24,000
BERGEN #4 CT	RIDGEFIELD, N.J.	9/25/75	33,000	42,000
BERGEN #4 CT	RIDGEFIELD, N.J.	8/23/76 (INC. RATING)	11,000	11,000
BURLINGTON #8	BURLINGTON, N.J.	6/ 2/67	17,000	21,000
BURLINGTON #9 CT	BURLINGTON, N.J.	5/15/72	168,000	208,000
BURLINGTON #10 CT	BURLINGTON, N.J.	6/16/72	84,000	124,000
BURLINGTON #10 CT	BURLINGTON, N.J.	11/ 1/75 (INC. RATING)	1,000	0
BURLINGTON #11 CT	BURLINGTON, N.J.	6/ 5/72	168,000	208,000
BURLINGTON #11 CT	BURLINGTON, N.J.	11/ 1/75 (INC. RATING)	5,000	0
HUDSON #3	JERSEY CITY, N.J.	12/ 1/67	123,000	135,000
HUDSON #3	JERSEY CITY, N.J.	11/ 1/76 (INC. RATING)	1,000	0
KEARNY #12	KEARNY, N.J.	5/ 4/73	188,000	250,000
KEARNY #12	KEARNY, N.J.	11/ 1/75 (INC. RATING)	1,000	0
LINDEN #5 CT	LINDEN, N.J.	11/ 1/76 (INC. RATING)	1,000	0
LINDEN #6 CT	LINDEN, N.J.	11/ 1/76 (INC. RATING)	1,000	0
LINDEN #7 CT	LINDEN, N.J.	11/ 1/76 (INC. RATING)	1,000	0
LINDEN #8 CT	LINDEN, N.J.	11/ 1/76 (INC. RATING)	1,000	0
LINDEN #9	LINDEN, N.J.	5/ 4/73	188,000	250,000
MERCER #3	HAMILTON TWP., N.J.	11/30/67	123,000	140,000
MERCER #3	HAMILTON TWP., N.J.	11/ 1/75 (INC. RATING)	1,000	0
NATIONAL PARK #1	NATIONAL PARK, N.J.	6/ 4/69	17,000	21,000
SEWAREN #6	SEWAREN, N.J.	11/17/65	123,000	135,000
SEWAREN #6	SEWAREN, N.J.	1/ 1/76 (DEC. RATING)	-61,000	-67,000
BARBADOES #5 C.T.	W. NORRITON TWP., PA.	7/21/70	18,000	22,000
CHESTER #7	CHESTER, PA.	2/ 7/69	16,000	21,000
CHESTER #8	CHESTER, PA.	5/20/69	16,000	21,000
CHESTER #9	CHESTER, PA.	3/ 6/69	16,000	21,000
CROYDON #1-4 CT	CROYDON, PA.	6/18/74	216,000	272,000
CROYDON 41 - 42	CROYDON, PA.	7/24/74	108,000	136,000
CROYDON 31	CROYDON, PA.	8/ 6/74	54,000	68,000
CROYDON 32	CROYDON, PA.	8/ 8/74	54,000	68,000
DELAWARE #9	PHILADELPHIA, PA.	7/24/70	18,000	23,000
DELAWARE #10	PHILADELPHIA, PA.	5/ 7/69	16,000	21,000
DELAWARE #11	PHILADELPHIA, PA.	4/19/69	16,000	21,000
DELAWARE #12	PHILADELPHIA, PA.	5/ 2/69	16,000	21,000
EDDYSTONE #10	EDDYSTONE, PA.	5/20/67	16,000	21,000
EDDYSTONE #20	EDDYSTONE, PA.	10/11/67	16,000	21,000
EDDYSTONE #30	EDDYSTONE PA.	3/ 7/70	18,000	23,000
EDDYSTONE #40	EDDYSTONE, PA.	6/21/70	18,000	23,000
FALLS #1	FALLS TOWNSHIP, PA.	5/22/70	18,000	23,000
FALLS #2	FALLS TOWNSHIP, PA.	6/10/70	18,000	23,000
FALLS #3	FALLS TOWNSHIP, PA.	6/28/70	18,000	23,000
MOSER #1	LOWER POTTSGROVE, PA.	6/ 9/70	18,000	23,000
MOSER #2	LOWER POTTSGROVE, PA.	5/29/70	18,000	23,000
MOSER #3	LOWER POTTSGROVE, PA.	6/11/70	18,000	23,000
PLYMTH MEET #9 CT	PLYMOUTH TOWNSHIP, PA.	6/17/71	35,000	45,000
PLYMTH MEET #15 CT	PLYMOUTH TOWNSHIP, PA.	6/ 4/71	35,000	45,000
RICHMOND #21,22 CT	PHILADELPHIA, PA.	6/ 8/71	70,000	90,000
RICHMOND #21,22 CT	PHILADELPHIA, PA.	11/ 1/75 (INC. RATING)	2,000	0
RICHMOND #31,32 CT	PHILADELPHIA, PA.	5/ 1/71	70,000	90,000
RICHMOND #31,32 CT	PHILADELPHIA, PA.	11/ 1/75 (INC. RATING)	2,000	0
RICHMOND #41 CT	PHILADELPHIA, PA.	11/ 4/71	24,000	32,000
RICHMOND #41 CT	PHILADELPHIA, PA.	11/ 1/75 (DEC. RATING)	-1,000	0

Table 1.1-17 (Continued)

ALL EQUIPMENT ON THE PJM SYSTEM, WITH THE LISTING OF COMBUSTION TURBINE - OIL FIRED

NAME	LOCATION	DATE MO. YR.	SUMMER DEP. CAP.	WINTER DEP. CAP.
RICHMOND #42 CT	PHILADELPHIA, PA.	12/28/71	24,000	32,000
RICHMOND #42 CT	PHILADELPHIA, PA.	11/ 1/75 (DEC. RATING)	-1,000	0
RICHMOND #43 CT	PHILADELPHIA, PA.	9/29/71	24,000	32,000
RICHMOND #43 CT	PHILADELPHIA, PA.	11/ 1/75 (DEC. RATING)	-1,000	0
RICHMOND #44 CT	PHILADELPHIA, PA.	10/26/71	24,000	32,000
RICHMOND #44 CT	PHILADELPHIA, PA.	11/ 1/75 (DEC. RATING)	-1,000	0
RICHMOND #51,52 CT	PHILADELPHIA, PA.	6/28/71	70,000	90,000
RICHMOND 51,52 CT	PHILADELPHIA, PA.	11/ 1/75 (INC. RATING)	2,000	0
RICHMOND #61 CT	PHILADELPHIA, PA.	7/13/71	35,000	45,000
RICHMOND #61 CT	PHILADELPHIA, PA.	11/ 1/75 (INC. RATING)	1,000	0
RICHMOND #62 CT	PHILADELPHIA, PA.	7/30/71	35,000	45,000
RICHMOND #62 CT	PHILADELPHIA, PA.	11/ 1/75 (INC. RATING)	1,000	0
RICHMOND #71 CT	PHILADELPHIA, PA.	7/ 8/71	24,000	32,000
RICHMOND #71 CT	PHILADELPHIA, PA.	11/ 1/75 (DEC. RATING)	-1,000	0
RICHMOND #72 CT	PHILADELPHIA, PA.	10/23/71	24,000	32,000
RICHMOND #72 CT	PHILADELPHIA, PA.	11/ 1/75 (DEC. RATING)	-1,000	0
RICHMOND #73 CT	PHILADELPHIA, PA.	11/ 1/75 (DEC. RATING)	-1,000	0
RICHMOND #74 CT	PHILADELPHIA, PA.	11/ 1/75 (DEC. RATING)	-1,000	0
RICHMOND 81 CT	PHILADELPHIA, PA.	6/ 7/73	56,000	72,000
RICHMOND #81 CT	PHILADELPHIA, PA.	11/ 1/75 (DEC. RATING)	-2,000	0
RICHMOND 91 CT	PHILADELPHIA, PA.	6/ 7/73	56,000	72,000
RICHMOND #91 CT	PHILADELPHIA, PA.	11/ 1/75 (DEC. RATING)	-2,000	0
RICHMOND 92 CT	PHILADELPHIA, PA.	6/ 7/73	56,000	72,000
RICHMOND #92 CT	PHILADELPHIA, PA.	11/ 1/75 (DEC. RATING)	-2,000	0
SCHUYKILL #10	PHILADELPHIA, PA.	5/30/69	16,000	21,000
SCHUYLKILL #11 CT	PHILADELPHIA, PA.	6/11/71	18,000	23,000
SOUTHWARK #3	PHILADELPHIA, PA.	6/14/67	16,000	21,000
SOUTHWARK #4	PHILADELPHIA, PA.	10/ 9/67	16,000	21,000
SOUTHWARK #5	PHILADELPHIA, PA.	7/26/67	16,000	21,000
SOUTHWARK #6	PHILADELPHIA, PA.	11/ 7/68	16,000	21,000
CARLL'S CORNER #1	UPPER DEERFIELD TWP, N.J.	4/12/73	37,000	46,000
CARLL'S CORNER #1	UPPER DEERFIELD TWP, N.J.	3/ 1/76 (DEC. RATING)	0	-2,000
CARLL'S CORNER #2	UPPER DEERFIELD TWP, N.J.	5/26/73	37,000	46,000
CARLL'S CORNER #2	UPPER DEERFIELD TWP, N.J.	3/ 1/76 (DEC. RATING)	0	-2,000
CEDAR #1 CT	OCEAN COUNTY, NEW JERSEY	6/15/72	46,000	53,000
CEDAR #2 CT	OCEAN COUNTY, NEW JERSEY	6/15/72	23,000	26,000
DEEPWATER JPT A	SALEM COUNTY, N.J.	3/ 1/76 (DEC. RATING)	0	-1,000
MICKLETON CT	E. GREENWICH TWP, NJ	6/28/74	57,000	79,000
MIDDLE C.T. #1-2	RIO GRANDE, N.J.	6/30/70	40,000	48,000
MIDDLE C.T. #1-2	RIO GRANDE, N.J.	4/ 1/77 (DEC. RATING)	0	-2,000
MIDDLE JPT #3 CT	RIO GRANDE, N.J.	5/26/71	37,000	45,000
MIDDLE JPT #3 CT	RIO GRANDE, N.J.	3/ 1/76 (DEC. RATING)	0	-1,000
MISSOURI AVE. JPT B	ATLANTIC COUNTY, N.J.	5/28/69	18,000	22,000
MISSOURI AVE. JPT B	ATLANTIC COUNTY, N.J.	3/ 1/76 (DEC. RATING)	0	-1,000
MISSOURI AVE. JPT C	ATLANTIC COUNTY, N.J.	1/17/69	18,000	22,000
MISSOURI AVE. JPT C	ATLANTIC COUNTY, N.J.	3/ 1/76 (DEC. RATING)	0	-1,000
MISSOURI AVE. JPT D	ATLANTIC COUNTY, N.J.	2/ 5/69	18,000	22,000
MISSOURI AVE. JPT D	ATLANTIC COUNTY, N.J.	3/ 1/76 (DEC. RATING)	0	-1,000
VINELAND #1 CT.	VINELAND, NEW JERSEY	6/26/72	29,000	35,000
VINELAND #1 CT.	VINELAND, NEW JERSEY	3/ 1/76 (DEC. RATING)	-3,000	-3,000
CHRISTIANA 11 CT	NEW CASTLE CO., DEL.	6/18/73	22,000	28,000
CHRISTIANA 14 CT	NEW CASTLE CO., DEL.	6/20/73	22,000	28,000
DELAWARE CITY #10	NEW CASTLE COUNTY, DEL.	4/17/68	17,000	21,000
INDIAN RIVER #10	SUSSEX COUNTY, DEL.	6/21/67	17,000	19,000

Table 1.1-17 (Continued)

ALL EQUIPMENT ON THE PJM SYSTEM, WITH THE LISTING OF COMBUSTION TURBINE - OIL FIRED

NAME	LOCATION	DATE MO. YR.	SUMMER DEP. CAP.	WINTER DEP. CAP.
KENT SUBSTATION #1	KENT COUNTY, DEL.	7/20/64	12,000	16,000
TASLEY #10 CT	TASLEY, VIRGINIA	6/30/72	26,000	33,000
VIENNA #10	VIENNA, MARYLAND	4/ 5/68	17,000	19,000
ALLENTOWN, CT#1	ALLENTOWN, PA.	7/ 3/67	14,000	18,000
ALLENTOWN CT#2	ALLENTOWN, PA.	7/ 3/67	14,000	18,000
ALLENTOWN CT#3	ALLENTOWN, PA.	7/ 3/67	14,000	18,000
ALLENTOWN #4 CT	ALLENTOWN, PA.	7/ 3/67	14,000	18,000
FISHBACH #1-2 CT	POTTSVILLE, PA.	8/20/69	28,000	36,000
HARRISBURG CT#1	HARRISBURG, PA.	3/27/67	14,000	18,000
HARRISBURG CT #2	HARRISBURG, PA.	3/27/67	14,000	18,000
HARRISBURG CT#3	HARRISBURG, PA.	3/27/67	14,000	18,000
HARRISBURG CT#4	HARRISBURG, PA.	3/27/67	14,000	18,000
HARWOOD CT #1	HAZELTON, PA.	7/31/67	14,000	18,000
HARWOOD CT #2	HAZELTON, PA.	7/31/67	14,000	18,000
JENKINS CT #1	LAFLIN, PA.	11/ 6/67	14,000	18,000
JENKINS CT #2	LAFLIN, PA.	10/18/67	14,000	18,000
LOCK HAVEN #1	LOCK HAVEN, PA.	11/21/69	14,000	18,000
MARTINS CREEK #1 CT	MARTINS CREEK, PA.	6/18/71	18,000	24,000
MARTINS CREEK #2 CT	MARTINS CREEK, PA.	6/18/71	18,000	24,000
MARTINS CREEK #3 CT	MARTINS CREEK, PA.	6/18/71	18,000	24,000
MARTINS CREEK #4 CT	MARTINS CREEK, PA.	6/18/71	18,000	24,000
SUBURBAN #7 CT	SCRANTON, PA.	7/ 9/70	20,000	31,000
SUNBURY #1 CT	SHAMOKIN DAM, PA.	7/ 3/71	18,000	24,000
SUNBURY #2 CT	SHAMOKIN DAM, PA.	7/28/71	18,000	24,000
WEST SHORE #1-2	HARRISBURG, PA.	8/14/69	28,000	36,000
WILLIAMSPORT CT #1	WILLIAMSPORT, PA.	8/31/67	14,000	18,000
WILLIAMSPORT CT #2	WILLIAMSPORT, PA.	8/31/67	14,000	18,000
CRANE #1 CT	BALTIMORE COUNTY, MD.	8/ 8/67	14,000	17,000
PERRYMAN G.T.S. #1	PERRYMAN, MARYLAND	1/11/72	51,000	55,000
PERRYMAN G.T.S. #1	PERRYMAN, MARYLAND	9/18/73 (INC. RATING)	0	5,000
PERRYMAN G.T.S. #2	PERRYMAN, MARYLAND	4/ 7/72	51,000	55,000
PERRYMAN G.T.S. #2	PERRYMAN, MARYLAND	9/18/73 (INC. RATING)	0	5,000
PERRYMAN G.T.S. #3	PERRYMAN, MARYLAND	4/29/72	51,000	55,000
PERRYMAN G.T.S. #3	PERRYMAN, MARYLAND	9/18/73 (INC. RATING)	0	5,000
PERRYMAN G.T.S. #4	PERRYMAN, MARYLAND	4/18/72	51,000	55,000
PERRYMAN G.T.S. #4	PERRYMAN, MARYLAND	9/18/73 (INC. RATING)	0	5,000
PHILA. ROAD CT #1-2	BALTIMORE, MARYLAND	8/14/70	32,000	34,000
PHILA. ROAD #3 CT	BALTIMORE, MARYLAND	9/25/70	16,000	17,000
PHILA. ROAD #4 CT	BALTIMORE, MARYLAND	9/25/70	16,000	17,000
WAGNER #1 CT	ANNE ARUNDEL COUNTY, MD.	8/16/67	14,000	17,000
BLOSSBURG #1 CT	TIOGA COUNTY, PA.	5/ 3/71	19,000	27,000
WARREN CT	WARREN COUNTY, PA.	9/22/72	55,000	73,000
WARREN CT	WARREN COUNTY, PA.	4/ 4/77 (INC. RATING)	6,000	6,000
WAYNE #1 CT	CRAWFORD COUNTY, PA.	8/14/72	54,000	73,000
WAYNE #1 CT	CRAWFORD COUNTY, PA.	4/ 4/77 (INC. RATING)	3,000	3,000
HAMILTON #1 CT	ADAMS COUNTY, PA.	6/25/71	20,000	26,000
HUNTERSTOWN #1 CT	ADAMS COUNTY, PA.	5/10/71	20,000	27,000
HUNTERSTOWN #2 CT	ADAMS COUNTY, PA.	5/23/71	20,000	27,000
HUNTERSTOWN #3 CT	ADAMS COUNTY, PA.	5/10/71	20,000	27,000
MOUNTAIN #1 CT	CUMBERLAND COUNTY, PA.	6/ 1/72	20,000	27,000
MOUNTAIN #2 CT	CUMBERLAND COUNTY, PA.	6/ 1/72	20,000	27,000
ORRTANNA #1 CT	ADAMS COUNTY, PA.	5/19/71	20,000	26,000
PORTLAND #4 CT	NORTHAMPTON COUNTY, PA.	5/ 5/71	20,000	26,000
SHAWNEE #1 CT	MONROE COUNTY, PA.	6/ 1/72	20,000	26,000

Table 1.1-17 (Continued)

ALL EQUIPMENT ON THE PJM SYSTEM, WITH THE LISTING OF COMBUSTION TURBINE - OIL FIRED

NAME	LOCATION	DATE MO. YR.		SUMMER DEP. CAP.	WINTER DEP. CAP.
TOLNA #1 CT	YORK COUNTY, PA.	6/ 1/72		20,000	27,000
TOLNA #2 CT	YORK COUNTY, PA.	6/ 1/72		20,000	27,000
GLEN GARDNER #A1 CT	HUNTERDON COUNTY, N.J.	6/16/71		20,000	26,000
GLEN GARDNER #A2 CT	HUNTERDON COUNTY, N.J.	6/18/71		20,000	26,000
GLEN GARDNER #A3 CT	HUNTERDON COUNTY, N.J.	6/22/71		20,000	26,000
GLEN GARDNER #A4 CT	HUNTERDON COUNTY, N.J.	6/24/71		20,000	26,000
GLEN GARDNER #B5 CT	HUNTERDON COUNTY, N.J.	6/30/71		20,000	26,000
GLEN GARDNER #B6 CT	HUNTERDON COUNTY, N.J.	7/ 2/71		20,000	26,000
GLEN GARDNER #B7 CT	HUNTERDON COUNTY, N.J.	7/12/71		20,000	26,000
GLEN GARDNER #B8 CT	HUNTERDON COUNTY, N.J.	7/16/71		20,000	26,000
SAYREVILLE #1 CT	MIDDLESEX COUNTY NJ	3/ 1/72		53,000	73,000
SAYREVILLE #2 CT	MIDDLESEX COUNTY NJ	3/29/72		53,000	73,000
SAYREVILLE #3 CT	MIDDLESEX COUNTY NJ	6/ 8/72		53,000	73,000
SAYREVILLE #4 CT	MIDDLESEX COUNTY, N.J.	10/ 3/73		53,000	73,000
WERNER C1 CT	MIDDLESEX COUNTY NJ	3/29/72		53,000	73,000
WERNER C2 CT	MIDDLESEX COUNTY NJ	4/20/72		53,000	73,000
WERNER C3 CT	MIDDLESEX COUNTY NJ	5/28/72		53,000	73,000
WERNER #4 CT	MIDDLESEX COUNTY NJ	6/17/72		53,000	73,000
BUZZARD POINT (E) CT	WASHINGTON, D.C.	5/28/68		128,000	160,000
BUZZARD POINT (E) CT	WASHINGTON, D.C.	12/ 1/75	(DEC. RATING)	-4,000	0
BUZZARD POINT (W) CT	WASHINGTON, D.C.	6/21/68		128,000	160,000
CHALK POINT #1 CT	PRINCE GEORGE'S CO., MD	4/ 4/67		18,000	18,000
CHALK POINT 2 CT	PRINCE GEORGE'S CO., MD.	6/28/74		28,000	33,000
CHALK POINT 2 CT	PRINCE GEORGE'S CO., MD.	12/ 1/75	(INC. RATING)	2,000	0
CHALK POINT 2 CT	PRINCE GEORGE'S CO., MD.	4/ 1/76	(INC. RATING)	0	2,000
DICKERSON #1 CT	MONTGOMERY COUNTY, MD.	3/14/67		18,000	18,000
DICKERSON #1 CT	MONTGOMERY COUNTY, MD.	12/ 1/75	(DEC. RATING)	-5,000	0
DICKERSON #1 CT	MONTGOMERY COUNTY, MD.	4/ 1/76	(DEC. RATING)	0	-5,000
MORGANTOWN #1 CT	NEWBURG, MARYLAND	12/31/70		16,000	20,000
MORGANTOWN #2 CT	NEWBURG, MARYLAND	2/ 2/71		16,000	20,000
MORGANTOWN 3 CT	NEWBURG, MARYLAND	6/28/73		54,000	53,500
MORGANTOWN 3 CT	NEWBURG, MARYLAND	12/ 1/75	(DEC. RATING)	-1,000	0
MORGANTOWN 3 CT	NEWBURG, MARYLAND	10/16/73	(INC. RATING)	0	11,500
MORGANTOWN 3 CT	NEWBURG, MARYLAND	11/ 1/76	(INC. RATING)	1,000	0
MORGANTOWN 4 CT	NEWBURG, MARYLAND	6/12/73		54,000	53,500
MORGANTOWN 4 CT	NEWBURG, MARYLAND	10/16/73	(INC. RATING)	0	11,500
MORGANTOWN 5 CT	NEWBURG, MARYLAND	5/31/73		54,000	53,500
MORGANTOWN 5 CT	NEWBURG, MARYLAND	10/16/73	(INC. RATING)	0	11,500
MORGANTOWN 6 CT	NEWBURG, MARYLAND	5/18/73		54,000	53,500
MORGANTOWN 6 CT	NEWBURG, MARYLAND	10/16/73	(INC. RATING)	0	11,500
SALEM #3 CT	LOWER ALLOWAYS CREEK N.J.	6/17/71		38,000	48,000
SEWAREN #6	SEWAREN, N.J.	5/ 1/82	(INC. RATING)	61,000	67,000
AE UNASSIGNED CT		5/31/82		60,000	60,000
AE UNASSIGNED CT		5/31/83		180,000	180,000
TOTAL RATINGS				5,748,000	7,214,000

Table 1.1-17 (Continued)

ALL EQUIPMENT ON THE PJM SYSTEM, WITH THE LISTING OF COMBUSTION TURBINE - GAS FIRED

NAME	LOCATION	DATE MO. YR.	SUMMER DEP. CAP.	WINTER DEP. CAP.
BERGEN #3	RIDGEFIELD, N.J.	7/ 7/67	17,000	21,000
ESSEX #8	NEWARK, N.J.	12/11/63	27,000	33,000
ESSEX #8	NEWARK, N.J.	1/ 1/76 (DEC. RATING)	-27,000	-33,000
KEARNY #9	KEARNY, N.J.	5/24/67	17,000	21,000
LINDEN #3	LINDEN, N.J.	7/19/67	17,000	21,000
EDGE MOOR #10	WILMINGTON, DELAWARE	6/24/63	13,000	15,000
EDGE MOOR #10	WILMINGTON, DELAWARE	4/ 1/75 (INC. RATING)	2,000	0
WEST SUBSTATION #1	NEW CASTLE COUNTY, DEL.	6/ 1/64	16,000	20,000
NOTCH CLIFF #1-4 CT	BALTIMORE COUNTY, MD.	6/16/69	66,000	68,000
NOTCH CLIFF #1-4 CT	BALTIMORE COUNTY, MD.	9/15/75 (DEC. RATING)	-2,000	0
NOTCH CLIFF #5-8 CT	BALTIMORE COUNTY, MD.	6/ 2/69	66,000	68,000
NOTCH CLIFF #5-8 CT	BALTIMORE COUNTY, MD.	9/15/75 (DEC. RATING)	-2,000	0
RIEGEL PAPER CT #1	HUNTERDON COUNTY, N.J.	8/28/70	22,000	28,000
ESSEX #8	NEWARK, N.J.	5/ 1/82 (INC. RATING)	27,000	33,000
TOTAL RATINGS			259,000	295,000

Table 1.1-17 (Continued)

ALL EQUIPMENT ON THE PJM SYSTEM, WITH THE LISTING OF COMBUSTION TURBINE - OIL OR GAS FIRED

NAME	LOCATION	DATE MO. YR.	SUMMER DEP. CAP.	WINTER DEP. CAP.
EDISON #1 CT	EDISON, N.J.	5/ 6/71	146,000	184,000
EDISON #1 CT	EDISON, N.J.	11/ 1/75 (INC. RATING)	3,000	0
EDISON #1 CT	EDISON, N.J.	4/ 1/77 (INC. RATING)	0	4,000
EDISON #2 CT	EDISON, N.J.	11/20/71	146,000	184,000
EDISON #2 CT	EDISON, N.J.	4/ 1/77 (INC. RATING)	0	4,000
EDISON #3 CT	EDISON, N.J.	6/29/71	146,000	184,000
EDISON #3 CT	EDISON, N.J.	11/ 1/75 (INC. RATING)	5,000	0
EDISON #3 CT	EDISON, N.J.	4/ 1/77 (INC. RATING)	0	4,000
ESSEX #9 CT	NEWARK, N.J.	6/25/71	54,000	65,000
ESSEX #9 CT	NEWARK, N.J.	11/ 1/76 (INC. RATING)	3,000	0
ESSEX # 9 CT	NEWARK, N.J.	4/ 1/77 (INC. RATING)	0	6,000
ESSEX #10 CT	NEWARK, N.J.	6/28/71	146,000	184,000
ESSEX #10 CT	NEWARK, N.J.	11/ 1/75 (INC. RATING)	9,000	0
ESSEX #10 CT	NEWARK, N.J.	4/ 1/77 (INC. RATING)	0	8,000
ESSEX #11 CT	NEWARK, N.J.	12/23/71	168,000	200,000
ESSEX #11 CT	NEWARK, N.J.	11/ 1/76 (INC. RATING)	8,000	0
ESSEX #11 CT	NEWARK, N.J.	4/ 1/77 (INC. RATING)	0	8,000
ESSEX #12 CT	NEWARK, N.J.	6/ 8/72	168,000	200,000
ESSEX #12 CT	NEWARK, N.J.	11/ 1/76 (INC. RATING)	8,000	0
ESSEX #12 CT	NEWARK, N.J.	4/ 1/77 (INC. RATING)	0	8,000
KEARNY #10	KEARNY, N.J.	5/ 9/70	120,000	154,000
KEARNY #10	KEARNY, N.J.	11/ 1/75 (INC. RATING)	2,000	0
KEARNY #11	KEARNY, N.J.	12/12/69	120,000	160,000
KEARNY #11	KEARNY, N.J.	11/ 1/75 (INC. RATING)	1,000	0
LINDEN #5 CT	LINDEN, N.J.	7/ 2/70	24,000	30,000
LINDEN #6 CT	LINDEN, N.J.	7/10/70	24,000	30,000
LINDEN #7 CT	LINDEN, N.J.	7/31/70	24,000	30,000
LINDEN #8 CT	LINDEN, N.J.	8/29/70	24,000	30,000
BARBADOES #6	WEST NORRITON TWP., PA.	10/21/61	20,000	21,000
BARBADOES #7	WEST NORRITON TWP., PA.	6/28/61	18,000	21,000
RICHMOND #73 CT	PHILADELPHIA, PA.	12/30/70	24,000	32,000
RICHMOND #74 CT	PHILADELPHIA, PA.	12/30/70	24,000	32,000
DEEPWATER JPT A	SALEM COUNTY, N.J.	4/ 7/67	17,000	22,000
MADISON STREET #1	WILMINGTON, DEL.	11/ 1/62	11,000	14,000
RIVERSIDE #6 C.T.	BALTIMORE CO., MARYLAND	4/24/70	118,000	132,000
RIVERSIDE #6 C.T.	BALTIMORE CO., MARYLAND	9/15/75 (INC. RATING)	10,000	0
RIVERSIDE #7 CT	BALTIMORE CO., MARYLAND	9/25/70	22,000	25,000
RIVERSIDE #8 CT	BALTIMORE CO., MARYLAND	9/25/70	22,000	25,000
WESTPORT #5 CT	BALTIMORE CITY, PA.	2/18/69	118,000	132,000
PORTLAND #3 CT	NORTHAMPTON COUNTY, PA.	12/22/67	15,000	19,000
TITUS #4	BERKS COUNTY, PA.	12/28/67	15,000	19,000
TITUS #5 C.T.	BERKS COUNTY, PA.	8/ 5/70	16,000	20,000
GILBERT C-4	HUNTERDON COUNTY, N.J.	7/22/70	25,000	31,000
GILBERT C-3	HUNTERDON COUNTY, N.J.	8/ 9/70	25,000	31,000
GILBERT C-2	HUNTERDON COUNTY, N.J.	10/25/70	25,000	31,000
GILBERT C-1	HUNTERDON COUNTY, N.J.	7/29/70	25,000	31,000
TOTAL RATINGS			1,899,000	2,315,000

Table 1.1-17 (Continued)

ALL EQUIPMENT ON THE PJM SYSTEM, WITH THE LISTING OF TEMPORARY OUTSIDE PURCHASE

NAME	LOCATION	DATE MO. YR.	SUMMER DEP. CAP.	WINTER DEP. CAP.
TRANSACTION UGI-APS		1/ 1/75	50,000	50,000
PL-AE CO-OP TRANSACT		11/ 1/80	65,000	65,000
TRANSACTION UGI-APS		1/ 1/81 (RETIREMENT)	-50,000	-50,000
PL-AE CO-OP TRANSACT		5/31/81 (DEC. RATING)	-10,000	-10,000
PL-AE CO-OP TRANSACT		5/ 1/82	65,000	65,000
PL-AE CO-OP TRANSACT		5/31/82 (DEC. RATING)	-20,000	-20,000
PL-AE CO-OP TRANSACT		5/31/83 (DEC. RATING)	-20,000	-20,000
PL-AE CO-OP TRANSACT		5/31/84 (DEC. RATING)	-20,000	-20,000
PL-AE CO-OP TRANSACT		5/31/85 (DEC. RATING)	-20,000	-20,000
TOTAL RATINGS			40,000	40,000

Table 1.1-17 (Continued)

ALL EQUIPMENT ON THE PJM SYSTEM, WITH THE LISTING OF COAL OR OIL FIRED STEAM

NAME	LOCATION	DATE MO. YR.		SUMMER DEP. CAP.	WINTER DEP. CAP.
DEEPWATER #1	SALEM COUNTY, N.J.	12/31/58		78,000	82,000
B. L. ENGLAND #1	CAPE MAY COUNTY, N.J.	10/22/62		127,000	127,000
B. L. ENGLAND #2	CAPE MAY COUNTY, N.J.	11/24/64		160,000	160,000
GREENWICH	GLOUCESTER COUNTY, N.J.	2/17/53		12,500	12,500
GREENWICH	GLOUCESTER, N.J.	4/20/74	(RETIREMENT)	-12,500	-12,500
DELAWARE CITY #1	NEW CASTLE COUNTY, DEL.	12/ 1/56		27,000	27,000
DELAWARE CITY #2	NEW CASTLE COUNTY, DEL.	12/ 1/56		27,000	27,000
DELAWARE CITY #3	NEW CASTLE COUNTY, DEL.	11/ 1/61		65,500	66,500
MONTOUR #11	MONTOUR COUNTY, PA.	4/30/73		15,000	15,000
MORGANTOWN #1	NEWBURG, MARYLAND	7/20/70		556,000	556,000
MORGANTOWN #2	NEWBURG, MARYLAND	6/23/71		558,000	558,000
MORGANTOWN #2	NEWBURG, MARYLAND	12/ 1/75	(DEC. RATING)	-2,000	0
MORGANTOWN #2	NEWBURG, MARYLAND	4/ 1/76	(DEC. RATING)	0	2,000
TOTAL RATINGS				1,611,500	1,616,500

Table 1.1-17 (Continued)

ALL EQUIPMENT ON THE PJM SYSTEM, WITH THE LISTING OF COAL OR GAS FIRED STEAM

NAME	LOCATION	DATE MO. YR.	SUMMER DEP. CAP.	WINTER DEP. CAP.
TOTAL RATINGS			0	0

Table 1.1-17 (Continued)

ALL EQUIPMENT ON THE PJM SYSTEM, WITH THE LISTING OF OIL FIRED STEAM

NAME	LOCATION	DATE MO. YR.		SUMMER DEP. CAP.	WINTER DEP. CAP.
BERGEN #1	RIDGEFIELD, N.J.	5/11/59		280,000	300,000
BERGEN #1	RIDGEFIELD, N.J.	11/ 1/75	(INC. RATING)	7,000	0
BERGEN #1	RIDGEFIELD, N.J.	8/ 1/76	(DEC. RATING)	-20,000	-20,000
BERGEN #2	RIDGEFIELD, N.J.	5/27/60		283,000	300,000
BURLINGTON #1	BURLINGTON, N.J.	11/16/22		11,200	11,200
BURLINGTON #2	BURLINGTON, N.J.	11/17/19		11,300	11,300
BURLINGTON #3	BURLINGTON, N.J.	12/18/15		11,200	11,200
BURLINGTON #4	BURLINGTON, N.J.	4/ 3/32		11,300	11,300
BURLINGTON LP	BURLINGTON, N.J.	3/ 1/74	(RETIREMENT)	-45,000	-45,000
BURLINGTON #5	BURLINGTON, N.J.	11/12/40		118,000	123,000
BURLINGTON #6	BURLINGTON, N.J.	6/17/43		120,000	128,000
BURLINGTON #7	BURLINGTON, N.J.	11/19/55		180,000	185,000
BURLINGTON #7 AUX.	BURLINGTON, N.J.	11/19/55		0	0
ESSEX #1	NEWARK, N.J.	4/16/74		104,000	110,000
ESSEX #2,3	NEWARK, N.J.	1/ 1/23		54,000	61,000
ESSEX #4,5,7	NEWARK, N.J.	7/15/24		112,000	115,000
ESSEX #2,3,4,5,7 LP	NEWARK N.J.	3/ 1/74	(RETIREMENT)	-166,000	-176,000
HUDSON #1	JERSEY CITY, N.J.	12/10/60		383,000	415,000
HUDSON #1	JERSEY CITY, N.J.	4/ 1/77	(DEC. RATING)	0	-10,000
KEARNY #1-6	KEARNY, N.J.	0/ 0/25		220,000	220,000
KEARNY LP (BLR LIM)	KEARNY, N.J.	10/ 1/71	(DEC. RATING)	-120,000	-120,000
KEARNY #1-6	KEARNY, N.J.	1/15/74	(RETIREMENT)	-100,000	-100,000
KEARNY #7	KEARNY, N.J.	3/30/53		142,000	148,000
KEARNY #7 AUX	KEARNY, N.J.	3/30/53		0	0
KEARNY #8	KEARNY, N.J.	11/10/53		146,000	148,000
KEARNY #8 AUX	KEARNY, N.J.	11/10/53		0	0
LINDEN #1	LINDEN, N.J.	5/30/57		230,000	230,000
LINDEN #2	LINDEN, N.J.	12/24/57		225,000	225,000
LINDEN #4	LINDEN, N.J.	5/31/72		25,000	25,000
LINDEN 1 & 4	LINDEN , N.J.	8/23/74	(INC. RATING)	10,000	29,000
LINDEN 1 & 4	LINDEN , N.J.	11/ 1/75	(DEC. RATING)	-21,000	0
MARION #10	JERSEY CITY, N.J.	7/29/41		116,000	119,000
MARION #10	JERSEY CITY, N.J.	10/ 1/74	(RETIREMENT)	-116,000	-119,000
SEWAREN #1	SEWAREN, N.J.	12/ 1/48		104,000	107,000
SEWAREN #1 AUX	SEWAREN, N.J.	12/ 1/48		0	0
SEWAREN #2	SEWAREN, N.J.	11/30/48		107,000	113,000
SEWAREN #2	SEWAREN, N.J.	11/ 1/75	(INC. RATING)	4,000	0
SEWAREN #2 AUX	SEWAREN, N.J.	11/30/48		0	0
SEWAREN #3	SEWAREN, N.J.	10/16/49		107,000	109,000
SEWAREN #3 AUX	SEWAREN, N.J.	10/16/49		0	0
SEWAREN #4	SEWAREN, N.J.	7/30/51		121,000	127,000
SEWAREN #4	SEWAREN, N.J.	11/ 1/75	(INC. RATING)	3,000	0
SEWAREN #4 AUX	SEWAREN, N.J.	7/30/51		0	0
SEWAREN #5	SEWAREN, N.J.	10/11/62		326,000	344,000
BARBADOES #3	WEST NORRITON TWP., PA.	3/ 1/49		67,000	70,000
BARBADOES #3	WEST NORRITON TWP, PA.	2/ 1/77		-2,000	-2,000
BARBADOES #4	WEST NORRITON TWP., PA.	6/ 1/40		67,000	70,000
BARBADOES #4	WEST NORRITON TWP.,PA.	2/ 1/77		-2,000	-2,000
CHESTER #1-3	CHESTER, PA.	10/28/24		66,000	69,000
CHESTER #1-3	CHESTER , PA.	1/ 1/75	(DEC. RATING)	-66,000	-69,000
CHESTER #1-3	CHESTER , PA.	6/23/75	(RETIREMENT)	0	0
CHESTER #5-6	CHESTER, PA.	4/ 1/41		124,000	130,000
CROMBY #2	CHESTER COUNTY, PA.	9/26/55		201,000	211,000
DELAWARE #2,4,5	PHILADELPHIA, PA.	0/ 0/24		78,000	89,000

Table 1.1-17 (Continued)

ALL EQUIPMENT ON THE PJM SYSTEM, WITH THE LISTING OF OIL FIRED STEAM

NAME	LOCATION	DATE MO. YR.	SUMMER DEP. CAP.	WINTER DEP. CAP.
DELAWARE #2,4,5	PHILADELPHIA, PA.	1/ 1/75 (DEC. RATING)	-78,000	-89,000
DELAWARE #2,4,5	PHILADELPHIA, PA.	6/23/75 (RETIREMENT)	0	0
DELAWARE #7	PHILADELPHIA, PA.	8/28/53	126,000	128,000
DELAWARE #8	PHILADELPHIA, PA.	4/ 1/53	124,000	128,000
EDDYSTONE #3	EDDYSTONE, PA.	9/24/74	185,000	185,000
EDDYSTONE #3	EDDYSTONE, PA.	6/29/76 (INC. RATING)	195,000	195,000
EDDYSTONE #4	EDDYSTONE, PA.	6/29/76	380,000	380,000
RICHMOND #9	PHILADELPHIA, PA.	10/ 6/50	166,000	175,000
RICHMOND #10	PHILADELPHIA, PA.	11/16/25	55,500	58,000
RICHMOND #11	PHILADELPHIA, PA.	1/20/26	55,500	58,000
RICHMOND (BLR LIM)	PHILADELPHIA, PA.	12/31/71	-38,000	-40,000
RICHMOND #10,11	PHILADELPHIA, PA.	1/ 1/75 (DEC. RATING)	-73,000	-76,000
RICHMOND #10,11	PHILADELPHIA, PA.	6/23/75 (RETIREMENT)	0	0
RICHMOND #12	PHILADELPHIA, PA.	8/ 6/35	160,000	167,000
RICHMOND 12	PHILADELPHIA, PA.	1/ 1/75 (DEC. RATING)	-33,000	-33,000
RICHMOND 12	PHILADELPHIA, PA.	4/ 1/76 (DEC. RATING)	-19,000	-19,000
RICHMOND 12	PHILADELPHIA, PA.	6/23/75 (RETIREMENT)	0	0
SCHUYKILL #1	PHILADELPHIA, PA.	7/25/58	170,000	175,000
SCHUYKILL #1	PHILADELPHIA, PA.	11/ 1/75 (DEC. RATING)	-4,000	0
SCHUYKILL #3	PHILADELPHIA, PA.	11/ 1/38	53,000	54,000
SCHUYLKILL #5 & 8	PHILADELPHIA, PA.	1/ 1/75 (DEC. RATING)	-38,000	-38,000
SCHUYLKILL #5 & 8	PHILADELPHIA, PA.	6/23/75 (RETIREMENT)	0	0
SCHUYKILL #5	PHILADELPHIA, PA.	11/12/17	15,000	15,000
SCHUYKILL #8	PHILADELPHIA, PA.	10/20/15	23,000	23,000
SCHUYKILL #9	PHILADELPHIA, PA.	3/18/16	30,000	34,000
SOUTHWARK #1	PHILADELPHIA, PA.	8/ 1/47	184,000	188,000
SOUTHWARK #1	PHILADELPHIA, PA.	11/ 1/75 (DEC. RATING)	-6,000	0
SOUTHWARK #2	PHILADELPHIA, PA.	4/15/48	184,000	188,000
SOUTHWARK #2	PHILADELPHIA, PA.	11/ 1/75 (DEC. RATING)	-6,000	0
DEEPWATER #3-4	SALEM COUNTY, N.J.	0/ 0/30	107,000	108,000
DEEPWATER #5	SALEM COUNTY, N.J.	0/ 0/42	24,000	24,000
DEEPWATER #7	SALEM COUNTY, N.J.	5/27/57	25,000	25,000
B.L. ENGLAND #3	CAPE MAY COUNTY, N.J.	12/31/74	70,000	70,000
B.L. ENGLAND #3	CAPE MAY COUNTY, N.J.	4/ 7/75 (INC. RATING)	80,000	80,000
B.L. ENGLAND #3	CAPE MAY COUNTY, N.J.	5/ 5/75 (INC. RATING)	10,000	10,000
VINELAND #4-6	VINELAND, N.J.	0/ 0/47	7,000	7,000
VINELAND #7	VINELAND, N.J.	0/ 0/52	8,000	8,000
VINELAND #8	VINELAND, N.J.	10/ 1/55	11,000	11,000
VINELAND #8	VINELAND, N.J.	2/22/74 (INC. RATING)	1,000	1,000
VINELAND #9	VINELAND, N.J.	1/ 1/61	17,000	17,000
VINELAND #10	VINELAND, N.J.	5/22/70	23,000	23,000
DOVER-MCKEE RUN 1	DOVER DELAWARE	9/ 1/75	15,000	15,000
DOVER-MCKEE RUN 2	DOVER, DELAWARE	9/ 1/75	15,000	15,000
DOVER-MCKEE RUN 3	DOVER, DELAWARE	9/ 1/75	92,000	92,000
DOVER-MCKEE RUN 3	DOVER, DELAWARE	11/ 4/75 (INC. RATING)	6,000	6,000
DOVER-MCKEE RUN 3	DOVER DELAWARE	12/26/76 (INC. RATING)	5,000	5,000
DOVER-MCKEE RUN 3	DOVER DELAWARE	1/18/77 (INC. RATING)	2,000	2,000
EDGE MOOR #1	WILMINGTON, DELAWARE	6/ 1/51	70,000	70,000
EDGE MOOR #2	WILMINGTON, DELAWARE	7/ 1/51	70,000	70,000
EDGE MOOR #3	WILMINGTON, DELAWARE	12/ 1/54	82,000	82,000
EDGE MOOR #4	WILMINGTON, DELAWARE	4/23/66	167,000	167,000
EDGE MOOR #5	EDGE MOOR, DELAWARE	8/10/73	350,000	350,000
EDGE MOOR #5	EDGE MOOR, DELAWARE	9/30/73	50,000	50,000
EDGE MOOR #5	EDGE MOOR, DELAWARE	9/ 8/75 (INC. RATING)	12,000	12,000

Table 1.1-17 (Continued)

ALL EQUIPMENT ON THE PJM SYSTEM, WITH THE LISTING OF OIL FIRED STEAM

NAME	LOCATION	DATE MO. YR.		SUMMER DEP. CAP.	WINTER DEP. CAP.
VIENNA #5	VIENNA, MARYLAND	2/ 1/48		17,000	17,000
VIENNA #6	VIENNA, MARYLAND	1/ 1/49		17,000	17,000
VIENNA #7	VIENNA, MARYLAND	4/ 1/51		40,000	40,000
VIENNA #8	VIENNA, MARYLAND	12/ 7/71		150,000	155,000
MARTINS CREEK #3	MARTINS CREEK, PA.	10/15/75		820,000	820,000
MARTINS CREEK #4	MARTINS CREEK, PA.	3/15/77		820,000	820,000
CRANE #1	BALTIMORE COUNTY, MD.	7/18/61		192,000	193,000
CRANE #2	BALTIMORE COUNTY, MD.	2/18/63		192,000	193,000
GOULD STREET #1	BALTIMORE CITY, MARYLAND	1/ 4/27		33,000	34,000
GOULD STREET #1	BALTIMORE CITY, MARYLAND	5/ 1/77	(RETIREMENT)	-33,000	-34,000
GOULD STREET #2	BALTIMORE CITY, MARYLAND	5/12/28		33,000	34,000
GOULD STREET #2	BALTIMORE CITY, MARYLAND	5/ 1/77	(RETIREMENT)	-33,000	-34,000
GOULD STREET #3	BALTIMORE CITY, MARYLAND	12/15/52		88,000	89,000
GOULD STREET #3	BALTIMORE CITY, MARYLAND	11/ 9/74	(INC. RATING)	15,000	15,000
RIVERSIDE #1	BALTIMORE COUNTY, MD.	12/25/42		58,000	59,000
RIVERSIDE #2	BALTIMORE COUNTY, MD.	4/30/44		59,000	60,000
RIVERSIDE #3	BALTIMORE COUNTY, MD.	8/13/48		60,000	61,000
RIVERSIDE #3	BALTIMORE COUNTY, MD.	11/ 9/74	(INC. RATING)	1,000	1,000
RIVERSIDE #4	BALTIMORE COUNTY, MD.	9/24/51		63,000	64,000
RIVERSIDE #4	BALTIMORE COUNTY, MD.	11/ 9/74	(INC. RATING)	2,000	2,000
RIVERSIDE #4	BALTIMORE COUNTY, MD.	3/19/76	(INC. RATING)	13,000	13,000
RIVERSIDE #5	BALTIMORE COUNTY, MD.	9/16/53		77,000	78,000
RIVERSIDE #5	BALTIMORE COUNTY, MD.	11/ 9/74	(INC. RATING)	1,000	1,000
RIVERSIDE #5	BALTIMORE COUNTY, MD.	12/ 8/75	(DEC. RATING)	-13,000	-13,000
WAGNER #1	ANNE ARUNDEL COUNTY, MD.	2/15/56		137,000	138,000
WAGNER #2	ANNE ARUNDEL COUNTY, MD.	1/20/59		134,000	135,000
WAGNER #4	ANNE ARUNDEL COUNTY, MD.	8/29/72		398,000	400,000
WESTPORT #1	BALTIMORE CITY, MD.	10/ 5/40		19,000	19,000
WESTPORT #3	BALTIMORE CITY, MD.	11/ 9/74	(DEC. RATING)	-2,000	-2,000
WESTPORT #3	BALTIMORE CITY, MD.	8/22/41		60,000	61,000
WESTPORT #4	BALTIMORE CITY, MD.	6/28/50		69,000	70,000
WESTPORT #4	BALTIMORE CITY, MD.	11/ 9/74	(DEC. RATING)	-1,000	-1,000
WESTPORT #13	BALTIMORE CITY, MD.	10/ 5/40		16,000	16,000
WESTPORT #14	BALTIMORE CITY, MD.	10/ 5/40		16,000	16,000
CRAWFORD #1	DAUPHIN COUNTY, PA.	12/12/24		32,000	32,000
CRAWFORD #2	DAUPHIN COUNTY, PA.	8/29/27		32,000	32,000
CRAWFORD #3	DAUPHIN COUNTY, PA.	12/31/47		42,000	44,000
CRAWFORD #4	DAUPHIN COUNTY, PA.	11/30/47		2,000	2,000
CRAWFORD BLRS	DAUPHIN COUNTY, PA.	10/ 1/73	(INC. RATING)	3,000	3,000
EYLER #5	BERKS COUNTY, PA.	4/ 9/19		10,000	10,000
EYLER #6-7	BERKS COUNTY, PA.	11/22/23		44,000	47,000
EYLER 5-7 BLRS	BERKS COUNTY, PA.	10/ 1/73	(DEC. RATING)	-3,000	-3,000
EYLER STATION	BERKS COUNTY,PA.	2/ 1/76	(RETIREMENT)	-51,000	-54,000
GILBERT #1,2	HUNTERDON COUNTY, N.J.	2/28/30		45,000	46,000
GILBERT #3	HUNTERDON COUNTY, N.J.	10/19/49		72,000	73,000
SAYREVILLE #1-3	MIDDLESEX COUNTY, N.J.	0/ 0/49		84,000	90,000
SAYREVILLE #4	MIDDLESEX COUNTY, N.J.	4/ 1/55		122,000	126,000
SAYREVILLE #4	MIDDLESEX COUNTY, N.J.	11/ 1/75	(DEC. RATING)	-4,000	0
SAYREVILLE #4	MIDDLESEX COUNTY, N.J.	3/ 8/76	(DEC. RATING)	0	-4,000
SAYREVILLE #5	MIDDLESEX COUNTY, N.J.	10/31/58		123,000	127,000
E. H. WERNER #1	MIDDLESEX COUNTY, N.J.	10/31/30		15,000	17,000
E. H. WERNER #1	MIDDLESEX COUNTY, N.J.	8/22/76	(RETIREMENT)	-15,000	-17,000
E. H. WERNER #3	MIDDLESEX COUNTY, N.J.	10/31/30		15,000	17,000
E. H. WERNER #3	MIDDLESEX COUNTY, N.J.	8/22/76	(RETIREMENT)	-15,000	-17,000

Table 1.1-17 (Continued)

ALL EQUIPMENT ON THE PJM SYSTEM, WITH THE LISTING OF OIL FIRED STEAM

NAME	LOCATION	DATE MO. YR.		SUMMER DEP. CAP.	WINTER DEP. CAP.
E. H. WERNER #4	MIDDLESEX COUNTY, N.J.	4/ 3/53		56,000	60,000
BENNING #15	WASHINGTON, D.C.	8/21/68		275,000	275,000
BENNING #16	WASHINGTON, D.C.	5/30/72		273,000	275,000
BENNING #16	WASHINGTON, D.C.	12/ 1/75	(INC. RATING)	2,000	0
BUZZARD POINT #1	WASHINGTON, D.C.	12/21/33		28,000	28,000
BUZZARD POINT #1	WASHINGTON, D.C.	1/ 1/75	(DEC. RATING)	-28,000	-28,000
BUZZARD POINT #2	WASHINGTON, D.C.	7/23/38		28,000	30,000
BUZZARD POINT #2	WASHINGTON, D.C.	12/ 1/75	(INC. RATING)	1,000	0
BUZZARD POINT #2	WASHINGTON, D.C.	11/ 1/76	(INC. RATING)	1,000	0
BUZZARD POINT #3	WASHINGTON, D.C.	11/ 5/40		48,000	49,000
BUZZARD POINT #3	WASHINGTON, D.C.	4/ 1/76		0	1,000
BUZZARD POINT #4	WASHINGTON, D.C.	7/22/42		48,000	50,000
BUZZARD POINT #5	WASHINGTON, D.C.	7/ 6/43		48,000	48,000
BUZZARD POINT #5	WASHINGTON, D.C.	4/ 1/76	(INC. RATING)	0	2,000
BUZZARD POINT #6	WASHINGTON, D.C.	9/ 2/45		48,000	48,000
BUZZARD POINT #6	WASHINGTON, D.C.	4/ 1/76	(INC. RATING)	0	2,000
CHALK POINT #3	PRINCE GEORGE'S CO. MD.	5/19/75		500,000	500,000
CHALK POINT #3	PRINCE GEORGE'S CO. MD.	6/ 6/75	(INC. RATING)	100,000	100,000
CHALK POINT #3	PRINCE GEORGE'S CO. MD.	12/ 1/75	(INC. RATING)	2,000	0
CHALK POINT #3	PRINCE GEORGE'S CO. MD.	4/ 1/76	(INC. RATING)	0	8,000
CHALK POINT #3	PRINCE GEORGE'S CO.,MD	4/ 1/77	(DEC. RATING)	0	-6,000
BRANDON SHORES #1	ANNE ARUNDEL COUNTY, MD.	1/31/81		610,000	620,000
CHALK POINT #4	PRINCE GEORGE'S CO. MD.	12/31/81		600,000	600,000
WESTPORT #1	BALTIMORE CITY, MD.	1/31/82	(RETIREMENT)	-19,000	-19,000
WESTPORT #13	BALTIMORE CITY, MD.	1/31/82	(RETIREMENT)	-16,000	-16,000
WESTPORT #14	BALTIMORE CITY, MD.	1/31/82	(RETIREMENT)	-16,000	-16,000
CROMBY #2	CHESTER COUNTY, PA.	5/31/82	(DEC. RATING)	-3,000	-3,000
DEEPWATER #3,4	SALEM COUNTY, N.J.	1/31/83	(RETIREMENT)	-107,000	-108,000
BRANDON SHORES #2	ANNE ARUNDEL COUNTY, MD.	1/31/83		610,000	620,000
EDGE MOOR 1	WILMINGTON,DEL.	1/31/84	(RETIREMENT)	-70,000	-70,000
VIENNA 5&6	VIENNA, MARYLAND	1/31/85	(RETIREMENT)	-34,000	-34,000
BURLINGTON #5	BURLINGTON, N.J.	5/ 1/85	(RETIREMENT)	-115,000	-123,000
BURLINGTON #6	BURLINGTON, N.J.	5/ 1/85	(RETIREMENT)	-120,000	-128,000
CHESTER #5,6	CHESTER, PA.	5/31/85	(RETIREMENT)	-124,000	-130,000
GILBERT 1&2	HUNTERDON COUNTY,N.J.	5/31/85	(RETIREMENT)	-45,000	-46,000
SAYREVILLE #1-3	MIDDLESEX COUNTY, N.J.	5/31/85	(RETIREMENT)	-84,000	-90,000
TOTAL RATINGS				13,217,000	13,485,000

ALL EQUIPMENT ON THE PJM SYSTEM, WITH THE LISTING OF NUCLEAR

NAME	LOCATION	DATE MO. YR.		SUMMER DEP. CAP.	WINTER DEP. CAP.
PEACH BOTTOM #1	PEACH BOTTOM, PA.	6/ 1/67		40,000	40,000
PEACH BOTTOM #1	PEACH BOTTOM, PA.	1/ 1/75	(DEC. RATING)	-40,000	-40,000
PEACH BOTTOM #1	PEACH BOTTOM, PA.	6/ 1/75	(RETIREMENT)	0	0
CALVERT CLIFFS #1	CALVERT CO., MARYLAND	5/ 8/75		800,000	800,000
CALVERT CLIFFS #1	CALVERT CO., MARYLAND	12/ 8/75	(INC. RATING)	0	10,000
CALVERT CLIFFS #1	CALVERT CO., MARYLAND	4/ 1/77	(INC. RATING)	10,000	10,000
CALVERT CLIFFS #2	CALVERT COUNTY, MARYLAND	4/ 1/77		810,000	820,000
OYSTER CREEK #1	OCEAN COUNTY, N.J.	12/23/69		620,000	650,000
THREE MILE ISLAND #1	DAUPHIN COUNTY, PA.	9/ 2/74		792,000	818,000
PEACH BOTTOM #2 NUC.	PEACH BOTTOM, PA.	7/ 5/74		1,051,000	1,055,000
PEACH BOTTOM #3 NUC.	PEACH BOTTOM, PA.	12/23/74		1,035,000	1,035,000
CALVERT CLIFFS #1	CALVERT COUNTY, MARYLAND	3/31/78	(INC. RATING)	60,000	60,000
CALVERT CLIFFS #2	CALVERT COUNTY, MARYLAND	1/31/78	(INC. RATING)	60,000	60,000
THREE MILE ISLAND #2	DAUPHIN COUNTY, PA.	5/31/78		880,000	906,000
SALEM #2 NUCLEAR	LOWER ALLOWAYS CREEK N.J.	5/ 1/79		1,115,000	1,115,000
SUSQUEHANNA #1	BERWICK, PA.	11/ 1/80		945,000	945,000
SUSQUEHANNA #2 NUC.	BERWICK, PA.	5/ 1/82		945,000	945,000
LIMERICK #1	MONTGOMERY COUNTY, PA.	5/31/83		1,055,000	1,055,000
FORKED RIVER #1	OCEAN COUNTY, N.J.	5/31/83		1,120,000	1,168,000
HOPE CREEK #1	BORDENTOWN, N.J.	5/ 1/84		1,067,000	1,067,000
ATLANTIC #1		5/ 1/85		1,150,000	1,150,000
LIMERICK #2	MONTGOMERY COUNTY, PA.	5/31/85		1,055,000	1,055,000
TOTAL RATINGS				14,570,000	14,724,000

Table 1.1-17 (Continued)

ALL EQUIPMENT ON THE PJM SYSTEM, WITH THE LISTING OF DIESEL

NAME	LOCATION	DATE MO. YR.		SUMMER DEP. CAP.	WINTER DEP. CAP.
P.E.CO MISC.DIES.	PHILADELPHIA, PA.	6/ 6/67		25,000	25,000
B. L. ENGLAND DIESLS	CAPE MAY COUNTY, N.J.	8/17/61		8,000	8,000
MISSOURI DIESEL #1	ATLANTIC COUNTY, N.J.	8/21/63		2,000	2,000
MISSOURI DIESEL #1	ATLANTIC COUNTY, N.J.	1/ 1/75	(RETIREMENT)	-2,000	-2,000
BAYVIEW (5 UNITS)	BAYVIEW, VIRGINIA	10/ 1/63		10,000	10,000
BAYVIEW #6	BAYVIEW, VIRGINIA	10/ 1/76		2,000	2,000
CAPE CHARLES #1-2	CAPE CHARLES, VIRGINIA	0/ 0/48		1,200	1,200
CAPE CHARLES #1-2	CAPE CHARLES, VIRGINIA	10/ 1/76	(INC. RATING)	400	400
CHINCOTEAGUE	CHINCOTEAGUE, VIRGINIA	8/ 1/64		2,000	2,000
CHINCOTEAGUE	CHINCOTEAGUE, VIRGINIA	10/ 1/76	(RETIREMENT)	-2,000	-2,000
CRISFIELD (4 UNITS)	CRISFIELD, MARYLAND	5/20/68		10,000	10,000
EASTON 3 D	EASTON, MARYLAND	3/14/73		500	500
EASTON 4 D	EASTON, MARYLAND	3/14/73		600	700
EASTON 4 D	EASTON, MARYLAND	6/23/75	(DEC. RATING)	0	-100
EASTON 5 D	EASTON, MARYLAND	3/14/73		900	1,100
EASTON 5 D	EASTON, MARYLAND	6/23/75	(DEC. RATING)	-100	-300
EASTON 6 D	EASTON, MARYLAND	3/14/73		1,100	1,200
EASTON 6 D	EASTON, MARYLAND	6/23/75	(INC. RATING)	100	0
EASTON 7 D	EASTON, MARYLAND	3/14/73		2,400	2,400
EASTON 8 D	EASTON, MARYLAND	3/14/73		2,500	2,500
EASTON 9 D	EASTON, MARYLAND	3/14/73		2,600	3,000
EASTON 9 D	EASTON, MARYLAND	6/23/75	(DEC. RATING)	-400	-800
EASTON 10 D	EASTON, MARYLAND	3/14/73		3,500	3,500
EASTON 11 D	EASTON, MARYLAND	3/14/73		3,800	3,800
EASTON 11 D	EASTON, MARYLAND	6/23/75	(DEC. RATING)	-200	-200
EASTON 12 D	EASTON, MARYLAND	3/14/73		4,100	4,100
EASTON 13	EASTON, MARYLAND	7/23/73		5,600	5,600
EASTON 14	EASTON, MARYLAND	7/20/73		5,600	5,600
MADISON STREET #2	WILMINGTON, DEL.	5/ 1/64		500	500
TASLEY #1-3	TASLEY, VIRGINIA	5/ 1/65		1,300	1,300
VIENNA DIESEL	VIENNA, MARYLAND	3/27/67		500	500
INDIAN RIVER D	SUSSEX COUNTY, DEL.	2/28/73		500	500
INDIAN RIVER D	SUSSEX COUNTY, DEL.	6/ 1/73	(RETIREMENT)	-500	-500
BRUNNER IS. D1,2,3	YORK HAVEN, PA.	6/ 5/67		8,000	8,000
MARTINS CREEK D1,D2	MARTINS CREEK, PA.	2/24/67		5,000	5,000
SUNBURY D1,D2	SHAMOKIN DAM,PA.	4/ 6/67		6,000	6,000
BENTON #1	COLUMBIA COUNTY, PA.	12/ 1/60		2,000	2,000
BENTON #2	COLUMBIA COUNTY, PA.	12/ 1/60		2,000	2,000
HOMER CITY #4-6	HOMER CITY, PA.	7/31/69		3,000	3,000
SHAWVILLE #5	CLEARFIELD COUNTY, PA.	12/20/63		2,000	2,000
SHAWVILLE #6	CLEARFIELD COUNTY, PA.	12/20/63		2,000	2,000
SHAWVILLE #7	CLEARFIELD COUNTY, PA.	12/20/63		2,000	2,000
KEYSTONE DIESELS	INDIANA COUNTY, PA.	11/23/68		11,000	11,000
CONEMAUGH DIESELS	INDIANA COUNTY, PA.	2/ 1/70		11,000	11,000
EASTON 21-22	EASTON,MARYLAND	1/31/78		12,500	12,500
EASTON 3	EASTON,MARYLAND	5/31/78	(DEC. RATING)	-500	-500
EASTON #4	EASTON, MARYLAND	5/31/81	(DEC. RATING)	-600	-600
EASTON 23-24	EASTON, MARYLAND	5/31/82		12,500	12,500
EASTON 7	EASTON, MARYLAND	5/31/84	(DEC. RATING)	-500	-500
TOTAL RATINGS				168,900	168,900

Table 1.1-17 (Continued)

ALL EQUIPMENT ON THE PJM SYSTEM, WITH THE LISTING OF COAL FIRED STEAM

NAME	LOCATION	DATE MO. YR.		SUMMER DEP. CAP.	WINTER DEP. CAP.
HUDSON #2	JERSEY CITY, N.J.	12/18/68		600,000	620,000
MERCER #1	HAMILTON TWP., N.J.	12/19/60		306,000	310,000
MERCER #2	HAMILTON TWP., N.J.	6/ 4/61		300,000	310,000
CROMBY #1	CHESTER COUNTY, PA.	7/23/54		150,000	153,000
EDDYSTONE #1	EDDYSTONE, PA.	2/ 5/60		307,000	327,000
EDDYSTONE #1	EDDYSTONE, PA.	11/ 1/75	(DEC. RATING)	-6,000	-6,000
EDDYSTONE #2	EDDYSTONE, PA.	10/ 7/60		334,000	343,000
MISSOURI AVE. #6	ATLANTIC COUNTY, N.J.	9/27/41		25,000	25,000
MISSOURI AVE #6	ATLANTIC COUNTY, N.J.	1/ 1/75	(RETIREMENT)	-25,000	-25,000
INDIAN RIVER #1	SUSSEX COUNTY, DEL.	11/ 3/57		89,000	90,000
INDIAN RIVER #2	SUSSEX COUNTY, DEL.	1/ 1/59		89,000	90,000
INDIAN RIVER #3	MILLSBORO, DELAWARE	4/30/70		162,000	165,000
BRUNNER ISLAND #1	YORK HAVEN, PA.	6/22/61		327,000	334,000
BRUNNER ISLAND #2	YORK HAVEN, PA.	10/18/65		378,000	390,000
BRUNNER ISLAND #3	YORK HAVEN, PA.	6/13/69		720,000	730,000
HOLTWOOD #17	HOLTWOOD,PA.	6/30/54		72,000	73,000
MARTINS CREEK #1	MARTINS CREEK,PA.	9/30/54		149,000	150,000
MARTINS CREEK #2	MARTINS CREEK,PA.	6/28/56		149,000	150,000
MONTOUR #1	MONTOUR COUNTY, PA.	3/ 6/72		740,000	750,000
MONTOUR #2	MONTOUR COUNTY, PA.	4/30/73		740,000	750,000
SUNBURY #1	SHAMOKIN DAM, PA.	11/ 7/49		70,000	76,000
SUNBURY #2	SHAMOKIN DAM, PA.	9/19/49		70,000	76,000
SUNBURY #3	SHAMOKIN DAM, PA.	4/18/51		94,000	103,000
SUNBURY #4	SHAMOKIN DAM, PA.	8/26/53		129,000	135,000
HUNLOCK #1	HUNLOCK CREEK, PA.	1/ 1/26		20,000	20,000
HUNLOCK #2	HUNLOCK CREEK, PA.	2/ 1/48		23,000	23,000
HUNLOCK #1&2	HUNLOCK CREEK, PA.	1/ 1/75	(DEC. RATING)	-20,000	-20,000
HUNLOCK #1&2	HUNLOCK CREEK, PA.	8/ 1/75	(RETIREMENT)	-23,000	-23,000
HUNLOCK #3	HUNLOCK CREEK, PA.	10/ 1/59		46,000	46,000
WAGNER #3	ANNE ARUNDEL COUNTY, MD.	8/ 1/66		319,000	321,000
FRONT STREET #4	ERIE COUNTY, PA.	0/ 0/44		28,000	28,000
FRONT STREET #1-3,5	ERIE COUNTY, PA.	0/ 0/53		90,000	82,000
HOMER CITY #1	INDIANA COUNTY, PA.	7/31/69		300,000	300,000
HOMER CITY #1	INDIANA COUNTY, PA.	4/ 4/77	(INC. RATING)	3,000	3,000
HOMER CITY #2	INDIANA COUNTY, PA.	12/11/69		300,000	300,000
HOMER CITY #2	INDIANA COUNTY, PA.	4/ 4/77	(INC. RATING)	7,000	7,000
SAXTON #2	BEDFORD COUNTY, PA.	0/ 0/23		34,000	35,000
SAXTON #2-3	BEDFORD COUNTY, PA.	1/ 1/75	(RETIREMENT)	-34,000	-35,000
SEWARD 2-4	INDIANA COUNTY, PA.	6/ 1/50		79,000	81,000
SEWARD 2-4	INDIANA COUNTY, PA.	4/ 4/77	(INC. RATING)	1,000	1,000
SEWARD #5	INDIANA COUNTY, PA.	4/23/57		136,000	137,000
SHAWVILLE #1	CLEARFIELD COUNTY, PA.	8/ 3/54		116,000	121,000
SHAWVILLE #1	CLEARFIELD COUNTY, PA.	11/22/76	(INC. RATING)	11,000	11,000
SHAWVILLE #2	CLEARFIELD COUNTY, PA.	3/31/54		123,000	128,000
SHAWVILLE #2	CLEARFIELD COUNTY, PA.	11/22/76	(INC. RATING)	4,000	4,000
SHAWVILLE #3	CLEARFIELD COUNTY, PA.	12/ 7/59		172,000	178,000
SHAWVILLE #3	CLEARFIELD COUNTY, PA.	4/ 4/77	(INC. RATING)	2,000	2,000
SHAWVILLE #4	CLEARFIELD COUNTY, PA.	4/ 4/60		172,000	178,000
SHAWVILLE #4	CLEARFIELD COUNTY, PA.	4/ 4/77	(INC. RATING)	2,000	1,000
SHAWVILLE #4	CLEARFIELD COUNTY, PA.	6/13/77	(INC. RATING)	4,000	4,000
WARREN #1	WARREN COUNTY, PA.	9/ 5/48		40,000	40,000
WARREN #1	WARREN COUNTY, PA.	4/ 4/77	(INC. RATING)	2,000	2,000
WARREN #2	WARREN COUNTY, PA.	3/18/49		40,000	40,000
WARREN #2	WARREN COUNTY, PA.	4/ 4/77	(INC. RATING)	2,000	2,000

Table 1.1-17 (Continued)

ALL EQUIPMENT ON THE PJM SYSTEM, WITH THE LISTING OF COAL FIRED STEAM

NAME	LOCATION	DATE MO. YR.	SUMMER DEP. CAP.	WINTER DEP. CAP.
WARREN #2	WARREN COUNTY, PA.	6/13/77 (INC. RATING)	2,000	2,000
WILLIAMSBURG #5	BLAIR COUNTY, PA.	0/ 0/44	30,000	31,000
WILLIAMSBURG #5	BLAIR COUNTY, PA.	4/ 4/77 (INC. RATING)	1,000	1,000
WILLIAMSBURG #5	BLAIR COUNTY, PA.	6/13/77 (INC. RATING)	2,000	2,000
PORTLAND #1	NORTHAMPTON COUNTY, PA.	10/29/58	158,000	156,000
PORTLAND #2	NORTHAMPTON COUNTY, PA.	9/21/62	246,000	246,000
TITUS #1	BERKS COUNTY, PA.	2/28/51	78,000	80,000
TITUS #2	BERKS COUNTY, PA.	5/31/51	78,000	80,000
TITUS #3	BERKS COUNTY, PA.	4/12/53	78,000	80,000
BENNING #10	WASHINGTON, D.C.	8/22/27	28,000	28,000
BENNING BLRS	WASHINGTON, D.C.	11/ 1/73 (DEC. RATING)	-28,000	-28,000
BENNING #13	WASHINGTON, D.C.	12/22/47	52,000	52,000
BENNING #11,12,14	WASHINGTON, D.C.	7/31/52	60,000	64,000
BENNING #11,12,14	WASHINGTON, D.C.	12/ 1/75 (DEC. RATING)	-3,000	0
BENNING #11,12,14	WASHINGTON, D.C.	4/ 1/76 (INC. RATING)	25,000	18,000
CHALK POINT #1	PRINCE GEORGE'S CO., MD	10/26/64	320,000	330,000
CHALK POINT #1	PRINCE GEORGE'S CO., MD	12/ 1/75 (INC. RATING)	10,000	0
CHALK POINT #2	PRINCE GEORGE'S CO., MD	4/19/65	327,000	330,000
CHALK POINT #2	PRINCE GEORGE'S CO., MD	12/ 1/75 (INC. RATING)	3,000	0
DICKERSON #1	MONTGOMERY COUNTY, MD.	6/25/59	180,000	182,000
DICKERSON #1	MONTGOMERY COUNTY, MD.	12/ 1/75 (INC. RATING)	2,000	0
DICKERSON #2	MONTGOMERY COUNTY, MD.	4/25/60	181,000	183,000
DICKERSON #2	MONTGOMERY COUNTY, MD.	12/ 1/75 (INC. RATING)	2,000	0
DICKERSON #3	MONTGOMERY COUNTY, MD.	3/23/62	184,000	184,000
DICKERSON #3	MONTGOMERY COUNTY, MD.	12/ 1/75 (DEC. RATING)	-1,000	0
DICKERSON #3	MONTGOMERY COUNTY, MD.	4/ 1/76 (DEC. RATING)	0	-1,000
POTOMAC RIVER #1	ALEXANDRIA, VIRGINIA	10/16/49	86,000	86,000
POTOMAC RIVER #1	ALEXANDRIA, VIRGINIA	4/ 1/77 (INC. RATING)	0	1,000
POTOMAC RIVER #2	ALEXANDRIA, VIRGINIA	6/12/50	90,000	90,000
POTOMAC RIVER #2	ALEXANDRIA, VIRGINIA	12/ 1/75 (DEC. RATING)	-24,000	-24,000
POTOMAC RIVER #2	ALEXANDRIA, VIRGINIA	4/ 1/76 (INC. RATING)	0	1,000
POTOMAC RIVER #3	ALEXANDRIA, VIRGINIA	7/14/54	101,000	102,000
POTOMAC RIVER #3	ALEXANDRIA	11/ 1/76	1,000	0
POTOMAC RIVER #4	ALEXANDRIA, VIRGINIA	3/ 6/56	102,000	102,000
POTOMAC RIVER #5	ALEXANDRIA, VIRGINIA	5/20/57	102,000	102,000
KEYSTONE #1	INDIANA COUNTY, PA	8/24/67	820,000	820,000
KEYSTONE #1	INDIANA COUNTY, PA	1/13/75 (INC. RATING)	20,000	30,000
KEYSTONE #2	INDIANA COUNTY, PA	7/23/68	820,000	820,000
KEYSTONE #2	INDIANA COUNTY, PA	1/13/75 (DEC. RATING)	0	0
KEYSTONE #2	INDIANA COUNTY, PA	3/17/75 (INC. RATING)	20,000	30,000
CONEMAUGH #1	INDIANA COUNTY, PA.	5/21/70	850,000	850,000
CONEMAUGH #2	INDIANA COUNTY, PA.	5/27/71	850,000	850,000
HOMER CITY #3	INDIANA COUNTY, PA.	12/15/77	325,000	325,000
INDIAN RIVER #4	MILLSBORO, DELAWARE	5/31/79	400,000	400,000
FRONT STREET 2&3	ERIE COUNTY, PA.	5/31/80 (RETIREMENT)	-35,000	-23,000
EDDYSTONE #1	EDDYSTONE, PA.	5/31/81 (DEC. RATING)	-3,000	-3,000
EDDYSTONE #2	EDDYSTONE, PA.	5/31/81 (DEC. RATING)	-10,000	-10,000
CROMBY #1	CHESTER COUNTY, PA.	5/31/81 (DEC. RATING)	-4,000	-4,000
CROMBY #1	CHESTER COUNTY, PA.	5/31/82 (DEC. RATING)	-3,000	-3,000
RICHMOND #12	PHILADELPHIA, PA.	5/31/83 (RETIREMENT)	-108,000	-115,000
WILLIAMSBURG #5	BLAIR COUNTY, PA.	5/31/83 (RETIREMENT)	-33,000	-34,000
SEWARD #7	INDIANA COUNTY, PA.	5/31/84	800,000	800,000
DICKERSON #4	MONTGOMERY COUNTY, MD.	12/31/84	800,000	800,000
TOTAL RATINGS			15,950,000	16,149,000

Table 1.1-17 (Continued)

ALL EQUIPMENT ON THE PJM SYSTEM, WITH THE LISTING OF PUMPED STORAGE HYDRO

NAME	LOCATION	DATE MO. YR.	SUMMER DEP. CAP.	WINTER DEP. CAP.
MUDDY RUN #1	DRUMORE, PA.	4/10/67	110,000	110,000
MUDDY RUN #2	DRUMORE, PA.	4/10/67	110,000	110,000
MUDDY RUN #3	DRUMORE, PA.	6/ 1/67	110,000	110,000
MUDDY RUN #4	DRUMORE, PA.	6/ 1/67	110,000	110,000
MUDDY RUN #5	DRUMORE, PA.	10/11/67	110,000	110,000
MUDDY RUN #6	DRUMORE, PA.	10/11/67	110,000	110,000
MUDDY RUN #7	DRUMORE, PA.	2/10/68	110,000	110,000
MUDDY RUN #8	DRUMORE, PA.	2/10/68	110,000	110,000
SENECA PUMPED HYDRO	WARREN COUNTY, PA.	1/14/70	76,000	76,000
YARDS CREEK #1	WARREN COUNTY, N.J.	11/26/65	110,000	110,000
YARDS CREEK #2	WARREN COUNTY, N.J.	12/22/65	110,000	110,000
YARDS CREEK #3	WARREN COUNTY, N.J.	9/ 3/65	110,000	110,000
TOTAL RATINGS			1,286,000	1,286,000

Table 1.1-17 (Continued)

ALL EQUIPMENT ON THE PJM SYSTEM, WITH THE LISTING OF OIL OR GAS FIRED STEAM

NAME	LOCATION	DATE MO. YR.	SUMMER DEP. CAP.	WINTER DEP. CAP.
BETHLHEM STEEL	BALTIMORE COUNTY, MD.	0/ 0/ 0	167,000	169,000
TOTAL RATINGS			167,000	169,000

Table 1.1-17 (Continued)

ALL EQUIPMENT ON THE PJM SYSTEM, WITH THE LISTING OF CONVENTIONAL HYDRO

NAME	LOCATION	DATE MO. YR.	SUMMER DEP. CAP.	WINTER DEP. CAP.
CONOWINGO HYDRO #1	CONOWINGO, MD.	3/ 1/28	36,000	36,000
CONOWINGO HYDRO #2	CONOWINGO, MD.	3/ 1/28	36,000	36,000
CONOWINGO HYDRO #3	CONOWINGO, MD.	3/ 6/28	36,000	36,000
CONOWINGO HYDRO #4	CONOWINGO, MD.	4/ 5/28	36,000	36,000
CONOWINGO HYDRO #5	CONOWINGO, MD.	6/ 1/28	36,000	36,000
CONOWINGO HYDRO #6	CONOWINGO, MD.	7/ 1/28	36,000	36,000
CONOWINGO HYDRO #7	CONOWINGO, MD.	6/ 1/28	36,000	36,000
CONOWINGO HYDRO #8	CONOWINGO, MD.	3/10/64	65,000	65,000
CONOWINGO HYDRO #9	CONOWINGO, MD.	3/25/64	65,000	65,000
CONOWINGO HYDRO #10	CONOWINGO, MD.	5/25/64	65,000	65,000
CONOWINGO HYDRO #11	CONOWINGO, MD.	5/ 4/64	65,000	65,000
HOLTWOOD #1-11,13	HOLTWOOD, PA.	3/24/57	102,000	102,000
WALLENPAUPACK #1	HAWLEY, PA.	6/ 3/26	22,000	22,000
WALLENPAUPACK #2	HAWLEY, PA.	6/ 3/26	22,000	22,000
DEEP CREEK #1	GARRETT COUNTY, MARYLAND	0/ 0/24	9,000	10,000
DEEP CREEK #2	GARRETT COUNTY, MARYLAND	0/ 0/24	9,000	9,000
PINEY #1	CLARION COUNTY, PA.	0/ 0/24	9,000	9,000
PINEY #2	CLARION COUNTY, PA.	0/ 0/24	9,000	9,000
PINEY #3	CLARION COUNTY, PA.	0/ 0/26	9,000	10,000
RAYSTOWN #1-3	HUNTINGTON COUNTY, PA.	0/ 0/13	0	0
WARRIOR RIDGE #3-6	HUNTINGTON COUNTY, PA.	0/ 0/ 7	0	0
YORK HAVEN #1-20	YORK COUNTY, PA.	3/ 1/30	10,000	14,000
SAFE HARBOR	LANCASTER COUNTY, PA.	6/ 3/26	228,000	228,000
RAYSTOWN	HUNTINGTON COUNTY, PA.	5/31/81	30,000	30,000
WARRIOR RIDGE	HUNTINGTON COUNTY, PA.	5/31/81	1,000	1,000
SAFE HARBOR **	LANCASTER COUNTY, PA.	9/ 1/85 (INC. RATING)	187,500	187,500
TOTAL RATINGS			1,159,500	1,165,500

Table 1.1-17 (Continued)

ALL EQUIPMENT ON THE PJM SYSTEM WITH THE USING OF COAL, OIL, OR GAS FIRED STEAM

NAME	LOCATION	DATE MO. YR.	SUMMER DEP. CAP.	WINTER DEP. CAP.
DEEPWATER #6	SALEM COUNTY, N.J.	12/31/54	80,000	81,000
TOTAL RATINGS			80,000	81,000

Table 1.1-17 (Continued)

ALL EQUIPMENT ON THE PJM SYSTEM, WITH THE LISTING OF COMBINED CYCLE

NAME	LOCATION	DATE MO. YR.	SUMMER DEP. CAP.	WINTER DEP. CAP.
BURLINGTON #10 CC	BURLINGTON, N.J.	6/16/72	84,000	84,000
BURLINGTON #10 CC	BURLINGTON, N.J.	12/27/74 (INC. RATING)	17,000	17,000
BURLINGTON #10 CC	BURLINGTON, N.J.	11/21/75 (INC. RATING)	19,000	19,000
GILBERT #4 (CC)	HUNTERDON COUNTY, N.J.	1/ 8/74	56,000	72,000
GILBERT #4 (CC)	HUNTERDON COUNTY, N.J.	3/15/77 (DEC. RATING)	0	-3,000
GILBERT #5 (CC)	HUNTERDON COUNTY, N.J.	4/22/74	56,000	72,000
GILBERT #5 (CC)	HUNTERDON COUNTY, N.J.	3/15/77 (DEC. RATING)	0	-3,000
GILBERT #6 (CC)	HUNTERDON COUNTY, N.J.	4/22/74	56,000	72,000
GILBERT #6 (CC)	HUNTERDON COUNTY, N.J.	3/15/77 (DEC. RATING)	0	-3,000
GILBERT #7 (CC)	HUNTERDON COUNTY, N.J.	5/31/74	56,000	72,000
GILBERT #7 (CC)	HUNTERDON COUNTY, N.J.	3/15/77 (DEC. RATING)	0	-3,000
GILBERT #8	HUNTERDON COUNTY, N.J.	5/28/77	91,000	91,000
GILBERT #8	HUNTERDON COUNTY, N.J.	5/31/77 (INC. RATING)	35,000	35,000
TOTAL RATINGS			470,000	522,000

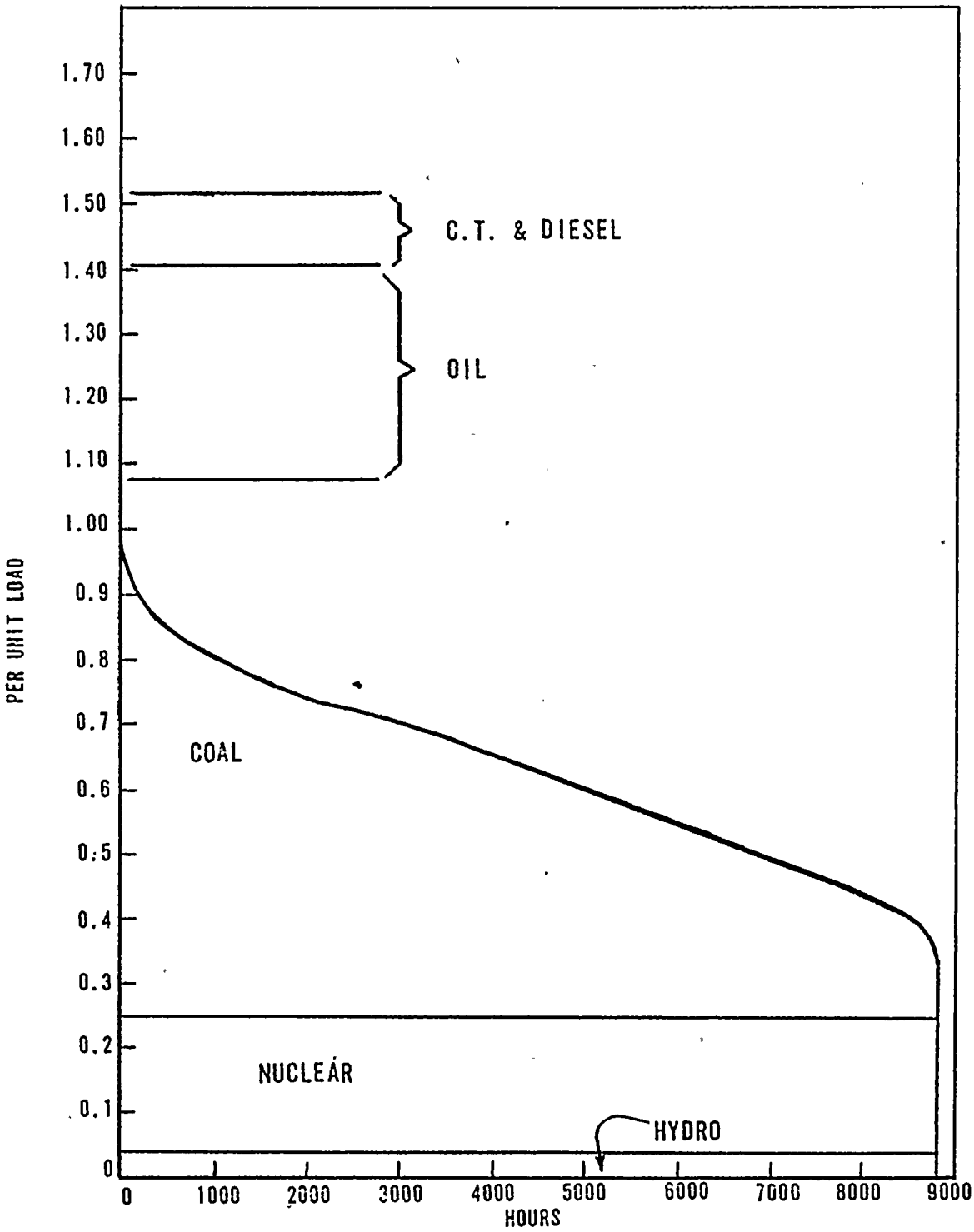
TABLE 1.1-18
APPLICANT'S PROJECTED UNIT CAPACITY FACTORS
1978-85 PERIOD

Unit	Type	Capacity Factor Range (%) For Various Load Projections			
		High	Mid-Range	Low	Very Low
Susquehanna 1-2	Nuclear	65-79	66-77	66-77	65-78
Brunner Island 1-3	Coal	75-76	73-75	69-74	65-72
Martins Creek 1-2	Coal	75-81	67-73	61-69	52-65
Sunbury 1-4	Coal	78-81	77-82	72-77	68-74
Holtwood 17	Coal	81-90	78-88	69-83	61-81
Montour 1-2	Coal	70-71	69-71	66-69	62-68
Keystone 1-2	Coal	62-63	61-63	59-62	57-62
Conemaugh 1-2	Coal	57-59	56-58	53-55	51-55
Martins Creek 3-4	Oil	44-52	37-42	19-30	9-25
Comb. Turb., Diesels	Oil	2	2	2	2
Holtwood	Hydro	65	65	65	65
Wallenpaupack	Hydro	20	20	20	20

TABLE 1.3-1

EFFECT OF DELAY OF SUSQUEHANNA SES
ON APPLICANT'S SYSTEM RESERVES

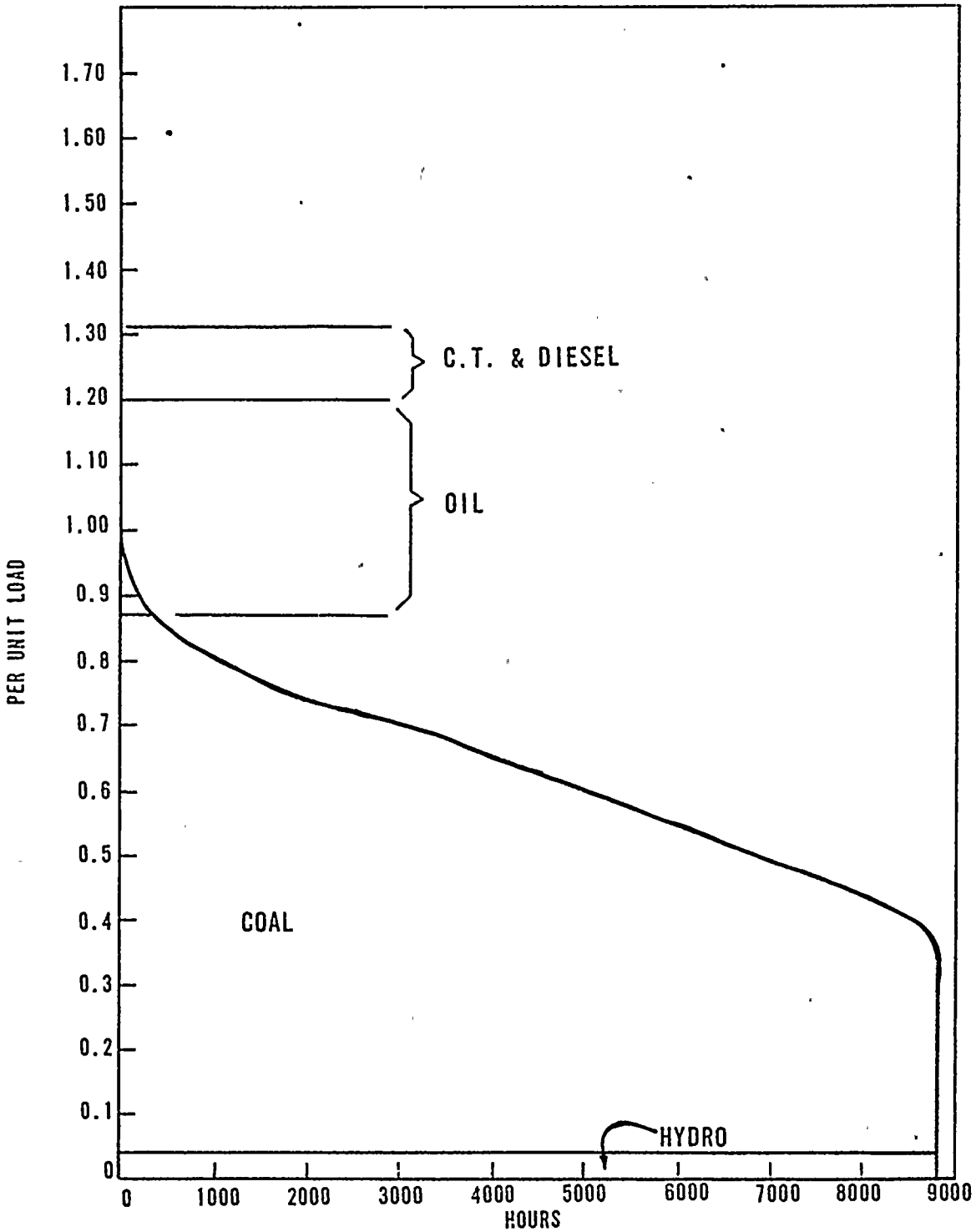
		1981	1982	1983	1984	1985
High Level Load Projection						
No Delay	Reserve	1326	1925	1534	1143	804
	% of Peak Load	22	30	22	16	11
1 Yr. Delay	Reserve	326	925	1534	1143	804
	% of Peak Load	5	14	22	16	11
2 Yr. Delay	Reserve	326	(65)	544	1143	804
	% of Peak Load	5	(1)	8	16	11
3 Yr. Delay	Reserve	326	(65)	(436)	163	804
	% of Peak Load	5	(1)	(6)	2	11
Mid-Range Load Projection						
No Delay	Reserve	1736	2415	2094	1783	1524
	% of Peak Load	31	40	33	27	22
1 Yr. Delay	Reserve	736	1415	2094	1783	1524
	% of Peak Load	13	24	33	27	22
2 Yr. Delay	Reserve	736	425	1104	1783	1524
	% of Peak Load	13	7	18	27	22
3 Yr. Delay	Reserve	736	425	124	803	1524
	% of Peak Load	13	7	2	12	22
Low Level Load Projection						
No Delay	Reserve	2256	3015	2724	2423	2324
	% of Peak Load	44	56	48	41	38
1 Yr. Delay	Reserve	1256	2015	2724	2423	2324
	% of Peak Load	24	37	48	41	38
2 Yr. Delay	Reserve	1256	1025	1734	2423	2324
	% of Peak Load	24	19	31	41	38
3 Yr. Delay	Reserve	1256	1025	754	1443	2324
	% of Peak Load	24	19	13	24	38
Very Low Level Load Projection						
No Delay	Reserve	2536	3355	3144	2923	2874
	% of Peak Load	52	66	60	54	52
1 Yr. Delay	Reserve	1536	2355	3144	2923	2874
	% of Peak Load	31	47	60	54	52
2 Yr. Delay	Reserve	1536	1365	2154	2923	2874
	% of Peak Load	31	27	41	54	52
3 Yr. Delay	Reserve	1536	1365	1174	1943	2874
	% of Peak Load	31	27	22	36	52



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

APPLICANT'S GENERATION MIX
PERCENTAGE OF PEAK LOAD
VERY LOW LOAD PROJECTION
1981 (WITH SUSQUEHANNA SES)

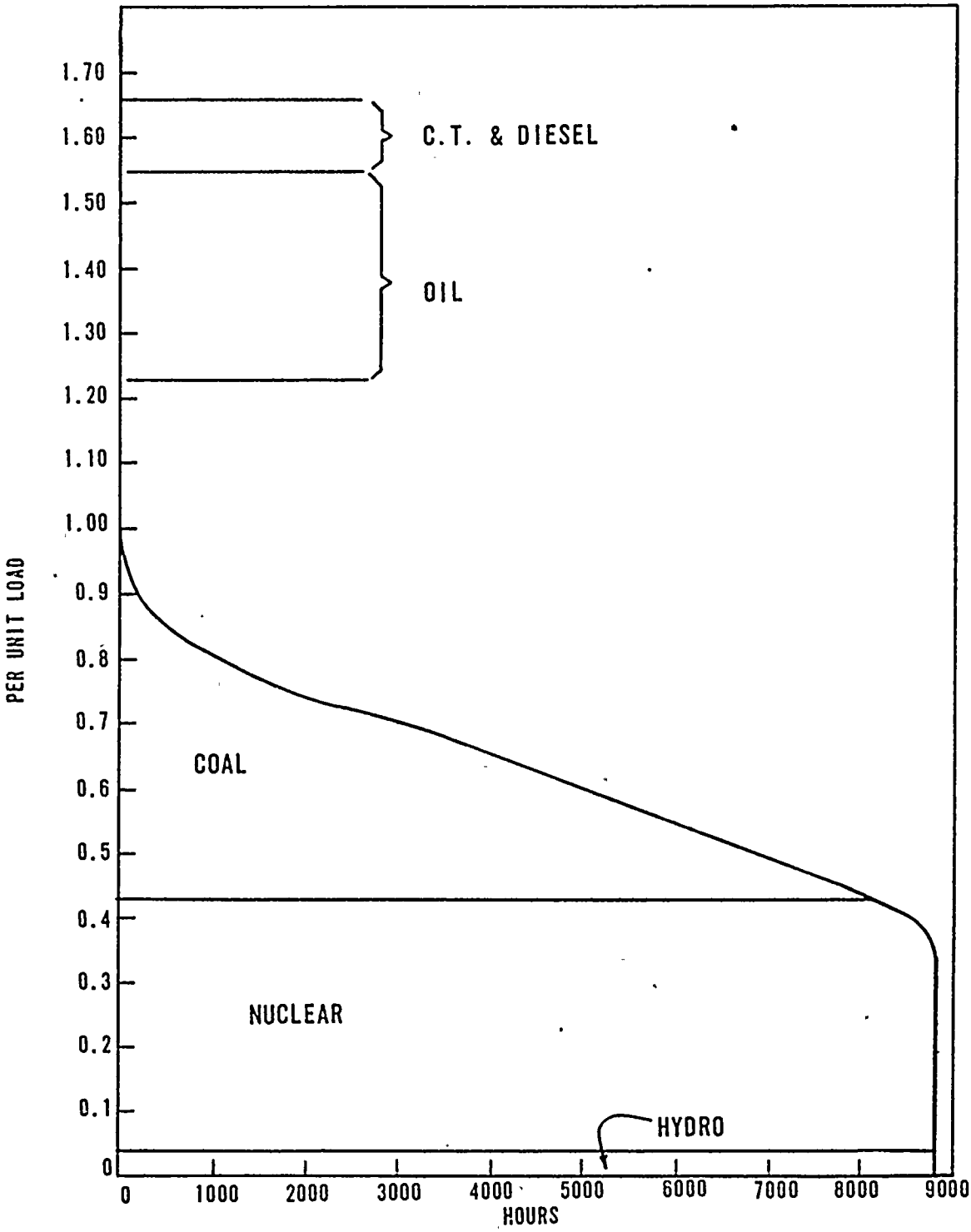
FIGURE 1.1-1



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

APPLICANT'S GENERATION MIX
PERCENTAGE OF PEAK LOAD
VERY LOW LOAD PROJECTION
1981 (WITHOUT SUSQUEHANNA SES)

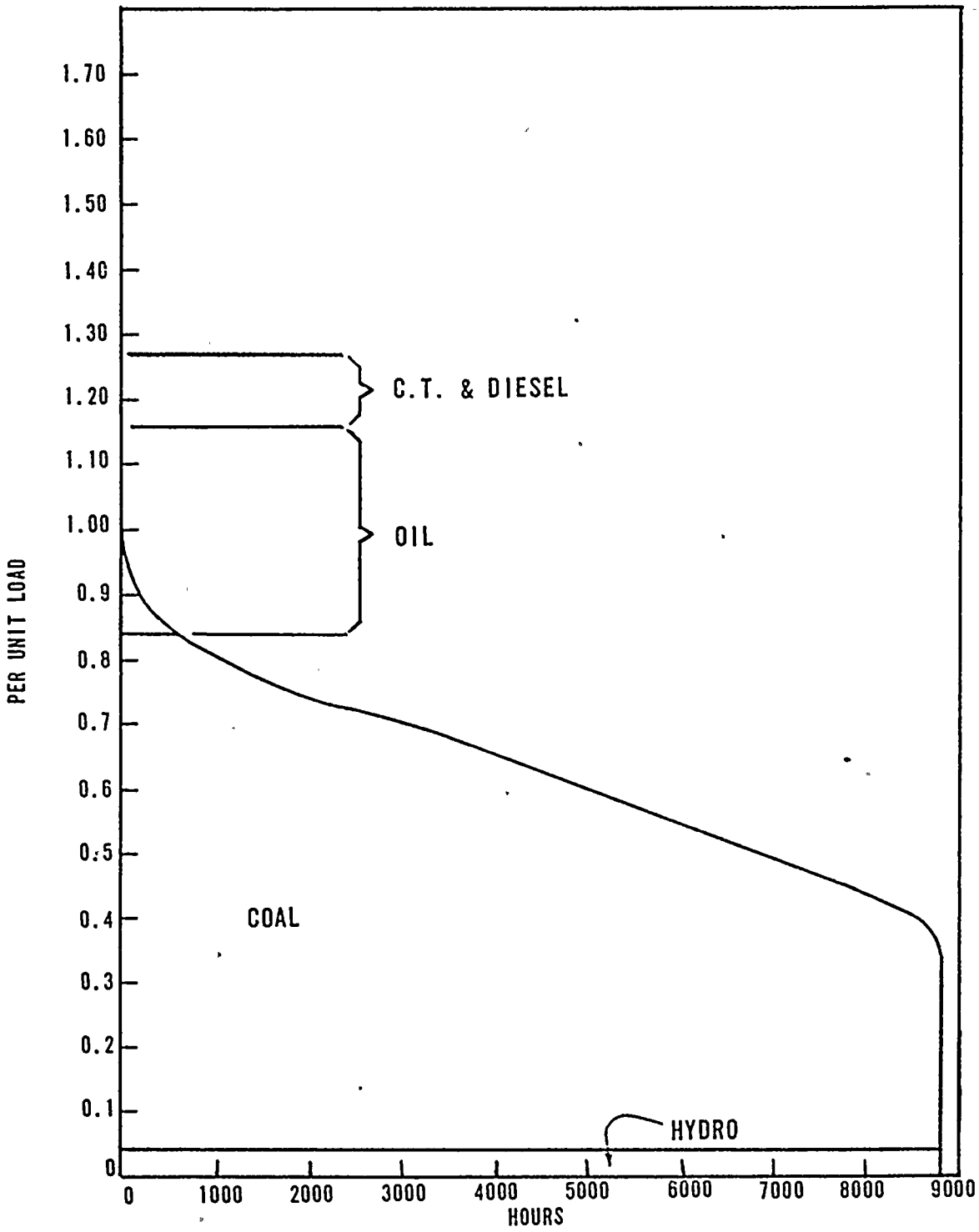
FIGURE 1.1-2



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

APPLICANT'S GENERATION MIX
PERCENTAGE OF PEAK LOAD
VERY LOW LOAD PROJECTION
1982 (WITH SUSQUEHANNA SES)

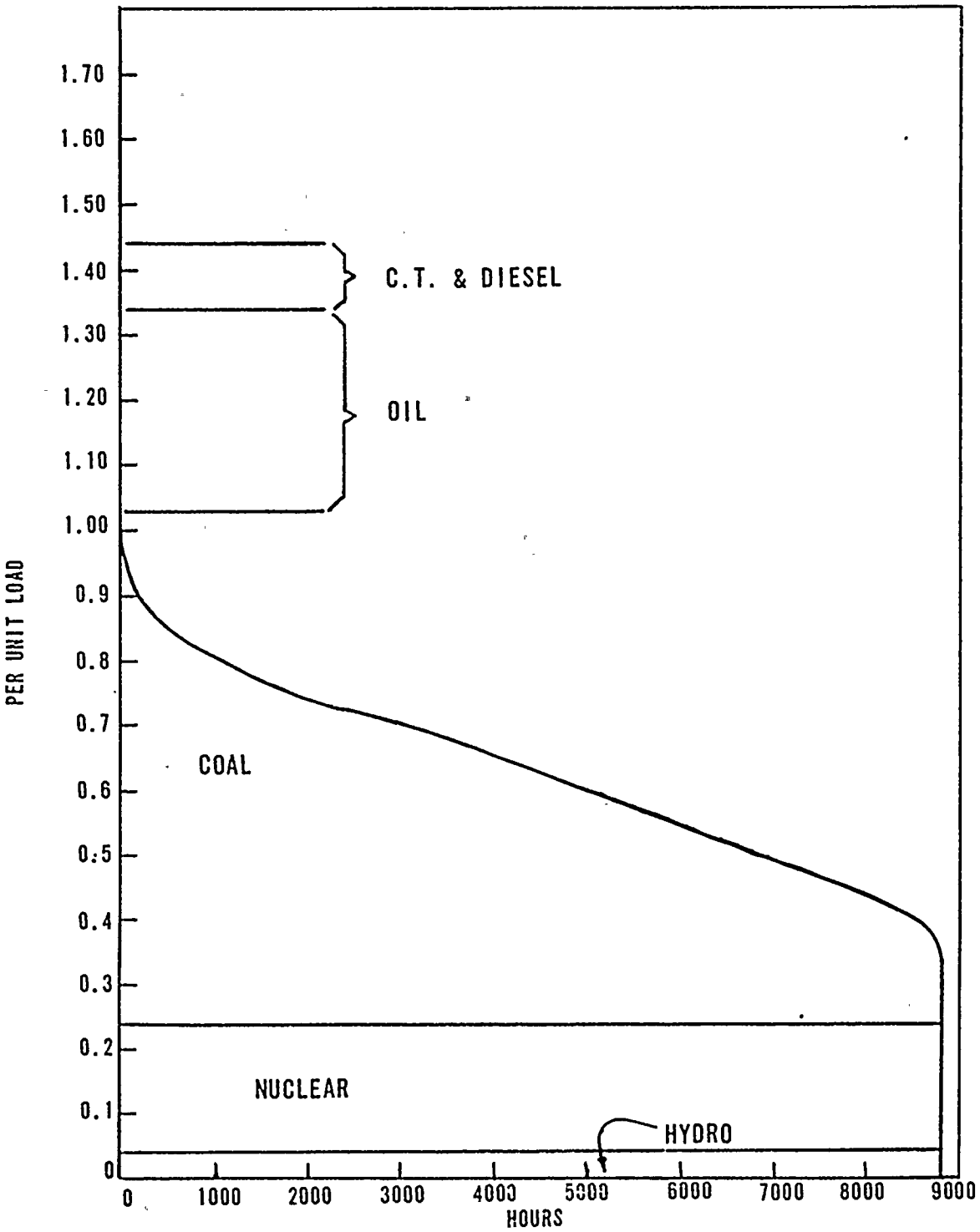
FIGURE 1.1-3



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

APPLICANT'S GENERATION MIX
PERCENTAGE OF PEAK LOAD
VERY LOW LOAD PROJECTION
1982 (WITHOUT SUSQUEHANNA SES)

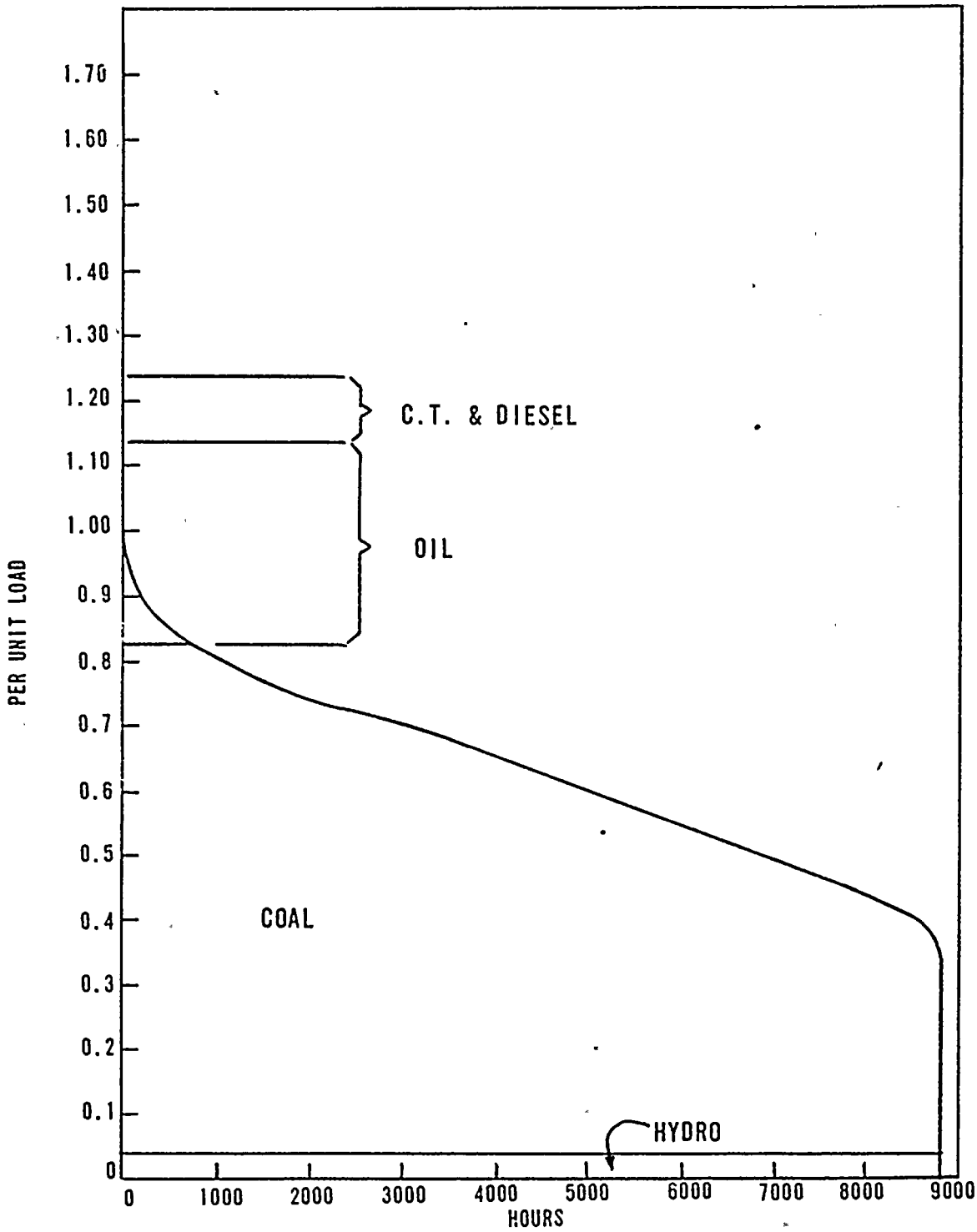
FIGURE 1.1-4



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

APPLICANT'S GENERATION MIX
PERCENTAGE OF PEAK LOAD
LOW LOAD PROJECTION
1981 (WITH SUSQUEHANNA SES)

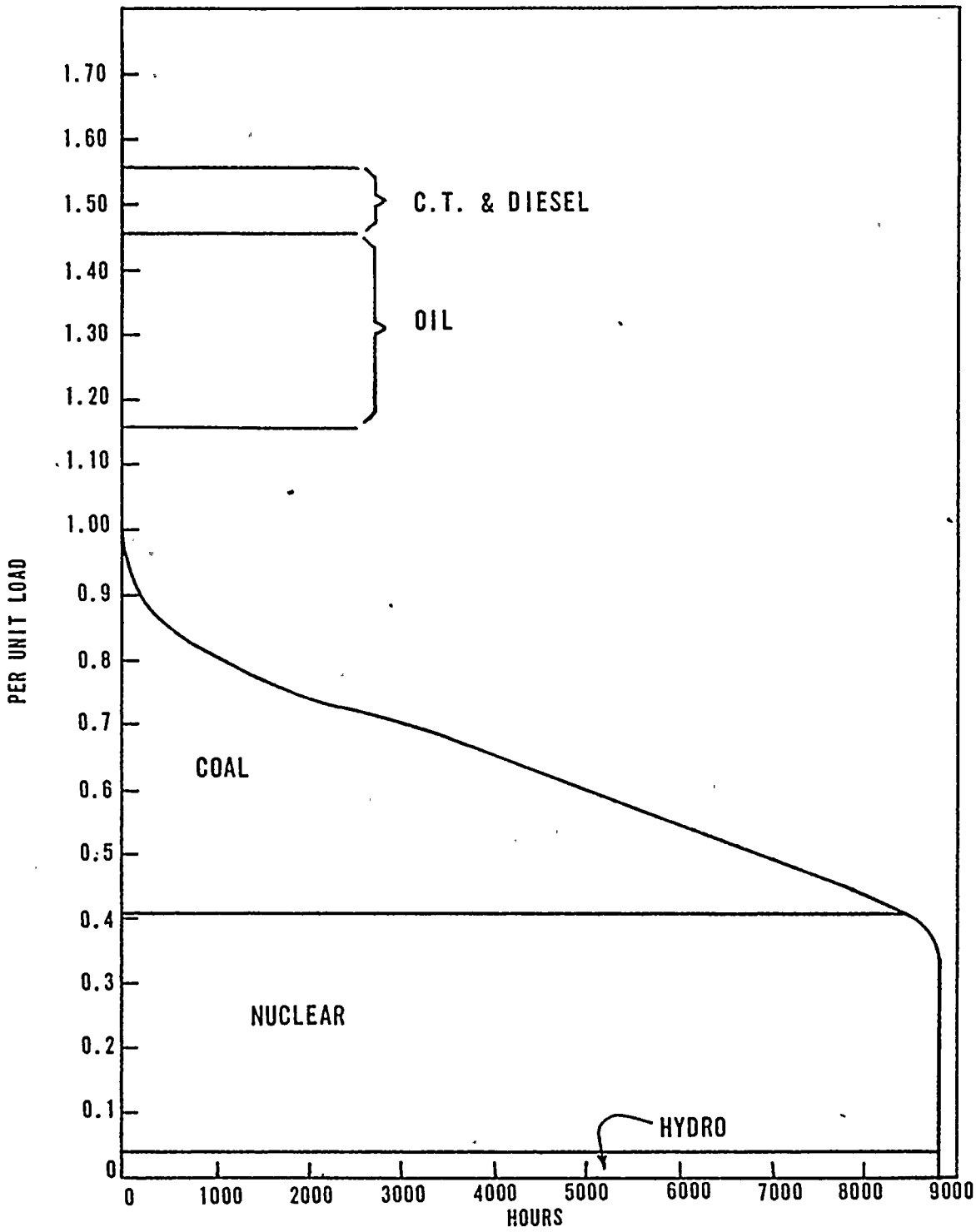
FIGURE 1.1-5



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

APPLICANT'S GENERATION MIX
PERCENTAGE OF PEAK LOAD
LOW LOAD PROJECTION
1981 (WITHOUT SUSQUEHANNA SES)

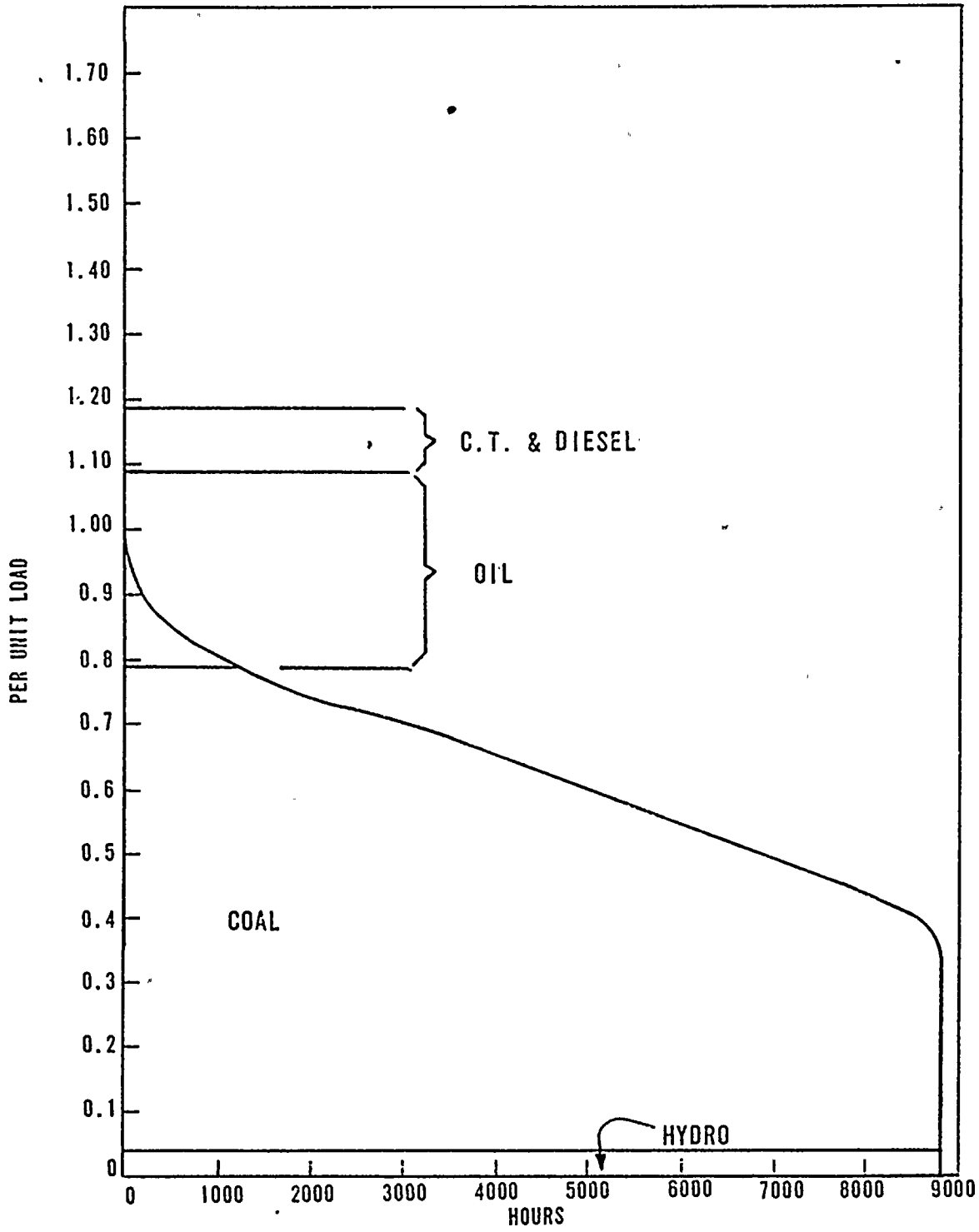
FIGURE 1.1-8



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

APPLICANT'S GENERATION MIX
PERCENTAGE OF PEAK LOAD
LOW LOAD PROJECTION
1982 (WITH SUSQUEHANNA SES)

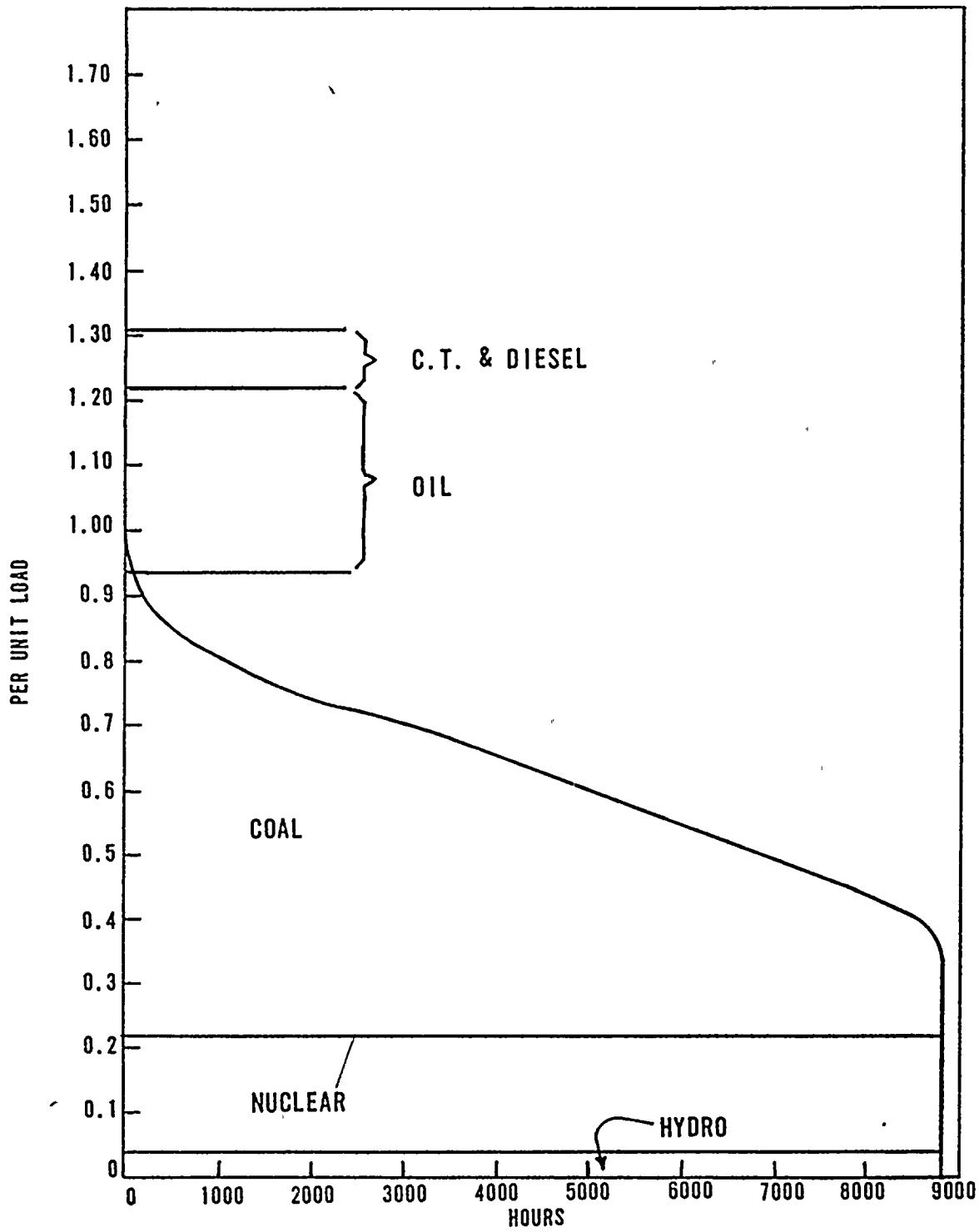
FIGURE 1.1-7



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

APPLICANT'S GENERATION MIX
PERCENTAGE OF PEAK LOAD
LOW LOAD PROJECTION
1982 (WITHOUT SUSQUEHANNA SES)

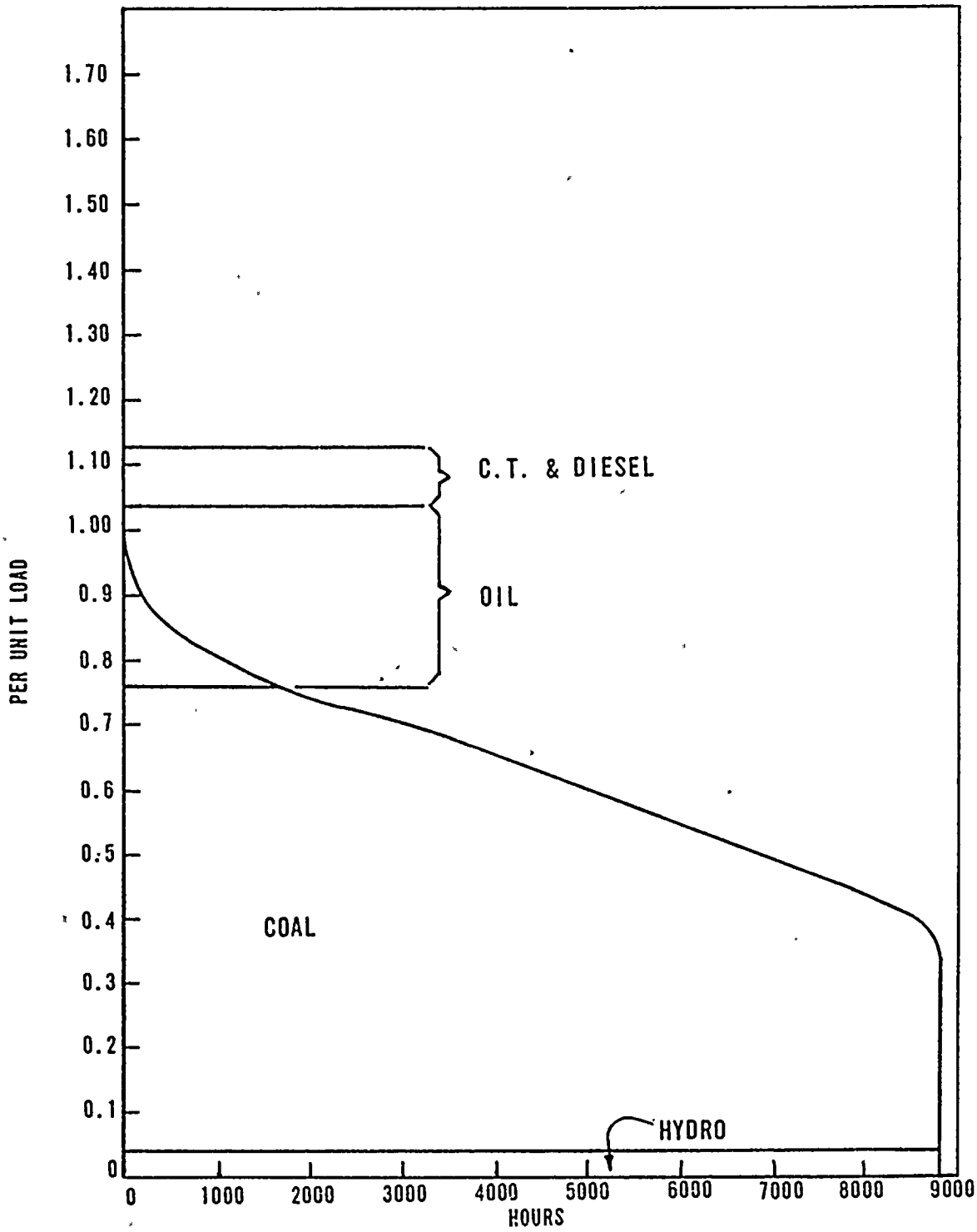
FIGURE 1.1-8



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

APPLICANT'S GENERATION MIX
PERCENTAGE OF PEAK LOAD
MID-RANGE LOAD PROJECTION
1981 (WITH SUSQUEHANNA SES)

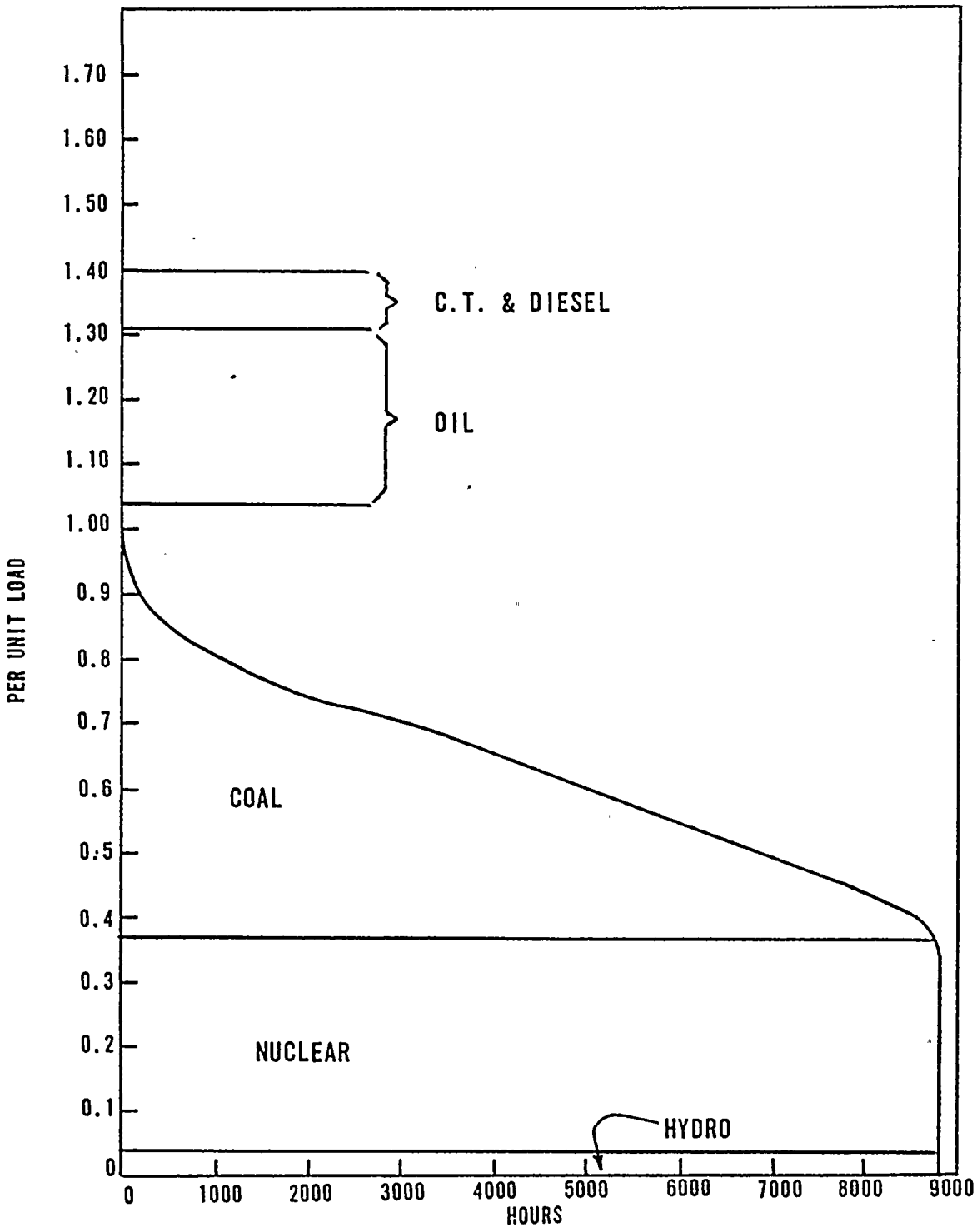
FIGURE 1.1-9



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

APPLICANT'S GENERATION MIX
PERCENTAGE OF PEAK LOAD
MID-RANGE LOAD PROJECTION
1981 (WITHOUT SUSQUEHANNA SES)

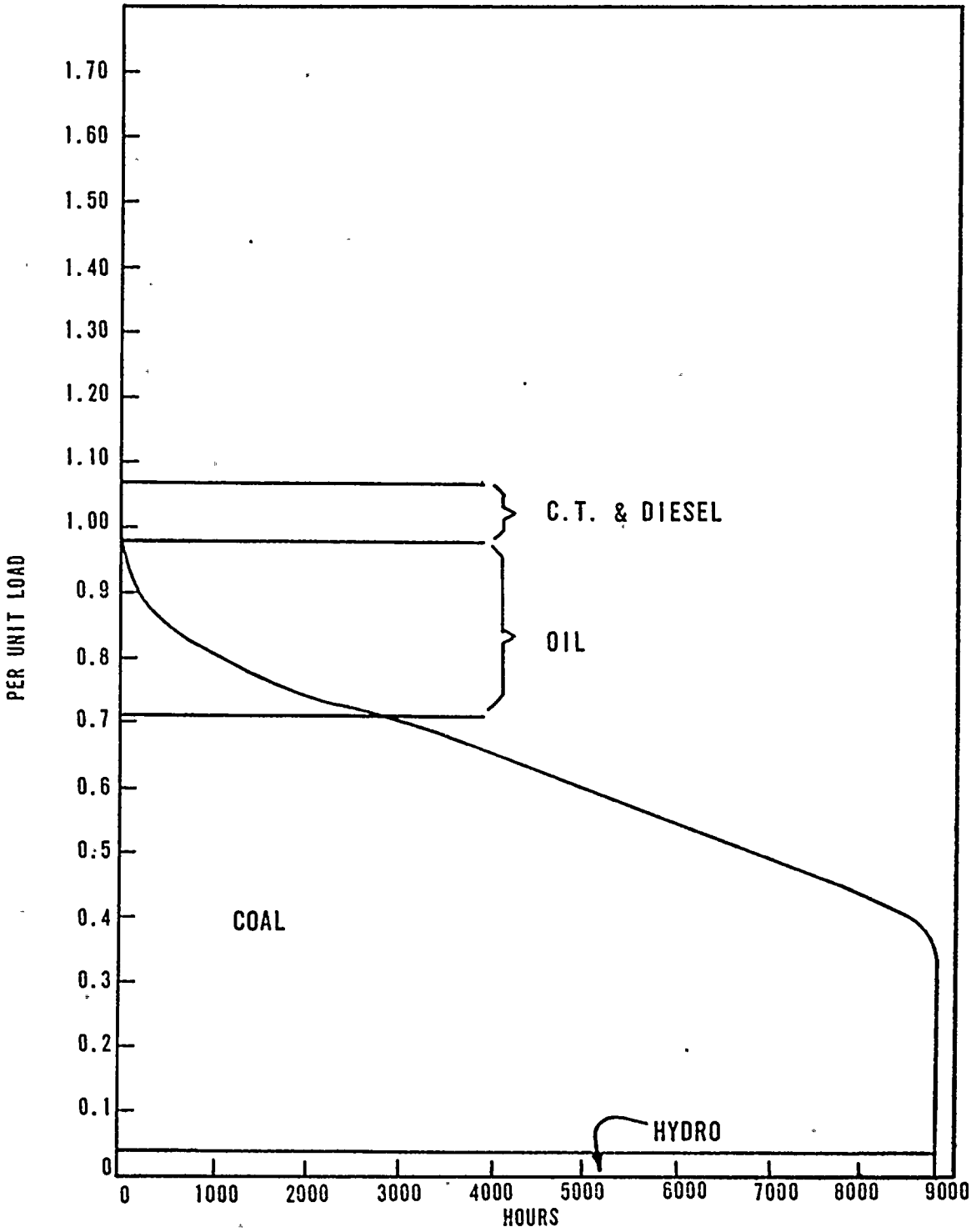
FIGURE 1.1-10



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

APPLICANT'S GENERATION MIX
PERCENTAGE OF PEAK LOAD
MID-RANGE LOAD PROJECTION
1982 (WITH SUSQUEHANNA SES)

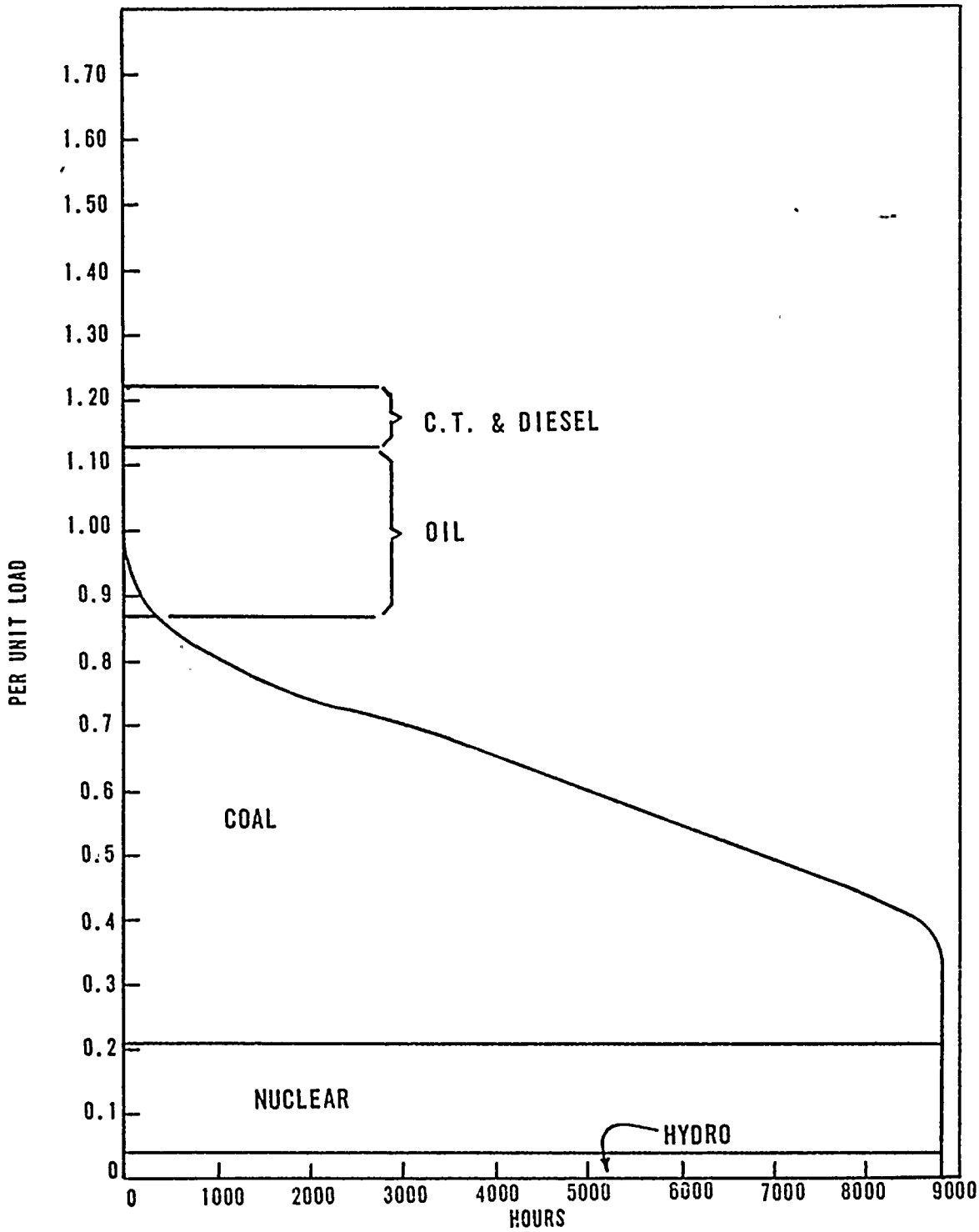
FIGURE 1.1-11



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

APPLICANT'S GENERATION MIX
PERCENTAGE OF PEAK LOAD
MID-RANGE LOAD PROJECTION
1982 (WITHOUT SUSQUEHANNA SES)

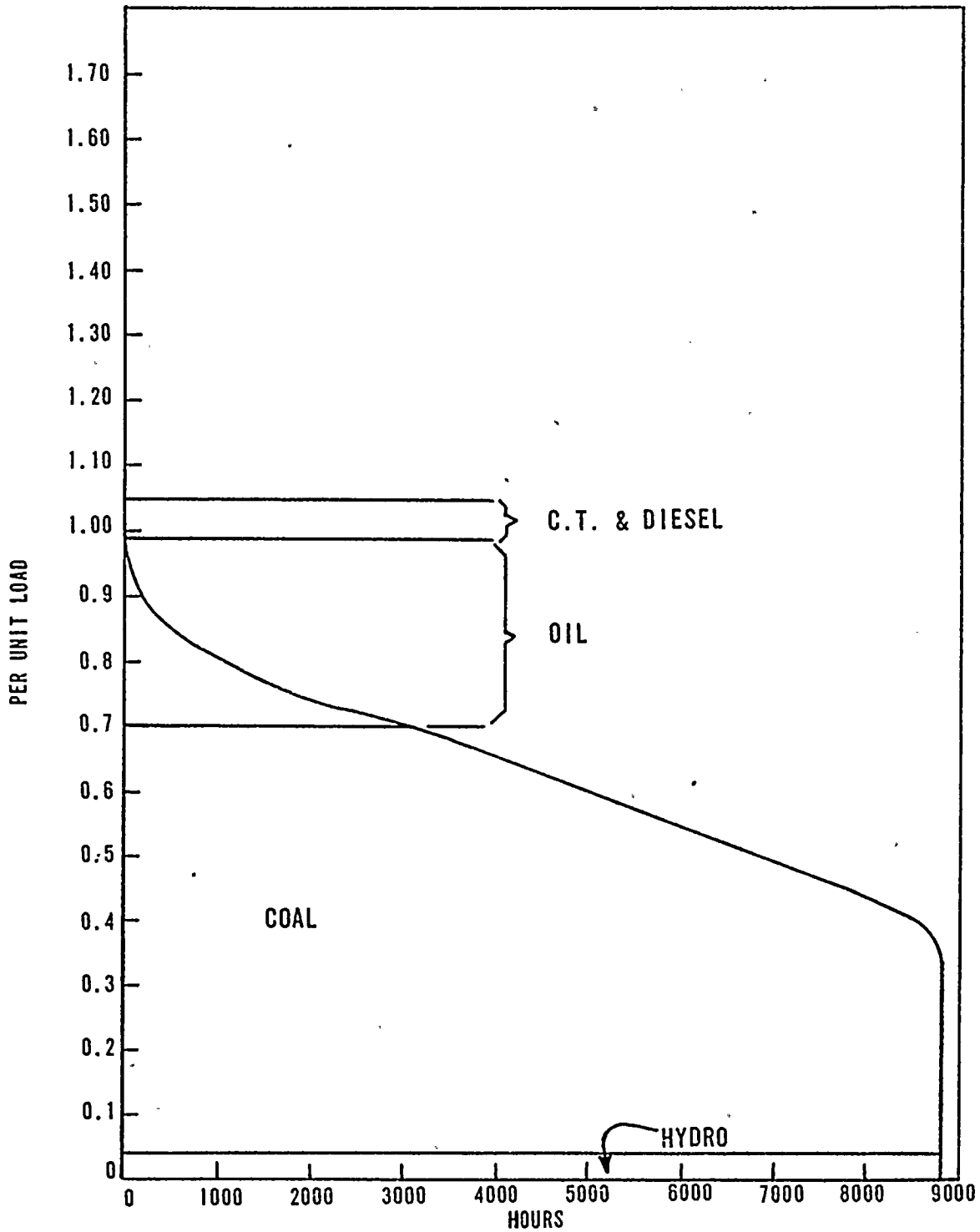
FIGURE 1.1-12



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

APPLICANT'S GENERATION MIX
PERCENTAGE OF PEAK LOAD
HIGH LOAD PROJECTION
1981 (WITH SUSQUEHANNA SES)

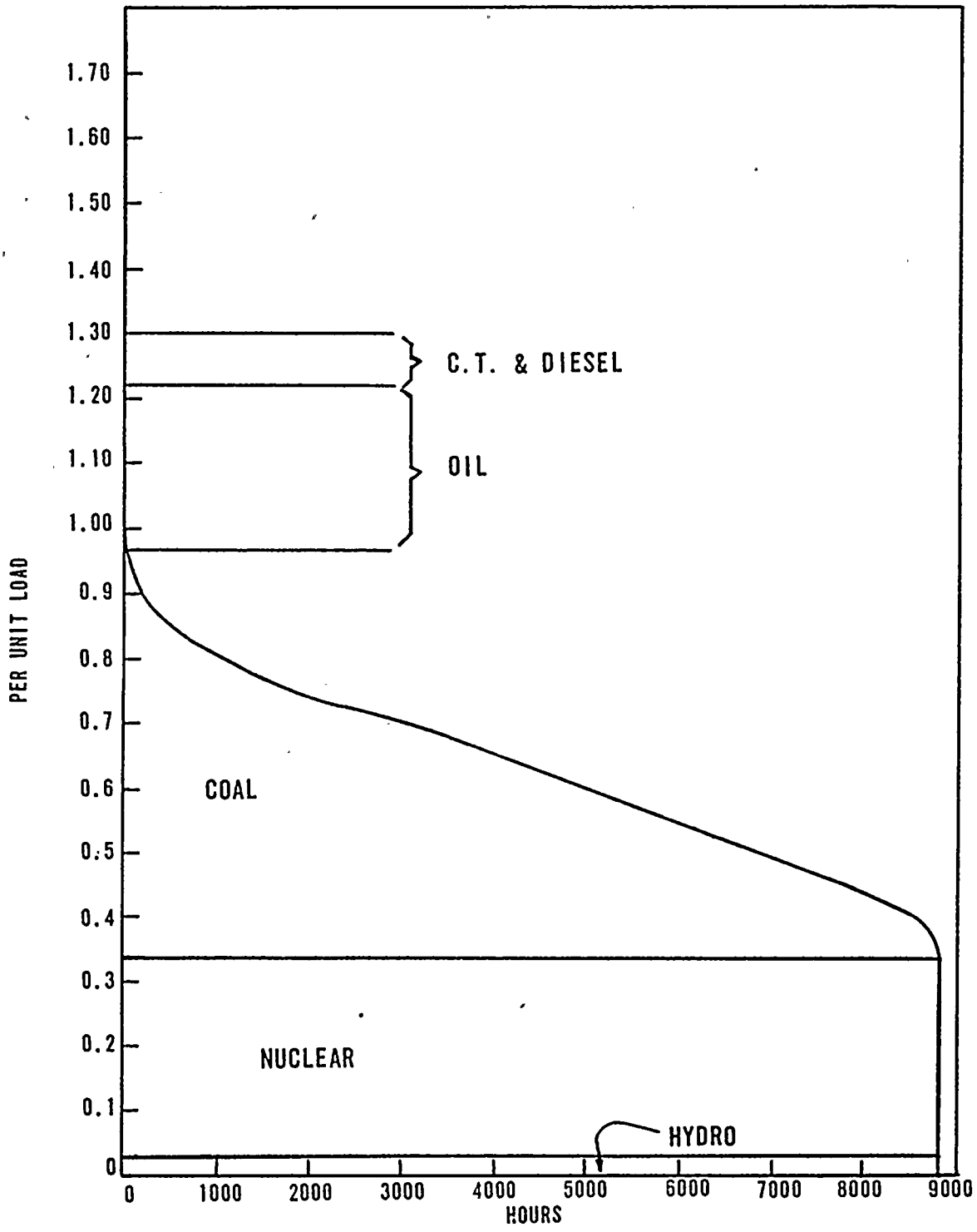
FIGURE 1.1-13



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

APPLICANT'S GENERATION MIX
PERCENTAGE OF PEAK LOAD
HIGH LOAD PROJECTION
1981 (WITHOUT SUSQUEHANNA SES)

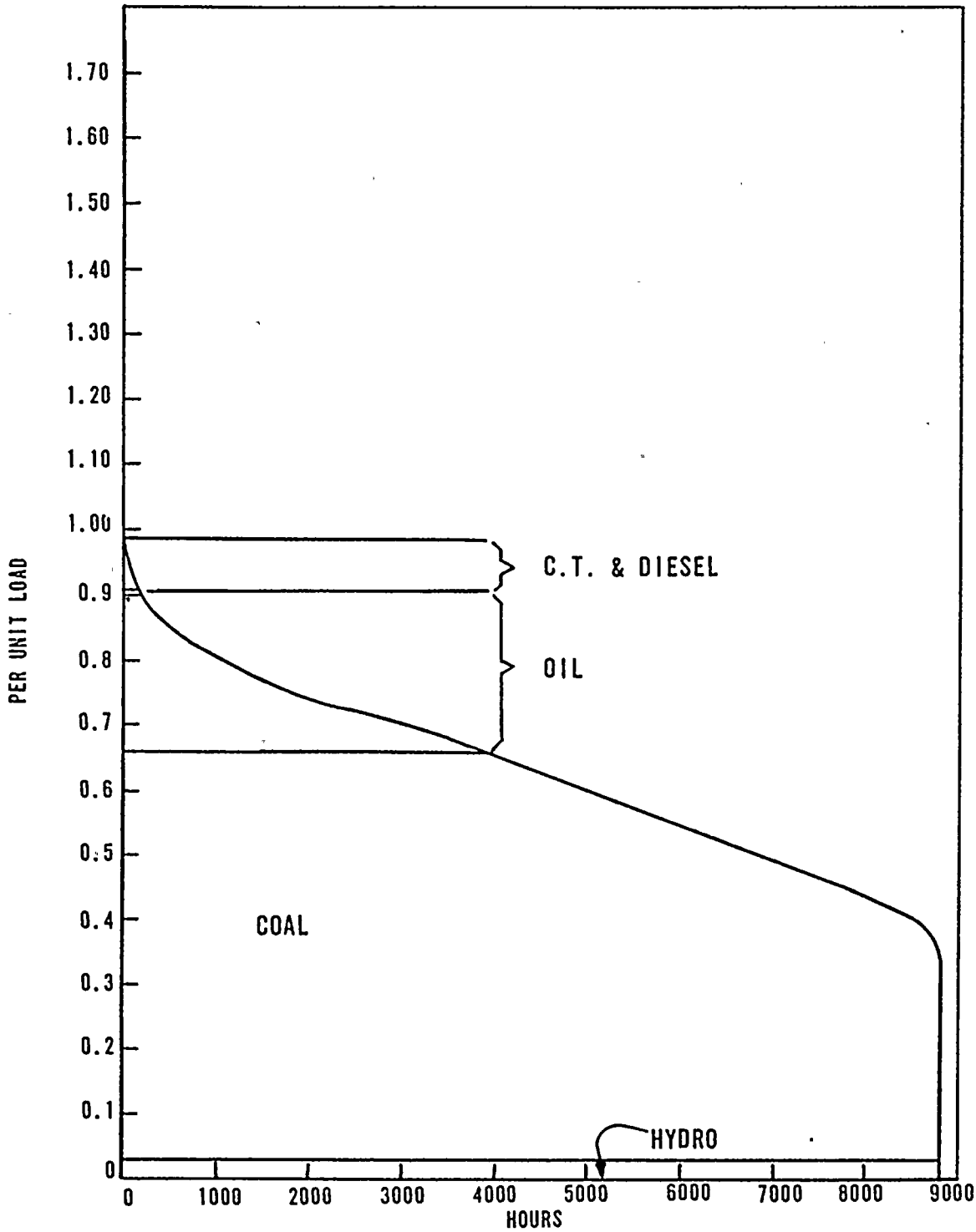
FIGURE 1.1-14



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

APPLICANT'S GENERATION MIX
PERCENTAGE OF PEAK LOAD
HIGH LOAD PROJECTION
1982 (WITH SUSQUEHANNA SES)

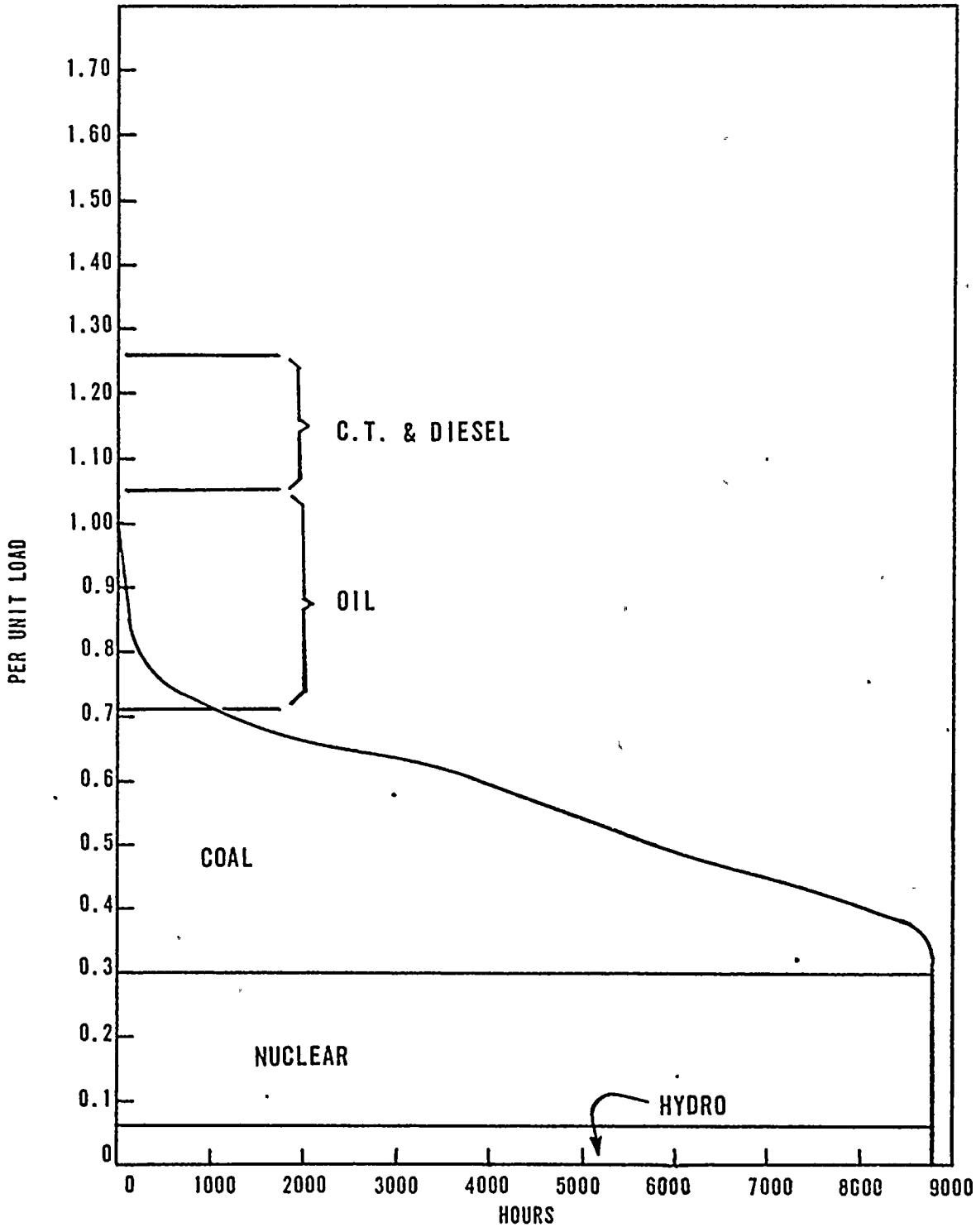
FIGURE 1.1-15



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

APPLICANT'S GENERATION MIX
PERCENTAGE OF PEAK LOAD
HIGH LOAD PROJECTION
1982 (WITHOUT SUSQUEHANNA SES)

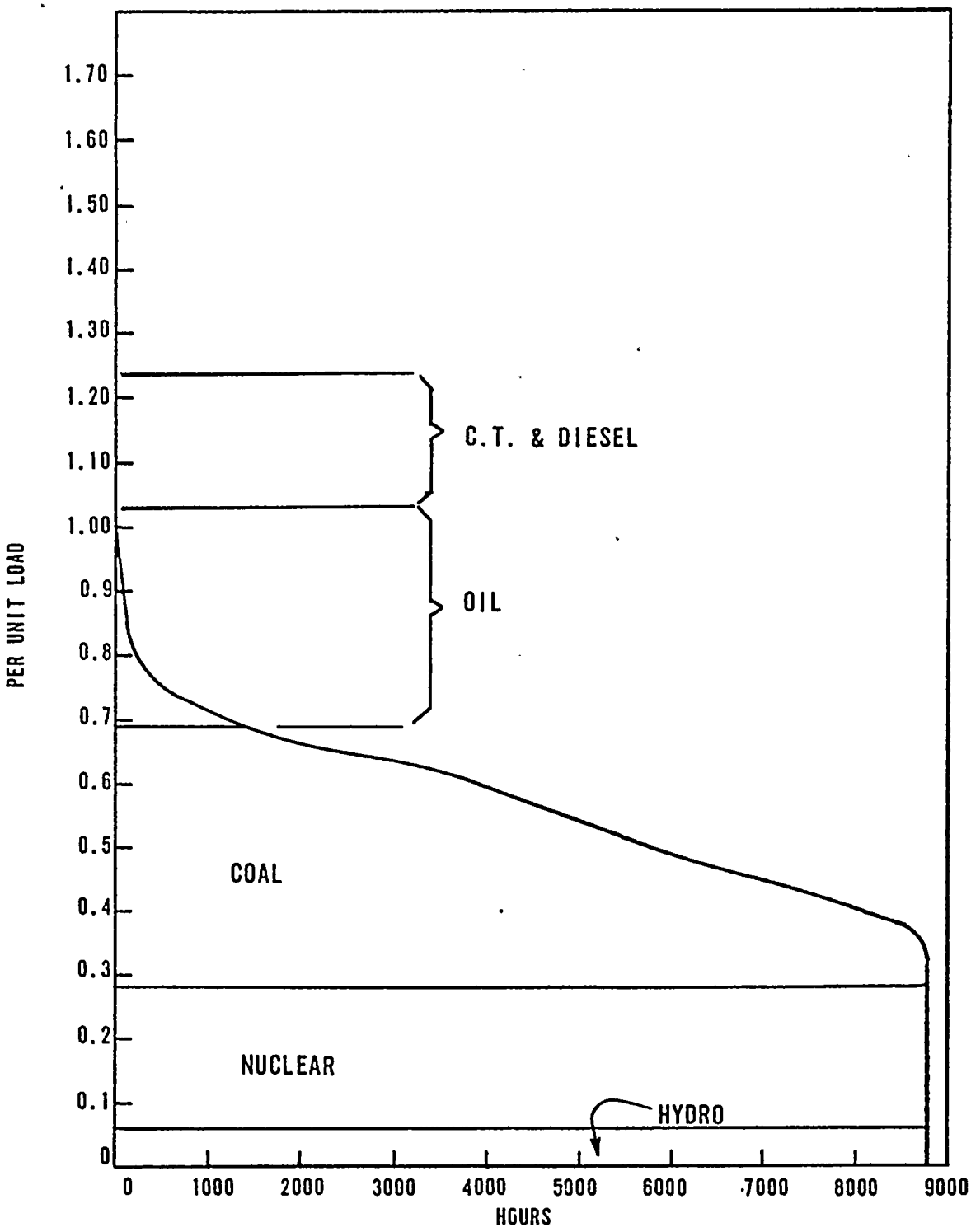
FIGURE 1.1-18



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

PJM'S GENERATION MIX
PERCENTAGE OF PEAK LOAD
1981 (WITH SUSQUEHANNA SES)

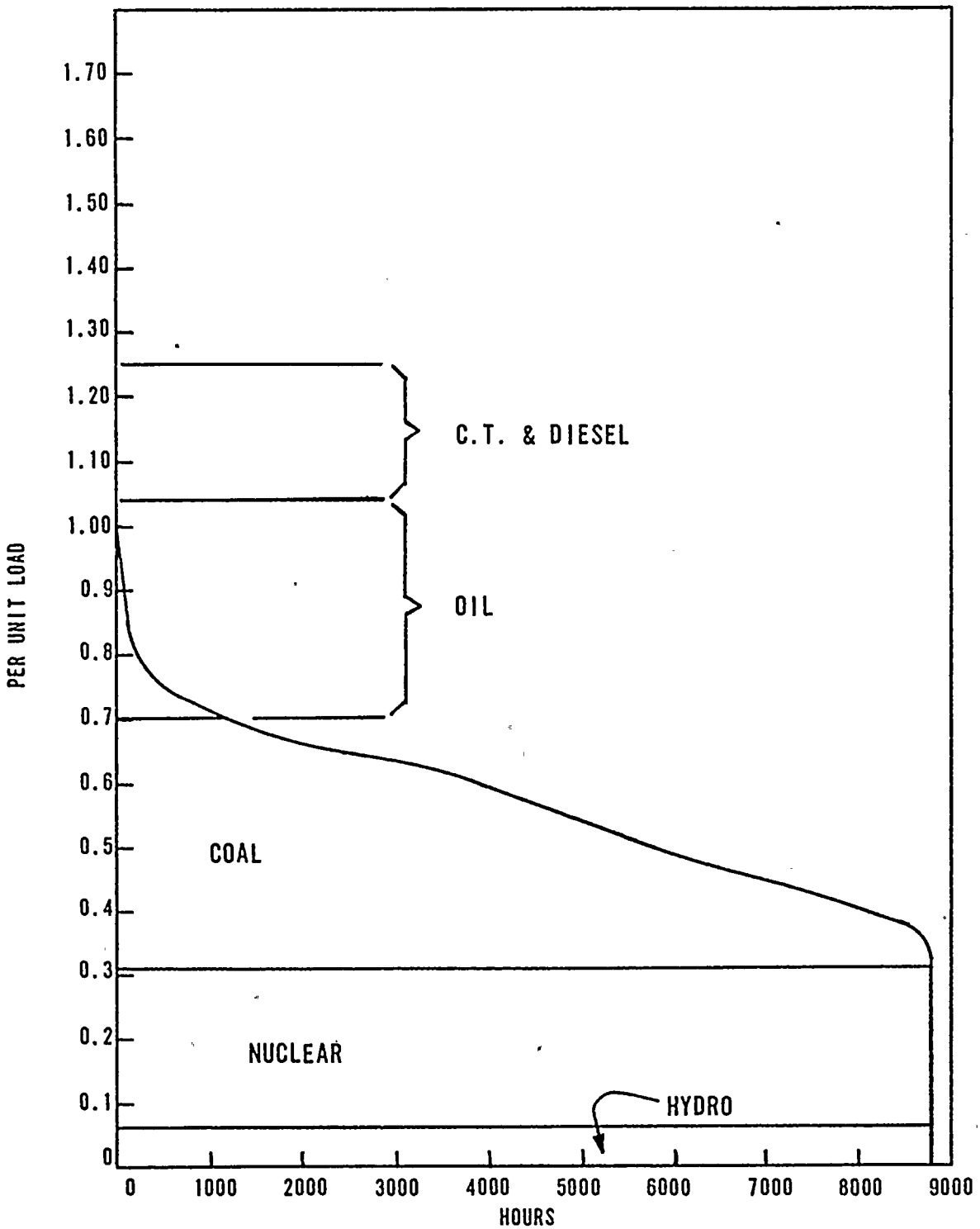
FIGURE 1.1-17



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

PJM'S GENERATION MIX
PERCENTAGE OF PEAK LOAD
1981 (WITHOUT SUSQUEHANNA SES)

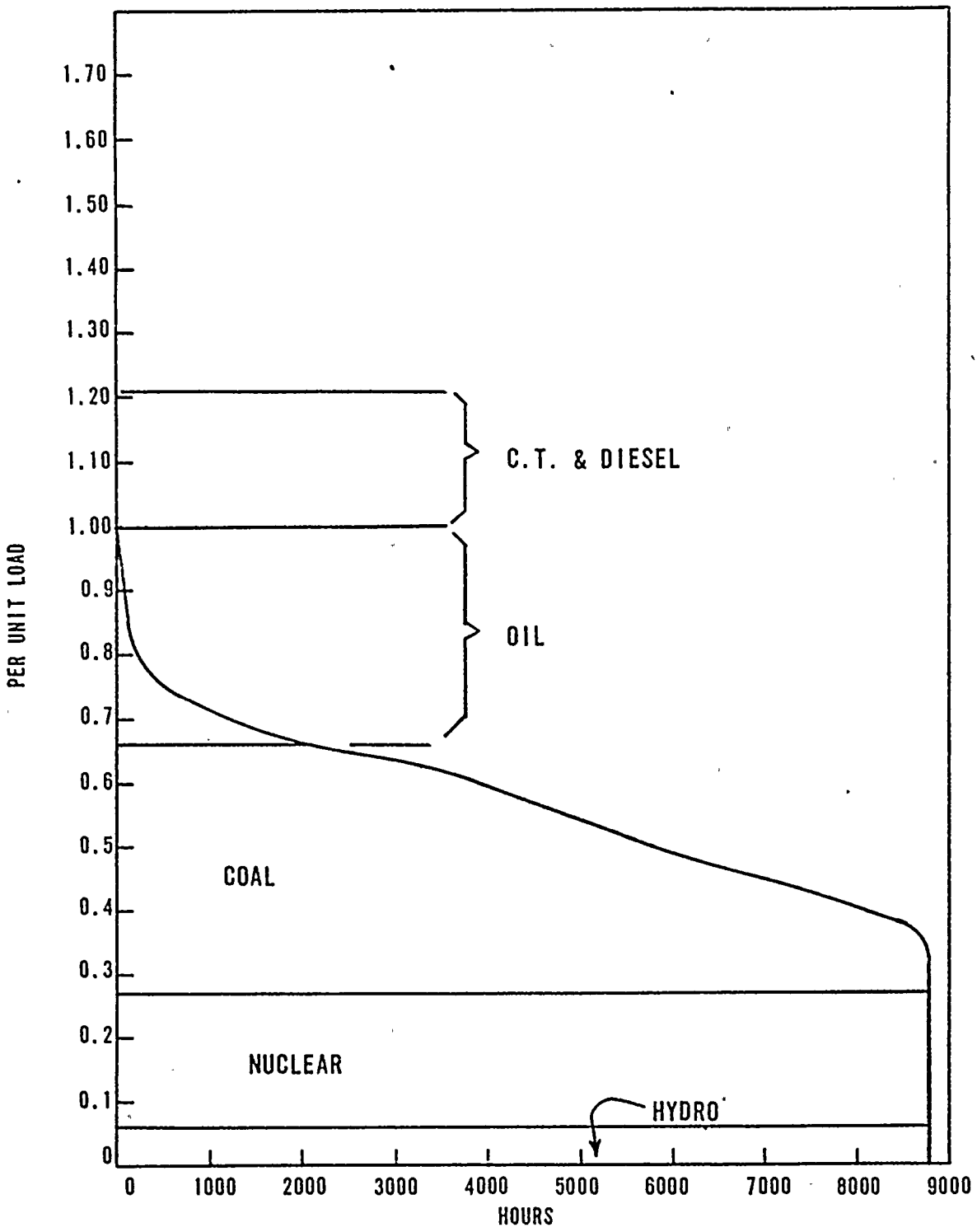
FIGURE 1.1-18



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

PJM'S GENERATION MIX
PERCENTAGE OF PEAK LOAD
1982 (WITH SUSQUEHANNA SES)

FIGURE 1.1-19



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

PJM'S GENERATION MIX
PERCENTAGE OF PEAK LOAD
1982 (WITHOUT SUSQUEHANNA SES)

FIGURE 1.1-20

1.1a SYSTEM DEMAND AND RELIABILITY - COOPERATIVE

The Cooperative is a generation and transmission cooperative serving the power requirements of its member distribution cooperatives, as listed below:

Members:

a. Adams Electric Cooperative, Inc.

b. Bedford Rural Electric Cooperative, Inc.

c. Central Electric Cooperative, Inc.

d. Claverack Rural Electric Cooperative, Inc.

e. New Enterprise Rural Electric Cooperative, Inc.

f. Northwestern Rural Electric Cooperative, Inc.

g. Somerset Rural Electric Cooperative, Inc.

h. Southwest Central Rural Electric Cooperative, Inc.

i. Sullivan County Rural Electric Cooperative, Inc.

j. Sussex Rural Electric Cooperative.

k. Tri-County Rural Electric Cooperative, Inc.

l. United Electric Cooperative, Inc.

m. Valley Rural Electric Cooperative, Inc.

n. Warren Electric Cooperative, Inc.

The service area of the Cooperative extends across the western and northern part of the Commonwealth of Pennsylvania and into parts of New Jersey. The service area covered is purely rural. In Pennsylvania, the Rural Electrification Act under which the rural electric cooperatives are incorporated limits them to service outside of communities of 2,500 or more population. A Map of the Cooperative Service Area is presented in Figure 1.1a-1.

At the present time, the Cooperative does not own any generation or transmission facilities (other than those associated with the Susquehanna SES project), but purchases all power requirements and transmission service from Pennsylvania Electric Company (Penelec), Metropolitan Edison Co. (Met-Ed), Jersey Central Power & Light Co. (Jersey Central), West Penn Power Co. (West Penn) and

Power Authority of State of New York (PASNY). A description of the Cooperative's power purchase contracts is given below:

1. PASNY - In the recent past the Cooperative has held a wholesale power contract with PASNY to purchase 130 MW of capacity with the associated energy equal to the Cooperative system monthly load factor. This contract with PASNY, however, expired on February 19, 1978. Immediately prior to this expiration date, the Cooperative had negotiated a contract for 110 MW of firm capacity and 20 MW of peaking capacity with PASNY, but these proposed arrangements were disapproved by the Governor of the state of New York. New contract arrangements are still being pursued. Currently the Cooperative is continuing to receive 130 MW of capacity under terms similar to the original contract.

2. Penelec - The Cooperative has a wheeling contract with Penelec through which Penelec wheels approximately 121 MW of PASNY power from the New York-Pennsylvania border to the Cooperative's Pennsylvania delivery points. In addition, to the wheeling contract, the Cooperative has a supplemental contract with Penelec, through which the Cooperative purchases power and energy from Penelec in order to satisfy customer demands not met by the PASNY power allocated to the Penelec service area. This contract can be terminated by either party two years after receipt of written notice of intent to terminate the contract.

3. Met-Ed - The Cooperative has the same type of contracts with Met-Ed as the Penelec contract described above except that the amount of PASNY power wheeled by Met-Ed is 9 MW.

4. Jersey Central - The Cooperative has a wholesale power contract with Jersey Central. This contract can be terminated by either party, one year after receipt of written notice of intent to terminate the contract. There is no PASNY power allocated to members served by Jersey Central, therefore there is no PASNY transmission agreement with Jersey Central.

5. West Penn - The Cooperative has a wholesale power contract with West Penn. This contract can be terminated by either party 3 months after receipt of written notice of intent to terminate the contract. There is no PASNY power allocated to members served by West Penn.

Since the Cooperative has no generation of its own, the availability, adequacy and nature of its present sources of power supply will depend largely on the development of national and regional policy; such as the policies covering the wholesale obligations of investor-owned companies and policies concerning the allocation of PASNY power. In short, the Cooperative has no

control over the availability, adequacy and nature of its present power sources.

In order to develop a more economic, reliable, and controllable source of power for its members than the present purchase power contracts, the Cooperative has pursued plans to acquire its own generating facilities. In addition to the Susquehanna SES the Cooperative has been negotiating with Penelec, Met-Ed and Jersey Central to obtain a three percent (3.0%) undivided interest ownership in the Forked River Nuclear Generating Unit which has a rating of 1,100 MW and is planned for in-service in 1983. The Cooperative also has begun to negotiate with West Penn to obtain approximately 7.2% undivided interest ownership in the Pleasants Steam Station. The Pleasants Steam Station will have two 625 MW coal-fired units to be in operation in 1979 and 1980. The Cooperative is investigating the possibility of a 50% ownership in the Penelec Raystown Dam project. Raystown is expected to have a capacity of 50 MW and be in operation in 1986. The Cooperative is also investigating the option of constructing one or more coal fired units in the late 1980's.

A summary of the Cooperative's Present and Projected Future Demand Sources and Requirements - MW (1977), is presented in Table 1.1a-1. As can be seen from the table, even considering all other presently planned future sources of power as well as Susquehanna SES, the Cooperative will still not own sufficient generating capacity to meet its projected demands. Since it has an obligation to provide all the power and energy required by its member distribution cooperatives, the Cooperative will be forced to rely on wholesale power purchases to provide its members remaining requirements. Even though Susquehanna SES power and energy cannot supply all of its future requirements, it can replace a significant portion of the power and energy presently supplied by purchased power contracts.

The power and energy supplied by Susquehanna SES will allow the Cooperative to be less dependent on power and energy purchased from other suppliers. Susquehanna SES will provide the Cooperative with a supply of base load power that is more economical, controllable and reliable than the present purchase power agreements.

Conservation

The Cooperative is pursuing plans to develop a system-wide energy conservation program. A conservation committee has been formed to oversee this project. Duties of the committee include the development of programs that will reduce energy and demand requirements in new and existing residential, commercial, and industrial facilities. Programs under consideration include:

1. reduction of system peak demand through controlled load management;
2. encouragement of improved insulation practices in new and existing facilities, and;
3. a consumer education and information program to encourage energy conservation activities in a variety of areas such as space and water heating, air conditioning, and appliance use and selection.

The Cooperative's future load estimates reflect a recognition of the potential impact of such programs on customer usage.

Effects of Prices on Consumption of Electrical Energy

The effects of price increases on the demand for power and energy are taken into account subjectively by the individual distribution cooperatives when making their usage projections. Based on local management's familiarity with the service area and past experience, price elasticity is taken into account when making usage projections for each consumer classification.

1.1.1a LOAD CHARACTERISTICS - COOPERATIVE

The Cooperative has traditionally peaked in the winter and projections for the future indicate that the Cooperative will continue to be winter peaking.

1.1.1.1a Cooperative's Loads

The Cooperative is an REA borrower and as such is required to conduct Power Requirement Studies based on the guidelines contained in REA Bulletin 120-1.

The Cooperative's most recent Power Requirements Study (PRS) was completed in October of 1976 and was subsequently reviewed and approved by the REA. The study estimates an annual growth rate in demand of 9.30% between 1975 and 1980, 7.88% from 1980 to 1985, and 8.05% between 1985 and 1990.

The Power Requirements Study also estimates an annual energy growth rate of 9.06% from 1975 to 1980, and 8.04% for the years 1980 through 1990. Energy and demand forecasts are contained in Table 1.1a-2, Cooperative's Projected Loads. Historical annual peak demands and annual energy requirements as described in the PRS are presented in Table 1.1a-3, Cooperative's Historical Peak Load and Energy Sales Data.

Load duration curves for 1982 and 1985 showing the Cooperative planned dispatching priorities are presented in Figures 1.1a-2 and 1.1a-3, Cooperative's Estimated Annual Load Duration Curve, GPU System Purchases 1982 and 1985 respectively.

The NRC request for load duration curves is made "in order to show the relationship of the station to the short term system requirements". Therefore, only the Cooperative's load in the area served by the principal subsidiaries of the General Public Utlities Corporation (GPU) are included in the load curves presented in Figures 1.1a-2 and 1.1a-3, since Susquehanna power will be allocated to meet the Cooperative's load requirements in the area served by these GPU subsidiary companies. The load duration curves in these figures were derived by subtracting PASNY and West Penn purchases from the Cooperative's total system load.

1.1.1.2a Demand Projections-Cooperative

The Cooperative Power Requirements Study was conducted based on the guidelines specified in the Revised REA Bulletin 120-1 dated March 5, 1974. REA Bulletin 120-1 provides guidelines for the development of up-to-date forecasts of power requirements. These guidelines describe the type of historical data which can be used for the purpose of deriving projections, as well as the manner in which the data should be compiled. The Bulletin also describes relationships between the specified historical data and the future estimates of power requirements which should be considered.

The historical data required to be compiled by the individual distribution cooperatives before any projections should be made consists of the most recent 11 calendar years of the following:

1. Monthly peak demand and monthly energy purchases at each delivery point

2. Total number of consumers billed each month and total energy sales to consumers in each classification, such as rural, residential, seasonal, small commercial, public buildings, street and highway lighting, etc.

3. Monthly energy usage by the distribution cooperative itself, if records are maintained separately and if the cooperative serves itself.

4. Monthly demand and energy usage separately for each commercial consumer with an installed transformer capacity over 350 kVA

5. Total miles of distribution line energized

These data are used to obtain certain statistics, as defined in the Bulletin, which are then used to determine the actual projections. The statistics obtained are per consumer energy usage in each consumer classification, distribution line losses, and consumer density and energy sales per mile of line.

These statistics and the data compiled comprise the basic data to be used in the projection methods described in the Bulletin for the preparation of a Power Requirement Study for a distribution cooperative.

The per consumer energy usage and number of consumers in each consumer classification are projected using mathematical trends and adjusted by managerial judgment. Where changes in accounting practices have occurred during the 11-year historical period, detailed analysis of specific classifications may be required to derive projections. The projections of per consumer usage and number of consumers are multiplied to obtain total annual energy usage in each consumer classification. The totals in each classification are summed to project the annual energy sales to all consumers, except the large commercials with an installed transformer capacity over 350 kVA.

The Cooperative's own use of energy is projected by the distribution cooperative personnel who are aware of plans which will affect its energy usage. The energy included is that energy used by the Cooperative in the operation of its headquarters, substations, etc.

The energy sales to each large commercial consumer with an installed capacity over 350 kVA are projected separately based on information provided by the consumer in question.

The total annual energy sales for the distribution cooperatives are projected by summing the projected sales in each consumer classification. The distribution cooperative's own use of energy is then added to the sales, and losses are added to that total to arrive at projections of total energy purchases. The annual load factor is projected based on historical factors and adjusted by managerial judgment, if necessary, and applied to the total energy purchases to calculate projected noncoincident peak demand.

The Cooperative's forecast peak demand and energy requirements as projected in the October 1976 Power Requirement Study (PRS), are presented in Table 1.1a-2. Monthly energy sales and peak demands experienced since October 1972 are presented in Tables 1.1a-4, Cooperative's Historical Monthly Sales, and Table 1.1a-5, Cooperative's Historical Monthly Billing Demand. A comparison of the Cooperative's 1974 and 1976 PRS energy projections to the

actual experienced energy requirement is presented in Table 1.1a-6, Cooperative's Comparison of Forecast and Actual Energy Requirements.

1.1.2a SYSTEM CAPACITY-COOPERATIVE

A list of the Cooperative's planned generation facilities is presented in Table 1.1a-1. Other than its interest in the Susquehanna SES, the Cooperative presently has no generation facilities itself.

1.1.3a RESERVE MARGINS-COOPERATIVE

Due to its lack of self owned generation facilities the Cooperative is dependent on its interconnections with its purchased power suppliers for reserve capacity. Reserve arrangements for planned self owned generation facilities are negotiated on an individual basis for each unit in question. In general the Cooperative makes arrangements which are the equivalent of a 20-30% reserve capacity. Reserve capacity for the Susquehanna station will be purchased from the GPU companies.

1.2a OTHER OBJECTIVES-COOPERATIVE

The Cooperative has no objective in ownership of Susquehanna other than production of power and energy for use by its consumers.

1.3a CONSEQUENCES OF DELAY-COOPERATIVE

If Susquehanna is delayed, the Cooperative must continue to rely on the other power companies for the power which is expected to be provided by Susquehanna. This will result in an increase in power cost for the Cooperative's customers as well as a decrease in reliability of supply.

TABLE 1.1a-1
COOPERATIVE'S PRESENT AND PROJECTED DEMAND SOURCES AND REQUIREMENTS - MW (1977)

Line No.	Item	Projected Capacity Factor Range	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
1.	Annual Peak Demand	50	367.9	376.1	420.6	459.7	502.5	542.1	584.8	630.8	680.5	734.1
	Sources @ Delivery (1)											
	Purchased Power (2)											
2.	PASNY(3)	63	134.5	134.5	134.5	134.5	134.5	134.5	134.5	134.5	134.5	134.5
3.	Penelec	--	163.5	169.4	203.2	232.8	264.1	259.9	255.5	245.6	256.4	277.9
4.	Met Ed	--	21.4	25.1	28.1	31.9	35.9	35.0	34.3	32.8	34.3	37.2
5.	Jersey Central	--	17.3	16.1	20.0	22.4	25.3	27.7	24.0	23.1	24.0	26.2
6.	West Penn	--	31.2	30.0	34.8	36.2	33.3	32.8	30.4	28.9	28.5	29.1
7.	Total Purchased Power	--	367.9	376.1	420.6	457.8	493.1	486.9	478.7	465.9	477.7	504.9
8.	Selfowned Generation											
9.	Cooperative Ownership (5) of Susquehanna Nuclear Units 1 & 2	--	-	-	-	-	0	91.0	165.3	198.4	198.4	198.4
10.	Susquehanna Sold Capacity	--	-	-	-	-	0	50.8	81.7	83.4	64.5	45.6
11.	Susquehanna Capacity Retained by the Cooperative	70	-	-	-	-	0	40.2	83.6	115.0	133.9	152.8
12.	Forked River Nuclear (4)	70	-	-	-	-	-	-	-	20.9	31.4	31.4
13.	Cooperative Ownership (4) (5) of Pleasant's Coal Station	--	-	-	-	18.7	56.2	75.0	75.0	75.0	75.0	75.0
14.	Pleasant's Sold Capacity	--	-	-	-	16.8	46.8	60.0	52.5	45.0	37.5	30.0
15.	Pleasant's Capacity Retained by the Cooperative	70	-	-	-	1.9	9.4	15.0	22.5	30.0	37.5	45.0
16.	Total Selfowned Capacity	--	-	-	-	18.7	56.2	166.0	240.3	294.3	304.8	304.8
17.	Total Sold Capacity	--	-	-	-	16.8	46.8	110.8	134.2	128.4	102.0	75.6
18.	Total Capacity Retained by the Cooperative	--	-	-	-	1.9	9.4	55.2	106.1	165.9	202.8	222.2

(1) All figures are annual averages.

(2) Purchased power contracts are subject to termination as noted in discussion of 1.1a, System Demand and Reliability - Cooperative.

(3) Negotiations for contract extension have not been completed.

(4) Negotiations for Cooperative ownership in these units have not been completed.

(5) Capacity available to the Cooperative from units in which it is a joint owner, is generally based on a contract specified sellback schedule under which the Cooperative's available capacity gradually increases in the first years of ownership and then remains constant for the remainder of the station's life.

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TABLE 1.1a-2

COOPERATIVE'S PROJECTED LOADS (1)

Year	MW	KWH (10^6)
1978	420.6	1758.6
1979	459.7	1917.8
1980	502.5	2091.5
1981	542.1	2257.9
1982	584.8	2437.5
1983	630.8	2631.5
1884	680.5	2840.8
1985	734.1	3066.8

(1) From Power Requirements Study, October 14, 1976

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TABLE 1.1a-3

COOPERATIVE'S HISTORICAL PEAK LOAD AND ENERGY SALES DATA

YEAR	PEAK DEMAND MW	ENERGY KWH (10^6)
1966	148.5	620.4
1967	161.2	662.2
1968	179.3	719.4
1969	194.1	787.8
1970	208.3	877.2
1971	228.2	966.3
1972	263.7	1,105.5
1973	273.3	1,181.1
1974	301.8	1,264.2
1975	320.6	1,355.2
1976	367.9	1,473.9
1977	376.1	1,547.3

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TABLE 1.1a-4

COOPERATIVES HISTORICAL MONTHLY SALES(1) - KWH (10^6)

Line No.	Month	1972	1973	1974	1975	1976	1977
1	January	-	122.69	125.90	135.92	162.32	192.29
2	February	-	119.43	123.70	143.22	160.27	170.18
3	March	-	101.37	112.40	129.52	124.35	132.31
4	April	-	102.64	109.36	122.50	118.55	128.61
5	May	-	86.53	94.34	100.20	105.49	106.04
6	June	-	86.06	89.08	91.83	99.35	101.16
7	July	-	81.45	86.15	90.57	98.36	103.80
8	August	-	83.98	89.20	97.46	100.58	106.70
9	September	-	91.62	92.55	96.56	100.67	107.95
10	October	85.76	85.39	97.08	100.98	108.97	115.88
11	November	97.13	103.51	110.19	112.98	140.02	123.08
12	December	114.78	116.38	134.23	133.48	154.91	159.37

(1) Information from REA Form 12 B

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TABLE 1.1a-5

COOPERATIVES HISTORICAL MONTHLY BILLING DEMAND(1) - MW

Line No.	Month	1972	1973	1974	1975	1976	1977
1	January	-	261.68	266.80	290.40	329.47	374.12
2	February	-	256.32	256.56	294.61	342.65	366.88
3	March	-	256.08	249.12	276.15	296.40	320.07
4	April	-	222.47	237.11	264.39	273.73	291.13
5	May	-	199.97	209.00	220.05	242.21	244.13
6	June	-	191.08	191.39	200.76	226.35	224.94
7	July	-	176.40	189.72	195.96	207.35	227.79
8	August	-	178.06	186.14	201.98	212.57	228.84
9	September	-	195.43	202.95	216.46	224.81	240.95
10	October	194.61	198.82	223.56	223.46	252.69	268.57
11	November	218.05	238.34	250.41	260.64	303.32	295.98
12	December	267.12	273.28	301.83	320.58	367.92	376.05

(1) Information from REA Form 12 B

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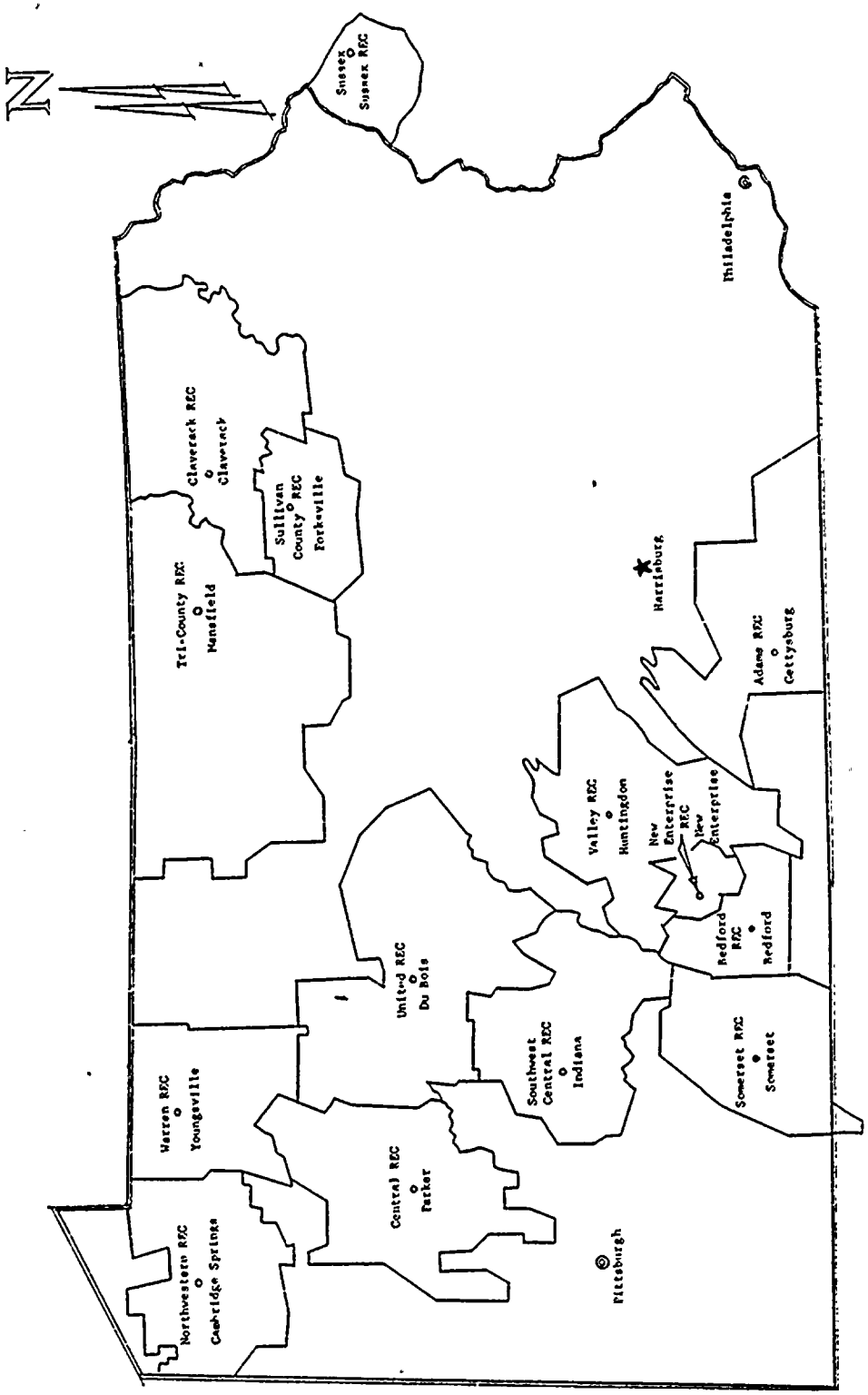
TABLE 1.1a-6

COOPERATIVE'S COMPARISON OF FORECAST AND ACTUAL

ENERGY REQUIREMENTS

KWH (10^6)

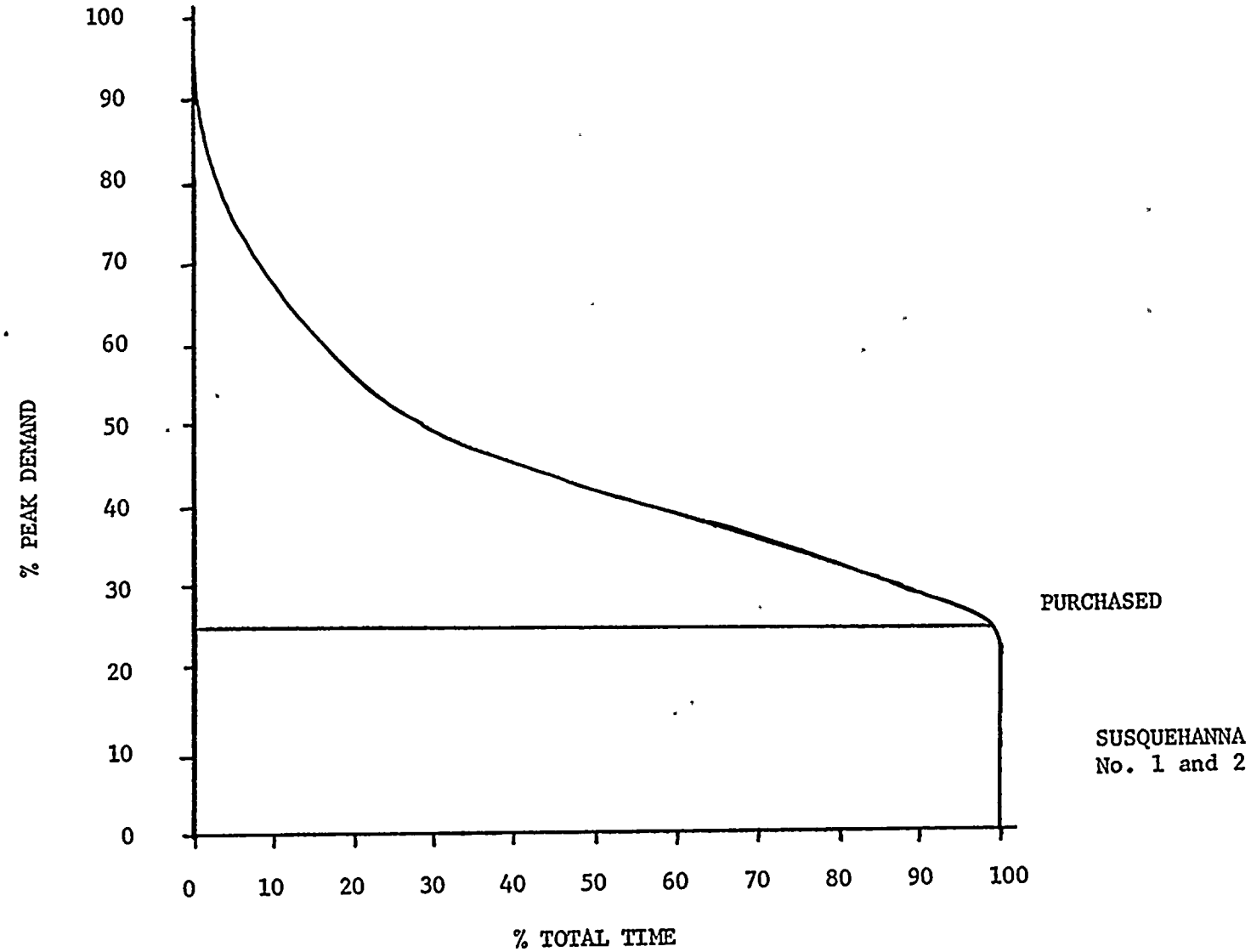
YEAR	ACTUAL	1976 POWER REQUIREMENTS STUDY	1974 POWER REQUIREMENTS STUDY
1974	1,261.3	---	1,304.8
1975	1,355.2	---	1,442.8
1976	1,473.9	1,478.6	1,595.2
1977	1,547.3	1,612.5	1,763.9
1978	---	1,758.5	1,950.3
1979	---	1,917.8	2,151.4
1980	---	2,091.5	2,373.2
1981	---	2,257.9	2,617.9
1982	---	2,437.5	2,887.8
1983	---	2,631.4	3,185.5
1984	---	2,840.8	3,521.9
1985	---	3,066.8	3,893.9



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

MAP OF COOPERATIVE'S SERVICE AREA

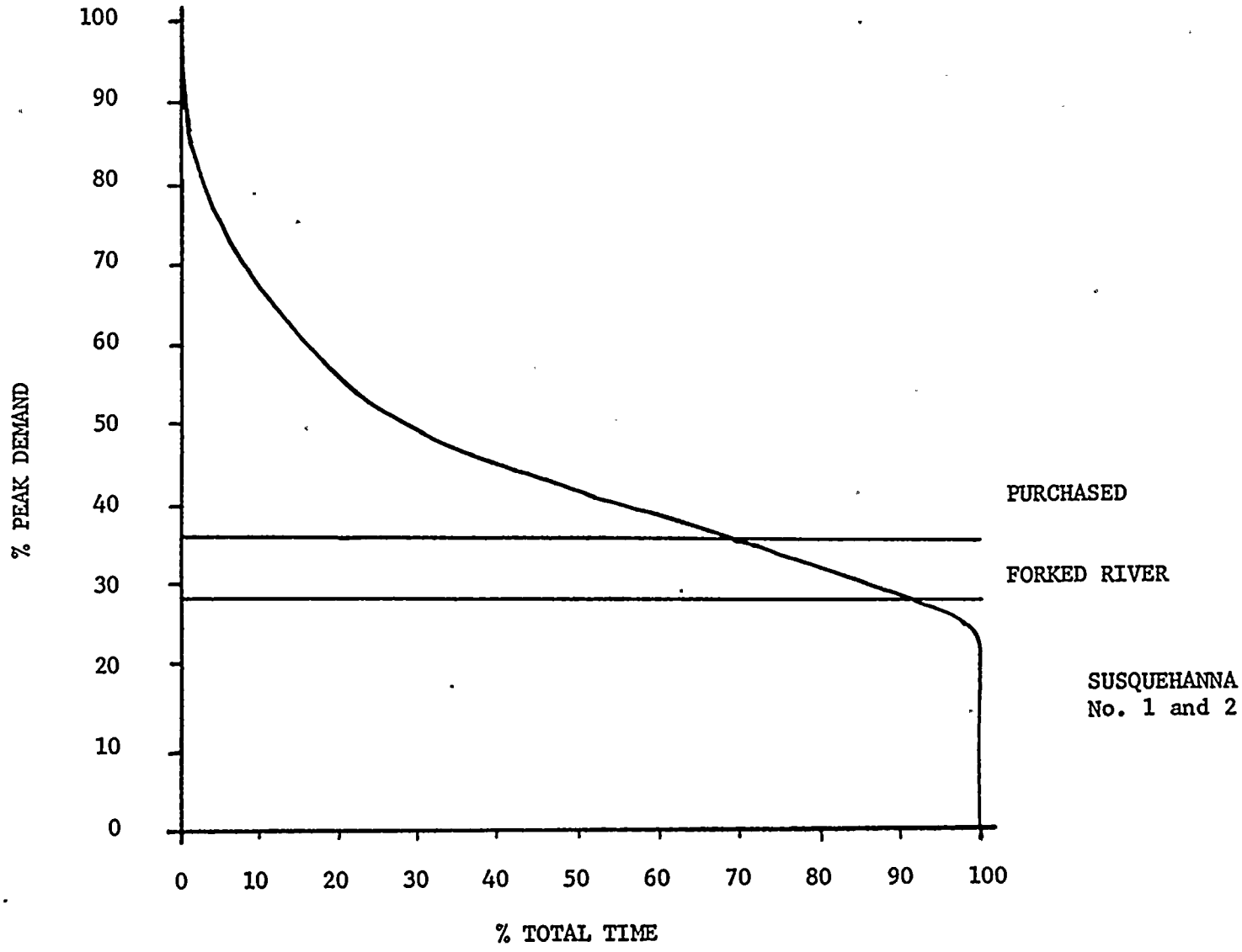
FIGURE 1.1a-1



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

COOPERATIVE'S ESTIMATED ANNUAL LOAD DURATION IN THE AREAS SERVED BY THE GPU SUBSIDIARY COMPANIES–1982

FIGURE 1.1a-2



SUSQUEHANNA STEAM ELECTRIC STATION
ER-OPERATING LICENSE STAGE
UNITS 1 AND 2

COOPERATIVE'S ESTIMATED ANNUAL LOAD DURATION IN THE AREAS SERVED BY THE GPU SUBSIDIARY COMPANIES-1985

FIGURE 1.1a-3

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CHAPTER 2
THE SITE AND ENVIRONMENTAL INTERFACES

2.1.0 GEOGRAPHY AND DEMOGRAPHY

2.1.1 SITE LOCATION AND DESCRIPTION

2.1.1.1 Specification of Location

The Susquehanna SES site is located in Salem Township, Luzerne County, Pennsylvania, on the west bank of the Susquehanna River. It is four miles south of Shickshinny and five miles northeast of Berwick. The nearest village is Beach Haven on the southeast edge of the main station site.

The Universal Transverse Mercator Coordinates for the center point between Susquehanna SES Units 1 and 2 reactors are 4,549,300 meters north and 403,800 meters east, Zone 18. These correspond to 41°05'30" north latitude and 76°08'55" west longitude and are also equivalent to the Pennsylvania Coordinate System (PCS) Coordinates 341,175 feet north and 2,442,025 feet east respectively. The PCS is used throughout this report.

Topography in the site area ranges from relatively flat floodplains to gently rolling hills. Elevations range from 500 feet on the floodplain to 1,600 feet above mean sea level (msl) on the northern boundary. In an east-west direction, the site is essentially flat from the river to U.S. Route 11. Elevation increases sharply to the west from U.S. Route 11 to the station site, rising from about 530 feet (msl) to about 700 feet (msl) in the station area, Site Vicinity Map, Figure 2.1-1. Continuing to the westerly edge of the site, the land is relatively flat and at about the same elevation as the main station buildings. Figure 2.1-2, Site Aerial View, is a photograph showing the site and local environs.

In a south-north direction, the site rises gradually from about 650 feet (msl) on the south boundary to about 900 feet (msl) on the north. The total site area is 1,075 acres, which includes the property on the floodplain, land between U.S. Route 11 and Township Road T-438 and agricultural land to the west of Township Road T-438. The main station site area within the security fence is approximately 100 acres.

The main station buildings are located on a terrace above the floodplain approximately 4000 feet west of the Susquehanna River (Site Facilities Plan, Figure 2.1-3). The land around the main station buildings is relatively open with trees on the steeper

slopes. It was formerly under cultivation for farm and orchard crops and is slowly reverting back to woodlands.

2.1.1.2 Site Area

A map of the site area is included as Figure 2.1-3. The station itself is located on the terrace above the floodplain approximately 4,000 feet west of the Susquehanna River. The land in and around the site was comprised of open fields and orchards; trees are found on most of the hills and higher ridges. Portions of the northern half of the site were under cultivation while the southern half is nearly all wooded. The site is essentially flat from the river west to U.S. Route 11. Elevation increases sharply to the west of U.S. Route 11 from about 530 feet msl to about 700 feet msl in the station area. The land continues to rise to the west and north to a maximum elevation of about 900 feet msl in the north central portion of the site.

The site boundary is the same as the station property lines and is shown on Figure 2.1-2.

The boundary lines of the station exclusion area (as defined in 10CFR100) and station property lines coincide only on the southern portion of the site (Figure 2.1-3). The exclusion area is defined as a circle with a radius of 1,800 feet with the center at the common release point. The coordinates (Pennsylvania Coordinate System) of the common release point are N 341,175 and E 1,441,970.5.

The site structures and facilities are shown on Figure 2.1-3. The Susquehanna SES contains two boiling water reactor generating units each with about 1050 MW net electrical capacity. The structures and facilities required to operate these reactors are as follows:

A. Main Station Structures and Facilities:

These are the structures and facilities required for the normal operation and/or safe shutdown of the station.

The Reactor, Turbine, Central Control, Diesel-Generator and Radioactive Waste buildings are adjacent to each other and are separated by expansion joints. These joints are designed to insure that each building is structurally independent of the others.

Each feature of the main facilities is described as follows:

a) Reactor Building

This building complex contains the Unit 1 and 2 primary containment structures which house the two boiling water reactors, the spent fuel storage pools, the engineered safeguard systems and the reactor auxiliaries. The building itself serves as a secondary containment structure.

b) Turbine Building

This building complex contains the two turbine generators for Units 1 and 2 including their auxiliary equipment.

c) Control Structure

This building is located between the reactor and turbine buildings. It contains the control room, cable spreading rooms, battery, heating and ventilating equipment and the standby gas treatment rooms.

d) Diesel Generator Building

This building contains the diesel generators and their auxiliary equipment. Diesel generators are required to provide emergency power if it is needed to shut down the station under emergency conditions without any other source of power.

e) Radioactive Waste Building

This building contains the equipment used to collect, consolidate, treat and process solid, liquid and gaseous radwaste prior to disposal. The equipment for treatment of liquid and gaseous radwaste prior to release is housed within this building.

f) Circulating Water Pumphouse

This building contains pumps to circulate water through the main condenser cooling water systems, service water pumps to supply general service water to the station, fire protection pumps and water treatment equipment.

g) Engineered Safeguards Service Water Pumphouse

This building contains the residual heat removal service water pumps and emergency service water pumps to supply water for shutdown cooling and for emergency core cooling.

h) River Intake Structure

The intake structure is located on the west bank of the Susquehanna River approximately 4,200 feet southeast of the site and provides make-up water to compensate for the water evaporated by the natural draft cooling towers.

i) River Discharge Structure

This is a perforated pipe constructed in the river bed downstream from the intake structure. Its function is to rapidly and uniformly mix the station discharge water with the main flow of the river.

j) Spray Pond

This approximately seven-acre, concrete lined, 25 million gallon capacity spray pond is used to store water for cooling the reactors during an emergency shutdown created by the loss of the normal water supply. The heated water is cooled by conducting it through the pond's piping network and spraying it into the atmosphere. The cooled water then falls into the pond and is directed back to the service water systems.

k) Cooling Towers

The two reinforced concrete, hyperbolic, natural draft cooling towers cool the water for the normal operation of the station. These structures are 540 feet high with a base diameter of 420 feet.

B. Auxiliary Station Structures and Facilities

These structures are required for the normal operation of the station and are necessary for such disciplines as administration maintenance, security, storage, etc.

a) Service and Administration Building

This two-story building houses the station administrative staff and consists of: offices, meeting rooms, equipment service area, machine shop, warehouse and locker facilities.

b) Chlorine Evaporator and Acid Storage Building

This building houses the equipment used to treat the circulating water to prevent scaling and biological fouling in the circulating water cooling system.

c) Security Buildings

(1) North Gate House (Alternate Security Control Center)

This building is located at the main gate entrance and controls access to the security controlled area enclosed by the main station fence. This structure also houses the alternate security control center.

(2) South Gate House

During peak influx traffic flows into the station, this building is used as a secondary entrance through the main station fence.

3) Security Control Center

This is the main intrusion detection security building of the site.

d) Sewage Treatment Plant

This facility is a complete, extended aeration package plant and contains all of the equipment necessary for the treatment of all station sewage.

e) 500 KV Substation

This facility is used to distribute the electricity produced at the station to related transmission line systems.

f) Site Buildings Retained from the Construction Phase:

Several buildings which were built during the construction phase have been retained for permanent use. The larger buildings used during construction were designated as: the Warehouse, Change House, Project Office and Combination Shop. In addition to those construction buildings several residential houses acquired during the land acquisition phase were cleared of residents and used as temporary offices by the station construction personnel. These buildings are used during station operation as temporary construction

offices and/or warehouses for the construction and maintenance personnel.

C Other Site Features

These features of the site are not required for station operation:

a) Recreation Area

The recreation area is located on the 370-acre floodplain located between the Susquehanna River and the present railroad tracks east of U.S. Route 11. Because of past flooding (1936, 1972, 1975), this recreation facility is generally limited to passive use activities such as picnicking and hiking. Also a 50-acre island can be used for a nature area.

Water recreation will include a 35-acre lake, utilizing existing ponds and a restored section of the North Branch Canal. The picnic sites serve a low density recreational population.

Traffic control for normal, as well as emergency conditions is assured by limiting visitor vehicle access to two entrances. Where practical, parallel to the railroad, trees and shrubs were planted to serve as an audio-visual buffer between the railroad and the recreation area.

The facilities offer expanded recreational opportunities to the residents of nearby communities. All of the recreational developments are discussed in Subsection 3.1.6.

b) Energy Information Center

This center was built to inform the public of the operation of the station and the necessity for nuclear energy in today's world.

c) Simulator Building

This building is used to train operating personnel in the use and maintenance of the station control room.

d) Biology Laboratory

This laboratory was designed to monitor the site environs (land, river, etc.) to detect any impact of the station on the area ecology before and during the operation of the station.

e) Meteorological Tower

A 300-foot meteorological tower was erected containing instruments to monitor meteorological conditions at the site. A small building, located at the base of the tower, houses additional instrumentation.

D. Site Data

The locations of the facilities mentioned are shown on Figure 2.1-3. There are no industries or residences within the 1,800 foot exclusion area of the Susquehanna SES. Also there are no shrines, monuments or other items listed in the National Register of Historic Places located within the site boundary.

Aside from transit through the exclusion area along Township Road T419, there are no activities permitted within this zone other than those related to station operation.

The boundary lines of the station exclusion area are shown on Figure 2.1-3. All of the station exclusion area boundary is within the site property area. Approximately 1,350 feet of station exclusion boundary line coincides with the station property lines. The minimum distance from the common release point of both reactor units to the exclusion area boundary is 1,800 feet. The distance to U.S. Route 11 is about 2,800 feet and the distance to the Consolidated Rail Corp (ConRail) railroad track is about 2,900 feet. The recreation facilities are located on the flood plain and outside the exclusion area. There are no residences within the exclusion area and no major highways pass through it. Township Road T419 passes approximately 1,600 feet north of Reactor Unit No. 1 and is very lightly traveled with about 100 cars per day as the average traffic.

Highways that traverse the site are:

a) On the north - Salem Township Road T-419

b) On the west - Salem Township Road T-438

c) On the south - Salem Township Road T-456

d) On the east - U.S. Route No. 11

Railways that traverse the site are:

ConRail, the only railway traversing the site is located on the floodplain approximately 2,900 feet east of the center of the exclusicn area. This line is only being used by the Applicant. The portion of the line north of the site is not beinq used at present. An access spur from the main line of the railroad onto the site permits rail service to the station.

The station property is bounded on the east by the Susquehanna River, which flows from north to south. It is naviqable only by small pleasure and fishinq boats because of shallow water and obstructions.

2.1.1.3 Boundaries for Establishinq Effluent Release Limits

The exclusion area is the area within a radius of 1,800 feet from the common release point of both reactors, (Figure 2.1-3). The distance from the station qaseous effluent release points to the boundary is at least 1,800 feet.

The station liquid effluent release point is located at the river approximately 4,000 feet from the qaseous release point (see Subsection 3.1.4).

2.1.2 POPULATION AND POPULATION DISTRIBUTION

The population in the vicinity of the Susquehanna SES is sparsely distributed. The steep sloped ridqes and the prevailinq land use, aqriculture, combine to yield a low population density outside of the communities. The nearest major populated area, the Wilkes-Barre/Scranton corridor, is 15 to 30 miles northeast of the site, Table 2.1-1, Population Changes of the Counties within 20 Miles of the Site, indicates a steady decline in population since 1940. Columbia County is the only exception. The increase in Columbia County, however, is lower than the populaticn qrowth rate of the U.S. Further, as shown in Table 2.1-2, Population by Residence for Counties within 20 Miles of the Site, 1960 to 1970, the rural population has declined in the counties, and the rural-farm has declined the most. It is probable that these trends will continue; small towns may increase in population, the rural-farm population will continue to decline; and the suburbs around Wilkes-Barre and Scranton will continue to qrow, althouqh at a low rate.

Transient populations were considered in calculating the population distribution in the site vicinity. Variations in the

transient population occur from 30 to 50 miles away from the site. This subject is discussed in greater detail in Subsection 2.1.2.3.

2.1.2.1 Population Within 10 Miles

The population within 10 miles of the site was sparsely distributed in 1970. The population within 10 miles of the site may be characterized as a declining rural-farm population with a few small communities scattered through the area. As shown in Figure 2.1-4 and Table 2.1-3, Population Distribution, 1970, 0-10 Miles, the bulk of the population was located in sectors WSW, NE, SSE and SW. These sectors contain all or part of several small communities (Table 2.1-4 Communities Within 10 Miles of the Site, 1970); however, none of these communities exceeded 25,000 people, and none qualifies as a population center (10CFR100) (Ref. 2.1-1). The rest of the area is agricultural; however, the number of farms between 1964 and 1969 declined by 34% for Luzerne County and 17% for Columbia County (Ref. 2.1-2). This decline combined with a decline in farmland (7% for Columbia and 24% for Luzerne) indicates a decline in agriculture in the vicinity of the site. For age distribution information see Subsection 2.1.2.4.

2.1.2.2 Population Between 10 and 50 Miles

As shown in Figure 2.1-5 and Table 2.1-5, Population Distribution, 1970, 10-50 Miles, the major focus of the population between 10 and 50 miles is the Wilkes-Barre/Scranton corridor. In 1970 Wilkes-Barre had 58,856 persons and Scranton had 103,564. Further, the two cities form the nuclei of two Standard Metropolitan Statistical Areas (SMSA's) which showed a slight total population on decline between 1970 (576,408) and 1960 (581,503).

Outside of the Wilkes-Barre/Scranton and Hazleton SMSA's the study area is rural in nature. It is expected that this area will remain rural. At the eastern edge of the study area, there is a concentration of vacation housing. Pike and Monroe counties, for example, have relatively high percentages of seasonal housing (See Subsection 2.1.2.3.1).

2.1.2.3 Transient Population Between 0 and 50 Mile

The transient population around the site are of three types:

1. Seasonal
2. Daily
3. Transportation

A seasonal population is dependent upon the time of year. Examples of seasonal dependency are tourists at resort areas and migrant workers. Commuters, a daily population, for example, may be present in an area 40 hours out of the 168 hours in a week. Another example of a daily population is the visitors to the mountains for the day. Finally, a transportation population is associated with some mode of transportation. For example, several thousand vehicles pass a particular location on a highway during a day, however, the persons in these vehicles may be in the site vicinity a few minutes only. Furthermore, many of the vehicles counted may be those of local residents going to and from work, or running errands.

The seasonal and daily populations are of interest to the location of a nuclear power station. The seasonal population may be many times the size of the permanent population. It is necessary to appropriately weigh such a population and add them to the resident population to calculate a usable cumulative population distribution. At the Susquehanna site a significant seasonal transient population is not present.

2.1.2.3.1 Seasonal Population Between 0 to 50 Miles

Within a 30-mile radius of this site there are all or part of eleven counties (Table 2.1-6, Seasonal Population of Counties in Study Area). The first step in identifying the seasonal population in these counties is to identify those dwelling units which are seasonal and those which are permanent (Ref. 2.1-3). Table 2.1-6 shows the classification of dwelling units for 1970. Seasonal and migratory housing comprise 2.3% of all the housing units in the counties located within 30 miles of the site. The population from seasonal housing in Columbia and Luzerne Counties is estimated to be about 4,300. This figure is approximately 1% of the total population in Columbia and Luzerne counties residing within 10 miles of the site. The seasonal population is a product of the number of seasonal housing units (1,435) and the average number of persons per housing unit (3). However, in Columbia and Luzerne counties, which make-up most of the land

area within 10 miles of the site, seasonal housing comprises approximately 1% of all the housing units.

From 30 to 50 miles the seasonal population maintains the same general concentration as it does within 30 miles of the station.

Table 2.1-6 shows that Pike, Wayne and Susquehanna counties have rather high concentrations of seasonal population. Each of these counties are northeast of the site. The seasonal population for the area defined by a 50 mile radius from the site was weighted, projected and incorporated in the Population Distribution (Tables 2.1-3, 2.1-5, 2.1-7 through 2.1-16 and Figures 2.1-4 through 2.1-15). The population classed as seasonal was derived in four steps:

1. Assume the seasonal housing is evenly spread over the area of the county.

2. Using a planimeter, the proportion of a county's area which is covered by a population wheel sector was determined.

3. Multiply the total seasonal housing by the proportion derived in Step 2 and the average persons per dwelling as reported in the U.S. Census of Housing.

4. The U.S. Census of Housing defines a seasonal dwelling unit as being vacant for six months or more of the year; therefore, multiply the population derived in step 3 by one-half.

The estimated population was then added to the resident population for the population wheel sector in question.

Other sources of seasonal populations are daily visitors to attractions such as parks, wildlife refuges and national forests. It is difficult to weigh the population due to these attractions since the length of stay is usually unknown. Furthermore, persons who visit a park and hike or swim for the day are often from within the study area. Thus, instead of there being a net increase of persons in the study area, there may only be a redistribution of persons. The station recreation area is estimated to have a peak daily attendance of 800 persons. The nearest recreational area of a significant size is Ricketts Glen State Park, located approximately 15 miles NNW of the site in Luzerne County. Hickory Run State Park in Carbon County is located 20 miles east of the site. Attendance at these parks was not included because of possible counting of local residents who visit the parks.

2.1.2.3.2 Daily Transient Population

Persons who work at locations which are different than their residences constitute shifts in population during working hours. Especially large employers or urban centers can result in substantial shifts in local population. The Susquehanna site has a favorable location with regard to daily shifts in population. Within 5 miles there are only ten industries which would result in a daily addition to the population; however, these industries employ a total of approximately 893 persons (see Table 2.1-17, Industries Within Five Miles of the Site). When one weighs these by 40/168 (the proportion of working hours to total hours in a week) then there occurs a net addition to the residential population of about 213 persons.

In Columbia and Luzerne Counties commutation patterns to work are away from the site. In luzerne County, the City of Wilkes-Barre, located 21 miles to the northeast, is a major urban and employment center. Valmont Industrial Park, located in the City of Hazleton 15 miles southeast of the site, is another important employment center. In Columbia County Berwick Borough located six miles to the southwest and Bloomsburg located 20 miles to the southwest are the major employment and urban centers.

Table 2.1-18 Patterns of Commutation in Luzerne and Columbia counties, 1970 shows that in 1970 Luzerne County experiences a net population loss of 4,000 from people commuting to work. Columbia County on the other hand gains about 1,500 in population. Table 2.1-19 Origin of Commuters for Columbia County and Destination of Commuters from Luzerne County 1970, shows that Columbia County receives its major gain in commuter population from Luzerne County. However the major loss of commuters from Luzerne County is to the northeast in Lackawanna County.

It has been assumed that the residential population presents a conservative (high) estimate of the distribution of persons in the vicinity of the station. This is supported by the location of Wilkes-Barre to the Northeast of the site. Persons who live in the area of the site most likely work at or near Wilkes-Barre; consequently, they commute away from the site to work.

2.1.2.3.3 Population Projections

The projections used are based upon U.S. Bureau of Census population projections for the nation (Ref. 2.1-2). These projections are "stepped-down" to the local level by a ratio technique (see Subsection 6.1.4). The U.S. Census projection series for the nation is based upon fertility assumptions. For the projections used in this report, two basic fertility

assumptions are made; one is that the completed cohort fertility is 2.7 children per woman, which is characteristic of a growing population, and the other is 2.1 children per woman, which is characteristic of a replacement population growth. At this time the 2.1 completed fertility generates birth rates which are comparable to national birth rates experienced in 1970-1974 (Ref. 2.1-4). It is reasonable to assume that the 2.1 completed fertility rate applies to the site area. The U.S. Census projections virtually assume a closed population. That is, on the national level migration of persons into or out of the U.S. is considered negligible. However, such a situation does not exist for the Pennsylvania area. For example, between 1960 and 1970 the U.S. population increased by 13%; however, Pennsylvania's population increased by 4%. These figures indicate that Pennsylvania experienced out-migration. To include migration in the projections, the trends established in the 1960 to 1970 decade are assumed to apply from 1970 to 2020 (Ref. 2.1-5 and 2.1-6). The results of these projections are given in Tables 2.1-7 through 2.1-16 and Figures 2.1-4 through 2.1-15.

There are two observations that can be made about the 1970 population distribution and subsequent projections.

1. As shown in Table 2.1-20, Cumulative Populations for 1970 and 1980, various radii of the population wheel do not exceed the cumulative population that is characteristic for a uniformly distributed population of 500 persons per square mile.

2. As shown in Table 2.1-21, Cumulative Populations for 1990, 2000, 2010 and 2020, do not exceed the cumulative population that is characteristic of a uniformly distributed population of 1,000 persons per square mile.

These observations indicate that the Susquehanna site is in a relatively isolated, low population density area. If one were to use the 2.7 fertility, 1960 to 1970 migration projection series as a comparison for the series presented in Tables 2.1-1 through 2.1-10 then the range for populations in 2020 is only 300,000 persons (Table 2.1-22, 2020 Projections for Various Fertility Assumptions). Such a range indicates that even at the date (2020) when the projections should be most divergent, the cumulative population is still less than that cumulative population which is characteristic of a uniformly distributed population of 1000 persons per square mile.

2.1.2.3.4 Low Population Zone

The distance of the low population zone (LPZ), established for the Susquehanna SES in accordance with 10 CFR 100, is a three-

mile radius from the center of exclusion area. From a house count in the field conducted in April, 1976, the population in the LPZ is approximately 2,400. Existing and projected population distribution data for distances up to 50 miles from the station are on Tables 2.1-3 through 2.1-16 and 2.1-20 through 2.1-21.

No schools, hospitals, state or municipal parks are located within the LPZ. The station recreation area is within the LPZ. One industrial plant, the Luzerne Outerwear Company is located within the LPZ. The plant employs 486 persons who would contribute to the peak daily transient population. Seasonal population and daily transient populations are discussed in Subsection 2.1.2.3.1.

2.1.2.4 Age Distribution

For the population within the 50-mile study area the age distributions may be given as the U.S. age distribution. Regulatory Guide 4.2 Revision 2, states that the U.S. age distribution may be used "provided there is no knowledge the site has a significantly different distribution." Using 1970 Census of Population data, this table shows that Luzerne County's age distribution does not exceed the U.S. age distribution by 10% for any of the categories. This is shown in Table 2.1-23, Age Distribution For U.S., Luzerne County, And Study Area (1970). Further, the age distribution for the 22 counties (Table 2.1-24 Counties Totally or Partially within 50-miles of Susquehanna SES), within the 50-mile study area differs from the U.S. age distribution by less than 10%. As indicated in Appendix D of the above mentioned Regulatory Guide, no refinement of the U.S. Age Distribution is required since the counties within 50 miles of the site are not significantly different than the U.S. population.

2.1.3 USES OF ADJACENT LANDS AND WATER

The major transportation routes located within five miles of the site include U.S. and state highways, and the ConRail and the Delaware Hudson Railway Lines. These transportation routes are shown on Figure 2.1-16, Major Transportation Routes and Pipelines.

U.S. Route 11, a north-south highway adjoining the eastern boundary of the site, runs east and then south of the station site. Its closest approach is approximately one-half mile east of the site. Pennsylvania Department of Transportation 1975 traffic volume statistics show that the average 24-hour traffic

flow on this seqment is 7,500 vehicles. Other major state highways within five miles of the site are Pennsylvania State Routes 93 and 239. The closest approach of Route 93 to the site is approximately five miles to the southwest. The average 24 hour traffic flow at this point is 3,700 vehicles. The closest approach of Route 239 to the site is four miles north at Shickshinny. The average 24-hour traffic flow at this point is 1,300 vehicles (Ref. 2.1-7).

Two interstate highways (I-80 and I-81) are located within 10 miles of the station. The closest approach of I-80 to the station is about 9 miles to the southwest. Here the average 24-hour traffic flow is 20,000 vehicles. The closest approach of I-81 is approximately 8.25 miles to the southeast. Here the 24 hour traffic flow is 13,100 vehicles.

There are two railroad lines located within five miles of the site. The ConRail (formerly Erie-Lackawanna Railroad) line is the nearest railroad line to the station, with a spur serving the site. The ConRail line's closest approach to the site is approximately one-half mile to the east. The only traffic on this line goes to the station. North of the site there is no present or projected traffic, (Ref. 2.1-8).

The Delaware and Hudson Railway Company (formerly Penn Central Railroad) is located on the east bank of the Susquehanna River approximately 1.25 miles to the east.

Oil and natural qas pipelines located within five miles of the site are shown on Fiqure 2.1-16, Table 2.1-25, Pipelines Within Five Miles of the Site and described in Subsection 2.1.3. Gasoline storaqe tanks located within five miles of the station are also shown on Fiqure 2.1-16.

There are two sand and qravel processinq facilities within five miles of the site. They are located approximately 2.5 miles southwest of the site. No explosives are used or stored on these sites. Their locations are also shown on Figure 2.1-16.

There are no military bases or missile sites located within five miles of the site. There are two military defense facilities within 50 miles of the site. The nearest is the Tobyhanna facility located about 38 miles to the east. The Edward Martin Military Reservation at Indiantown Gap is located approximately 50 miles southwest.

The nearest airport is the Berwick Airport, which is approximately four miles southwest of the site. The closest major airports are Hazleton Municipal Airport and Wilkes-Barre/Scranton Airport, which are 12 miles southeast and 28 miles northeast of the station respectively. The control area for the Hazleton Municipal Airport reaches to a point five miles from the

site. Figure 2.1-17, Airport and Airline Route Map, shows the locations of these airports and the control area for the Hazleton Municipal and the Wilkes-Barre/Scranton Airports.

Federal Vortac (VOR) airways passing near the site are as follows:

1) V-499 3.0 miles west, Lancaster, PA to Binghampton, N.Y.

2) V-106 3.5 miles southeast, Wilkes-Barre/Scranton to Johnstown, PA.

3) V-164 6.7 miles southwest, Allentown to Williamsport, PA.

4) V-232 9.0 miles south, Newark, N.J., to Cleveland, OH

5) V-188/226 13 miles north, Wilkes-Barre/Scranton to Williamsport, PA.

2.1.3.1 Descriptions of Industries & Public Facilities

All industries located within five miles of the Susquehanna SES are listed on Table 2.1-17, along with their products and number of employees. None of these manufacturers stores any explosives or hazardous materials. The nearest industry to the site is Luzerne Outerwear Manufacturing Corporation which is located 1.25 miles NNE. The company does not use any explosive material. The Company employs 486 employees (Ref. 2.1-9). The remaining industries within five miles of the site are located in Shickshinny Borough, Berwick Borough, Nescopeck Borough, Nescopeck Township, Conyngham Township (Luzerne County) and Salem Township.

There are 40 industries located in Berwick Borough beyond the five mile limit but within a distance of seven miles from the site. The three largest employers are Wise Foods with 1,141 employees, Berwick Forge and Fabricating Company with 724 employees and Consolidated Cigar Company with 567 employees. The remaining industries are mainly manufacturers of apparel and other finished products. None of these industries located beyond five miles uses or stores any explosive or hazardous materials.

There are six schools and a hospital located within five miles of the site. Berwick Hospital has 195 beds. These schools have a total enrollment in 1975-76 of 3,054 students as indicated in Table 2.1-23, Schools Within Five Miles of the Site. There are seven other schools in Berwick Borough located beyond five miles

but less than seven miles from the site. Their total enrollment in 1975-76 was 2,390 students.

2.1.3.2 Descriptions of Products and Materials

The railroads transport unrestricted cargo. They may carry explosives and toxic materials. Delaware and Hudson Railway makes two runs per day except Tuesday and Thursday when there are four runs. ConRail makes only special runs to the station, transporting specific material (Ref. 2.1-10).

2.1.3.3 Pipelines

As shown in Figure 2.1-16 there is one natural gas distribution pipeline and two oil pipelines within five miles of the site. Table 2.1-25 lists pipe sizes, operation pressure, age, location, type of isolation valves and types of fluid carried. The closest approach of the natural gas pipeline to the site is 1.5 miles to the north. Currently, there are no other natural gas pipelines located within five miles of the site.

The Sun Pipeline's (oil) closest approach to the site is 0.75 miles to the northeast. The Arco Pipeline's (oil) closest approach is 2.5 miles to the west.

2.1.3.4 Waterways

Navigation, except for recreational boating, is negligible on the Susquehanna River. Therefore, no commercial traffic occurs in the vicinity of the Susquehanna SES. Only recreational boating, and sports fishing occur in the vicinity of the Susquehanna SES. (Ref. 2.1-11).

2.1.3.5 Airports

Berwick Airport, which is located approximately four miles southwest of the site, is the closest airport. No commercial traffic uses the airport; it can handle only small single engine and twin engine airplanes. The direction of the runway is east to west. Its length is 2,300 feet and it has a grass surface. The airport has a normal left hand traffic pattern (Ref. 2.1-12). There are no plans at this time to expand the airport facilities.

The Hazleton Municipal Airport is located 12 miles southeast of the site. The airport serves commercial, private and corporate airplanes. The airport has one paved runway with a length of 4,800 feet with an east-west orientation. The flying pattern is a normal left hand pattern. The number of operations in 1975 was 72,000. Future expansion plans call for extending the runway to 5,000 feet to accommodate larger aircraft (Ref. 2.1-13).

The Wilkes-Barre/Scranton Airport located 28 miles northeast of the site handles single wheel, dual wheel and dual tandem wheel airplanes. The types of commercial aircraft using the airport are Boeing 727s, BAC-111s and DC-9s. The airport has three asphalt paved runways. The length of the longest runway (Runway 4-22) is 6,499 feet. The restricted maximum weight is 110,000 pounds for single wheel loads, 169,000 pounds for dual wheel loads, and 300,000 pounds for dual tandem wheels. The lengths of the two remaining runways are 4,499 and 3,700 feet. The orientation of the runways are as follows: 4-22-SSW to NNE; 10-28-E to W; 16-34-NNW to SSE. The number of operations conducted at the airport in 1973 was 78,800. The airport Master Plan forecasts of total operations in 1980, 1985, and 1995 are 106,800, 129,100 and 167,400 respectively. (Ref. 2.1-14). The average number of daily operations in 1973 was about 260. It is proposed in the Airport Master Plan that runway 4-22 be extended during the 1975-1980 time period.

2.1.3.6 Projections of Industrial Growth

Commonwealth employment forecasts for textile and apparel manufacturing for the Bloomsburg - Berwick and Wilkes-Barre - Hazleton Labor Market Areas indicate negligible industrial expansion. Employment is projected to increase 5.1% (3,500 to 3,679) in textile manufacturing and 14% (1,621 to 1,870) in apparel manufacturing from 1970-1990 in the Berwick - Bloomsburg Labor Market Area. For the same period of time in the Wilkes-Barre - Hazleton Labor Market Area, employment is projected to decrease by 40% (3,057 to 1,808) in textile manufacturing and to increase 6.2% (17,703 to 18,815) in apparel manufacturing (Ref. 2.1-15).

2.1.3.7 Recreation Land Use

2.1.3.7.1 Recreational Facilities and Activities Within A 10 Mile Radius of the Station Site

There is one county park, Briar Creek Lake Park, (Columbia County) located within a ten-mile radius of the station. There

are no federal or state parks within the ten-mile radius. In Luzerne and Columbia Counties there are State Game Lands where the primary recreation activities included hunting, backpacking, camping, hiking, cross country skiing, and sledding.

Camping areas include two girl scout camps and three privately owned campgrounds. Camp Joy-Lo Girl Scout Camp, located in Luzerne County, 4 miles southeast of the station, is used mostly on weekends for general camp craft projects. Camp Louise Girl Scout Camp is located in Columbia County, 9 miles northwest of the station. The camp is opened all year with its most extensive use in the summer. During the summer the maximum capacity is 240 persons which decreases to 80 in the winter. The nearest privately owned campgrounds is located 4.5 miles SE of the station in Luzerne County, Moyers Camp Grove. Moyers Camp Grove has 93 camp sites and 5 cabins. Hidden Lake Camp sites also located in Luzerne County 8.9 miles NNW of the station has 125 camp sites and 4 cabins. The Hazleton-Wilkes-Barre Kampgrounds of America (KOA) in Luzerne County is located 9 miles to the southeast. It contains 75 camp sites (Ref. 2.1-16).

The recreational facilities and activities located within 10 miles of the Susquehanna SES are listed on Table 2.1-27, Recreational Facilities Within a 10 Mile Radius of Site, and shown in Figure 2.1-18, Recreation Out to 50 Miles.

2.1.3.7.2 Major Recreational Facilities and Activities Within a 10 to 50 Mile Radius of the Station Site

The major recreational facilities and activities located between 10 and 50 miles of the Susquehanna SES are listed on Table 2.1-28, Recreational Facilities Within a 10 to 50 Mile Radius of the Site, and shown on Figure 2.1-18.

The dominant major recreational facilities within a fifty mile radius of the station are 18 state parks. These parks have facilities for high-intensity recreation activities ranging from backpacking to swimming and boating. The parks are open year round with 80% of their annual attendance occurring between May 30 and Labor Day. Presently, for five proposed state parks, land is either being acquired or the park is being developed. These parks are: Nescopeck Creek State Park, 16 miles to the east; Lehigh Gorge State Park, 25 miles SSE; Swatara Gap State Park, 44 miles SW; Jacobsburg State Park, 48 miles SE; Blue Marsh State Park, 49 miles S.

There are two federal recreation areas which are administered by the U.S. Army Corp. of Engineers, Francis Walter Dam (Carbon County) and Aylesworth Creek Reservoir Park (Lackawanna County).

Francis Walter Dam when its development plan is completed will have a capacity for 240,000 people.

The nearest county park to the station is Moon Lake, located 12 miles northeast in Luzerne County. Trexler-Lehigh Game Preserve located 41 miles southeast in Lehigh County has the largest attendance (109,141) of the county parks in 1976.

Private recreational areas include Hawk Mountain Sanctuary, four amusement parks and one campground on Lake Wallenpaupack. Attendance data are not available for the amusement parks (Ref. 2.1-16).

2.1.3.7.3 Limited Recreation Areas Within A 10 to 50 Mile Radius of the Station Site

Limited recreation areas include state forests and county parks having low intensity recreational activities. Backpacking, hiking, boating (canoe or sailing) snowmobiling and horseback riding are the typical recreational activities undertaken in these areas (see Table 2.1-29, Limited Recreation Areas Within a 50 Mile Radius of the Site). These types of recreational activities tend to have lower participation rates than do the swimming and picnicking activities in the state parks (Ref. 2.1-16).

2.1.3.8 Agricultural Land Use

Approximately 11% of the 891 square miles of land (570,000 acres) in Luzerne County are utilized for farming by about 500 farms. Revenue from agricultural products sold in 1974 amounted to about $9,200,000 (Ref. 2.1-17). In 1975, 0.8% of Luzerne County's total work force was employed in agricultural activities (Ref. 2.1-18). The county's agricultural sales are broken down in Table 2.1-30, Proportion of Gross Sales for Agricultural and Livestock Products 1974.

The amount of tillable land on the site is about 300 acres and includes both floodplain and upland areas. The only current farming on the site is by a tenant farmer working approximately 175 acres of floodplain land.

Summaries of Annual Production of Milk, Meat and Poultry, Fruit, Vegetable and Potatoes Within 50 Miles of the Susquehanna SES are provided on Tables 2.1-31, 2.1-32 and 2.1-33 respectively.

2.1.3.9 Residence Within FIve Miles

The Nearest Residence in Each Sector Within Five Miles of the Site is shcwn on Table 2.1-27.

2.1.3.10 The Nearest Residence and Farms

The locations of the nearest residence, milk cow, milk goat, site boundary and vegetable garden (greater than 500 feet square in area) can be found on Tables 2.1-34 through 2.1-38 respectively. The tables are organized according to sectors. The information on Tables 2.1-35 through 2.1-38 is limited to a five mile radius from the Susquehanna SES site. The cow and goat locations that are dairy operations are indicated on Tables 2.1-35 and 2.1-36. The usage of milk from smaller dairy farms is predominately home or local usage, primarily as fresh milk while the processed products are generated from commercial operations to which the larger dairy farms contribute predominately. The percentage of milk used for processed dairy products from the 50-mile area is offered on Table 2.1-39, Summary of Milk Distribution within 50-Miles of Susquehanna SES.

2.1.3.11 Fishing and Hunting

There is no occurrence of commercial fishing within 50 miles of the Susquehanna SES site. Recreational fishing is a predominate sport. Most fishing occurs on the east bank of the Susquehanna River between Shickshinny and Wapwallopen. The nearest public boat launching facility to the Susquehanna SES is the Berwick Boat Club. It is located about two miles south of the site near Bell Bend. Five species of fish compose 76% of the total number of fish in this area of the Susquehanna River. These five species of fish are carp, quillback, white sucker, shorthead redhorse and smallmouth bass. White sucker is the most abundant. (Ref. 2.1-19). Shellfish are absent from the fresh water environs.

Average Annual Hunting Harvest, found on Table 2.1-40 contains game species harvested by counties within 50 miles of the site. Some counties have only a portion of their area within this 50-mile radius (Ref. 2.1-20).

2.1.3.12 Ground Water Use

2.1.3.12.1 Water Well Inventory

A complete water well inventory in the local area was performed by making a house-to-house survey within two miles (3.22 kilometers) of the Susquehanna SES during March 1977. The results of this inventory with the available well data are presented in Table 2.1-41, Water Well Data Within Two Miles of the Station. The locations of these wells are given in Figure 2.1-19, Water Wells Within Two Miles of the Station. Wherever springs were utilized for water supply they were tabulated separately. The pertinent information on the springs used locally is given in Table 2.1-42, Spring Data Within Two Miles of the Station, and their locations are shown in Figure 2.1-20, Springs Used For Water Supply Within Two Miles of the Station. Estimates of present withdrawal rates from each well or spring were calculated on the daily per-person or per-animal consumption rates shown at the bottom of Tables 2.1-41 and 2.1-42.

A total of 185 water wells and 33 developed springs were inventoried in the two-mile (3.22-kilometer) radius area. The vast majority of the wells are used for domestic or stock watering purposes. Nineteen of the wells are used, at least in part, for commercial purposes, seven are currently unused, and one is used as standby for public supply purposes by the Citizens Water Company of Wapwallopen. The largest estimated average withdrawal from a single well in the area is about 2,700 gallons per day (gpd) or, 10,220 liters per day (lpd). With one exception, the developed springs in the local area provide supplies of water only for domestic and stock use. At Wapwallopen, the Citizens Water Company withdraws an average of 8,200 gpd (31,037 lpd) from a spring believed to issue from the Trimmers Rock Formation.

In the region, an inventory of major wells (with the exception of public-supply wells) located between two and 10 miles (3.22 and 16.1 kilometers) from the Susquehanna SES was performed. A major well was defined as one with a reported tested yield of 15 gallons per minute (gpm) or more (56.8 lpm or more). In addition, an inventory of all public supply wells located between two and 20 miles (3.22 and 32.2 kilometers) from the station was carried out. The source for both these inventories was a published report (Ref. 2.1-21) and unpublished records and computer printouts from bureaus of the Pennsylvania Department of Environmental Resources, (Ref. 2.1-22 through 2.1-26).

The results of the major well inventory are presented in Table 2.1-43, Data For Major Wells, Other Than Public Wells, Between Two an 10 Miles From the Station include well location, owner,

use, total depth, probable aquifer tapped, reported well yield, specific capacity and static water level. The locations of these wells are shown on Figure 2.1-21, Major Wells Two to 10 Miles From the Station, Excepting Public Supply Wells. A total of 77 major wells has been enumerated. Reported well yields range up to 550 gpm, (2082 lpm), and the median value of these wells for which yields is reported is 20 gpm (75.7 lpm). With the exception of three industrial wells located near Nanticoke, the remaining wells are used exclusively for domestic or stock-watering purposes.

The results of the inventory of public-supply wells are provided in Table 2.1-44, Data For Public Supply Wells Located Between Two and 20 Miles from the Station. Their locations are shown in Figure 2.1-22, Public Supply Wells Two to 20 Miles From The Station. A total of 213 public-supply wells was enumerated over the 20-mile (32.2-kilometer) radius area. The area has a large number of small municipal water-supply companies or municipal departments, and because of the relatively low yield of many wells completed in rock, a considerable number of wells is required. As shown on Figure 2.1-22, the majority of these wells are concentrated either in the vicinity of the Wyoming Valley, northeast of the station, or in the southeastern quadrant, in the Freeland-Hazleton-Mahanoy City area.

Table 2.1-45, Data for Public Supply Wells Located on the Susquehanna River Bank Within 20-Miles of the Station, presents only those public supply wells, extracted from Table 2.1-44, that are located on the river bank of the Susquehanna River. River bank wells are herein defined as those located within 500 feet (152 meters) of the edge of the river during normal flow.

A field inventory of all river-bank wells downstream of the Susquehanna SES within 10 miles of the station was performed in September 1977. A total of 152 wells were found downstream of the station within 500 feet of the river. These wells are tabulated in Table 2.1-46, Data For Susquehanna River-Bank Wells Within 10 Miles and Downstream of the Station, and their locations are indicated on Figure 2.1-23, Susquehanna River-Bank Wells Within 10 Miles and Downstream of the Station.

2.1.3.12.2 Ground Water Withdrawal

The estimated average ground water withdrawal rate during 1976 from all wells and springs within a two-mile radius of the site is 56,000 gpd, which is equivalent to only 38.9 gpm (147.2 lpm). Table 2.1-47, Estimated Ground Water Withdrawal in 1976 Within Two Miles of the Station, shows the estimated withdrawals from wells and from springs, as well as from individual geologic units within this local area for that year. Approximately 52% of the

withdrawals is from the Mahantango Formation. Spring withdrawal amounts to about 25% of total ground water use in the area. The values in Table 2.1-47 were obtained by summing up the appropriate figures in the column for "estimated present average withdrawal" in Tables 2.1-41 and 2.1-42.

The estimated Projections of Future Ground Water Withdrawal Within Two and 20 Miles of the Station through the year 2020 in the two-mile (3.22-kilometer) radius area are given in Table 2.1-48. It is estimated that by the year 2000, ground water withdrawal within two miles of the station will amount to about 64,000 gpd (242,240 lpd). The projections are based on the population projections given in Tables 2.1-20 through 2.1-21.

Estimates of regional groundwater withdrawals are based on: records and computer printouts of the Pennsylvania Department of Environmental Resources (DER) (Ref. 2.1-27); a personal communication with water departments (Ref. 2.1-28), and the U.S. Census publication for 1970 (Ref. 2.1-29). Tables 2.1-49, Major Ground Water Withdrawal and Population Served by Water Supply Companies Within a 20-Mile Radius, and 2.1-50, Estimation of Total Groundwater Withdrawal in 1975 Within 20 Miles Radius of the Station, summarize the information and calculations on which were based the estimate of the ground water withdrawal rate for 1975 within 20 miles (32.2 kilometers) of the station. As shown in Table 2.1-50, the estimated average withdrawal in 1975 from all geologic units by water departments or companies and by industries was 6.3 mgd (million gallons per day), or 23.8 mld (million liters per day) and that from private domestic wells and springs was 5.2 mgd (19.7 mld). Thus, the estimated average withdrawal rate in 1975 was 11.5 mgd (43.5 mld) for the 20-mile (32.2-kilometer) area.

Table 2.1-48 gives the estimated projections of ground water use in the region through the year 2020. These projections are also based on population projections, as found in Tables 2.1-20 and 2.1-21. The estimated average ground water withdrawal rate within 20 miles (32.2 kilometers) of the station for the year 2000 is 12.1 mgd (45.8 mld).

2.1.3.13 Downstream Surface Water Uses

Information has been collected for known points of water use within a 50 mile water route distance from the Susquehanna SES site.

Users on or near the Susquehanna River downstream of the site are included, since these are the only locations where detectable amounts of radioactivity could possibly affect such use. The types of use found are municipal water supply, industrial use and

recreation. Most of this information was obtained from the DER (Ref. 2.1-30 to 2.1-33). Listed in Table 2.1-51, Water Users, are known water users on or near the Susquehanna with their location, type of use, radial and water route distance from the station site, present total and consumptive use and, where available, projected use with sources and dates of projections. The locations of the water users in Table 2.1-51, are indicated on the map of the river presented in Figure 2.1-24, Water Users of the Susquehanna River. Water users can be identified on the map by use of the identifier symbol provided in the column entitle "map code" in Table 2.1-51.

Information on municipal water users was provided by the DER through Water Company Consolidated Inventory, and Surface Water Use Inventory reports (Ref. 2.1-30 and 2.1-31). Four municipal water supply companies withdrawing water directly from the reach of the Susquehanna downstream of the station site have been identified. These four companies serve the towns of Berwick, Danville, Sunbury, and Shamokin Dam. Projected use for these water companies in the area have multiple sources and it is not possible to project that their entire use can be drawn from the Susquehanna River. Ground water is presently the primary source of water supply in the region. The Susquehanna and its tributaries provide a secondary source, but as water demand increases, direct withdrawal from the Suusquehanna is expected to increase.

Information concerning industrial water users is also supplied by the DER (Ref. 2.1-32). Name and type of company, location, water source and total withdrawal is given in Table 2.1-51. Information on water return to the river or future water demand for these companies is not generally available. The DER does have estimates of consumptive use vs. total use and also future water demand estimates on an area wide basis for various types of use (municipal, manufacturing, mining, etc.) (Ref. 2.1-33). For the region under study, the consumptive use for manufacturing is about eight % of the total water use. Total and consumptive use for manufacturing is projected to increase 15% from 1970 to 1990. A rough estimate of 30% may therefore be used for industrial water use increase in the general area over the station life. Of course, these values should be used only as guidelines,as they pertain to industry for the area in general and not necessarily to those companies withdrawing water from the Susquehanna.

Points of known recreational use along the Main Branch of the Susquehanna within 50 miles of the station site are listed in Table 2.1-51. Five of the locations are considered to be good fishing locations. Four of these five are listed in the "100 Best Bass Spots in Pennsylvania", a brochure distributed by the Pennsylvania Fish Commission (Ref. 2.1-34). The remaining recreational area is Shikellamy State Park and Marina. The marina is located on the southern tip of Packer's Island at the

confluence of the West and Main Branches of the Susquehanna. This portion of the river is called Lake Augusta, which is a 3,000 acre lake created by the Sunbury Fabridam located three miles downstream of the confluence. The Lake Augusta is heavily used for boating activities, including water skiing.

2.1.4 REFERENCES

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SUSQUEHANNA SES-ER-OL

TABLE 2.1-1

POPULATION CHANGES OF COUNTIES WITHIN 20 MILES OF THE SITE

County	1940	1950	1960	1970	% Change 1940 to 1970
Luzerne	441,518	392,241	346,972	342,301	-22.5
Columbia	51,413	53,460	53,489	55,114	7.2
Sullivan	7,504	6,745	6,751	5,961	-20.6
Schuylkill	228,331	200,577	173,089	160,089	-29.9
Carbon	61,735	57,558	52,889	50,573	-18.1

Source: U.S. Census of Population, 1970

SUSQUEHANNA SES-ER-OL

TABLE 2.1-2

POPULATION BY RESIDENCE FOR COUNTIES WITHIN 20 MILES OF THE SITE, 1960 TO 1970

County	1970			1960		
	Urban	Rural-Nonfarm	Rural-Farm	Urban	Rural-Nonfarm	Rural-Farm
Luzerne	267,510	66,461	2,699	281,507	61,717	3,748
Columbia	23,926	26,170	5,018	24,238	23,966	5,285
Sullivan	-	4,691	1,270	-	4,887	1,364
Schuylkill	83,133	73,251	3,705	93,579	74,376	5,072
Carbon	32,268	17,564	741	33,854	18,070	965

Source: U.S. Census of Population, 1970
U.S. Census of Population, 1960

SUSQUEHANNA SES-ER-OL

TABLE 2.1-3

POPULATION DISTRIBUTION

1970
0-10 Miles
Distance (Miles)

Sector	0-1	1-2	2-3	3-4	4-5	5-10	10 Mile Total
N	30	12	39	1,050	1,989	800	3,920
NNE	0	60	24	0	0	1,900	1,984
NE	0	0	132	180	340	10,800	11,452
ENE	0	12	30	63	87	900	1,092
E	0	45	18	31	66	700	868
ESE	18	21	51	165	159	1,600	2,014
SE	33	195	120	135	12	1,900	2,395
SSE	30	123	30	84	42	2,200	2,509
S	27	117	24	129	9	1,100	1,406
SSW	3	195	36	78	111	700	1,123
SW	3	12	273	84	1,401	1,600	3,373
WSW	3	48	270	105	3,755	12,000	16,181
W	3	24	48	87	168	1,100	1,430
WNW	9	33	36	93	240	600	1,011
NW	12	57	75	0	87	800	1,031
NWN	15	15	12	0	21	800	863
TOTAL	186	969	1,218	2,292	8,487	39,500	52,652
CUMULATIVE TOTAL	186	1,155	2,373	4,665	13,152	52,652	

Source: U.S. Census, 1970

SUSQUEHANNA SES-ER-OL

TABLE 2.1-4

COMMUNITIES WITHIN 10 MILES OF THE SITE, 1970

Communities	Population 1970	Population 1960	Directional Sector	Radial Distance	% Change
Huntington Mills	6,987	7,234	NW	5-10	-3.4
Briar Creek	456	399	WSW	5-10	14.3
Berwick	12,274	13,353	WSW	5-10	-8.1
Nescopeck	1,897	1,934	SW	5-10	-1.9
Conyngham	1,850	1,163	SSE	5-10	59.1
Glen Lyon	3,408	4,173	NNE	5-10	-18.3
Shickshinny	1,685	1,843	N	4-5	-8.6

Source: U.S. Census of Population, 1970

SUSQUEHANNA SES-ER-OL

TABLE 2.1-5

POPULATION DISTRIBUTION
1970
10-50 MILES

Sector	10-Mile Total	DISTANCE (miles) 10-20	20-30	30-40	40-50	50-Mile Total
N	3,920	3,300	100	4,700	5,400	17,420
NNE	1,984	11,500	9,200	11,700	7,800	42,184
NE	11,452	138,400	86,600	163,700	36,400	436,552
ENE	1,092	19,900	6,600	8,000	7,200	42,792
E	868	6,500	700	3,900	25,600	37,568
ESE	2,014	9,800	2,400	4,800	25,600	44,614
SE	2,395	44,600	25,100	27,500	150,400	249,995
SSE	2,509	9,900	21,300	7,000	34,000	74,709
S	1,406	16,600	18,500	24,800	20,400	81,706
SSW	1,123	8,300	34,900	9,900	15,800	70,023
SW	3,373	2,000	19,900	26,900	12,600	64,773
WSW	16,181	20,700	19,800	30,200	31,300	118,181
W	1,430	3,100	4,200	22,900	15,300	46,930
WNW	1,011	3,100	2,300	10,300	54,000	70,711
NW	1,031	1,300	1,400	1,900	2,100	7,731
NNW	863	1,200	1,400	3,600	6,800	13,863
TOTAL	52,652	300,200	254,400	361,800	450,700	1419,752
CUMULATIVE TOTAL	52,652	352,852	607,252	969,052	1,419,752	

SOURCE: US Census Population 1970

SUSQUEHANNA SES-ER-OL

TABLE 2.1-6

SEASONAL POPULATION OF COUNTIES IN STUDY AREA

	All Housing	Seasonal Housing	Percentage Seasonal
Counties Within 30 Miles of Site			
Wyoming	7,801	1,220	15.6
Sullivan	3,538	1,069	30.2
Monroe	21,047	3,476	16.5
Lackawanna	79,179	280	0.4
Carbon	19,199	803	4.2
Schuylkill	57,880	383	0.7
Luzerne	116,924	786	0.7
Columbia	19,136	649	3.4
Montour	4,676	24	0.5
Northumberland	36,245	229	0.6
Lycoming	38,763	500	1.3
TOTAL	404,388	9,419	2.3
Counties Within 50 Miles of Site			
Susquehanna	13,196	1,089	8.3
Bradford	19,517	818	4.2
Wayne	12,580	1,789	14.2
Pike	10,139	4,652	45.9
Northampton	70,494	42	-
Lehigh	85,809	71	-
Berks	101,027	235	0.2
Lebanon	32,264	323	1.0
Dauphin	79,007	107	0.1
Snyder	8,819	181	2.0
Union	8,712	569	6.5
TOTAL	441,564	9,876	2.2
TOTAL FOR ALL COUNTIES	845,952	19,295	2.3

Source: U.S. Census of Housing, 1970. Pennsylvania

SUSQUEHANNA SES-ER-OL

TABLE 2.1-7

POPULATION DISTRIBUTION

1980
0-10 Miles

Distance (miles)

Sector	0-1	1-2	2-3	3-4	4-5	5-10	10-Mile Total
N	35	14	44	1,066	2,014	1,000	4,173
NNE	0	69	27	0	0	1,900	1,996
NE	0	0	149	183	344	10,600	11,276
ENE	0	14	34	64	88	1,100	1,300
E	0	52	21	40	67	900	1,080
ESE	21	24	57	168	161	1,900	2,331
SE	38	225	135	137	12	2,400	2,947
SSE	35	142	34	85	43	3,000	3,339
S	31	135	27	131	9	1,500	1,833
SSW	3	225	41	79	112	900	1,360
SW	3	14	307	85	1,419	2,000	3,828
WSW	3	55	304	107	3,802	12,300	16,571
W	3	28	54	88	170	1,300	1,643
WNW	10	38	41	95	243	600	1,027
NW	13	66	84	0	88	800	1,051
NNW	16	17	14	0	21	900	968
TOTAL	211	1,118	1,373	2,378	8,593	43,100	56,723
CUMULATIVE TOTAL	211	1,329	2,702	5,030	13,623	56,723	

SUSQUEHANNA SES-ER-OL

TABLE 2.1-8

POPULATION DISTRIBUTION
1980
10-50 MILES

Sector	10-Mile Total	DISTANCE (miles) 10-20	20-30	30-40	40-50	50-Mile Total
N	4,173	3,600	2,400	5,700	5,100	20,973
NNE	1,996	13,400	11,900	15,400	8,500	51,196
NE	11,276	136,200	90,700	169,100	42,200	449,476
ENE	1,300	23,400	9,000	10,000	8,300	52,000
E	1,080	7,800	900	4,500	28,700	42,980
ESE	2,331	11,500	2,900	5,800	27,800	50,331
SE	2,947	44,000	25,500	30,500	164,700	267,647
SSE	3,339	10,900	24,000	8,200	40,100	86,539
S	1,833	17,200	22,800	32,900	23,400	98,133
SSW	1,360	9,000	40,000	11,900	18,500	80,760
SW	3,828	2,200	14,600	26,700	13,500	65,828
WSW	16,571	22,500	20,400	29,800	34,600	123,871
W	1,643	3,600	9,400	21,700	14,200	50,543
WNW	1,027	3,500	1,900	7,800	42,400	56,627
NW	1,051	1,400	1,000	1,500	1,700	6,651
NNW	968	1,400	1,000	3,500	6,700	13,568
TOTAL	56,723	311,600	283,400	385,000	480,400	1,517,123
CUMULATIVE TOTAL	56,723	368,323	651,723	1,036,723	1,517,123	

SUSQUEHANNA SES-ER-OL

TABLE 2.1-9

POPULATION DISTRIBUTION

1990
0-10 Miles

Distance (miles)

Sector	0-1	1-2	2-3	3-4	4-5	5-10	10-Mile Total
N	38	14	47	1,133	2,116	1,100	4,448
NNE	0	72	29	0	0	1,900	2,001
NE	0	0	160	194	362	10,500	11,216
ENE	0	14	36	68	93	1,300	1,511
E	0	54	22	42	70	1,000	1,188
ESE	23	25	62	178	169	2,100	2,557
SE	42	234	146	146	13	2,800	3,381
SSE	38	145	36	91	45	3,400	3,758
S	34	141	29	139	10	1,700	2,053
SSW	4	234	44	84	118	1,000	1,484
SW	4	14	331	91	1,491	2,000	3,931
WSW	4	58	328	113	3,996	12,900	17,399
W	4	29	58	94	179	1,400	1,764
WNW	11	40	44	100	255	700	1,150
NW	10	68	91	0	93	900	1,167
NNW	19	18	15	0	22	1,000	1,074
TOTAL	236	1,163	1,478	2,473	9,032	45,700	60,082
CUMULATIVE TOTAL	236	1,399	2,877	5,350	14,382	60,082	

SUSQUEHANNA SES-ER-OL

TABLE 2.1-10

POPULATION DISTRIBUTION
1990
10-50 MILES

Sector	10-Mile Total	DISTANCE (miles) 10-20	20-30	30-40	40-50	50-Mile Total
N	4,448	3,700	1,600	6,600	5,200	21,548
NNE	2,001	14,300	24,300	19,100	15,100	74,801
NE	11,216	134,000	93,400	173,700	44,200	456,516
ENE	1,511	25,500	11,300	11,600	9,400	59,311
E	1,188	9,800	1,100	6,000	30,700	48,788
ESE	2,557	12,100	3,100	6,500	29,700	53,957
SE	3,381	43,500	26,400	32,900	181,400	287,581
SSE	3,758	11,400	25,300	9,500	97,000	146,958
S	2,053	17,700	24,100	37,200	26,700	107,753
SSW	1,484	9,500	41,200	13,100	26,600	91,884
SW	3,931	2,300	19,600	26,600	14,600	67,031
WSW	17,399	23,900	21,400	30,100	37,100	129,899
W	1,764	4,000	4,800	22,200	15,100	47,864
WNW	1,150	3,900	2,100	8,700	44,300	60,150
NW	1,167	1,500	1,500	2,000	2,100	8,267
NNW	1,074	1,500	1,300	3,500	7,400	14,774
TOTAL	60,082	318,600	302,500	409,300	586,600	1,677,082
CUMULATIVE TOTAL	60,082	378,682	681,182	1,090,482	1,677,082	

SUSQUEHANNA SES-ER-OL

TABLE 2.1-11

POPULATION DISTRIBUTION

2000
0-10 Miles

Distance (miles)

Sector	0-1	1-2	2-3	3-4	4-5	5-10	10-Mile Total
N	40	15	49	1,159	2,215	1,200	4,678
NNE	0	17	30	0	0	1,800	1,897
NE	0	0	166	199	379	10,000	10,744
ENE	0	15	38	70	97	1,500	1,720
E	0	57	23	43	79	1,200	1,397
ESE	24	27	64	182	177	2,300	2,774
SE	44	249	151	149	13	2,900	3,506
SSE	40	157	38	93	47	3,700	4,075
S	36	150	30	142	10	1,900	2,268
SSW	4	249	45	86	123	1,000	1,507
SW	4	15	344	93	1,560	2,000	4,016
WSW	4	61	340	116	4,181	12,800	17,502
W	4	31	60	96	187	1,500	1,878
WNW	12	42	45	103	267	700	1,169
NW	16	73	94	0	97	900	1,180
NNW	20	19	15	0	23	1,000	1,077
TOTAL	248	1,177	1,532	2,531	9,450	46,400	61,338
CUMULATIVE TOTAL	248	1,425	2,957	5,488	14,938	61,338	

SUSQUEHANNA SES-ER-OL

TABLE 2.1-12

POPULATION DISTRIBUTION
2000
10-50 MILES

Sector	10-Mile Total	DISTANCE (miles) 10-20	20-30	30-40	40-50	50-Mile Total
N	4,678	3,800	1,800	7,300	5,000	22,578
NNE	1,847	16,800	16,200	19,700	9,400	63,947
NE	10,744	129,000	93,800	177,400	41,900	452,844
ENE	1,720	26,400	12,200	12,400	9,600	62,320
E	1,397	11,500	1,300	6,900	32,100	53,197
ESE	2,774	12,300	3,200	7,300	31,300	56,874
SE	3,506	41,600	27,000	34,400	198,600	305,106
SSE	4,075	11,500	25,300	10,700	52,700	104,275
S	2,268	17,900	23,800	38,900	29,200	112,068
SSW	1,507	9,500	40,500	13,400	21,500	86,407
SW	4,016	2,400	19,100	25,900	14,800	66,216
WSW	17,502	24,400	20,900	29,700	39,400	131,902
W	1,878	4,200	4,700	21,200	15,600	47,578
WNW	1,169	3,900	2,100	8,500	4,300	19,969
NW	1,180	1,600	1,600	2,000	2,000	8,380
NNW	1,077	1,600	1,100	3,300	7,500	14,577
TOTAL	61,338	318,400	294,600	419,000	514,900	1,608,238
CUMULATIVE TOTAL	61,338	379,738	674,338	1,093,338	1,608,238	

SUSQUEHANNA SES-ER-OL

TABLE 2.1-13

POPULATION DISTRIBUTION

2010
0-10 Miles

Distance (miles)

Sector	0-1	1-2	2-3	3-4	4-5	5-10	10-Mile Total
N	40	15	48	1,112	2,157	1,200	4,572
NNE	0	75	29	0	0	1,600	1,704
NE	0	0	162	191	369	9,000	9,722
ENE	0	15	37	67	94	1,600	1,813
E	0	56	22	41	72	1,200	1,391
ESE	24	26	63	175	172	2,300	2,760
SE	44	245	147	143	13	3,000	3,592
SSE	40	154	37	89	46	3,700	4,066
S	36	147	29	137	10	1,900	2,259
SSW	4	245	44	83	120	1,000	1,496
SW	4	15	335	89	1,520	2,000	3,963
WSW	4	60	331	111	4,073	12,700	17,279
W	4	30	59	92	182	1,500	1,867
WNW	12	41	44	99	260	700	1,156
NW	16	72	92	0	94	800	1,074
NNW	70	19	15	0	23	1,000	1,077
TOTAL	248	1,215	1,494	2,429	9,205	45,200	59,791
CUMULATIVE TOTAL	248	1,463	2,957	5,386	14,591	59,791	

SUSQUEHANNA SES-ER-OL

TABLE 2.1-14

POPULATION DISTRIBUTION
2010
10-50 MILES

DISTANCE (miles)

Sector	10-Mile Total	10-20	20-30	30-40	40-50	50-Mile Total
N	4,572	3,700	1,800	7,700	4,800	22,572
NNE	1,704	17,100	17,200	20,100	8,900	65,004
NE	9,722	118,800	86,200	164,800	40,900	420,422
ENE	1,813	25,400	10,800	12,000	9,600	59,613
E	1,391	12,500	1,400	7,900	33,700	56,891
ESE	2,760	11,600	3,100	7,900	32,600	57,960
SE	3,592	37,200	25,500	34,600	211,500	312,392
SSE	4,066	10,700	23,400	11,500	57,400	107,066
S	2,259	17,300	21,500	38,200	31,100	110,359
SSW	1,496	9,200	36,700	12,600	21,500	81,496
SW	3,963	2,500	17,600	23,700	14,700	62,463
WSW	17,279	23,900	20,300	27,700	40,900	130,079
W	1,867	4,400	4,700	20,500	16,300	47,767
WNW	1,156	4,000	2,300	8,900	43,600	59,956
NW	1,074	1,600	1,500	2,000	1,900	8,074
NNW	1,077	1,500	800	3,000	7,500	13,877
TOTAL	59,791	301,400	274,800	403,100	576,900	1,615,991
CUMULATIVE TOTAL	59,791	361,191	635,991	1,039,091	1,615,991	

SUSQUEHANNA SES-ER-OL

TABLE 2.1-15

POPULATION DISTRIBUTION

2020
0-10 Miles

Distance (miles)

Sector	0-1	1-2	2-3	3-4	4-5	5-10	10-Mile Total
N	41	15	47	1,056	2,010	1,200	4,369
NNE	0	76	29	0	0	1,400	1,505
NE	0	0	160	181	359	7,400	8,100
ENE	0	15	36	63	92	1,600	1,806
E	0	57	22	39	70	1,200	1,388
ESE	24	26	62	166	168	2,400	2,846
SE	45	246	145	136	13	3,100	3,685
SSE	41	155	36	84	44	4,000	4,360
S	37	147	29	130	10	1,800	2,153
SSW	4	246	44	78	117	1,000	1,489
SW	4	15	330	84	1,480	2,000	3,913
WSW	4	60	327	106	3,966	12,100	16,563
W	4	30	58	88	177	1,500	1,857
WNW	12	42	44	94	254	700	1,146
N	16	72	91	0	92	800	1,071
NNW	20	19	15	0	22	1,000	1,076
TOTAL	252	1,221	1,475	2,305	8,874	43,200	57,327
CUMULATIVE TOTAL	252	1,473	2,948	5,253	14,127	57,327	

SUSQUEHANNA SES-ER-OL

TABLE 2.1-16

POPULATION DISTRIBUTION
2020
10-50 MILES

Sector	10-Mile Total	DISTANCE (miles) 10-20	20-30	30-40	40-50	50-Mile Total
N	4,369	3,600	2,000	8,200	4,500	22,669
NNE	1,505	18,200	18,900	21,400	9,900	69,905
NE	8,100	107,300	76,900	151,700	37,400	381,400
ENE	1,806	24,600	8,900	13,600	9,800	58,706
E	1,388	14,800	1,500	8,900	35,600	62,188
ESE	2,846	11,000	3,100	8,300	33,700	58,946
SE	3,685	32,500	23,600	34,700	225,600	320,085
SSE	4,360	9,600	21,200	12,000	62,700	109,860
S	2,153	16,000	18,600	38,600	33,700	109,053
SSW	1,489	8,700	32,500	11,800	21,600	76,089
SW	3,913	2,500	16,200	20,700	13,900	57,213
WSW	16,563	24,400	19,700	25,900	43,600	130,163
W	1,857	4,400	4,700	19,200	16,600	46,757
WNW	1,146	4,000	2,100	8,700	42,100	58,046
NW	1,071	1,500	1,400	1,900	1,800	7,671
NNW	1,076	1,500	700	2,700	7,500	13,476
TOTAL	57,327	284,600	252,000	388,300	600,000	1,582,227
CUMULATIVE TOTAL	57,327	341,927	593,927	982,227	1,582,227	

TABLE 2.1-17

INDUSTRIES WITHIN 5 MILES OF THE SITE

	Industry	Distance and Direction from the Site	Number of Employees	Products
(1)	Riverview Vibrated Block Co.	4 Miles WSW	13	Concrete Block and Brick
(2)	Multiplex Mfg. Co., Inc.	4.75 Miles WSW	17	Valves and Pipe Fittings
(3)	Luzerne Hide and Tallow	4.0 Miles SW	23	Animal, Marine Fats & Oils
(4)	RAD Woodwork Co., Inc.	4.5 Miles SW	53	Lumber Mill
(5)	Zeiser Vault Co.	4.25 Miles SW	22	Concrete Products
(6)	Lee Food Inc.	5.0 Miles WSW	16	Meat Products
(7)	Luzerne Outerwear Mfg. Corp.	1.25 Miles NNE	486	Men's Apparel
(8)	Berwick Industries Inc.	3.9 Miles WSW	192	Textile Products
(9)	Garnerville Mfg. Corp.	4.5 Miles SW	7	Fabric Mill
(10)	Amil Mfg. Co.	4 Miles N	64	Men's Apparel

Source: 1974 Pennsylvania Industrial Directory, Pennsylvania Department of Commerce.

SUSQUEHANNA SES-ER-OL

TABLE 2.1-18

PATTERNS OF COMMUTATION IN LUZERNE AND COLUMBIA COUNTIES, 1970

Item	County	
	Luzerne	Columbia
Total Workers by Residence	132,771	22,344
Live and Work in Same County	116,298	19,200
Workers with Coded Destination	128,364	21,928
Workers by Destination*	124,419	23,435
Net Commutation	-3,944	1,507

*Includes out of state residents working in Pennsylvania.

Source: Table 1: "Summary of Work Trips to and from Pennsylvania Counties During Census Week" in Population Information, June, 1974. "Patterns of Commutation in Pennsylvania by County." Office of State Planning and Development, Harrisburg, Pennsylvania..

TABLE 2.1-19

ORIGIN OF COMMUTERS FOR COLUMBIA COUNTY AND DESTINATION OF COMMUTERS FROM LUZERNE COUNTY, 1970

	Work in Columbia County and Come From:	Live in Luzerne County and Work In:
Columbia	19,200	3,103
Luzerne	3,103	116,298
Carbon	7	634
Montour	276	-
Lackawanna	-	6,232
Schuylkill	84	387

Source: "Journey to Work Patterns" in Population Information, June, 1974. "Patterns of Commutation in Pennsylvania by County", Office of State Planning and Development; Harrisburg, Pennsylvania.

TABLE 2.1-20

CUMULATIVE POPULATIONS FOR 1970 AND 1980

Distance (mi)	1970	1980	500#/mi^{2*}
0-1	186	211	1,570
1-2	1,155	1,329	6,280
2-3	2,373	2,702	14,135
3-4	4,655	5,030	25,130
4-5	13,152	13,623	39,265
5-10	52,652	56,723	157,079
10-20	352,852	368,323	628,315
20-30	607,252	651,723	1,413,715
30-40	969,052	1,036,723	2,513,270
40-50	1,419,752	1,517,123	3,926,990

* This is the population that would occur if 500 persons per square mile were uniformly distributed over the study area.

SUSQUEHANNA SES-ER-OL

TABLE 2.1-21

CUMULATIVE POPULATIONS FOR 1990, 2000, 2010, AND 2020

Distance (mi)	1990	2000	2010	2020	1000#/mi^{2*}
0-1	236	248	248	252	3,140
1-2	1,399	1,425	1,463	1,473	12,560
2-3	2,877	2,957	2,957	2,948	28,270
3-4	5,350	5,488	5,386	5,253	50,260
4-5	14,382	14,938	14,591	14,127	78,530
5-10	60,082	61,338	59,791	57,327	314,159
10-20	378,682	379,738	361,191	341,927	1,256,630
20-30	681,182	674,338	635,991	593,927	2,827,430
30-40	1,090,482	1,093,338	1,039,091	982,227	5,026,540
40-50	1,677,082	1,608,238	1,615,991	1,582,227	7,853,980

*This is the population that would occur if 1000 persons per square mile were uniformly distributed over the study area.

SUSQUEHANNA SES-ER-OL

TABLE 2.1-22

2020 PROJECTIONS FOR VARIOUS FERTILITY ASSUMPTIONS

Distance (mi)	2.1 Fertility 1960-1970 Migration	2.7 Fertility 1960-1970 Migration	1000#/mi^{2*}
0-1	252	300	3,140
1-2	1,473	1,300	12,560
2-3	2,948	2,800	28,270
3-4	5,253	6,000	50,260
4-5	14,127	16,000	78,530
5-10	57,327	68,400	314,159
10-20	341,927	347,400	1,256,630
20-30	593,927	711,000	2,827,430
30-40	982,227	1,175,700	5,026,540
40-50	1,582,227	1,883,000	7,853,980

* This is the population that would occur if 1000 persons per square mile were uniformly distributed over the study area.

SUSQUEHANNA SES-ER-OL

TABLE 2.1-23

AGE DISTRIBUTION FOR U.S., LUZERNE COUNTY AND STUDY AREA, 1970

Age	Percent Distribution		
	U.S.	Luzerne Co.	Study Area
0 to 12	22	19	20
12 to 18	12	10	11
18 & Older	66	71	69

TABLE 2.1-24

COUNTIES TOTALLY OR PARTIALLY WITHIN 50 MILES OF SUSQUEHANNA SES

Wyoming	Lehigh	Schuykill
Susquehanna	Berks	Luzerne
Bradford	Lebanon	Columbia
Sullivan	Dauphin	Montour
Wayne	Snyder	Union
Pike	Lackawanna	Northumberland
Monroe	Carbon	Lycoming
Northampton		

TABLE 2.1-25

PIPELINES WITHIN FIVE MILES OF THE SITE

Pipeline	Size (Inches)	Operating Pressure (psig)	Age (years)	Depth of Burial	Isolation Valves Location	Isolation Valves Type	Fluid Carried Present	Fluid Carried Future
Sun Pipeline	6.625	1200	46	24" to 36"	a. 3/4 mile N.E. of plant site b. 1-3/4 mile east of plant site c. 6-1/2 miles north of plant site	NA	Petroleum	(1)
Arco Pipeline	6.0	460	45	30"	a. Each side of the Susq. River 2-1/2 and 2.8 mi. S.W. of plant site b. 19.7 miles N. and 13.5 mi. S. of the Susq. River	GATE NA	Petroleum	(1)
Transconti-nental Gas Pipeline Corp.	24.0	1200	11	30"	a. Valve No. 515LB21. M.P. 25.90. 25.90 is located between the extreme W. bank of the Susq. River & the tracks of the Erie-Lackawanna RR. To the E. Valve No. 515LB20, M.P. 25.64 is located between the extreme E. bank of the Susq. River & the tracks of the Pa. RR.	NA	Natural Gas	(1)

(1) At the present time and in the foreseeable future, there are no plans to utilize these facilities to carry a different product.

SUSQUEHANNA SES-ER-OL

TABLE 2.1-26

SCHOOLS WITHIN FIVE MILES OF THE SITE

School	Distance and Direction from the Site	1975-1976 Enrollment
Conyngham Township, Luzerne County Brick Elementary School	3.5 Miles NNE	168
Shickshinny Borough, Luzerne County E. Garrison Memorial Elementary	4.5 Miles N	364
Berwick Borough, Columbia County Salem Elementary	4.5 Miles WSW	827
Senior High	4.6 Miles WSW	1,154
Nescopeck Borough Luzerne County	4.5 Miles SW	287
Nescopeck Middle School	4.5 Miles SW	254

Source: Communication by letters with Berwick Area School District, Northwest Area School District and Greater Nanticoke Area School District.

TABLE 2.1-27
RECREATIONAL FACILITIES WITHIN A 10 MILE RADIUS OF THE SITE

	Name	Location	Distance and Direction from Site	Acres	Activities	Total Attendance 1976
			Camps and Camp Grounds			
1.	Camp Joy-Lo Girl Scout Camp	Hollenback Township Luzerne County	4.0 Miles SE	40	General camp crafts. 120 person capacity	N.A.
2.	Moyers Camp Grove	Hollenback Township Luzerne County	4.5 Miles SE	68	Backpacking, boating, fishing, hiking, hunting, ice skating, picnicking, sledding, swimming, snowmobiling. 93 camp sites; 5 cabins.	N.A.
3.	Hidden Lake Camp Sites	Rt. 239 Huntington Township Luzerne County	8.9 Miles NNW	100	Bicycling, boating, camping, fishing, hiking, picnicking, swimming.	N.A.
4.	Camp Louise Girl Scout Camp	LR 19069 Fishing Creek Township Columbia County	9.0 Miles NW	380	Hiking, picnicking, boating, swimming, camping. 240 person capacity.	N.A.
5.	Hazleton-Wilkes-Barre Kampgrounds of America	Rt. 309 Butler Township Luzerne	9.0 Miles SE	40	Backpacking, bicycling, camping hiking, hunting, cross country skiing, sledding. 75 camp sites.	N.A.
			County & Municipal Parks			
6.	Briar Creek Lake County Park	LR 19042 Between Evansville & Martzville Columbia County	7.0 Miles W	30	Boating, fishing, swimming, picnicking.	N.A.
7.	Ber-Vaughn Park	Rt. 11 Briar Creek Borough Columbia County	7.0 Miles SW	---	Municipal park - swimming pool, baseball fields.	30,450 avg.
			Fishing & Boating Areas			
8.	Wapwallopen Boat Launching Facility	Wapwallopen Luzerne County	1.0 Mile SE	---	Boat ramp	N.A.

TABLE 2.1-27 (Cont'd.)

	Name	Location	Distance and Direction from Site	Acres	Activities	Total Attendance 1976
9.	Berwick Boat Launching Facility	Berwick Borough Columbia County	5.0 Miles SW	---	Boat ramp.	N.A.
10.	Lilly Lake	LR 40120 Conyngham & Slocum Twps. Luzerne County	5.5 Miles NE	160	Fishing.	N.A.
11.	Lake Irena	Rt. 93 Sugar Loaf Township Luzerne County	9.0 Miles SSE	20	Boating, fishing, picnicking	N.A.
			Golf Course & Country Clubs			
12.	Berwick Country Club	Briar Creek Township Columbia County	6.0 Miles W	---	18 hole golf course, social activities.	N.A.
13.	Briar Heights Lodge	Briar Creek Township Columbia County	9.0 Miles SW	---	18 hole golf course.	N.A.
			Historic & Scenic Sites			
14.	Jonestown Overlook	LR 19069 Fishing Creek Township Columbia County	7.0 Miles NW	---	Scenic overlook.	N.A.
15.	Old Stone Church	Rt. 93 Briar Creek Township Columbia County	8.5 Miles W	---	Historic structure	N.A.
16.	State Game Lands #260	Rt. 11 Schickshinny Luzerne County	5.0 Miles N	2,878	Bicycling, fishing, horse-back riding, hunting.	N.A.
17.	State Game Lands #224	Rt. 11 Union Township Luzerne County	8.0 Miles NNE	533	Hiking, hunting.	N.A.

TABLE 2.1-27 (Cont'd.)

	Name	Location	Distance and Direction from Site	Acres	Activities	Total Attendance 1976
18.	State Game Lands #55	Columbia County	9.0 Miles NW	2,470	Hunting.	N.A.
19.	State Game Lands #187	Rt. 309 Butler, Dennison & Foster Townships Luzerne County	10.0 Miles SE	7,880	Bicycling, fishing, hiking, horseback riding, hunting, cross country skiing, sledding.	N.A.

Footnote: N.A. - Not Available

TABLE 2.1-28
RECREATIONAL FACILITIES WITHIN A 10 TO 50
MILE RADIUS OF THE SITE

	Name	Location	Distance and Direction from Site	Acres	Activities	Total Attendance 1976
			Federal			
F1	Francis Walter Dam	Rt. 940 Carbon County	24 Miles E	1,164	Boating, fishing, hiking, ice skating, picnicking, vista overlooks.	N.A.
F2	Aylesworth Creek Reservoir Park	Lackawanna County	48 Miles NNE	260	Backpacking, bicycling, boating, fishing, hiking, hunting, ice skating, picnicking, cross country skiing, sledding, snowmobiling, hunting.	N.A.
			State			
S1	Ricketts Glen State Park	Luzerne County Sullivan County	15 Miles NE	13,000	Bicycling, boating, camping, fishing, hiking, horseback riding, hunting, ice skating, picnicking, cross country skiing, sledding, snowmobiles, swimming, vistas.	398,401
S2	Tuscarora State Park	Schuylkill County	21 Miles S	1,600	Boating, fishing, hiking, hunting, ice skating, picnicking, sledding, swimming.	229,654
S3	Locust Lake State Park	Schuylkill County	21.5 Miles S	1,144	Bicycling, boating, camping, fishing, hiking, hunting, ice skating.	109,354
S4	Francis Slocum State Park	Luzerne County	22 Miles NE	1,000	Bicycling, backpacking, fishing, hiking, horseback riding, ice skating, picnicking, sledding, swimming.	228,939

TABLE 2.1-28 (Cont'd.)

	Name	Location	Distance and Direction from Site	Acres	Activities	Total Attendance 1976
S5	Hickory Run State Park	I-80 Carbon County	25 Miles SE	15,500	Bicycling, camping, fishing, hiking, horseback riding, hunting, ice skating, picnicking, scenic drives, cross country skiing, sledding, snowmobiling, swimming.	249,639
S6	Beltzville Lake State Park	Carbon County	31 Miles SSE	927	Boating, fishing, hiking, hunting, picnicking, scenic drives, swimming, vista.	546,580
S7	World's End State Park	Sullivan County	37 Miles NNW	1,606	Camping, fishing, swimming, hiking, snowmobiling, picnicking, hunting.	230,728
S8	Shikellamy Marina State Park	Northumberland County	38 Miles SW	(See Shikellamy State Park)	Boating.	152,912
S9	Milton State Park	Northumberland	38 Miles W	76	Picnicking, hiking.	31,649
S10	High Knob State Forest Monument	Sullivan County	38 Miles NW	22	Vistas and overlooks.	44,601
S11	Gouldsboro State Park	Monroe County	38 Miles NE	2,800	Bicycling, boating, fishing, hiking, horseback riding, hunting, ice skating, off-road vehicles, picnicking, swimming.	211,630
S12	Tobyhanna State Park	Monroe County	38 Miles NE	4,188	Bicycling, boating, camping, fishing, hiking, hunting, ice skating, picnicking, snowmobiling, swimming.	250,265

TABLE 2.1-28 (Cont'd.)

	Name	Location	Distance and Direction from Site	Acres	Activities	Total Attendance 1976
S13	Shikellamy State Park	Union County	39 Miles SW	115 (Includes Shikellamy Marina)	Fishing, boating, hiking, picnicking.	81,063
S14	Lackawanna State Park	Lackawanna County	41 Miles NNE	1,300	Bicycling, boating, camping, fishing, hiking, horseback riding, ice skating, hunting, picnicking, scenic drives, cross country skiing, sledding, swimming, vistas.	289,183
S15	Big Pocono State Park	Monroe County	42 Miles E	1,300	Bicycling, hiking, hunting, picnicking, scenic drives, vistas.	157,630
S16	Arch Bald Pothole State Park	Lackawanna County	43 Miles NE	1	Picnicking.	76,125
S17	Promise Land State Park	Pike County	49 Miles NE	2,971	Backpacking, bicycling, boating, camping, fishing, hiking, hunting, ice skating, picnicking, scenic drives, cross country skiing, sledding, snowmobiling, swimming.	453,240
S18	Susquehanna State Park	Lycoming County	49 Miles NW	19	Fishing, boating, picnicking	78,324
*S19	Nescopeck Creek State Park	Luzerne County	16 Miles E	2,981	-----	-----
*S20	Lehigh Gorge State Park	Lehigh River Carbon County	25 Miles SSE	6,000	-----	-----

TABLE 2.1-28 (Cont'd.)

	Name	Location	Distance and Direction from Site	Acres	Activities	Total Attendance 1976
*S21	Swatara Gap State Park	Lebanon County	44 Miles SW	3,200	-----	-----
*S22	Jacobsburg State Park	Northampton County	48 Miles SE	1,166	-----	-----
*S23	Blue Marsh State Park	Berks County	49 Miles S	460	-----	-----
			County			
C1	Moon Lake County Park	Luzerne County	12 Miles NE	600	Bicycling, boating, camping, fishing, hiking, horseback riding, ice skating, picnicking, swimming.	1975 est. 39,375
C2	Mauch Chunk Creek County Park	Carbon County	25 Miles SSE	2,100	Swimming, picnicking, fishing, boating, tent camping maximum 720 persons.	26,000
C3	Northumberland County Park	East of Northumberland Borough Northumberland County	35 Miles SW	87	Picnicking, baseball fields.	N.A.
C4	Trexler-Lehigh Game Preserve	Lehigh County	41 Miles SE	1,500	Children's zoo, picnic area, natural areas, trails, fishing.	109,141
C5	Sun Fish Pond County Park	Bradford County	48 Miles NNW	79	Backpacking, bicycling, boating, camping, fishing, ice skating, picnicking.	5,000
C6	Louise W. Moore County Park	Northampton County	49 Miles SE	125 Under Development	-----	-----

TABLE 2.1-28 (Cont'd.)

	Name	Location	Distance and Direction from Site	Acres	Activities	Total Attendance 1976
			Private & Other			
P1	Hawk Mountain Sanctuary	Schuylkill-Berks Counties	37 Miles S	2,578	Wildlife sanctuary, scenic overlooks.	47,000
P2	Lakewood Park	Schuylkill County	21 Miles S	70	Amusement park, festivals, fishing, theater.	N.A.
P3	Knoebel's Grove	Columbia County	23 Miles SW	N.A.	Amusement park, camping, swimming.	500,000 est.
P4	Ghost Town in the Glen	Lackawanna County	29 Miles NE	N.A.	Amusement park.	N.A.
P5	Dorney Park	Allentown Lehigh County	47.5 Miles SE	N.A.	Amusement park.	N.A.
P6	Ledgedale Recreation	Lake Wallenpaupack Pike County	48 Miles NE	30 est.	Camping, fishing, boating, 90 tent capacity.	4,272

Footnote:
N.A. - Not Available
*S - Under land acquisition or construction

TABLE 2.1-28 (Cont'd.)

	Name	Location	Distance and Direction from Site	Acres	Activities	Total Attendance 1976
			Private & Other			
P1	Hawk Mountain Sanctuary	Schuylkill-Berks Counties	37 Miles S	2,578	Wildlife sanctuary, scenic overlooks.	47,000
P2	Lakewood Park	Schuylkill County	21 Miles S	70	Amusement park, festivals, fishing, theater.	N.A.
P3	Knoebel's Grove	Columbia County	23 Miles SW	N.A.	Amusement park, camping, swimming.	500,000 est.
P4	Ghost Town in the Glen	Lackawanna County	29 Miles NE	N.A.	Amusement park.	N.A.
P5	Dorney Park	Allentown Lehigh County	47.5 Miles SE	N.A.	Amusement park.	N.A.
P6	Ledgedale Recreation	Lake Wallenpaupack Pike County	48 Miles NE	30 est.	Camping, fishing, boating, 90 tent capacity.	4,272

Footnote:
N.A. - Not Available
*S - Under land acquisition or construction

TABLE 2.1-29
LIMITED RECREATION AREAS
WITHIN A 50 MILE RADIUS OF THE SITE

	Name	Location	Distance and Direction from Site	Acres	Activities
SF1	State Forest Lands	Luzerne County	13 Miles NNE	1,200	Hiking, hunting, horseback riding.
SF2	State Forest Lands	Schuylkill County	21 Miles S	2,505	Hiking, hunting, horseback riding, cross country skiing.
SF3	State Forest Lands	Schuylkill County	28 Miles SW	2,034	Hiking, hunting, horseback riding, cross country skiing.
SF4	Lackawanna State Forest	Lackawanna County	28 Miles NE	63,000	Backpacking, bicycling, fishing, hiking, hunting, picnicking, snowmobiling.
SF5	Weiser State Forest Lands	Carbon County	30 Miles SE	250	Hiking, horseback riding, hunting.
SF6	State Forest Lands	Schuylkill County	28 Miles SSW	580	Hiking, hunting, horseback riding, cross country skiing.
SF7	State Forest Lands	Schuylkill County	34 Miles S	2,620	Hiking, hunting, horseback riding, cross country skiing.
SF8	State Forest Lands	Schuylkill County	36 Miles S	N.A.	Hiking, hunting, horseback riding, cross country skiing.
SF9	Wyoming State Forest	Sullivan County Lycoming County	38 Miles NNW	40,698	Backpacking, bicycling, boating, camping, fishing, hiking, horseback riding, ice skating, picnicking, scenic drive, cross country skiing, snowmobiling, swimming, vistas and overlooks.
SF10	State Forest Lands	Bradford County	42 Miles NNW	N.A.	Hiking, horseback riding, hunting, cross country skiing, snowmobiling.
SF11	Bald Eagle State Forest	Union County	48.5 Miles W	192,441	Picnicking, horseback riding, hiking.

TABLE 2.1-29 (Cont'd.)

	Name	Location	Distance and Direction from Site	Acres	Activities
SF12	Tiadaghton State Forest (Scattered Parcels)	Lycoming County	49 Miles W 46 Miles NW 40 Miles NW	204,100	Picnicking, horseback riding, hiking.
SF13	Haldeman State Forest	Dauphin County	49 Miles SW	18,000	Picnicking, horseback riding, hiking.
SF14	Delaware State Forest	Monroe County Pike County	49 Miles E 45 Miles NE	8,621	Camping, hiking, horseback riding, hunting, cross country skiing, snowmobiling.
			County		
C15	Leaser Lake	Lehigh County	33 Miles SE	205	Lake oriented recreation, hiking, fishing, limited hunting.
C16	Kaercher Creek County Park	Berks County	37 Miles S	150	-----
			Under Development		

TABLE 2.1-30

PROPORTION OF GROSS SALES FOR AGRICULTURAL AND LIVESTOCK PRODUCTS 1974 (1)

		COUNTY			
		Luzerne	Carbon	Columbia	Schuylkill
CROPS	Field Crops	13.7	20.4	18.7	13.8
	Vegetables & Potatoes	17.5	11.3	9.6	16.4
	Fruits	0.9	1.7	1.0	1.6
	Forest Products	0.6	0.6	1.7	0.7
	Horticultural Specialties	11.1	9.9	17.2	1.0
LIVESTOCK	Meat Animals	6.4	9.7	9.2	11.0
	Dairy Products	42.4	16.6	24.5	18.2
	Poultry Products	7.3	29.8	18.1	37.3

Source: Pennsylvania Department of Agriculture, Crop Reporting Service, Pennsylvania Crop and Livestock Annual Summary, 1975, C.R.S.66

(1) Figures in Percent of Gross Sales.

TABLE 2.1-31
SUMMARY OF ANNUAL MILK PRODUCTION IN KILOLITERS WITHIN 50 MILES OF SUSQUEHANNA SES

DISTANCE RANGE IN MILES

Direction	0-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50	Total
N	0	0	0	0	0	5.05 E2	8.84 E2	4.22 E2	1.99 E4	2.59 E4	4.76 E4
NNE	0	0	0	0	0	2.53 E2	7.58 E2	7.51 E3	1.82 E4	2.28 E4	4.96 E4
NE	0	0	0	7.9 E0	4.0 E0	2.53 E2	6.31 E2	1.58 E3	4.93 E3	1.20 E4	1.94 E4
ENE	0	0	0	0	0	2.53 E2	2.53 E2	3.16 E2	2.66 E3	1.00 E4	1.35 E4
E	0	0	2.0 E1	0	1.76 E2	2.53 E2	2.53 E2	2.03 E2	2.18 E2	2.18 E2	1.34 E3
ESE	0	0	3.70 E2	3.21 E2	0	2.53 E2	9.51 E2	2.68 E2	2.81 E3	1.84 E4	2.33 E4
SE	0	0	6.4 E1	3.21 E2	0	5.05 E2	4.87 E2	7.59 E2	4.26 E3	9.90 E3	1.63 E4
SSE	0	0	4.0 E0	4.75 E2	0	2.53 E2	5.76 E2	1.78 E3	1.48 E4	2.68 E4	4.47 E4
S	0	0	2.0 E1	3.05 E2	0	3.79 E2	7.74 E2	1.46 E3	5.78 E3	3.73 E4	4.60 E4
SSW	0	0	1.61 E2	6.86 E2	0	5.77 E2	1.33 E3	6.84 E2	2.59 E3	9.92 E3	1.60 E4
SW	0	0	2.01 E2	0	4.0 E0	4.50 E2	2.18 E3	3.67 E3	4.93 E3	6.70 E3	1.81 E4
WSW	0	4.97 E2	0	6.46 E2	0	5.94 E2	2.77 E3	6.03 E3	7.98 E3	2.18 E4	4.04 E4
W	0	0	0	0	3.21 E2	5.94 E2	3.96 E3	7.72 E3	1.40 E4	1.34 E4	3.99 E4
WNW	0	0	0	0	0	3.24 E2	2.38 E3	7.70 E3	1.00 E4	3.85 E3	2.42 E4
NW	4.0 E0	0	0	0	0	6.31 E2	1.62 E3	1.48 E3	2.31 E3	3.51 E3	9.56 E3
NNW	0	0	0	0	3.21 E2	7.58 E2	1.01 E3	9.50 E2	1.90 E4	1.72 E4	3.92 E4
Total	4.0 E0	4.97 E2	8.40 E2	2.76 E3	8.26 E2	6.83 E3	2.08 E4	4.25 E4	1.34 E5	2.40 E5	4.49 E5

TABLE 2.1-32
SUMMARY OF ANNUAL MEAT WITH POULTRY PRODUCTION IN KILOGRAMS WITHIN 50 MILES OF SUSQUEHANNA SES

Direction	DISTANCE RANGE IN MILES										
	0-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50	Total
N	0	7.3 E2	0	0	0	4.79 E4	8.39 E4	1.66 E4	7.93 E5	1.06 E6	2.01 E6
NNE	0	0	0	0	0	2.40 E4	7.19 E4	3.37 E5	7.38 E5	9.56 E5	2.13 E6
NE	0	0	2.20 E2	1.68 E3	3.66 E2	2.40 E4	5.99 E4	1.18 E5	3.00 E5	6.66 E5	1.17 E6
ENE	0	0	0	2.03 E3	0	2.40 E4	2.40 E4	2.35 E4	1.61 E5	5.03 E5	7.38 E5
E	0	0	5.34 E3	0	8.00 E3	2.40 E4	2.40 E4	2.17 E4	1.97 E4	1.97 E4	1.22 E5
ESE	0	0	1.01 E4	7.93 E3	1.43 E4	2.40 E4	9.54 E4	4.61 E4	2.50 E5	7.91 E5	1.24 E6
SE	1.46 E2	0	3.03 E3	5.94 E3	0	4.79 E4	6.43 E4	1.75 E5	3.85 E5	8.92 E5	1.57 E6
SSE	0	0	4.39 E2	1.09 E4	0	2.40 E4	1.24 E5	5.49 E5	1.57 E6	2.61 E6	4.88 E6
S	0	0	1.39 E3	2.65 E4	0	3.60 E4	2.12 E5	4.49 E5	1.17 E6	3.60 E6	5.49 E6
SSW	0	0	1.24 E4	2.68 E4	5.36 E3	8.71 E4	4.00 E5	2.01 E5	7.98 E5	2.76 E6	4.29 E6
SW	0	0	5.64 E3	0	7.59 E2	7.51 E4	5.63 E5	1.05 E6	1.55 E6	1.97 E6	5.22 E6
WSW	0	1.63 E4	4.68 E3	2.35 E4	2.66 E3	1.53 E5	7.16 E5	1.29 E6	2.30 E6	4.81 E6	9.31 E6
W	0	0	0	2.23 E4	5.05 E3	1.53 E5	1.02 E6	1.29 E6	3.29 E6	1.63 E6	7.41 E6
WNW	0	1.71 E3	2.20 E2	9.52 E2	1.15 E3	6.31 E4	6.14 E5	6.58 E5	7.60 E5	2.92 E5	2.39 E6
NW	7.3 E1	0	3.66 E2	0	2.75 E2	5.99 E4	3.16 E5	1.38 E5	2.15 E5	3.21 E5	1.05 E6
NNW	0	0	0	0	4.10 E3	7.19 E4	9.59 E4	8.87 E4	1.24 E6	7.07 E5	2.20 E6
Total	2.20 E2	1.87 E4	4.39 E4	1.29 E5	4.20 E4	9.40 E5	4.49 E6	6.46 E6	1.55 E7	2.36 E7	5.12 E7

TABLE 2.1-33

SUMMARY OF ANNUAL PRODUCTION OF FRUIT, VEGETABLE AND POTATO IN KGS WITHIN 50 MILES OF SUSQUEHANNA SES

	DISTANCE RANGE IN MILES										
Direction	0-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50	Total
N	0	2.26 E3	0	0	0	8.62 E5	1.51 E6	1.36 E4	5.44 E5	2.14 E5	3.14 E6
NNE	0	0	0	0	0	4.31 E5	1.29 E6	1.51 E6	7.81 E5	4.27 E5	4.44 E6
NE	0	0	2.56 E3	6.33 E3	9.17 E3	4.31 E5	1.08 E6	1.30 E6	1.16 E6	1.89 E6	5.88 E6
ENE	0	0	4.54 E3	1.42 E5	1.28 E4	4.31 E5	4.31 E5	2.60 E5	6.24 E5	3.79 E5	2.28 E6
E	0	0	1.16 E4	0	7.63 E3	4.31 E5	4.31 E5	4.11 E5	5.55 E5	5.55 E5	2.40 E6
ESE	0	1.25 E	9.45 E3	8.15 E3	9.1 E2	4.31 E5	1.68 E6	6.76 E5	4.88 E6	1.15 E7	1.92 E7
SE	1.88 E3	8.24 E4	1.29 E4	3.11 E3	0	8.62 E5	1.02 E6	1.90 E6	1.34 E7	3.10 E7	4.82 E7
SSE	2.03 E5	0	4.05 E4	1.02 E6	8.55 E3	4.31 E5	1.23 E6	4.41 E6	1.01 E7	9.01 E6	2.64 E7
S	0	2.19 E4	3.48 E3	3.15 E5	0	6.46 E5	1.82 E6	3.61 E6	7.69 E6	6.21 E6	2.03 E7
SSW	0	1.26 E4	8.77 E3	7.43 E4	2.15 E5	9.83 E5	3.14 E6	1.54 E6	6.41 E6	5.51 E6	1.79 E7
SW	0	0	6.81 E4	2.08 E6	4.72 E3	7.68 E5	3.70 E6	4.77 E6	7.81 E6	5.08 E6	2.43 E7
WSW	0	1.69 E5	2.82 E4	7.94 E4	1.60 E4	1.01 E6	4.71 E6	3.40 E6	5.60 E6	3.44 E6	1.85 E7
W	0	7.1 E2	1.88 E3	5.38 E5	0	1.01 E6	6.73 E6	3.84 E6	6.90 E6	1.29 E6	2.03 E7
WNW	0	3.90 E3	6.10 E3	1.74 E3	6.94 E3	5.52 E5	4.04 E6	2.16 E6	2.03 E6	7.82 E5	9.59 E6
NW	2.18 E3	0	0	0	4.15 E4	1.08 E6	2.76 E6	1.91 E5	2.97 E5	4.81 E5	4.85 E6
NNW	0	0	0	0	1.73 E3	1.29 E6	1.72 E6	3.21 E5	1.26 E6	2.25 E5	4.82 E6
Total	2.07 E5	2.94 E5	1.98 E5	4.27 E6	3.25 E5	1.17 E7	3.73 E7	3.03 E7	7.00 E7	7.80 E7	2.33 E8

SUSQUEHANNA SES-ER-OL

TABLE 2.1-34

NEAREST RESIDENCE IN EACH SECTOR WITHIN FIVE MILES OF THE SITE

Sector	Distance (Mile)	Residence
1 N	0.710	Stanley Thomas
2 NNE	1.045	Bx. 349, W. Of US #11 N OF Energy Ctr.
3 NE	2.273	Bx. 34B, Pole 44937 Trlr/Sale 34098 UGI Pachence Realty
4 ENE	2.367	G. Remensnyder
5 E	1.326	Biziggs
6 ESE	0.473	Baker
7 SE	0.378	Mott
8 SSE	0.701	Trailer
9 S	1.136	J. Boner
10 SSW	0.757	Shortz
11 SW	0.800	Golomb House SW of Station
12 WSW	1.089	W. Kisner
13 W	1.183	Hummel & Seely
14 WNW	0.710	H. Folk (Headley)
15 NW	0.805	Serafin
16 NNW	0.757	Tlr. Not on Map Pole 44094/TBA 34490/2

SUSQUEHANNA SES-ER-OL

TABLE 2.1-35

NEAREST MILK COW

Sector	Distance	Milk Destination
1 N	>5	
2 NNE	>5	
3 NE	3.8	Home Use
4 ENE	>5	
5 E	2.2	Home Use
6 ESE	2.4	Hazleton Coop
7 SE	2.5	Hazleton Coop
8 SSE	2.5	Home Use
9 S	2.4	Home Use
10 SSW	2.5	Hazleton Coop
11 SW	2.5	Gorman's
12 WSW	1.6	Dairy Lea
13 W	4.9	Independent
14 WNW	>5	
15 NW	.7	Home Use
16 NNW	4.1	Dairy Lea

SUSQUEHANNA SES-ER-OL

TABLE 2.1-36

NEAREST MILK GOAT

Sector	Distance (Miles)
1 N	≥ 5
2 NNE	≥ 5
3 NE	≥ 5
4 ENE	≥ 5
5 E	≥ 5
6 ESE	≥ 5
7 SE	≥ 5
8 SSE	3.3
9 S	≥ 5
10 SSW	≥ 5
11 SW	≥ 5
12 WSW	≥ 5
13 W	≥ 5
14 WNW	≥ 5
15 NW	≥ 5
16 NNW	≥ 5

SUSQUEHANNA SES-ER-OL

TABLE 2.1-37

NEAREST SITE BOUNDARY

Sector	Distance (Miles)
1 N	0.411
2 NNE	0.458
3 NE	1.140
4 ENE	0.947
5 E	0.790
6 ESE	0.474
7 SE	0.341
8 SSE	0.341
9 S	0.341
10 SSW	0.431
11 SW	0.379
12 WSW	0.700
13 W	0.640
14 WNW	0.640
15 NW	0.544
16 NNW	0.434

SUSQUEHANNA SES-ER-OL

TABLE 2.1-38

NEAREST VEGETABLE GARDEN

Sector	Distance (Miles)
1 N	0.5
2 NNE	0.9
3 NE	2.3
4 ENE	2.8
5 E	0.7
6 ESE	1.5
7 SE	0.4
8 SSE	0.4
9 S	1.2
10 SSW	0.6
11 SW	0.8
12 WSW	1.2
13 W	0.7
14 WNW	1.3
15 NW	0.7
16 NNW	0.7

TABLE 2.1-39

SUMMARY OF MILK DISTRIBUTION FOR PENNSYLVANIA

USAGE	% of TOTAL
Marketed Whole Milk	60.3
Whole Milk Sold Directly to Consumers	4.0
Frozen Products	14.5
Cheese	8.4
Butter	6.0
Farmer's Home Use	1.4
Animals Feeds	0.6
Other	4.8

Source: Pennsylvania Department of Agriculture, Crop Reporting Service, Pennsylvania Crop and Livestock Annual Summary, 1975, C.R.S.66

TABLE 2.1-40

AVERAGE ANNUAL HUNTING HARVEST

	Squirrel 1972-75 Avg.	Rabbit 1972-75 Avg.	Turkey 1972-73 Avg.	Pheasant 1972-75 Avg.	Deer 1972-76 Avg.	Bear 1972-76 Avg.
Bradford	39,881	32,765	1,225	12,856	4,982	8
Berks	49,431	86,468	*	75,544	1,354	0
Carbon	8,597	21,007	*	7,052	2,153	5
Columbia	31,984	30,382	*	20,295	2,234	1
Dauphin	47,210	39,123	249	37,553	1,510	0
Lackawanna	15,452	29,117	*	5,302	944	6
Lebanon	22,870	40,886	203	35,266	645	0
Lehigh	16,419	37,799	*	36,214	340	0
Luzerne	44,000	53,385	501	12,661	2,842	7
Lycoming	49,323	37,608	1,628	13,704	3,956	35
Monroe	14,870	22,853	401	4,450	1,731	19
Montour	8,360	6,951	*	6,387	286	0
Northampton	23,323	42,208	214	34,728	431	0
Northumberland	35,444	32,459	168	19,147	932	0
Pike	8,822	4,516	502	1,853	2,090	34
Schuylkill	35,403	53,992	*	21,131	2,618	0
Snyder	24,368	21,557	*	12,810	733	2
Sullivan	7,089	5,453	719	1,682	2,507	10
Susquehanna	15,853	28,686	*	3,672	2,111	0
Union	12,662	16,517	493	13,666	723	8
Wayne	13,823	15,723	*	1,885	2,755	4
Wyoming	17,311	19,519	*	2,039	1,139	7
	542,994	673,454	6,054	378,017	38,306	146
Highway State (deer)					26,524	

* Sample not adequate to calculate harvest

TABLE 2.1-41

WATER WELL DATA WITHIN TWO MILES OF THE STATION

Well No.	Owner	Location	Well Use[1]	Well Diam., Type & Casing Length	Total Depth (ft.)	Probable Formation Tapped	Number Served	Estimated Present Average Withdrawal (gpd)[2]	Tested Yield (gpm)	Static Water Level Below Ground (ft.)	Comments
1	Smith	Founderville Rd. 6700 ft N of site	D	6" drilled, 60' casing	105	Trimmers Rock	5 people No livestock	300	-	22	Soft water
2	Smith	Founderville Rd. 6600 ft N of site	D	6" drilled, 48' casing	148	Trimmers Rock	2 people No livestock	120	-	22	-
3	L. Sczesnick	Rt. 11 7400 ft NE of site	D	6" drilled, 40' casing	375	Trimmers Rock	2 people No livestock	120	-	3	Water unsuitable for drinking
4	H. Burd	Founderville Rd. 6300 ft N of site	D	6" drilled, 175' casing	375	Trimmers Rock	5 people No livestock	300	-	-	Water contains sulphur
5	J. Walton	Founderville Rd. 6400 ft N of site	D	6" drilled, 40' casing	254	Trimmers Rock	3 people No livestock	180	-	50	Soft water; contains iron
6	Luzerne Outerwear	Rt. 11 6500 ft NE of site	C	Drilled	-	Trimmers Rock	-	-	-	-	-
7	Luzerne Outerwear	Rt. 11 6500 ft NE of site	C	Drilled	-	Trimmers Rock	-	-	-	-	-
8	C. Roskowski	Rt. 11 6000 ft NE of site	D	Drilled	190	Trimmers Rock	5 people No livestock	300	-	-	Hard water
9	F. Sherlock (Home and restaurant)	Rt. 11 5800 ft NE of site	C&D	6" drilled, 45' casing	220	Trimmers Rock	~100 customers daily No livestock	1000	-	30	Plastic casing used
10	Belles (Sign factory)	Rt. 11 5600 ft NE of site	C	Drilled	200	Trimmers Rock	1 person No livestock	15	-	-	Water not used for drinking

TABLE 2.1-41 (Continued)

Well No.	Owner	Location	Well Use[1]	Well Diam., Type & Casing Length	Total Depth (ft.)	Probable Formation Tapped	Number Served	Estimated Present Average Withdrawal (gpd)[1]	Tested Yield (gpm)	Static Water Level Below Ground (ft.)	Comments
11	Chiambi (Home and restaurant)	Rt. 11 5500 ft NE of site	C&D	6" drilled	125	Trimmers Rock	-	-	-	-	Water quality poor; water only for dishwashing and toilet use
12	Gordon Thomas	Rt. 11 5400 ft NE of site	D	6" drilled	460	Trimmers Rock	2 people No livestock	120	-	-	Hard water
13	C. Postens	Rt. 11 5200 ft NE of site	D	6" drilled	75	Trimmers Rock	3 people No livestock	180	-	-	Water quality poor; water unusable for drinking even with filter
14	L.M. Roberts	Rt. 11 4800 ft NE of site	D	6" drilled	130	Trimmers Rock	1 person No livestock	60	-	-	Soft water
15	Paraqas Inc.	Rt. 11 6600 ft NE of site	C	8" drilled	-	Trimmers Rock	2 people No livestock	30	-	-	Water quality good
16	Schuatz	Rt. 11 6400 ft NE of site	D&S	2' dug	28	Pleistocene Sand & Gravel	2 people 2 horses	145	-	-	Soft water; clay pipe retaining walls without mortar used
17	B. Rood	Rt. 11 6200 ft NE of site	D	6" drilled	125	Trimmers Rock	2 people No livestock	120	-	-	Medium hard water; contains iron
18	H. Woznock	Rt. 11 6000 ft NE of site	D	6" drilled	150	Trimmers Rock	5 people No livestock	300	-	2	Hard water
19	C. Lubach	Rt. 11 5600 ft NE of site	D	8" drilled, 120' casing	150	Trimmers Rock	4 people No livestock	240	-	20	Hard water

TABLE 2.1-41 (Continued)

Well No.	Owner	Location	Well Use[1]	Well Diam., Type & Casing Length	Total Depth (ft.)	Probable Formation Tapped	Number Served	Estimated Present Average Withdrawal (gpd)[1]	Tested Yield (gpm)	Static Water Level Below Ground (ft.)	Comments
20	F. Hummel (Restaurant)	Rt. 11 5400 ft NE of site	C	6" drilled	100	Trimmers Rock	~200 customers daily No livestock	2000	-	15-20	Hard water; contains sulphur
21	H. Sickler	Rt. 11 5300 ft NE of site	D	Drilled	105	Trimmers Rock	3 people No livestock	180	-	-	Hard water
22	M. Ashbridge	Rt. 11 5200 ft NE of site	D	6" drilled	150-165	Trimmers Rock	1 person No livestock	60	-	-	Hard water; contains iron
23	Khowlisky	Rt. 11 5000 ft NE of site	D	6" drilled	137	Trimmers Rock	2 people No livestock	120	-	-	Hard water
24	Reider	Rt. 239 9400 ft NE of site	D	6" drilled, 40' casing	125	Trimmers Rock	1 person No livestock	60	-	-	Hard water
25	A. Shafara	Rt. 239 8800 ft NE of site	U	6" drilled, 90' casing	150	Trimmers Rock	None	-	-	35	Hard water; contains iron; See Table ____, Spring #3
26	PP&L	Rt. 11 4000 ft NE of site	U	-	-	-	None	-	-	-	-
27	PP&L	Rt. 11 2400 ft E of site	D	Drilled	≥50	Mahantango	10 people No livestock	150	-	-	Water quality good; water only for office use
28	PP&L Construction Office	Rt. 11 2300 ft E of site	D	6" drilled, 50' casing	223	Mahantango	15 people No livestock	225	12	30 (7/76)	Hard water; water only for office use

TABLE 2.1-41 (Continued)

Well No.	Owner	Location	Well Use[1]	Well Diam., Type & Casing Length	Total Depth (ft.)	Probable Formation Tapped	Number Served	Estimated Present Average Withdrawal (gpd)[1]	Tested Yield (gpm)	Static Water Level Below Ground (ft.)	Comments
29	PP&L	Rt. 11 2200 ft E of site	D	6" drilled	200	Mahantango	2 people No livestock	120	-	-	Hard water
30	H. Schultz	Rockhill Rd. 10,500 ft E of site	D	Drilled	-	Mahantango	4 people No livestock	240	-	-	-
31	E. Hess	Rockhill Rd. 9300 ft E of site	D&S	6" drilled	-	Mahantango	5 people 1 horse	310	-	-	Hard water; contains sulphur
32	R. Hinchcliff	Rockhill Rd. 8800 ft E of site	D	6" drilled	45	Mahantango	4 people No livestock	240	-	8-10 (1977)	Hard water, trace of sulphur
33	W. Daily	Rockhill Rd. 8700 ft E of site	D	6" drilled, 35-40' casing	87	Mahantango	4 people No livestock	240	-	0	Hard water
34	W. Hess	Rockhill Rd. 8500 ft E of site	D	Drilled	-	Mahantango	4 people No livestock	240	-	-	Hard water
35	E. Fanx	Rockhill Rd. 8400 ft E of site	D	3' dug	15	Recent Alluvium	2 people No livestock	120	-	2	Hard water; stone retaining wall used
36	W. Roth	Rockhill Rd. 8200 ft E of site	D	6" drilled, 29' casing	105	Mahantango	4 people No livestock	240	20	10 (10/64)	Hard water
37	B. Fanx	Rockhill Rd. 8100 ft E of site	D	6" drilled, 29' casing	65	Mahantango	3 people No livestock	180	-	10	Hard water
38	E. Yanulewjcz (Summer house)	Rt. 239 7100 ft E of site	D	-	-	Mahantango	-	-	-		-
39	PP&L	Susquehanna River Bank 3800 ft E of site	C	6" drilled, 64' casing	160	Mahantango	12 people No livestock	180	60	40	Hard water

TABLE 2.1-41 (Continued)

Well No.	Owner	Location	Well Use[1]	Well Diam., Type & Casing Length	Total Depth (ft.)	Probable Formation Tapped	Number Served	Estimated Present Average Withdrawal (gpd)[1]	Tested Yield (gpm)	Static Water Level Below Ground (ft.)	Comments
40	Citizens Water Co. of Wapwallopen	8800 ft SE of site	P	8" drilled, 30' casing	390	Trimmers Rock	-	-	60	30	Hard water; standby well; See Table __, Spring #7
41	M. Mont	2500 ft SE of site	D	Drilled	-	Mahantango	-	-	-	-	-
42	J. Fatoma	2600 ft SE of site	D	6" drilled, 20' casing	90	Mahantango	5 people No livestock	300	-	-	Hard water
43	PP&L	2600 ft SE of site	D	6" drilled, 20' casing	70	Mahantango	6 people No livestock	360	-	-	Hard water
44	PP&L	2600 ft SE of site	D	6" drilled, 20' casing	60	Mahantango	5 people No livestock	300	-	-	Hard water
45	PP&L	2200 ft SE of site	D	6" drilled, 20' casing	80	Mahantango	2 people No livestock	120	6-8	20	Hard water
46	Hikline	2100 ft SE of site	D	6" drilled, 20' casing	90	Mahantango	4 people No livestock	240	6	30 (1945)	Very hard water
47	Hikline	2100 ft SE of site	D	6" drilled, 20' casing	80	Mahantango	1 person No livestock	60	2	30 (1940)	Very hard water
48	Hikline	2100 ft SE of site	D	6" drilled, 25' casing	60	Mahantango	-	-	-	-	Very hard water, stand-by well; See Well #45 and #46
49	C. Mont	2000 ft SE of site	D	6" drilled, 50' casing	57	Mahantango	1 person No livestock	60	26	-	Medium hard water
50	PP&L	2300 ft SE of site	D	6" drilled, 30' casing	300	Mahantango	5 people No livestock	300	6-8	50	Hard water
51	PP&L	2400 ft SE of site	D	6" drilled, 30' casing	354	Mahantango	3 people No livestock	180	-	30-40	Hard water
52	Samsel	Rt. 11 3100 ft SE of site	D	6" drilled, 50' casing	100	Mahantango	4 people No livestock	240	-	31	Soft water

TABLE 2.1-41 (Continued)

Well No.	Owner	Location	Well Use[1]	Well Diam., Type & Casing Length	Total Depth (ft.)	Probable Formation Tapped	Number Served	Estimated Present Average Withdrawal (gpd)[1]	Tested Yield (gpm)	Static Water Level Below Ground (ft.)	Comments
53	E. Shilbiski	Rt. 11 3300 ft SE of site	D	6" drilled	60	Mahantango	6 people No livestock	360	-	30	Medium hard water
54	E. Panas	3000 ft SE of site	D	6" drilled	45	Mahantango	4 people No livestock	240	50-60	10	Hard water
55	K. Swigonski	3100 ft SE of site	D	6" drilled, 40' casing	63	Mahantango	2 people No livestock	120	50	10	Hard water; contains sulphur
56	J. McDonald	3100 ft SE of site	D	6" drilled, 50' casing	80	Mahantango	4 people No livestock	240	-	10	Hard water
57	J. Naunczek	3700 ft SE of site	D	6" drilled, 30' casing	300	Mahantango	2 people No livestock	120	30	30	Hard water; water for farm use
58	Salem Township Office	4000 ft SE of site	C	6" drilled, 60' casing	150	Mahantango	3 people No livestock	45	50	-	Hard water; contains iron
59	E. Wolfe	4600 ft SE of site	D	6" drilled	60	Mahantango	8 people No livestock	480	-	-	Hard water; contains iron and sulphur; water unusable for drinking
60	J.H. Roberts	4700 ft SE of site	D	6" drilled	60	Mahantango	2 people No livestock	120	-	-	Hard water; contains iron; water unusable for drinking
61	R. Petroski	4800 ft SE of site	D	6" drilled	-	Mahantango	3 people No livestock	180	-	-	Hard water
62	R. Petroski	4800 ft SE of site	D	6" drilled	150	Mahantango	4 people No livestock	240	-	-	Hard water
63	A. Petroski	Rt. 11 5000 ft SE of site	D	6" drilled	65	Mahantango	3 people No livestock	180	-	30	Soft water

TABLE 2.1-41 (Continued)

Well No.	Owner	Location	Well Use[1]	Well Diam., Type & Casing Length	Total Depth (ft.)	Probable Formation Tapped	Number Served	Estimated Present Average Withdrawal (gpd)[1]	Tested Yield (gpm)	Static Water Level Below Ground (ft.)	Comments
64	A. Belles	Rt. 11 4900 ft SE of site	D	6" drilled	34(?)	Mahantango	1 person No livestock	60	-	8	Soft water
65	J. Funket	Rt. 11 4800 ft SE of site	D	Drilled	-	Mahantango	2 people No livestock	120	-	-	-
66	E. Wolfe (Home and retail farm equipment store)	5300 ft S of site	C&D	6" drilled, 130' casing	150	Mahantango	4 people No livestock	240	-	-	Hard water; contains sulphur and iron; plastic casing used
67	B. Zowlinski (State Police)	Rt. 11 2600 ft SE of site	C	8" drilled, 30' casing	80	Mahantango	18 people No livestock	270	10	20 (1971)	-
68	C. Mingoia (Restaurant)	Rt. 11 2700 ft SE of site	C	6" drilled, 20' casing	50	Mahantango	~100 customers daily No livestock	1000	60	10 (1957)	Hard water
69	M. Samsel (Car dealer)	Rt. 11 2900 ft SE of site	C	6" drilled, 100' casing	205	Mahantango	2 people No livestock	30	-	3	Hard water
70	S. Patrishin	Rt. 11 3600 ft SE of site	D	Drilled	-	Mahantango	3 people No livestock	180	-	-	-
71	H. Schuett	Rt. 11 3700 ft SE of site	D	6" drilled, 22' casing	85	Mahantango	4 people No livestock	240	25	24 (1958)	Soft water
72	C. Dent	Rt. 11 3900 ft SE of site	D	Drilled, 20' casing	65	Mahantango	2 people No livestock	120	-	15	Medium hard water
73	R. Zwolinski	Rt. 11 4000 ft SE of site	D	Drilled, 20' casing	65	Mahantango	2 people No livestock	120	-	15	Medium hard water
74	R. Zwolinski	Rt. 11 4100 ft SE of site	D	Drilled, 20' casing	60	Mahantango	5 people No livestock	300	-	15 (1950)	Medium hard water

TABLE 2.1-41 (Continued)

Well No.	Owner	Location	Well Use[1]	Well Diam., Type & Casing Length	Total Depth (ft.)	Probable Formation Tapped	Number Served	Estimated Present Average Withdrawal (gpd)[1]	Tested Yield (gpm)	Static Water Level Below Ground (ft.)	Comments
75	R. Zwolinski	Rt. 11 4300 ft SE of site	D	6" drilled, 40' casing	65	Mahantango	5 people. No livestock	300	15	15 (1962)	Medium hard water
76	L.W. Laubachs	Rt. 11 4400 ft SE of site	D	6" drilled, 20' casing	65	Mahantango	2 people No livestock	120	-	15	Medium hard water
77	T.R. Church	Rt. 11 4700 ft SE of site	D	8" drilled, 22' casing	55	Mahantango	2 people No livestock	120	8	11 (1947)	Hard water
78	J. Pleviack	Rt. 11 4900 ft SE of site	D	6" drilled, 22' casing	46	Mahantango	1 person No livestock	60	-	11	Medium hard water
79	F. Butz (Home and gas station)	Rt. 11 5000 ft SE of site	C&D	6" drilled, 2' casing	75	Mahantango	3 people No livestock	180	-	3-5	Hard water
80	S. Bloshinski	Rt. 11 5300 ft SE of site	D	6" drilled, 70' casing	100	Mahantango	2 people No livestock	120	25	80	Soft water
81	J.C. Labar (Truck rental agency)	Rt. 11 5400 ft SE of site	C	6" drilled, 33' casing	35	Mahantango	5 people No livestock (includes Well #82)	75 (includes Well #82)	-	3	Hard water; See Well #82
82	J.C. Labar (Truck rental agency)	Rt. 11 5400 ft SE of site	C	6" drilled, 90' casing	150	Mahantango	5 people No livestock (includes Well #81)	75 (includes Well #81)	26	30	Hard water; See Well #81
83	C.R. Thomas	Rt. 11 6300 ft S of site	D	6" drilled	60	Mahantango	2 people No livestock	120	-	-	Hard water; contains iron and sulphur; used for everything but drinking
84	R. Mack	Rt. 11 6600 ft S of site	D	6" drilled, 80' casing	128	Mahantango	6 people No livestock	360	15	48 (1972)	Hard water

TABLE 2.1-41 (Continued)

Well No.	Owner	Location	Well Use[1]	Well Diam., Type & Casing Length	Total Depth (ft.)	Probable Formation Tapped	Number Served	Estimated Present Average Withdrawal (gpd)[1]	Tested Yield (gpm)	Static Water Level Below Ground (ft.)	Comments
85	F. Selecky	Rt. 11 6700 ft S of site	D	6" drilled	120	Mahantango	2 people No livestock	120	-	60	Hard water
86	P. Saracino	Rt. 11 6800 ft S of site	D	6" drilled	195	Mahantango	5 people No livestock	300	-	60	Hard water
87	M. Simone	Rt. 11 6900 ft S of site	D	6" drilled, 120' casing	153	Mahantango	4 people No livestock	240	8	55	Hard water; contains sulphur and iron
88	A. Markovich	Rt. 11 6000 ft S of site	D	6" drilled, 113' casing	150	Mahantango	1 person No livestock	60	20	70 (1973)	Hard water
89	J.D. Bower	6100 ft S of site	D	8" drilled, 96' casing	167	Mahantango	1 person No livestock	60	-	75	Soft water
90	T. Barr	6400 ft S of site	D	8" drilled, 100' casing	100	Pleistocene Sand & Gravel(?)	2 people No livestock	120	-	75	Soft water
91	S.W. Cope	Rt. 11 6600 ft S of site	D	6" drilled	179	Mahantango	6 people No livestock	360	-	60(?)	Soft water
92	G. Shultz	Rt. 11 6500 ft S of site	D	6" drilled	160	Mahantango	1 person No livestock	60	-	60(?)	Hard water
93	H. Kaahler	Rt. 11 6600 ft S of site	D	6" drilled	135	Mahantango	2 people No livestock	120	-	60(?)	Hard water
94	PP&L	Rt. 11 6800 ft S of site	D	Drilled	80	Mahantango	2 people No livestock	120	-	-	Hard water; contains iron
95	H. Wise	Rt. 11 6900 ft S of site	D	8" drilled	108	Mahantango	2 people No livestock	120	-	-	Hard water

TABLE 2.1-41 (Continued)

Well No.	Owner	Location	Well Use[1]	Well Diam., Type & Casing Length	Total Depth (ft.)	Probable Formation Tapped	Number Served	Estimated Present Average Withdrawal (gpd)[1]	Tested Yield (gpm)	Static Water Level Below Ground (ft.)	Comments
96	J. Search	Rt. 11 7000 ft S of site	D	6" drilled, 165'(?) casing	165	Mahantango	2 people No livestock	120	-	50	Hard water
97	F. Rehrig	Rt. 11 7100 ft S of site	D	6" drilled, 85' casing	117	Mahantango	3 people No livestock	180	9	40 (1961)	Hard water
98	D. Yohe	Rt. 11 7200 ft S of site	D	6" drilled	125	Mahantango	6 people No livestock	360	-	-	Soft water; contains iron
99	R. Price	Rt. 11 7600 ft S of site	D	6" drilled, 109' casing	160	Mahantango	5 people No livestock	300	-	60	Soft water
100	P. Moskaluk	Rt. 11 7500 ft S of site	D	6" drilled	100	Mahantango	3 people No livestock	180	-	-	Hard water; contains iron
101	S. Botsford	Rt. 11 7400 ft S of site	D	6" drilled, 200'(?) casing	200	Mahantango	5 people No livestock	300	6(?)	-	Hard water
102	A. Colomb	Rt. 11 7700 ft SW of site	D	6" drilled	180	Mahantango	2 people No livestock	120	5	60	Soft water
103	D. Brown	Walnut Dr. 8200 ft SW of site	D	6" drilled	70	Mahantango	3 people No livestock	180	-	-	See Table __ Spring #16
104	C. Wolfe	River Dr. 10,400 ft S of site	D	3' dug	22	Pleistocene Sand & Gravel	3 people No livestock	180	-	-	Hard water; stone retaining wall used
105	J. Humenick	River Dr. 10,400 ft S of site	D	8" drilled, 40' casing	40	Pleistocene Sand & Gravel	7 people No livestock	420	-	5	Hard water
106	L. Stevens (Summer house)	10,300 ft SW of site	D	6" drilled	80	Mahantango	-	-	-	-	-

TABLE 2.1-41 (Continued)

Well No.	Owner	Location	Well Use[1]	Well Diam., Type & Casing Length	Total Depth (ft.)	Probable Formation Tapped	Number Served	Estimated Present Average Withdrawal (gpd)[1]	Tested Yield (gpm)	Static Water Level Below Ground (ft.)	Comments
107	K. Confer	Walnut Dr. 9600 ft SW of site	D	6" drilled, 20' casing	80	Mahantango	2 people No livestock	120	12	60 (1974)	Hard water
108	H. Smith	Walnut Dr. 9800 ft SW of site	D	6" drilled	60	Mahantango	9 people No livestock	540	-	16	Hard water
109	J.E. Tailer	10,400 ft SW of site	D	6" drilled, 22' casing	52	Mahantango	3 people No livestock	180	-	25	Soft water
110	J. Karchner	Walnut Dr. 10,200 ft SW of site	D	3' dug	20	Pleistocene Sand & Gravel	3 people No livestock	180	-	16	Soft water; stone retaining wall used
111	W.F. Smith	Walnut Dr. 10,300 ft SW of site	D	2' dug	20	Pleistocene Sand & Gravel	3 people No livestock	180	-	8	Soft water
112	E. Becker	Walnut Dr. 10,400 ft SW of site	D	2' dug	20	Pleistocene Sand & Gravel	1 person No livestock	60	-	8	Soft water; concrete retaining wall used
113	R. Kreischer	Walnut Dr. 10,500 ft SW of site	D	6" drilled, 50' casing	150	Mahantango	4 people No livestock	240	-	50	Soft water
114	M. Ash	Walnut Dr. 10,600 ft SW of site	D	3' dug	24	Pleistocene Sand & Gravel	6 people No livestock	360	-	20	Soft water; stone retaining wall used
115	Benjamin	Walnut Dr. 10,100 ft SW of site	D	Dug	-	Pleistocene Sand & Gravel	5 people No livestock	300	-	-	Soft water
116	M. Ridell	Walnut Dr. 10,100 ft SW of site	D	6" drilled, 36' casing	98	Mahantango	2 people No livestock	120	18	1 (1976)	Hard water
117	S. Molyneaux	Rt. 11 10,300 ft SW of site	D	6" drilled, 20' casing	70	Mahantango	3 people No livestock	180	-	2	Water quality good and soft

TABLE 2.1-41 (Continued)

Well No.	Owner	Location	Well Use[1]	Well Diam., Type & Casing Length	Total Depth (ft.)	Probable Formation Tapped	Number Served	Estimated Present Average Withdrawal (gpd)[1]	Tested Yield (gpm)	Static Water Level Below Ground (ft.)	Comments
118	N. Fraind	Pine Crest 10,300 ft SW of site	D	6" drilled, 20' casing	137	Mahantango	3 people No livestock	180	5	20 (1961)	-
119	S. Zwolinski	Pine Crest 10,200 ft SW of site	D	6" drilled, 20' casing	145	Mahantango	2 people No livestock	120	5	30 (1968)	Soft water
120	S. Miller	Pine Crest 10,200 ft SW of site	D	6" drilled, 20' casing	85	Mahantango	2 people No livestock	120	-	30	Soft water
121	L. Roundtree	Pine Crest 10,100 ft SW of site	D	6" drilled, 20' casing	135	Mahantango	2 people No livestock	120	-	20	Soft water
122	R. Ross	Pine Crest 10,000 ft SW of site	D	6" drilled, 20' casing	145	Mahantango	5 people No livestock	300	-	30	Soft water
123	K. Kissenger	Pine Crest 10,000 ft SW of site	D	6" drilled, 40' casing	125	Mahantango	5 people No livestock	300	8	60 (9/71)	Medium hard water
124	S. Molnar	Pine Crest 10,200 ft SW of site	D	6" drilled	145	Mahantango	4 people No livestock	240	-	30(?)	Medium hard water
125	E. Steele	Pine Crest 10,300 ft SW of site	D	6" drilled, 20' casing	115	Mahantango	7 people No livestock	420	-	-	Hard water
126	W. Fish	Pine Crest 9700 ft SW of site	D	6" drilled, 60' casing	68	Mahantango	2 people No livestock	120	-	60	Hard water
127	B. Kishpaugh (Toyota dealer)	Rt. 11 10,000 ft SW of site	C	6" drilled, 20' casing	140	Mahantango	16 people No livestock	240	8	20 (1976)	Hard water
128	B. Kishpaugh (Spare car parts dealer)	Rt. 11 9600 ft SW of site	C	6" drilled, 20' casing	100	Mahantango	5 people No livestock	75	-	2	Hard water

TABLE 2.1-41 (Continued)

Well No.	Owner	Location	Well Use [1]	Well Diam., Type & Casing Length	Total Depth (ft.)	Probable Formation Tapped	Number Served	Estimated Present Average Withdrawal (gpd) [1]	Tested Yield (gpm)	Static Water Level Below Ground (ft.)	Comments
129	D. Antonacci (Home and fabric store)	Rt. 11 9800 ft SW of site	C&D	6" drilled, 20' casing	160	Mahantango	4 people No livestock	240	18	15 (1965)	Medium hard water
130	N. Getz	Rt. 11 9600 ft SW of site	D	6" drilled, 20' casing	65	Mahantango	2 people No livestock	120	-	2	Hard water
131	F. Aranella	Rt. 11 9500 ft SW of site	U	6" drilled, 20' casing	65	Mahantango	None	-	-	-	Soft water
132	B. Miller	Rt. 11 9000 ft SW of site	D	6" drilled, 12' casing	203	Mahantango	3 people No livestock	180	-	1	Soft water
133	L.W. Confer	Confer Lane 7600 ft SW of site	D	6" drilled, 90'(?) casing	90	Mahantango	2 people No livestock	120	10	-	Soft water
134	S. Bodnar	Confer Lane 7200 ft SW of site	D&S	6" drilled, 128' casing	167	Mahantango	4 people 2 beef cattle	265	130	45	Hard water
135	W.H. Sink	Confer Lane 4400 ft SW of site	D	3' dug	50	Mahantango	2 people No livestock	120	-	5	Soft water; stone retaining wall without mortar used
136	E. Shortz	Confer Lane 3300 ft SW of site	D	5' dug & blasted, 4' casing	30	Mahantango	3 people No livestock (includes Well #137)	180 (includes Well #137)	-	8	Soft water; concrete retaining wall used; See Well #137
137	E. Shortz	Confer Lane 3600 ft SW of site	D	10' dug & blasted, 4' casing	30	Mahantango	3 people No livestock (includes Well #136)	180 (includes Well #136)	-	8	Soft water; concrete retaining wall used; See Well #136
138	PP&L	Confer Lane 2600 ft SW of site	D	6" drilled, 20' casing	80	Mahantango	2 people No livestock	120	-	-	Hard water

TABLE 2.1-41 (Continued)

Well No.	Owner	Location	Well Use[1]	Well Diam., Type & Casing Length	Total Depth (ft.)	Probable Formation Tapped	Number Served	Estimated Present Average Withdrawal (gpd)[1]	Tested Yield (gpm)	Static Water Level Below Ground (ft.)	Comments
139	W. Kisner	R.D. 1 6300 ft SW of site	D	6" drilled, 20' casing	24	Mahantango	2 people No livestock	120	-	2	Soft water
140	M. Michael	R.D. 1 8000 ft SW of site	D&S	6" drilled, 20' casing	172	Mahantango	5 people 2 horses	325	5	10	Water contains sulphur
141	F. Shultz	R.D. 1 9200 ft SW of site	D&S	8" drilled, 75' casing	115	Mahantango	5 people 100 cows	2650	-	15	Hard water; contains iron
142	H.J. Shultz	R.D. 1 10,500 ft SW of site	D	6" drilled, 40' casing	110	Mahantango	2 people No livestock	120	-	35	Soft water
143	L.E. Shultz	R.D. 1 10,600 ft SW of site	D	6" drilled, 35' casing	70	Mahantango	1 person No livestock	60	-	35	Soft water
144	D. Hill	R.D. 1 10,500 ft SW of site	D	6" drilled, 80' casing	90	Mahantango	4 people No livestock	240	-	15	Hard water
145	P. Young	R.D. 1 10,600 ft SW of site	D&S	3' dug	40	Mahantango	7 people 60 cows	1830	-	4	Hard water; stone retaining wall without mortar used
146	M. Cobe	R.D. 1 8600 ft SW of site	D	8" drilled	400	Mahantango	3 people No livestock	180	50	-	Hard water; contains sulphur; See Well #147
147	M. Cobe	R.D. 1 8700 ft SW of site	U	8" drilled	250	Mahantango	None	-	-	-	Hard water; contains sulphur; See Well #146
148	A. Cobe	R.D. 1 8300 ft SW of site	D&S	3' dug	18	Recent Alluvium	1 person 2 beef cattle	85	-	1.5	Soft water; stone retaining wall without mortar used

TABLE 2.1-41 (Continued)

Well No.	Owner	Location	Well Use[1]	Well Diam., Type & Casing Length	Total Depth (ft.)	Probable Formation Tapped	Number Served	Estimated Present Average Withdrawal (gpd)[1]	Tested Yield (gpm)	Static Water Level Below Ground (ft.)	Comments
149	A. Davis	R.D. 1 7000 ft SW of site	D	6" drilled, 21' casing	27	Mahantango	2 people No livestock	120	500(?)	15 (1944)	Soft water
150	C. Nevel	R.D. 1 10,300 ft SW of site	D	6" drilled	102	Mahantango	2 people No livestock	120	-	-	Soft water; plastic casing used
151	Louis Kilti	Off R.D. 1 9200 ft SW of site	D&S	3' dug	20	Mahantango	5 people 20-90 hogs	660	-	6	Medium hard water; stone retaining wall without motar used
152	J. Keller	R.D. 1 10,400 ft SW of site	D	6" drilled	110	Mahantango	2 people No livestock	120	-	-	Soft water
153	R.J. Nevel	R.D. 1 10,300 ft SW of site	D&S	6" drilled	77	Mahantango	2 people 3 hogs	130	300(?)	10	Soft water; See Well #154
154	R.J. Nevel	R.D. 1 10,400 ft SW of site	U	6" drilled	35	Mahantango	None	-	-	-	Soft water See Well #153
155	A. Schmid	R.D. 1 10,300 ft W of site	D	6" drilled	-	Mahantango	4 people No livestock	240	-	-	Water quality hard, but good
156	H. Killian	R.D. 1 10,200 ft W of site	D	6" drilled	245	Mahantango	1 person No livestock	60	-	-	Hard water
157	H. Brader	R.D. 1 9800 ft W of site	D	6" drilled, 150'(?) casing	150	Mahantango	2 people No livestock	120	-	100	Slightly hard water
158	W. Kishpaugh	R.D. 1 9400 ft W of site	D&S	6" drilled, 100' casing	100	Mahantango	6 people 6 horses	430	16	30 (1972)	Hard water

TABLE 2.1-41 (Continued)

Well No.	Owner	Location	Well Use[1]	Well Diam., Type & Casing Length	Total Depth (ft.)	Probable Formation Tapped	Number Served	Estimated Present Average Withdrawal (gpd)[1]	Tested Yield (gpm)	Static Water Level Below Ground (ft.)	Comments
159	Shnyder	R.D. 1 9400 ft W of site	D&S	4' dug	50	Mahantango	3 people 4 horses	230	-	2	Soft water; stone retaining wall without mortar used
160	M. Hart	R.D. 1 8500 ft W of site	D&S	6" drilled, 36' casing	200	Mahantango	5 people 6 horses	370	40	24	Soft water
161	W. Johnson	R.D. 1 4200 ft W of site	D&S	6" drilled, 75' casing	75	Mahantango	4 people 6 horses	310	-	8	Hard water; contains iron plastic casing used
162	H.E. Folk	R.D. 1 4100 ft W of site	D	6" drilled, 20' casing	60	Mahantango	2 people No livestock	120	110(?)	40 (1951)	Soft water
163	Weaver	R.D. 1 9400 ft NW of site	D&S	6" drilled	250	Trimmers Rock	5 people 1 horse 5 cows (includes Spring #24)	440 (includes Spring #24)	-	-	Hard water See Table __, Spring #24
164	W. Hiller	R.D. 1 9800 ft NW of site	D	6" drilled	48	Trimmers Rock	2 people No livestock	120	-	-	Soft water
165	Peters	R.D. 1 10,000 ft NW of site	U	3' dug	-	Trimmers Rock	None	-	-	-	-
166	J. Krisanda	7900 ft NW of site	D	6" drilled, 20' casing	100	Trimmers Rock	2 people No livestock	120	6	6 (1976)	Soft water
167	Moskaluk	6600 ft NW of site	D	8" drilled, 40' casing	151	Trimmers Rock	3 people No.livestock	~300	6.5	25 (1945)	Soft water; plastic casing used
168	K.A. Church	6100 ft NW of site	D	6" drilled, 20' casing	450	Trimmers Rock	2 people No livestock	120	8	50	Water quality good and soft; plastic casing used

TABLE 2.1-41 (Continued)

Well No.	Owner	Location	Well Use[1]	Well Diam., Type & Casing Length	Total Depth (ft.)	Probable Formation Tapped	Number Served	Estimated Present Average Withdrawal (gpd)[1]	Tested Yield (gpm)	Static Water Level Below Ground (ft.)	Comments
169	I. Thomas	R.D. 1 4500 ft NW of site	D	-	-	Trimmers Rock	1 person No livestock	60	-	-	-
170	Serafin	R.D. 1 4400 ft NW of site	D&S	8" drilled, 12' casing	80	Trimmers Rock	2 people 2 beef cattle (includes Spring #29)	145 (includes Spring #29)	-	12	Soft water See Table __, Spring #29
171	A. Haydock	R.D. 1 4800 ft NW of site	D	6" drilled	200	Trimmers Rock	2 people No livestock	120	-	-	Soft water
172	Stanley Thomas	R.D. 1 3000 ft N of site	D&S	6" drilled, 20' casing	110	Trimmers Rock	4 people 3 horses	275	-	0	Soft water; artesian well
173	J. Thomas	R.D. 1 3200 ft N of site	D	6" drilled	300	Trimmers Rock	3 people No livestock	180	12	25 (1977)	Soft water
174	Perkoski	Off Founderville Rd. 8400 ft N of site	U	Drilled	100	Trimmers Rock	None	-	-	-	Soft water See Table __, Spring #33
175	Perkoski	Off Founderville Rd. 8100 ft N of site	U	Drilled	175	Trimmers Rock	None	-	-	-	See Table __, Spring #33
176	Harold Vojt	Founderville Rd. 7100 ft NW of site	D	6" drilled	125	Trimmers Rock	1 person No livestock	60	-	25	Soft water; contains iron
177	E. Naunczek	Founderville Rd. 7800 ft NW of site	D	6" drilled, 18' casing	125	Trimmers Rock	2 people No livestock	120	40	20 (1938)	Medium hard water
178	D. Stout	Founderville Rd. 8300 ft NW of site	D&S	5' dug	-	Trimmers Rock	4 people 3 beef cattle 1 hog (includes Well #179)	280 (includes Well #179)	-	4	Hard water; See Well #179

TABLE 2.1-41 (Continued)

Well No.	Owner	Location	Well Use[1]	Well Diam., Type & Casing Length	Total Depth (ft.)	Probable Formation Tapped	Number Served	Estimated Present Average Withdrawal (gpd)[1]	Tested Yield (gpm)	Static Water Level Below Ground (ft.)	Comments
179	D. Stout	Founderville Rd. 8100 ft NW of site	D&S	6" drilled	20	Trimmers Rock	4 people 3 beef cattle 1 hog (includes Well #178)	280 (includes Well #178)	10	10 (1976)	Hard water; See Well #178
180	G. Remaky	Founderville Rd. 9200 ft NW of site	D	3' dug	4	Residual Soil overlying Trimmers Rock	2 people No livestock	120	-	~4	Hard water
181	G. Remaky	Founderville Rd. 9000 ft NW of site	D	6" drilled	250	Trimmers Rock	2 people No livestock	120	-	-	Soft water
182	G. Remaky	Founderville Rd. 8900 ft NW of site	D	Drilled	-	Trimmers Rock	2 people No livestock	120	-	-	Soft water
183	J.S. Lennux	Founderville Rd. 9000 ft NW of site	D	3' dug	10-15	Residual Soil overlying Trimmers Rock	3 people No livestock	180	-	~4	Water quality good and soft; stone retaining wall used
184	Arthur Philips (New trailer court)	Founderville Rd. 10,000 ft NW of site	D	6" drilled	146	Trimmers Rock	40 people No livestock	2400	-	-	Soft water
185	Michael Church	9100 ft S of site	D	-	-	Pleistocene Sand & Gravel	2 people No livestock	120	-	-	-

Note:
gpd - gallons per day
gpm - gallons per minute
1 foot = 0.3048 meters
1 gallon = 3.785 liters

[1] Well Use Key:

C - Commercial
D - Domestic
P - Public Supply
S - Stock

[2] Estimated Present Average Withdrawal (gpd) Key:

Average withdrawal was estimated based on the following consumption rates:

1 person (domestic use) uses 60 gpd*
1 person (office use) uses 15 gpd+
1 person (restaurant customer) uses 10 gpd+
1 horse uses 12 gpd*
1 beef cattle uses 12 gpd*
1 cow uses 35 gpd* (Note - Calculations were done assuming half the dairy animals are dry (12 gpd) and half are producing (35 gpd) at any given time.)
1 hog uses 4 gpd*
1 sheep uses 2 gpd*

*Reference: Fairbanks Morse Pump Division, Hydraulic Handbook, Kansas City, Kansas: Fairbanks Morse Pump Division, Colt Industries, (1965).

+ Our estimate

TABLE 2.1-42

SPRING DATA WITHIN TWO MILES OF THE STATION

Spring No.	Owner	Location	Spring Use[1]	Probable Formation Tapped	No. of People Served	No. and Type of Livestock Served	Estimated Present Average Withdrawal (gpd)[2]	Comments (Water Quality, etc.)
1	A. Duney	Rt. 11 7300 ft N of site	D	Trimmers Rock	2	None	120	Soft water
2	J. Kotsur	Rt. 11 7400 ft N of site	D	Trimmers Rock	4	None	240	-
3	A. Shafara	Rt. 239 9000 ft NE of site	D	Trimmers Rock	2	None	120	Hard water; See Table 2.1-a, Well #25
4	A. Hess	Rockhill Rd. 9800 ft E of site	D	Mahantango	1	None	60	Soft water
5	M. Briggs	Rt. 239 6800 ft E of site	D	Mahantango	2	None	120	-
6	W. Hart	8600 ft SE of site	D	Mahantango	2	None	120	Soft water
7	Citizens Water Co. of Wapwallopen	8800 ft SE of site	P	Trimmers Rock	~200	None	~8200	Soft water; 3 springs included here; See Table 2.1-a, Well #40
8	PP&L	2400 ft SE of site	D&S	Mahantango	7	3 horses	445	Hard water
9	H. Scholl	3000 ft SE of site	D	Pleistocene Sand & Gravel	2	None	120	Hard water
10	J. Knowles	4200 ft SE of site	D	Pleistocene Sand & Gravel	3	None	~4	Medium hard water; due to small withdrawal amount, remaining water needs probably supplied by unknown source
11	Draina	Rt. 11 4000 ft SE of site	D	Pleistocene Sand & Gravel	2	None	120	Soft water
12	B. Pebelochi	4000 ft SE of site	D	Pleistocene Sand & Gravel	1	None	60	Hard water
13	P.M. Krystofik (Home and beauty parlor)	Rt. 11 6000 ft S of site	C&D	Pleistocene Sand & Gravel	4	None	240	Soft water
14	R. Mack	Rt. 11 6600 ft S of site	S	Pleistocene Sand & Gravel	-	-	-	Hard water
15	L. Judge	River Dr. 10,200 ft S of site	D	Mahantango	2	None	120	Hard water
16	D. Brown	Walnut Dr. 8200 ft SW of site	S	Pleistocene Sand & Gravel	None	12 horses	145	See Table 2.1-a, Well #103
17	G. Ramensnyder	Walnut Dr. 9600 ft SW of site	D&S	Pleistocene Sand & Gravel	2	1 horse	130	Soft water
18	J. Becker	Walnut Dr. 10,400 ft SW of site	D	Pleistocene Sand & Gravel	5	None	300	Soft water
19	M. Harris	Pine Crest 10,200 ft SW of site	D	Pleistocene Sand & Gravel	4	None	240	Soft water
20	C.H. Michael	R.D. 1 7400 ft SW of site	D&S	Pleistocene Sand & Gravel	3	3 hogs	190	Soft water

TABLE 2.1-42 (Continued)

Spring No.	Owner	Location	Spring Use[1]	Probable Formation Tapped	No. of People Served	No. and Type of Livestock Served	Estimated Present Average Withdrawal (gpd)[2]	Comments (Water Quality, etc.)
21	Louis Kilti	Off R.D. 1 9200 ft SW of site	S	Mahantango	None	16 beef cattle	190	Medium hard water
22	E. Seely	R.D. 1 6800 ft W of site	D	Trimmers Rock	4	None	240	Soft water
23	G.H. Seely	R.D. 1 8300 ft NW of site	D	Trimmers Rock	2	None	120	-
24	Weaver	R.D. 1 9400 ft NW of site	D&S	Trimmers Rock	5 (includes Well #163)	1 horse 5 cows (includes Well #163)	440 (includes Well #163)	Hard water; See Table 2-1a, Well #163
25	D. Wright	R.D. 1 10,000 ft NW of site	D	Trimmers Rock	3	None	180	Soft water
26	Stoda	9600 ft NW of site	D	Trimmers Rock	9	None	540	Water quality good and soft
27	Stoda	9400 ft NW of site	S	Trimmers Rock	None	10 beef cattle 15 hogs	180	Water quality good and soft
28	A. Krisanda	7400 ft NW of site	D&S	Trimmers Rock	4	7 beef cattle	325	Water quality good and soft
29	Serafin	R.D. 1 4500 ft NW of site	D&S	Trimmers Rock	2 (includes Well #169)	2 beef cattle (includes Well #169)	145 (includes Well #169)	Soft water; See Table 2.1-a, Well #169
30	J. Rubinski	R.D. 1 4200 ft NW of site	D	Trimmers Rock	8	None	480	Water quality good and soft
31	Rubinski	R.D. 1 4800 ft NW of site	D	Trimmers Rock	3	None	180	Water quality good and soft
32	Cosk	Founderville Rd. 6700 ft N of site	D&S	Trimmers Rock	6	2 beef cattle	385	Water quality good and soft
33	Perkoski	Off Founderville Rd. 8200 N of site	D&S	Catskill	2	15 beef cattle	300	Soft water; See Table 2.1-a, Well #174 and #175

Note: gpd = gallons per day
1 gallon = 3.785 liters

[1]Spring Use Key:

C = Commercial
D = Domestic
P = Public Supply
S = Stock

[2]Estimated Present Average Withdrawal (gpd) Key:

With the exception of spring no. 7, for which an estimate was provided, average withdrawal was estimated based on the following rates:

1 person (domestic use) uses 60 gpd*
1 person (office use) uses 15 gpd+
1 horse uses 12 gpd*
1 beef cattle uses 12 gpd*
1 hog uses 4 gpd*

*Reference: Fairbanks Morse Pump Division, Hydraulic Handbook, Kansas City, Kansas:
Fairbanks Morse Pump Division, Colt Industries, (1965).

+ Our estimate

TABLE 2.1-43 (Sheet 1 of 4)

DATA FOR MAJOR WATER WELLS[1], OTHER THAN PUBLIC WELLS, LOCATED BETWEEN 2 AND 10 MILES FROM THE STATION

[1]Major water wells are defined as those with a reported yield of 15 gpm or more.

Well No.	Pa. State Well No.[2]	Location	Owner	Use[3]	Total Depth (ft)	Probable Aquifer(s) Tapped	Reported Well Yield (gpm)	Specific Capacity (gpm/ft)	Static Water Level Below Land Surface (ft)[4]	Date of S.W.L. Measurement	Average Current Withdrawal (gpd)	Source of Information[5]
1	Lu 107	41°12'23"-76°04'10" 3 mi W of Nanticoke	Luzerne Co. Gas and Electric Co.	I	253	Pocono Formation	18	0.7	50	-	-	1
2	Lu 118	41°12'23"-76°04'10" 3 mi W of Nanticoke	Luzerne Co. Gas and Electric Co.	I	48	Glacial Outwash	100	33	21	-	-	1
3	Lu 111	41°12'45"-76°02'35" 4 mi W of Nanticoke	Mr. Sable	D	52	Glacial Outwash	-	-	39	-	-	1
4	Lu 110	41°12'49"-76°02'32" 4 mi W of Nanticoke	A. Swithers	D	30	Glacial Outwash	-	-	6	-	-	1
5		41°11'20"-76°05'01" 4 mi SW of Nanticoke	State Well #1	D	-	Susquehanna	*	*	-	-	-	2
6	Lu 89	41°11'10"-76°04'51" 4 mi SW of Nanticoke	Retreat County	I	807	Mauch Chunk	65	-	30	-	-	1
7	Lu 74	41°11'14"-76°05'02" 4 mi SW of Nanticoke	Retreat State Hospital	-	800	Pocono Formation	133	-	300	-	-	1
8		41°11'15"-76°05'04" 4 mi SW of Nanticoke	State Well #2	D	-	Susquehanna Group	*	*	-	-	-	2
9	Lu 90	40°11'17"-76°05'03" 4 mi SW of Nanticoke	Retreat Mental Hospital	-	60	Glacial Outwash	550	-	28	-	-	1
10	Lu 247	41°09'10"-76°05'09" 3 mi E of Schickshinny	Angelo Billings	D	51	Mauch Chunk Formation	-	-	-	9/55	-	1
11	Lu 249	41°10'13"-76°00'25" 2 mi S of Nanticoke	Andrew E. Rushin	D	100	Llewellyn Formation	-	-	-	-	-	1
12	Lu 250	41°10'14"-76°00'16" 2 mi S of Nanticoke	Daniel W. Kibler	D	92	Pottsville Formation	-	-	10	9/55	-	1
13	Lu 57	41°05'39"-75°59'55" 7 mi NW of Freeland	Charles Fey	D	89	Marine Beds	-	-	22	-	-	1
14	Lu 398	41°04'39"-75°58'26" 5½ mi NW of Freeland	Sun Oil Co.	D	153	Catskill Formation	35	-	-	-	-	3
15	Lu 81	41°01'18"-76°00'03" 5 mi W of Freeland	Mr. Comfort	D	50	Glacial Outwash	-	-	20	-	-	1
16	Lu 591	40°59'49"-76°02'17" 3 mi NW of Hazleton	Sugarloaf Golf	D	110	Mauch Chunk Formation	20	*0.24	60	1/67	-	3
17	Lu 589	40°59'49"-76°02'44" 3 mi NW of Hazleton	Julius Foldes	D	158	Mauch Chunk Formation	27	-	-	6/68	-	3
18	Lu 226	40°59'58"-76°02'58" 3 mi NW of Hazleton	-	D	100	Mauch Chunk Formation	17	-	35	-	-	1
19	Lu 224	40°59'07"-76°03'18" 3 mi NW of Hazleton	Mr. Hess	D	90	Mauch Chunk Formation	-	-	40	-	-	1
20	Lu 366	40°59'07"-76°02'22" 2½ mi NW of Hazleton	Frank Zavoline	D	234	Mauch Chunk Formation	32	6.4	120	9/69	-	3
21	Lu 588	40°59'05"-76°02'24" 2½ mi NW of Hazleton	Tom Landis	D	133	Mauch Chunk Formation	20	-	-	7/68	-	3

TABLE 2.1-43 (Sheet 2 of 4)

DATA FOR MAJOR WATER WELLS[1], OTHER THAN PUBLIC WELLS, LOCATED BETWEEN 2 AND 10 MILES FROM THE STATION

[1]Major water wells are defined as those with a reported yield of 15 gpm or more.

Well No.	Pa. State Well No.[2]	Location	Owner	Use[3]	Total Depth (ft)	Probable Aquifer(s) Tapped	Reported Well Yield (gpm)	Specific Capacity (gpm/ft)	Static Water Level Below Land Surface (ft)[4]	Date of S.W.L. Measurement	Average Current Withdrawal (gpd)	Source of Information[5]
22	Lu 244	40°58'59"-76°02'12" 2 mi NW of Hazleton	Henri Twins	D	200	Mauch Chunk Formation	-	-	175	-	-	3
23	Lu 233	40°58'50"-76°02'00" 2 mi NW of Hazleton	J. Davis	D	150	Pottsville Formation	20	-	60	-	-	3
24	Lu 283	41°00'09"-76°05'25" 5 mi NW of Hazleton	A.E. Dick	S	702	Mauch Chunk Formation	-	-	F	6/50	-	1
25	Lu 78	41°01'04"-76°04'52" 5½ mi NW of Hazleton	-	D	201	Mauch Chunk Formation	-	-	30	-	-	1
26	Lu 586	41°01'27"-76°04'54" 5½ mi NW of Hazleton	Richard Sipenski	D	235	Mauch Chunk Formation	20	1.0	160	2/69	-	3
27	Lu 1	41°03'38"-76°05'47" 6½ mi E of Nescopeck	Calvin P. Readler	D	30	Glacial Outwash	-	-	27	7/36	-	1
28		41°02'45"-76°07'14" 5 mi E of Nescopeck	Curtis Chapin	D	140	-	30	-	-	-	-	1
29		41°02'22"-76°08'16" 4 mi E of Nescopeck	Roland Beischamie	D	275	-	20	-	-	-	-	4
30	Lu 87	41°02'47"-76°09'02" 3 mi E of Nescopeck	Mr. Slosser	D	138	Marine Beds	-	-	38	-	-	1
31		41°02'58"-76°09'55" 2 mi E of Nescopeck	Larry Bline	D	140	-	-	-	-	-	-	4
32		41°02'00"-76°10'20" 2 mi SE of Nescopeck	Harold Hough	D	140	-	15	-	-	-	-	4
33		41°01'55"-76°10'19" 2 mi SE of Nescopeck	Harold Seward	D	245	-	22	-	50	-	-	4
34		41°01'59"-76°10'26" 2 mi SE of Nescopeck	Rev. Steinhauer	D	170	-	25	-	35	4/74	-	4
35		41°02'00"-76°10'48" 2 mi SE of Nescopeck	George Hawk	D	230	-	18	-	30	3/74	-	4
36		41°02'34"-76°11'54" 1 mi SE of Nescopeck	Orville Benjamin	D	125	-	-	-	-	-	-	4
37		41°01'22"-76°10'32" 3 mi SE of Nescopeck	Nester Salvaterra	D	275	-	18	-	60	1/73	-	4
38		41°00'09"-76°08'35" 5 mi SE of Nescopeck	Chas A. Jurewicz	D	200	-	20	-	50	8/74	-	4
39		40°59'00"-76°09'04" 8 mi W of Hazleton	Stephen G. Belusku Jr.	D	125	-	25	-	-	-	-	4
40	Lu 669	41°00'51"-76°12'26" 2½ mi S of Nescopeck	Kenneth Haskell	D	75	Marine Beds	30	-	-	4/69	-	3
41		41°01'10"-76°12'51" 2 mi S of Nescopeck	Carmen Chander	D	185	-	20	-	40	3/74	-	4
42	Co 138	41°01'24"-76°13'30" 3 mi S of Nescopeck	C.Y. Mowery	D	85	Catskill Formation	30	-	45	?/66	-	4
43	Co 3	40°58'40"-76°13'14" 11 mi W of Hazleton	C. Zehner	D	109	Mauch Chuck Formation	16	-	-	2/68	-	4
44	Co 135	40°00'33"-76°15'51" 2½ mi S of Berwick	Commonwealth of Pa.	D	80	Catskill Formation	30	1.6 (1 hr)	32	5/66	-	4

TABLE 2.1-43 (Sheet 3 of 4)

DATA FOR MAJOR WATER WELLS[1], OTHER THAN PUBLIC WELLS, LOCATED BETWEEN 2 AND 10 MILES FROM THE STATION

[1]Major water wells are defined as those with a reported yield of 15 gpm or more.

Well No.	Pa. State Well No.[2]	Location	Owner	Use[3]	Total Depth (ft)	Probable Aquifer(s) Tapped	Reported Well Yield (gpm)	Specific Capacity (gpm/ft)	Static Water Level Below Land Surface (ft)[4]	Date of S.W.L. Measurement	Average Current Withdrawal (gpd)	Source of Information[5]
45	Co 136	41°00'36"-76°15'50" 2½ mi S of Berwick	Commonwealth of Pa.	D	80	Catskill Formation	50	-	-	6/66	-	4
46	Co 142	41°01'53"-76°18'22" 3 mi SW of Berwick	A. Harris	D	55	Hamilton Group	20	0.6	19	7/68	-	4
47	Co 130	41°01'58"-76°18'27" 3 mi SW of Berwick	V. Barnes	D	80	Hamilton Group	20	-	-	4/67	-	4
48	Co 30	41°02'45"-76°16'05" 1 mi W of Berwick	J. McElrath, Jr.	D	73	Hamilton Group	30	0.8 (1 hr)	35	3/68	-	4
49	Co 29	41°03'15"-76°16'05" 1 mi W of Berwick	R.J. Vaught	D	210	Hamilton Group	20	2.0 (2 hr)	140	3/68	-	4
50	Co 15	41°04'25"-76°15'40" ½ mi N of Berwick	Wasil Bodnar	D	73	Bloomsburg Formation	40	0.8 (1 hr)	25	4/67	-	4
51	Co 50	41°04'00"-76°16'15" 1 mi NW of Berwick		D	66	Hamilton Group	15	1.5	35	6/68	-	4
52	Co 51	41°04'31"-76°15'42" 1 mi N of Berwick	A. Naugle	D	50	Hamilton Group	15	0.3 (1 hr)	1	7/68	-	4
53	Co 252	41°04'36"-76°16'00" 1 mi N of Berwick	B. Deflace	D	150	Mahantango Formation	15	-	-	5/71	-	4
54	Co 28	41°04'09"-76°17'25" 2 mi NW of Berwick	H. Campbell	D	93	Catskill Formation	50	3.8 (1 hr)	7	7/67	-	4
55	Co 270	41°04'00"-76°17'39" 2 mi NW of Berwick	Barry Newman	D	185	Mahantango Formation	25	-	-	4/74	-	4
56	Co 31	41°03'40"-76°17'57" 2 mi NW of Berwick	D. Whitmore	D	86	Hamilton Group	15	-	37	3/68	-	4
57	Co 38	41°05'27"-76°15'28" 2 mi N of Berwick	R. Albertson	D	115	Catskill Formation	15	0.2 (1 hr)	30	7/66	-	4
58	Co 71	41°07'50"-76°18'20" 6 mi NW of Berwick	G. Nemphrey	D	80	Catskill Formation	30	-	24	-	-	4
59	Co 72	41°07'52"-76°18'02" 6 mi NW of Berwick	C.G. Powers	D	90	Hamilton Formation	20	-	20	8/66	-	4
60	Co 217	41°08'26"-76°18'45" 7 mi NW of Berwick	Don Hess	D	75	Catskill Formation	25	-	20	4/69	-	4
61	Lu 235	41°10'40"-76°15'39" 6 mi NW of Shickshinny	Dr. Van Horn	D	200	Marine Beds	-	-	-	-	-	1
62	Lu 664	41°11'30"-76°16'20" 7 mi NW of Shickshinny	Don McDermott	D	92	Marine Beds	45	5.63	4	11/68	-	3
63	Lu 474	41°11'47"-76°14'20" 5½ mi NW of Shickshinny	Rufus Koons	D	105	Sand & Gravel	20	0.25	25	4/68	-	3
64	Lu 473	41°11'21"-76°13'53" 5 mi NW of Shickshinny	Don McDermott	D	157	Susquehanna Group	24	0.46	28	6/67	-	3
65	Lu 470	41°09'55"-76°12'31" 3 mi W of Shickshinny	Bernard Kalie	D	110	Susquehanna Group	15	0.23	40	9/66	-	3
66	Lu 620	41°13'14"-76°12'18" 5½ mi NW of Shickshinny	Wayne Thomas	D	173	Susquehanna Group	20	0.45	64	2/69	-	3

TABLE 2.1-43 (Sheet 4 of 4)

DATA FOR MAJOR WATER WELLS[1], OTHER THAN PUBLIC WELLS, LOCATED BETWEEN 2 AND 10 MILES FROM THE STATION

[1]Major water wells are defined as those with a reported yield of 15 gpm or more.

Well No.	Pa. State Well No.[2]	Location	Owner	Use[3]	Total Depth (ft)	Probable Aquifer(s) Tapped	Reported Well Yield (gpm)	Specific Capacity (gpm/ft)	Static Water Level Below Land Surface (ft)[4]	Date of S.W.L. Measurement	Average Current Withdrawal (gpd)	Source of Information[5]
67	Lu 98	41°14'01"-76°10'17" 5½ mi N of Shickshinny	Mike Polander	D	115	*Marine Beds	-	-	63	-	-	1
68	Lu 626	41°11'39"-76°10'25" 3 mi N of Shickshinny	Fred Harrison	D	145	Susquehanna Group	35	5.83	21	1/67	-	3
69	Lu 629	41°13'42"-76°09'36" 5 mi N of Shickshinny	Steven Lipka	D	123	Susquehanna Group	20	2	60	8/67	-	3
70	Lu 627	41°13'00"-76°09'02" 4½ mi N of Shickshinny	Keith McMichael	D	100	Susquehanna Group	15	0.3	30	3/67	-	3
71	Lu 628	41°11'08"-76°10'13" 2½ mi N of Shickshinny	Donald Gensel	D	210	Susquehanna Group	100	0.53	20	8/67	-	3
72	Lu 633	41°11'06"-76°10'08" 2½ mi N of Shickshinny	Irene Kivler	D	175	Susquehanna Group	20	0.13	25	5/68	-	3
73	Lu 100	41°10'10"-76°10'06" 1½ mi N of Shickshinny	Mr. Carey	D	63	Catskill Formation	-	-	30	-	-	1
74	Lu 99	41°09'32"-76°09'22" ½ mi N of Shickshinny	Jake Balshamer	D	47	Glacial Outwash	-	-	7	-	-	1
75	Lu 246	41°09'26"-76°09'21" ½ mi N of Shickshinny	Mr. Frank Selecky	D	62	Pottsville Formation	40	-	F	9/55	-	1
76	Lu 563	41°08'21"-76°12'19" 3 mi SW of Shickshinny	Irvin Garrison	D	135	Pocono Formation	30	3.0	50	12/66	-	3
77	Lu 93	41°07'35"-76°08'39" 2 mi S of Shickshinny	Mr. Cisco	D	145	Catskill Formation	25	25	25	-	-	1

*Units unknown, so data are not listed, but are available from the Commonwealth of Pennsylvania Department of Environmental Resources Regional Offices.

2. Pa. State Well No. Key:
   Co - Columbia County
   Lu - Luzerne County

3. Water Use Key:
   C - Commercial
   D - Domestic
   I - Institutional
   S - Stock Supply

4. Static Water Level Below Land Surface (ft) Key:
   F - Flowing

5. Source of Information Key:
   1 Newport, Thomas G., Summary Groundwater Resources of Luzerne County, Pennsylvania, Pennsylvania Department of Environmental Resources, Bureau of Topographic and Geologic Survey, Water Resource Report 40, (1977).
   2 Pennsylvania Department of Environmental Resources, Bureau of Sanitary Engineering, Water Quality Management Information System, (WAMIS), Unpublished Computer Printouts of Water Supply Identification Reports, (1976).
   3 Pennsylvania Department of Environmental Resources, Bureau of Topographic and Geologic Survey, Unpublished Computer Printouts of Geo-Survey Groundwater Inventory Reports (1976).
   4 Pennsylvania Department of Environmental Resources, Bureau of Topographic and Geologic Survey, Unpublished Records of Reports by Drillers concerning Water Well Completion.
   5 Pennsylvania Department of Environmental Resources, Bureau of Water Quality Management, Unpublished Computer Printouts of Health Groundwater Well Reports, and Health Groundwater Spring Reports (1975).

Metric Conversion Factors:

1 foot = 0.3048 meters

TABLE 2.1-44 (Sheet 1 of 10)

DATA FOR PUBLIC SUPPLY WELLS LOCATED BETWEEN 2 AND 20 MILES FROM THE STATION

Well No.	Pa. State Well No.[1]	Location	Owner	Total Depth (ft)	Probable Aquifer(s) Tapped	Reported Well Yield (gpm)	Specific Capacity (gpm/ft)	Average Current Withdrawal (gpd)	Static Water Level Below Land Surface (ft)[2]	Date of S.W.L. Measurement	Source of Information[3]
1	Lu 192	41°17'28"-76°08'30" 10 mi NW of Nanticoke	Community Well	174	Catskill Formation	40	-	-	30	-	1
2	Lu 184	41°22'14"-76°03'32" 11 mi N of Nanticoke	Laketon Water Co.	278	Catskill Formation	-	-	-	135	-	1
3	Lu 185	41°22'23"-76°02'59" 12 mi N of Nanticoke	N. Raskin	295	Catskill Formation	-	-	-	105	-	1
4		41°20'54"-76°03'07" 10 mi N of Nanticoke	Whitebread Water Co.	210	Susquehanna Group	*	*	-	90	-	2
5		41°20'55"-76°02'58" 10 mi N of Nanticoke	Whitebread Water Co.	210	Susquehanna Group	60	-	-	90	-	5
6		41°21'04"-76°02'05" 10 mi N of Nanticoke	Harveys Lake Water Service	212	Susquehanna Group	*	*	-	-	-	2
7		41°21'08"-76°01'59" 10 mi N of Nanticoke	Harvey Lake Water Supply	212	Susquehanna Group	18	-	-	-	-	5
8		41°21'16"-76°01'47" 10 mi N of Nanticoke	Rhodes Terrace Water Co.	335	Susquehanna Group	*	*	-	30	-	2
9		41°21'39"-76°01'36" 10½ mi N of Nanticoke	Warden Place Water Service	550	Susquehanna Group	*	*	-	65	-	2
10		41°21'42"-76°01'32" 10½ mi N of Nanticoke	Warden Place Water Service	750	Susquehanna Group	*	*	-	75	-	2
11	Lu 183	41°21'53"-76°01'29" 11 mi N of Nanticoke	W.S. Kitchen	250	Catskill Formation	7	-	-	50	-	1
12		41°21'16"-76°01'24" 10 mi N of Nanticoke	Briarcrest Assoc.	250	Susquehanna Group	-	-	-	-	-	5
13		41°20'17"-76°00'55" 8½ mi N of Nanticoke	Oakhill Development	229	-	*	*	-	60	-	2
14	Lu 173	41°20'15"-76°00'50" 8½ mi N of Nanticoke	Whitesell Brothers Water Co.	229	Catskill Formation	12	-	-	60	-	1
15	Lu 174	41°20'15"-76°00'50" 8½ mi N of Nanticoke	Whitesell Brothers Water Co.	400	Catskill Formation	65	-	-	-	-	1
16		41°20'16"-76°00'48" 8½ mi N of Nanticoke	Oakhill Development	400	-	*	*	-	98	-	2
17		41°20'12"-76°00'45" 8½ mi N of Nanticoke	Oakhill Development	400	-	*	*	-	-	-	2
18		41°20'00"-76°00'16" 8½ mi N of Nanticoke	Village Water Co.	250	-	-	-	-	80	7/66	5
19	Lu 160	41°21'08"-75°58'50" 9½ mi N of Nanticoke	Dallas Water Co.	153	Catskill Formation	60	-	-	30	-	1
20		41°20'28"-75°58'43" 6½ mi N of Plymouth	Dallas Water Co.	390	Susquehanna Group	*	*	-	8	6/39	2
21	Lu 12	41°20'25"-75°58'42" 6½ mi N of Plymouth	Natona Mills	500	Catskill Formation	85	-	-	-	-	1
22		41°20'25"-75°58'40" 6½ mi N of Plymouth	Native Textiles	-	-	*	*	-	-	-	2

TABLE 2.1-44 (Sheet 2 of 10)

DATA FOR PUBLIC SUPPLY WELLS LOCATED BETWEEN 2 AND 20 MILES FROM THE STATION

Well No.	Pa. State Well No.[1]	Location	Owner	Total Depth (ft)	Probable Aquifer(s) Tapped	Reported Well Yield (gpm)	Specific Capacity (gpm/ft)	Average Current Withdrawal (gpd)	Static Water Level Below Land Surface (ft)[2]	Date of S.W.L. Measurement	Source of Information[3]
23		41°20'24"-75°58'39" 6½ mi N of Plymouth	Native Textiles	-	-	*	*	-	-	-	2
24	Lu 8	41°20'25"-75°58'39" 6½ mi N of Plymouth	Dallas Water Co.	235	Catskill Formation	-	-	-	-	-	1
25	Lu 13	41°20'24"-75°58'34" 6½ mi N of Plymouth	Natona Mills	493	Catskill Formation	-	-	-	-	-	1
26	Lu 9	41°20'20"-75°58'12" 6½ mi N of Plymouth	Dallas Water Co.	390	Catskill Formation	-	-	-	-	-	1
27	Lu 159	41°21'28"-75°58'16" 7½ mi N of Plymouth	Dallas Water Co.	188	Catskill Formation	50	-	-	70	-	1
28		41°20'37"-75°57'33" 6½ mi N of Plymouth	Dallas Water Co.	425	Susquehanna Group	*	*	-	-	-	2
29		41°20'21"-75°58'14" 6½ mi N of Plymouth	Dallas Water Co.	235	Susquehanna Group	*	*	-	27	7/57	2
30	Lu 10	41°20'12"-75°57'46" 6 mi N of Plymouth	Dallas Water Co.	498	Catskill Formation	-	-	-	-	-	1
31		41°20'12"-75°57'42" 5½ mi N of Plymouth	Dallas Water Co.	530	Susquehanna Group	*	*	-	15	11/65	2
32	Lu 161	41°19'50"-75°57'37" 5½ mi N of Plymouth	Dallas Water Co.	305	Catskill Formation	12	-	-	100	-	1
33		41°19'46"-75°57'06" 5 mi NW of Luzerne	Pa. Gas Water	-	Susquehanna Group	*	*	-	-	-	2
34		41°19'27"-75°57'08" 4½ mi NW of Luzerne	Overbrook Water Co.	-	-	*	*	-	-	-	2
35		41°19'25"-75°57'07" 4½ mi NW of Luzerne	Overbrook Water Co.	525	Susquehanna Group	*	*	-	-	-	2
36		41°19'27"-75°57'06" 4½ mi NW of Luzerne	Overbrook Water Co.	300	Susquehanna Group	*	*	-	-	-	2
37		41°19'47"-75°57'09" 5 mi NW of Luzerne	Homesite Water Co.	179	Susquehanna Group	14	-	-	-	-	5
38		41°19'51"-75°56'36" 4½ mi NW of Luzerne	Shavertown Water Co.	-	Susquehanna Group	*	*	-	-	-	2
39	Lu 164	41°19'52"-75°56'22" 4½ mi NW of Luzerne	Shavertown Water Co.	364	Catskill Formation	10	-	-	-	-	1
40	Lu 165	41°20'02"-75°56'07" 4½ mi NW of Luzerne	Dallas Water Company	580	Catskill Formation	12	-	-	-	-	3
41	Lu 171	41°19'55"-75°55'05" 4 mi NW of Luzerne	Whitesell Brothers	500	Catskill Formation	150	-	-	100	-	1
42		41°19'27"-75°56'03" 4 mi NW of Luzerne	Pa. Gas Water	-	Susquehanna Group	*	*	-	-	-	2
43		41°19'19"-75°56'03" 4 mi NW of Luzerne	Dallas Water Co.	-	-	-	-	-	-	-	5
44		41°19'20"-75°56'05" 4 mi NW of Luzerne	Shavertown Water Co.	244	Susquehanna Group	6	-	-	0	-	5

TABLE 2.1-44 (Sheet 3 of 10)

DATA FOR PUBLIC SUPPLY WELLS LOCATED BETWEEN 2 AND 20 MILES FROM THE STATION

Well No.	Pa. State Well No.[1]	Location	Owner	Total Depth (ft)	Probable Aquifer(s) Tapped	Reported Well Yield (gpm)	Specific Capacity (gpm/ft)	Average Current Withdrawal (gpd)	Static Water Level Below Land Surface (ft)[2]	Date of S.W.L. Measurement	Source of Information[3]
45		41°19'31"-75°56'05" 4 mi NW of Luzerne	Shavertown King	408	Susquehanna Group	9	-	-	-	-	5
46		41°19'23"-75°56'43" 4½ mi NW of Luzerne	Shavertown Water Co.	390	Susquehanna Group	*	*	-	29	7/57	2
47		41°19'19"-75°56'06" 4 mi NW of Luzerne	W.A. Still Water Co.	-	-	*	*	-	-	-	2
48		41°19'18"-75°55'59" 4 mi NW of Luzerne	Pa. Gas Water	-	Susquehanna Group	*	*	-	-	-	2
49		41°19'16"-75°56'16" 4 mi NW of Luzerne	Shavertown Water Co.	285	Susquehanna Group	*	*	-	27	9/37	2
50		41°19'16"-75°56'27" 4½ mi NW of Luzerne	Shavertown Water Co.	302	Susquehanna Group	*	*	-	-	-	2
51	Lu 145	41°19'07"-75°56'37" 4 mi NW of Luzerne	Shavertown Water Co.	205	Catskill Formation	18	-	-	-	-	1
52		41°19'07"-75°56'37" 4 mi NW of Luzerne	Shavertown Water Co.	205	Susquehanna Group	*	*	-	-	-	2
53		41°19'11"-75°56'11" 4 mi NW of Luzerne	W.A. Still Water Co.	-	Susquehanna Group	*	*	-	-	-	2
54	Lu 144	41°19'08"-75°56'15" 4 mi NW of Luzerne	Shavertown Water Co.	171	Catskill Formation	15	-	-	-	-	1
55		41°19'15"-75°56'00" 4 mi NW of Luzerne	Shavertown King Water Co.	350	Susquehanna Group	16	-	-	-	-	5
56		41°18'46"-75°56'32" 4 mi NW of Luzerne	Shavertown Water Co.	388	Susquehanna Group	*	*	-	27	8/48	2
57		41°18'45"-75°56'46" 4 mi NW of Luzerne	Hillcrest Water Co.	490	Susquehanna Group	30	-	-	-	3/35	5
58		41°18'58"-75°55'14" 3 mi NW of Luzerne	Meadowcrest Water	395	Susquehanna Group	27	0.42	-	28	7/63	5
59		41°18'57"-75°55'14" 3 mi NW of Luzerne	Meadowcrest Water	-	-	*	*	-	-	-	2
60		41°18'51"-75°55'06" 3 mi NW of Luzerne	Shavertown Water Co.	-	Susquehanna Group	*	*	-	-	-	2
61		41°19'11"-75°54'43" 3 mi NW of Luzerne	Meadowcrest Water	-	-	*	*	-	-	-	2
62		41°18'52"-75°55'05" 3 mi NW of Luzerne	Meadowcrest Water	403	Susquehanna Group	50	-	-	-	-	5
63		41°18'34"-75°56'15" 3½ mi NW of Luzerne	Shavertown Water Co.	420	Susquehanna Group	*	*	-	-	5/59	2
64		41°18'18"-75°56'05" 3 mi NW of Luzerne	Trucksville Water	103	Susquehanna Group	41	-	-	-	-	5
65	Lu 146	41°18'32"-75°55'51" 3 mi NW of Luzerne	C.D. Hazeltine	285	Catskill Formation	-	-	-	-	-	1
66		41°18'23"-75°55'37" 3 mi NW of Luzerne	Pa. Gas Water	-	Susquehanna Group	*	*	-	-	-	2

TABLE 2.1-44 (Sheet 4 of 10)

DATA FOR PUBLIC SUPPLY WELLS LOCATED BETWEEN 2 AND 20 MILES FROM THE STATION

Well No.	Pa. State Well No.[1]	Location	Owner	Total Depth (ft)	Probable Aquifer(s) Tapped	Reported Well Yield (gpm)	Specific Capacity (gpm/ft)	Average Current Withdrawal (gpd)	Static Water Level Below Land Surface (ft)[2]	Date of S.W.L. Measurement	Source of Information[3]
67		41°18'17"-75°55'38" 3 mi NW of Luzerne	Pa. Gas Water	-	Susquehanna Group	*	*	-	-	-	2
68	Lu 148	41°18'02"-75°55'22" 3 mi NW of Luzerne	C.D. Hazeltine	505	Catskill Formation	8	-	-	80	-	1
69		41°18'31"-75°55'06" 3 mi NW of Luzerne	Meadowcrest Water Co.	-	Susquehanna Group	*	*	-	-	-	2
70		41°18'30"-75°55'02" 3 mi NW of Luzerne	Meadowcrest Water Co.	303	Susquehanna Group	30	-	-	-	-	5
71		41°18'04"-75°59'45" 4½ mi NW of Plymouth	Village Water Co.	-	Susquehanna Group	*	*	-	-	-	2
72		41°16'55"-75°57'54" 2½ mi NW of Plymouth	Meadow Crest Manor	-	-	*	*	-	-	-	2
73		41°16'55"-75°57'54" 2½ mi NW of Plymouth	Meadow Crest Manor	-	-	*	*	-	-	-	2
74	Lu 149	41°16'06"-75°55'40" 2½ mi NW of Wilkes-Barre	Scranton Springbrook Water Co.	1000	Pottsville Formation	-	-	-	-	-	1
75	Lu 68	41°14'24"-75°58'18" 5 mi W of Wilkes-Barre	Scranton Springbrook Water Co.	1950	Pottsville Formation	-	-	-	F	-	1
76	Lu 69	41°14'23"-75°58'20" 5 mi W of Wilkes-Barre	Scranton Springbrook Water Co.	1040	Pottsville Formation	-	-	-	F	-	1
77	Lu 114	41°13'25"-76°01'17" 1 mi NW of Nanticoke	James Medley	298	Pocono Formation	-	-	-	F	9/55	1
78	Lu 65	41°11'35"-75°55'03" 4 mi SW of Wilkes-Barre	Scranton Springbrook Water Co.	550	Pottsville Formation	-	-	-	F	-	1
79		41°11'39"-75°55'05" 4 mi SW of Wilkes-Barre	Pa. Gas Water	-	-	*	*	-	-	-	2
80	Lu 66	41°11'47"-75°53'32" 3½ mi S of Wilkes-Barre	Scranton Springbrook Water Co.	550	Mauch Chunk Formation	-	-	-	F	-	1
81	Lu 63	41°13'04"-75°51'52" 1½ mi SE of Wilkes-Barre	Scranton Springbrook Water Co.	-	Pottsville Formation	24	-	-	F	-	1
82		41°08'03"-75°51'09" 8 mi S of Wilkes-Barre	Ind. Spring Water Co.	-	Catskill Formation	*	*	-	-	-	2
83		41°03'08"-75°48'13" 5 mi NE of Freeland	White Haven Mun.	613	-	-	-	-	-	-	5
84		41°03'08"-75°48'13" 5 mi NE of Freeland	White Haven Mun. Water Authority	665	-	-	-	-	-	-	5
85	Lu 6	41°03'08"-75°48'03" 5 mi NE of Freeland	White Haven Water Co.	800	Mauch Chunk Formation	-	-	-	-	-	1
86	Lu 35	41°03'08"-75°48'03" 5 mi NE of Freeland	White Haven Water Co.	700	Mauch Chunk Formation	-	-	-	-	-	1
87		41°02'50"-75°55'27" 2 mi NW of Freeland	Lake of Four Seasons	-	-	*	*	-	-	-	2
88		41°02'35"-75°55'50" 2½ mi NW of Freeland	Lake of Four Seasons	-	-	*	*	-	-	-	2

TABLE 2.1-44 (Sheet 5 of 10)

DATA FOR PUBLIC SUPPLY WELLS LOCATED BETWEEN 2 AND 20 MILES FROM THE STATION

Well No.	Pa. State Well No.[1]	Location	Owner	Total Depth (ft)	Probable Aquifer(s) Tapped	Reported Well Yield (gpm)	Specific Capacity (gpm/ft)	Average Current Withdrawal (gpd)	Static Water Level Below Land Surface (ft)[2]	Date of S.W.L. Measurement	Source of Information[3]
89	Lu 41	41°02'05"-75°53'58" ½ mi NW of Freeland	Freeland Water Co.	150	Pottsville Formation	-	-	-	-	-	1
90	Lu 7	41°01'55"-75°54'20" 1 mi NW of Freeland	Freeland Water Co.	700	Mauch Chunk Formation	90	-	-	-	-	1
91	Lu 40	41°01'57"-75°53'46" Freeland Boro	Freeland Water Co.	700	Mauch Chunk Formation	90	-	-	-	-	1
92	Lu 42	41°01'32"-75°53'58" ¼ mi E of Freeland	Freeland Water Co.	325	Mauch Chunk Formation	10	-	-	-	-	1
93	Lu 43	41°01'32"-75°53'51" ¼ mi E of Freeland	Freeland Water Co.	275	Mauch Chunk Formation	-	-	-	F	-	1
94		41°01'31"-75°53'48" Freeland Boro	Freeland Mun. Water Authority	275	Mauch Chunk Formation	*	*	-	15	10/68	2
95		41°01'33"-75°53'18" Freeland Boro	Freeland Mun. Water Authority	-	-	*	*	-	-	-	2
96	Lu 37	41°01'36"-75°51'49" 1½ mi E of Freeland	Jeddo Highland Coal Co.	699	Mauch Chunk Formation	60	-	-	50	-	1
97		41°01'09"-75°53'35" ¼ mi S of Freeland	Freeland Mun. Water Authority	203	Mauch Chunk Formation	*	*	-	-	-	2
98		41°01'06"-75°53'36" ¼ mi S of Freeland	Freeland Mun. Water Authority	332	Mauch Chunk Formation	*	*	-	-	-	2
99		41°01'07"-75°53'32" ¼ mi S of Freeland	Freeland Mun. Water Authority	203	Mauch Chunk Formation	*	*	-	21	-	2
100		41°01'07"-75°53'24" ¼ mi S of Freeland	Freeland Mun. Water Authority	430	Mauch Chunk Formation	*	*	-	35	-	2
101		41°01'01"-75°53'29" ½ mi S of Freeland	Freeland Mun. Water Authority	200	Mauch Chunk Formation	*	*	-	-	-	2
102		41°01'01"-75°53'29" ½ mi S of Freeland	Freeland Mun. Water Authority	390	Mauch Chunk Formation	*	*	-	40	-	2
103	Lu 16	41°00'57"-75°53'32" 1 mi S of Freeland	Freeland Water Co.	500	Mauch Chunk Formation	150	1.5	-	F	-	1
104		41°00'55"-75°54'27" 1½ mi SW of Freeland	Freeland Mun. Water Authority	514	Mauch Chunk Formation	*	*	-	-	-	2
105	Lu 14	41°01'01"-75°53'35" ½ mi S of Freeland	Freeland Water Co.	287	Pottsville Formation	150	0.46	-	F	9/30	1
106	Lu 15	41°01'03"-75°53'32" ½ mi S of Freeland	Freeland Water Co.	203	Mauch Chunk Formation	200	-	-	21	-	1
107	Lu 17	41°01'03"-75°53'32" ½ mi S of Freeland	Freeland Water Co.	525	Mauch Chunk Formation	65	0.26	-	F	-	1
108	Lu 44	41°01'02"-75°53'29" ½ mi S of Freeland	Freeland Water Co.	225	Pottsville Formation	-	-	-	F	-	1
109		41°00'53"-75°54'29" 1½ mi SW of Freeland	Freeland Mun. Water Authority	-	-	*	*	-	-	-	2
110	Lu 26	41°00'43"-75°54'56" 2 mi SW of Freeland	Wyoming Valley Water Co.	600	Mauch Chunk Formation	100	-	-	-	9/30	1
111	Lu 73	41°00'38"-75°54'51" 2 mi SW of Freeland	Freeland Water Co.	514	Mauch Chunk Formation	50	-	-	1	-	1
112	Lu 21	41°00'27"-75°54'04" 1½ mi SW of Freeland	Wyoming Valley Water Co.	554	Mauch Chunk Formation	100	-	-	100	5/14	1

TABLE 2.1-44 (Sheet 6 of 10)

DATA FOR PUBLIC SUPPLY WELLS LOCATED BETWEEN 2 AND 20 MILES FROM THE STATION

Well No.	Pa. State Well No.[1]	Location	Owner	Total Depth (ft)	Probable Aquifer(s) Tapped	Reported Well Yield (gpm)	Specific Capacity (gpm/ft)	Average Current Withdrawal (gpd)	Static Water Level Below Land Surface (ft)[2]	Date of S.W.L. Measurement	Source of Information[3]
113	Lu 72	41°00'01"-75°53'29" 1½ mi S of Freeland	Freeland Water Co.	200	Mauch Chunk Formation	25	-	-	-	-	1
114	Lu 199	40°59'45"-75°52'20" 5 mi E of Hazleton	Wyoming Valley Water Co.	500	Mauch Chunk Formation	100	-	-	F	-	1
115	Lu 281	41°00'10"-75°58'05" 2 mi N of Hazleton	Pardeesville Assoc.	170	Mauch Chunk Formation	10	-	-	-	-	1
116	Lu 275	40°59'51"-75°59'18" 2 mi NW of Hazleton	Coop.	190	Mauch Chunk Formation	-	-	-	-	-	1
117	Lu 433	40°59'20"-75°59'29" 1 mi NW of Hazleton	Mellonville Co.	195	Mauch Chunk Formation	35	-	-	-	2/69	3
118		40°59'32"-75°57'37" 1½ mi NE of Hazleton	Hazleton Mun. Water Authority	-	Llewellyn Formation	*	*	-	-	-	2
119	Lu 264	40°59'21"-75°57'18" 1½ mi NE of Hazleton	Llewellyn	190	Mauch Chunk Formation	-	-	-	107	-	1
120		40°59'15"-75°56'28" 2 mi NE of Hazleton	Hazleton Mun. Water Works	-	Mauch Chunk Formation	*	*	-	-	-	2
121	Lu 209	40°59'12"-75°56'19" 2 mi NE of Hazleton	Jeddo Highland Coal Co.	171	Pottsville Formation	50	-	-	F	-	1
122		40°58'48"-75°57'43" Hazleton	Kawon Inc.	-	-	*	*	-	-	-	2
123		40°58'20"-75°57'53" Hazleton	Hazleton Mun. Water Works	-	Llewellyn Formation	*	*	-	-	-	2
124		40°56'46"-75°51'09" 5½ mi E of Hazleton	Weatherly Water Co.	-	Pocono Formation	-	-	-	-	-	5
125		40°56'53"-75°51'04" 5½ mi E of Hazleton	Weatherly Municipal Authority	-	-	*	*	-	-	-	2
126		40°57'05"-75°49'43" 7 mi E of Hazleton	Weatherly Municipal Authority	-	-	*	*	-	-	-	2
127		40°56'28"-75°49'14" 7½ mi E of Hazleton	Weatherly Municipal Authority	-	-	*	*	-	-	-	2
128		40°58'45"-75°01'13" 2 mi W of Hazleton	Hazleton Mun. Water Authority	-	Llewellyn Formation	*	*	-	-	-	2
129		40°58'44"-76°01'21" 2 mi W of Hazleton	Hazleton Mun. Water Works	-	Llewellyn Formation	*	*	-	-	-	2
130		40°58'42"-76°01'24" 2 mi W of Hazleton	Hazleton Mun. Water Authority	-	-	*	*	-	-	-	2
131		40°57'02"-76°03'33" 4½ mi NW of McAdoo	Hazleton Mun. Water Authority	170	Pottsville Formation	*	*	-	-	-	2
132		40°56'57"-76°03'33" 4½ mi NW of McAdoo	Hazleton Mun. Water Authority	500	Pottsville Formation	-	-	-	4	2/69	5
133	Lu 219	40°56'20"-76°03'35" 4 mi NW of McAdoo	-	587	Pottsville Formation	140	1.3	-	4	-	1
134		40°55'59"-76°01'14" 2 mi NW of McAdoo	Hazleton Mun. Water Works	465	Mauch Chunk Formation	*	*	-	-	-	2
135		40°55'41"-76°01'02" 2 mi NW of McAdoo	Hazleton Mun. Water Authority	-	-	*	*	-	-	-	2
136	Lu 222	40°55'35"-76°01'33" 2½ mi NW of McAdoo	Wyoming Valley Water Co.	-	Pottsville Formation	-	-	-	F	-	1

TABLE 2.1-44 (Sheet 7 of 10)

DATA FOR PUBLIC SUPPLY WELLS LOCATED BETWEEN 2 AND 20 MILES FROM THE STATION

Well No.	Pa. State Well No.[1]	Location	Owner	Total Depth (ft)	Probable Aquifer(s) Tapped	Reported Well Yield (gpm)	Specific Capacity (gpm/ft)	Average Current Withdrawal (gpd)	Static Water Level Below Land Surface (ft)[2]	Date of S.W.L. Measurement	Source of Information[3]
137		40°55'34"-76°01'22" 2 mi NW of McAdoo	Hazleton Mun. Water Authority	257	Mauch Chunk Formation	*	*	-	-	-	2
138		40°55'31"-76°01'14" 2 mi NW of McAdoo	Hazleton Mun. Water Works	478	Mauch Chunk Formation	*	*	-	-	-	2
139		40°55'26"-76°00'57" 1½ mi NW of McAdoo	Hazleton Mun. Water Works	325	Mauch Chunk Formation	*	*	-	-	-	2
140		40°55'22"-76°01'32" 2 mi NW of McAdoo	Hazleton Mun. Water Authority	277	Mauch Chunk Formation	*	*	-	-	-	2
141		40°55'26"-76°01'28" 2 mi NW of McAdoo	Hazleton Mun. Water Works	-	Mauch Chunk Formation	*	*	-	-	-	2
142		40°55'26"-76°01'31" 2 mi NW of McAdoo	Hazleton Mun. Water Authority	263	Mauch Chunk Formation	*	*	-	-	-	2
143		40°55'18"-76°01'31" 2 mi NW of McAdoo	Hazleton Mun. Water Authority	452	Mauch Chunk Formation	*	*	-	-	-	2
144		40°55'07"-76°01'32" 2 mi NW of McAdoo	Hazleton Mun. Water Authority	-	-	*	*	-	-	-	2
145		40°55'26"-75°59'38" ½ mi N of McAdoo	Beaver Brook Water Co.	425	Pottsville Formation	*	*	-	-	-	2
146		40°53'53"-76°00'07" 1 mi SW of McAdoo	Honey Brook Water Co.	374	Mauch Chunk Formation	*	*	-	-	-	2
147		40°53'53"-76°00'08" 1 mi SW of McAdoo	Honey Brook Water Co.	375	Mauch Chunk Formation	*	*	-	-	-	2
148		40°53'39"-76°01'35" 2 mi SW of McAdoo	Honey Brook Water Co.	961	Mauch Chunk Formation	-	-	-	-	-	5
149		40°53'39"-76°01'35" 2 mi SW of McAdoo	Honey Brook Water Co.	961	Mauch Chunk Formation	*	*	-	-	-	2
150		40°53'42"-76°00'54" 1½ mi SW of McAdoo	Honey Brook Water Co.	-	Mauch Chunk Formation	*	*	-	-	-	2
151		40°53'54"-76°00'08" 1 mi SW of McAdoo	Honey Brook Water Co.	374	Mauch Chunk Formation	-	-	-	-	-	5
152		40°52'12"-76°04'50" 5½ mi SW of McAdoo	Mahanoy Twp. Water Authority		Pottsville Formation	-	-	-	-	-	5
153		40°54'35"-76°07'01" 7 mi NE of Shenandoah	Oneida Water Co.	700	Pottsville Formation	15	-	-	15	-	5
154	Sc 280	40°53'43"-76°07'49" 6 mi NE of Shenandoah	Archery Club	132	Mauch Chunk Formation	15	-	-	-	11/66	3
155		40°54'18"-76°07'36" 6½ mi NE of Shenandoah	Oneida Water Co.	700	Pottsville Formation	*	*	-	-	-	2
156		40°54'24"-76°09'00" 6 mi NE of Shenandoah	Oneida Water Co.	700	Pottsville Formation	15	-	-	15	-	5
157		40°54'13"-76°08'47" 5½ mi NE of Shenandoah	Cove Ski Village	-	-	*	*	-	-	-	2
158		40°54'12"-76°08'51" 5½ mi NE of Shenandoah	Cove Ski Village	-	-	*	*	-	-	-	2
159		40°54'10"-76°08'57" 5½ mi NE of Shenandoah	Oneida Water Co.	700	Pottsville Formation	15	-	-	15	-	5
160		40°56'17"-76°10'17" 7 mi N of Shenandoah	Nuremberg Water Co., Inc.	193	Mauch Chunk Formation	*	*	-	-	-	2

TABLE 2.1-44 (Sheet 8 of 10)

DATA FOR PUBLIC SUPPLY WELLS LOCATED BETWEEN 2 AND 20 MILES FROM THE STATION

Well No.	Pa. State Well No.[1]	Location	Owner	Total Depth (ft)	Probable Aquifer(s) Tapped	Reported Well Yield (gpm)	Specific Capacity (gpm/ft)	Average Current Withdrawal (gpd)	Static Water Level Below Land Surface (ft)[2]	Date of S.W.L. Measurement	Source of Information[3]
161		40°56'21"-76°10'22" 7½ mi N of Shenandoah	Nuremberg Water Co., Inc.	235	Mauch Chunk Formation	*	*	-	-	-	2
162		40°56'23"-76°10'25" 7½ mi N of Shenandoah	Nuremberg Water Co., Inc.	605	Mauch Chunk Formation	*	*	-	-	-	2
163		40°50'45"-76°07'32" 4 mi E of Shenandoah	Mahanoy Twp. Water Co.	-	Pottsville Formation	*	*	-	-	-	2
164		40°50'45"-76°07'32" 4 mi E of Shenandoah	Mahanoy Twp. Water Authority	-	Pottsville Formation	-	-	-	-	-	5
165		40°50'35"-76°08'13" 3 mi E of Shenandoah	Mahanoy Twp. Water Authority	-	Pottsville Formation	-	-	-	-	-	5
166		40°50'24"-76°08'33" 3 mi E of Shenandoah	Mahanoy Twp. Water Authority	-	Pottsville Formation	-	-	-	-	-	5
167		40°49'57"-76°09'46" 2 mi E of Shenandoah	Mahanoy Twp. Water Co.	-	Pottsville Formation	*	*	-	-	-	2
168		40°50'10"-76°11'48" Shenandoah Boro	Shenandoah Mun. Water Authority	-	-	*	*	-	-	-	2
169		40°50'09"-76°11'50" Shenandoah Boro	Shenandoah Mun. Water Authority	-	-	*	*	-	-	-	2
170		40°50'08"-76°11'50" Shenandoah Boro	Shenandoah Mun. Water Authority	-	-	*	*	-	-	-	2
171		40°50'49"-76°13'16" 1½ mi NW of Shenandoah	Ringtown Water Works	-	Mauch Chunk Formation	*	*	-	-	-	2
172		40°51'22"-76°13'48" 2½ mi NW of Shenandoah	Ringtown Water Works	-	-	*	*	-	-	-	2
173		40°56'22"-76°26'02" 2 mi S of Catawissa	Catawissa Mun. Water Authority	-	Catskill Formation	*	*	-	-	-	2
174		40°56'22"-76°26'08" 2 mi S of Catawissa	Catawissa Mun. Water Authority	-	Catskill Formation	*	*	-	-	-	2
175		40°56'22"-76°26'15" 2 mi S of Catawissa	Catawissa Mun. Water Authority	-	Catskill Formation	*	*	-	-	-	2
176		40°56'56"-76°26'59" 1 mi S of Catawissa	Catawissa Mun. Water Authority	208	Catskill Formation	*	*	-	60	-	2
177		40°56'56"-76°27'02" 1 mi S of Catawissa	Catawissa Mun. Water Authority	302	Catskill Formation	*	*	-	130	-	2
178		40°57'01"-76°26'56" 1 mi S of Catawissa	Catawissa Mun. Water Authority	250	Catskill Formation	*	*	-	50	-	2
179		40°58'30"-76°26'00" 1 mi NW of Catawissa	Wonderview Devp.	-	-	*	*	-	-	-	2
180		40°58'30"-76°26'00" 1 mi NE of Catawissa	Wonderview Devp.	-	-	*	*	-	-	-	2
181		41°04'35"-76°24'41" 5 mi N of Bloomsburg	Orangeville Mun. Water Authority	465	Catskill Formation	*	*	-	64	10/63	2
182		41°04'35"-76°24'41" 5 mi N of Bloomsburg	Orangeville Mun. Water Authority	-	Catskill Formation	*	*	-	-	-	2
183		41°04'44"-76°24'41" 5 mi N of Bloomsburg	Orangeville Mun. Water Authority	-	Catskill Formation	*	*	-	-	-	2
184		41°04'44"-76°24'41" 5 mi N of Bloomsburg	Orangeville Mun. Water Authority	-	Catskill Formation	*	*	-	-	-	2

TABLE 2.1-44 (Sheet 9 of 10)

DATA FOR PUBLIC SUPPLY WELLS LOCATED BETWEEN 2 AND 20 MILES FROM THE STATION

Well No.	Pa. State Well No.[1]	Location	Owner	Total Depth (ft)	Probable Aquifer(s) Tapped	Reported Well Yield (gpm)	Specific Capacity (gpm/ft)	Average Current Withdrawal (gpd) /	Static Water Level Below Land Surface (ft)[2]	Date of S.W.L. Measurement	Source of Information[3]
185		41°04'35"-76°23'54" 5 mi NE of Bloomsburg	Orangeville Mun. Water Authority	-	Catskill Formation	*	*	-	-	-	2
186		41°04'35"-76°23'54" 5 mi NE of Bloomsburg	Orangeville Mun. Water Authority	-	Catskill Formation	*	*	-	-	-	2
187		41°04'35"-76°23'54" 5 mi NE of Bloomsburg	Orangeville Mun. Water Authority	-	Catskill Formation	*	*	-	-	-	2
188		41°11'41"-76°23'28" 12 mi NW of Berwick	Benton Water Supply Co.	7	Glacial Outwash	*	*	-	5	-	2
189	Lu 108	41°11'46"-76°05'30" 5 mi W of Nanticoke	Central Poor Dist.	557	Pocono Formation	3	-	-	F	-	1
190	Lu 386	41°08'31"-76°07'54" 1 mi SE of Shickshinny	Macanaqua Water	307	Mauch Chunk Formation	75	.26	-	15	7/67	3
191		41°08'32"-76°07'43" 1 mi SE of Shickshinny	Macanaqua Water Co.	230	Pottsville Formation	*	*	-	15	-	2
192		41°08'30"-76°07'42" 1¼ mi SE of Shick-shinny	Macanaqua Water Co.	192	Pottsville Formation	*	*	-	-	-	2
193		41°02'06"-75°59'50" 5 mi N of Hazleton	L.G. Williams Son	-	Mauch Chunk Formation	*	*	-	-	-	2
194		41°01'32"-76°02'25" 5 mi NW of Hazleton	Windgate, Inc.	-	-	*	*	-	-	-	2
195		40°59'03"-76°02'20" 3 mi E of Hazleton	Conyngham Water Co.	247	Mauch Chunk Formation	*	*	-	-	-	2
196		40°58'58"-76°03'14" 4 mi E of Hazleton	Conyngham Water Co.	500	Mauch Chunk Formation	*	*	-	-	-	2
197		40°59'13"-76°03'15" 4 mi E of Hazleton	Conyngham Water Co.	230	Mauch Chunk Formation	*	*	-	-	-	2
198		40°59'10"-76°03'16" 4 mi E of Hazleton	Conyngham Water Co.	255	Mauch Chunk Formation	*	*	-	-	-	2
199	Lu 225	40°59'15"-76°03'27" 4 mi E of Hazleton	Guy Hutton	266	Mauch Chunk Formation	33	-	-	80	-	1
200		40°58'42"-76°03'36" 4 mi E of Hazleton	Hazleton Mun. Water Authority	587	Pottsville Formation	-	-	-	4	-	5
201	Lu 282	40°58'14"-76°05'30" 6 mi E of Hazleton	Hazleton City Authority	-	Pottsville Formation	45	-	-	-	-	1
202		40°58'10"-76°05'27" 6 mi E of Hazleton	Hazleton Mun. Water Authority	150	Pottsville Formation	-	-	-	-	-	5
203		40°58'12"-76°05'33" 6 mi E of Hazleton	Hazleton Mun. Water Authority	289	Pottsville Formation	*	*	-	11	3/69	2
204		40°57'05"-76°08'39" 8 mi SE of Nesopeck	Hazleton Mun. Water Authority	-	Llewellyn Formation	*	*	-	-	-	2
205	Lu 230	40°57'05"-76°09'11" 7½ mi SE of Nescopeck	Wyoming Valley Water Co.	687	Pottsville Formation	35	-	-	-	-	1
206		41°03'13"-76°13'55" Berwick Boro	Berwick Water Co.	160	Upper Silurian Formations	*	*	-	34	-	2
207		41°03'13"-76°13'55" Berwick Boro	Berwick Water Co.	90	Upper Silurian Formations	*	*	-	34	-	2
208		41°03'13"-76°13'55" Berwick Boro	Berwick Water Co.	87	Upper Silurian Formations	*	*	-	34	-	2

TABLE 2.1-44 (Sheet 10 of 10)

DATA FOR PUBLIC SUPPLY WELLS LOCATED BETWEEN 2 AND 20 MILES FROM THE STATION

Well No.	Pa. State Well No.[1]	Location	Owner	Total Depth (ft)	Probable Aquifer(s) Tapped	Reported Well Yield (gpm)	Specific Capacity (gpm/ft)	Average Current Withdrawal (gpd)	Static Water Level Below Land Surface (ft)[2]	Date of S.W.L. Measurement	Source of Information[3]
209		41°02'15"-76°17'39" 3 mi SW of Berwick	Mifflin Twp. Water Authority	-	-	*	*	-	-	-	2
210		41°02'12"-76°17'42" 3 mi SW of Berwick	Mifflin Twp. Water Authority	-	Hamilton Group	*	*	-	-	-	2
211		41°02'27"-76°19'30" 4½ mi SW of Berwick	Scenic Knolls Water Co.	-	-	*	*	-	-	-	2
212		41°02'27"-76°19'30" 4½ mi SW of Berwick	Scenic Knolls Water Co.	-	-	*	*	-	-	-	2
213		41°02'27"-76°19'30" 4½ mi SW of Berwick	Scenic Knolls Water Co.	-	-	*	*	-	-	-	2

*Units unknown, so data are not listed, but are available from the Commonwealth of Pennsylvania Department of Environmental Resources Regional Offices.

1. Pa. State Well No. Key:

   Co - Columbia County
   Lu - Luzerne County
   Sc - Schuylkill County

2. Static Water Level Below Land Surface (ft) Key:

   F - Flowing

3. Source of Information Key:

   1 Newport, Thomas G., Summary Groundwater Resources of Luzerne County, Pennsylvania, Pennsylvania Department of Environmental Resources, Bureau of Topographic and Geologic Survey, Water Resource Report 40, (1977).

   2 Pennsylvania Department of Environmental Resources, Bureau of Sanitary Engineering, Water Quality Management Information System, (WAMIS), Unpublished Computer Printouts of Water Supply Identification Reports, (1976).

   3 Pennsylvania Department of Environmental Resources, Bureau of Topographic and Geologic Survey, Unpublished Computer Printouts of Geo-Survey Groundwater Inventory Reports (1976).

   4 Pennsylvania Department of Environmental Resources, Bureau of Topographic and Geologic Survey, Unpublished Records of Reports by Drillers concerning Water Well Completion.

   5 Pennsylvania Department of Environmental Resources, Bureau of Water Quality Management, Unpublished Computer Printouts of Health Groundwater Well Reports, and Health Groundwater Spring Reports (1975).

Metric Conversion Factors:

1 foot = 0.3048 meters
1 gallon = 3.785 liters

TABLE 2.1-45

DATA FOR PUBLIC SUPPLY WELLS LOCATED ON THE SUSQUEHANNA RIVER BANK WITHIN 20 MILES OF THE STATION

Well No.[2]	Pa. State Well No.[3]	Location	Owner	Total Depth (ft)	Probable Aquifer(s) Tapped	Reported Well Yield (gpm)	Specific Capacity (gpm/ft)	Average Current Withdrawal (gpd)	Static Water Level Below Land Surface (ft)[4]	Date of S.W.L. Measurement	Source of Information[5]
77	Lu 114	41°13'25"-76°01'17" 1 mi NW of Nanticoke	James Medley	298	Pocono Formation	-	-	-	F	9/55	1
189	Lu 108	41°11'46"-76°05'30" 5 mi W of Nanticoke	Central Poor Dist.	557	Pocono Formation	3	-	-	F	-	1
190	Lu 386	41°08'31"-76°07'54" 1 mi SE of Shickshinny	Macanaqua Water	307	Mauch Chunk Formation	75	.26	-	15	7/67	3
191		41°08'32"-76°07'43" 1 mi SE of Shickshinny	Macanaqua Water Co.	230	Pottsville Formation	*	*	-	15	-	2
192		41°08'30"-76°07'42" 1¼ mi SE of Shick-shinny	Macanaqua Water Co.	192	Pottsville Formation	*	*	-	-	-	2
206		41°03'13"-76°13'55" Berwick Boro	Berwick Water Co.	160	Upper Silurian Formations	*	*	-	34	-	2
207		41°03'13"-76°13'55" Berwick Boro	Berwick Water Co.	90	Upper Silurian Formations	*	*	-	34	-	2
208		41°03'13"-76°13'55" Berwick Boro	Berwick Water Co.	87	Upper Silurian Formations	*	*	-	34	-	2

1. Metric conversion:

   1 foot = 0.3048 meters
   1 gallon = 3.785 liters

2. Well numbers refer to those given in Table 2.1-d. Locations of wells are shown on Figure 2.1-d.

3. Pa. State Well No. Key:

   Co - Columbia County
   Lu - Luzerne County
   Sc - Schuylkill County

4. Static Water Level Below Land Surface (ft) Key:

   F - Flowing

5. Source of Information Key:

   1 Newport, Thomas G., Summary Groundwater Resources of Luzerne County, Pennsylvania, Pennsylvania Department of Environmental Resources, Bureau of Topographic and Geologic Survey, Water Resource Report 40, (1977).

   2 Pennsylvania Department of Environmental Resources, Bureau of Sanitary Engineering, Water Quality Management Information System, (WAMIS), Unpublished Computer Printouts of Water Supply Identification Reports, (1976).

   3 Pennsylvania Department of Environmental Resources, Bureau of Topographic and Geologic Survey, Unpublished Computer Printouts of Geo-Survey Groundwater Inventory Reports (1976).

* Units unknown, so data are not listed, but are available from the Commonwealth of Pennsylvania Department of Environmental Resources Regional Office.

TABLE 2.1-46 (Sheet 1 of 9)

RIVER-BANK WATER WELLS LOCATED WITHIN THE 10-MILE REACH DOWNSTREAM OF STATION

Well No.	Well Use	Well Diameter & Type; Length of Casing	Total Depth (ft)	Probable Formation Tapped	Number Served	Est. Present Average Withdrawal (gpd)	Static Water Level (ft. Below Ground)	Comments
1	C	6", drilled, 64' of casing	160	Mahantango	12 people	180	40	Hard water
2	D	8", drilled, 40' of casing	40	Pleistocene sand and gravel	7 people	420	5	Hard water
3	D	3' dug	22	Pleistocene sand and gravel	3 people	180	-	Hard water, stone retaining wall
4	D	-	-	-	-	-	-	-
5	D	-	80-100	Mahantango	-	-	-	-
6	D	6", drilled	84	Mahantagno	-	-	-	-
7	D	Drilled	240	Mahantango	-	-	-	-
8	D	Drilled	170	Mahantango	-	-	-	-
9	D	Drilled	170	Mahantango	-	-	-	-
10	D	-	-	-	-	-	-	-
11	D	-	-	-	-	-	-	-
12	D	-	-	-	-	-	-	-
13	D	-	65	Mahantango	-	-	-	Tested yield = 32 gpm; water is hard with iron
14	D	-	-	-	-	-	-	-
15	D	-	-	-	-	-	-	-
16	D	-	-	-	-	-	-	-
17	D	6", drilled	100	Mahantango	2 people	120	∿15' (July, 1977)	Tested yield = 3 gpm; water has slight iron taste
18	D	-	-	-	-	-	-	-

TABLE 2.1-46 (Sheet 2 of 9)

Well No.	Well Use	Well Diameter & Type; Length of Casing	Total Depth (ft)	Probable Formation Tapped	Number Served	Est. Present Average Withdrawal (gpd)	Static Water Level (ft. Below Ground)	Comments
19	D	6", drilled	500	Mahantango	-	-	-	Water is brackish, stains clothes badly and is corrosive. Well not presently used.
20	D	6", drilled	200-225	Mahantango	-	-	-	-
21	D	-	-	-	-	-	-	-
22	D	Hand dug	18	Pleistocene sand and gravel	-	-	-	Lined with terracotta pipe; good water
23	D	-	-	-	-	-	-	-
24	D	-	-	-	-	-	-	-
25	D	-	-	-	-	-	-	-
26	D	-	-	Pleistocene sand and gravel	2 people	120	-	-
27	D	6", drilled	80	Mahantango	-	-	-	-
28	D	6", drilled, 22' of casing	52	Mahantango	3 people	180	25	Soft water
29	D	-	-	-	-	-	-	-
30	D	-	-	-	-	-	-	-
31	D	-	-	-	-	-	-	-
32	D	-	-	-	-	-	-	-
33	D	-	-	-	-	-	-	-
34	D	-	-	-	-	-	-	-
35	D	3', dug, stone-lined	<30	Pleistocene sand and gravel	-	-	-	Contains much iron; water used only for washing
36	D	Dug (?)	-	-	-	-	-	Hard water; used for drinking
37	D	-	-	-	-	-	-	-

TABLE 2.1-46 (Sheet 3 of 9)

Well No.	Well Use	Well Diameter & Type; Length of Casing	Total Depth (ft)	Probable Formation Tapped	Number Served	Est. Present Average Withdrawal (gpd)	Static Water Level (ft. Below Ground)	Comments
38	D	Hand dug, 4-5 ft. diam.	73	Mahantango	-	-	15 (Aug., 1977)	Good quality water
39	D	6", drilled	85	Mahantango	-	-	15 (Aug., 1977)	Water has sulfur odor, not used
40	D	-	-	-	-	-	-	-
41	D	-	-	-	-	-	-	-
42	D	-	-	-	-	-	-	-
43	D	Drilled, plastic casing	80	Pleistocene sand and gravel	1 person	60	-	Water is hard with some iron
44	D	-	-	-	-	-	-	-
45	D	-	-	-	-	-	-	-
46	D	Drilled, plastic casing	128	Pleistocene sand and gravel	2 people	120	-	Water is soft, but contains some iron
47	D,S	6", drilled steel casing	∿80	Mahantango	6 people 20 horses 20 cattle	840	-	Water is soft and of good quality
48	D	Drilled, steel casing	118	Pleistocene sand and Mahantango	3 people	180	-	Water is very hard, high in iron and has a bad taste
49	D	Drilled	163	Mahantango	2 people	120	-	Water is hard. Taste is bad, but improved with filter
50	D	6", drilled, steel casing	136	Pleistocene gravel and Mahantango	2 people	120	-	Water is hard and contains iron. Not used for drinking
51	D	6", drilled plastic casing	150	Mahantango	6 people	360	-	Water is hard with a little iron
52	C	6", drilled plastic casing	180	Mahantango	-	100	-	Water is hard with a little iron

TABLE 2.1-46 (Sheet 4 of 9)

Well No.	Well Use	Well Diameter & Type; Length of Casing	Total Depth (ft)	Probable Formation Tapped	Number Served	Est. Present Average Withdrawal (gpd)	Static Water Level (ft. Below Ground)	Comments
53	D	-	-	-	-	-	-	-
54	D	-	-	-	-	-	-	-
55	D	Dug well	110	Pleistocene gravel and Mahantango	4 people	240	-	Good quality water
56	D	6-1/2", drilled steel casing	125	Pleistocene gravel and Mahantango	2 people	120	-	Good quality water
57	D	Dug, with plastic casing at bottom	24	Pleistocene gravel	2 people	120	-	Good quality water
58	D	Drilled	85	-	2 people	120	-	Good quality water
59	D	Drilled	75	-	2 people	120	-	Good quality water
60	D	Drilled, with plastic casing	-	-	4 people	240	-	Water is hard, with some iron
61	D	-	-	-	-	-	-	-
62	D	Drilled	110	Upper Silurian Fms.	3 people	180	-	Hard water, but good taste
63	D	-	-	-	-	-	-	-
64	D	-	-	-	-	-	-	-
65	D	Dug well	29	Pleistocene sand and gravel	2 people	120	-	Good quality water; some iron
66	D	-	-	-	-	-	-	-
67	D	Drilled, steel casing	51	Pleistocene gravel and Mahantango	2 people	120	-	Tested yield = 10 gpm; water is hard, with some iron
68	D	-	-	-	-	-	-	-
69	D	-	-	-	-	-	-	-
70	D	-	27	Pleistocene gravel	2 people	120	-	Good quality water

TABLE 2.1-46 (Sheet 5 of 9)

Well No.	Well Use	Well Diameter & Type; Length of Casing	Total Depth (ft)	Probable Formation Tapped	Number Served	Est. Present Average Withdrawal (gpd)	Static Water Level (ft. Below Ground)	Comments
71	D	-	-	-	-	-	-	-
72	D	-	-	-	-	-	-	-
73	P	12", drilled, 60' of casing	160	Upper Silurian Fms.	8,400+ people	2.0×10^6	35 (in 1958)	Hardness is 200 ppm; well not connected to river
74	P	12", drilled, 60' of casing	87	Upper Silurian Fms.	-	Standby well	35 (in 1958)	Hardness is 200 ppm; well not connected to river
75	P	12", drilled, 60' of casing	90	Upper Silurian Fms.	6,300+ people	1.5×10^6	35 (in 1958)	Hardness is 200 ppm; well not connected to river
76	D	-	-	-	-	-	-	-
77	D	-	-	-	-	-	-	-
78	D	-	-	-	-	-	-	-
79	D	-	-	-	-	-	-	-
80	D,C	6-8", drilled steel casing	70	-	4 people	240	-	Good quality water, soft
81	D	-	-	-	-	-	-	-
82	D	-	-	-	-	-	-	-
83	D	-	-	-	-	-	-	-
84	D	-	-	-	-	-	-	-
85	D	-	-	-	-	-	-	-
86	D	-	-	-	-	-	-	-
87	D	-	-	-	-	-	-	-

+Based on an estimated figure of 239 gallons per day per person given for Berwick in Reference g.

TABLE 2.1-46 (Sheet 6 of 9)

Well No.	Well Use	Well Diameter & Type; Length of Casing	Total Depth (ft)	Probable Formation Tapped	Number Served	Est. Present Average Withdrawal (gpd)	Static Water Level (ft. Below Ground)	Comments
88	D	-	-	-	-	-	-	Good water
89	D	-	-	-	-	-	-	-
90	D	-	-	-	-	-	-	-
91	D	-	-	-	-	-	-	-
92	D	6", drilled, steel casing	87	Pleistocene deposits	3 people	180	-	Good quality iron
93	D	-	-	-	-	-	-	-
94	D	-	-	-	-	-	-	-
95	C	-	-	-	-	-	-	-
96	D	-	-	-	-	-	-	-
97	D	-	-	-	-	-	-	-
98	D	-	-	-	-	-	-	-
99	D	-	-	-	-	-	-	-
100	D	Dug well	-	-	-	-	-	-
101	D	6", drilled	85	Pleistocene gravel	-	-	-	Some hardness, no iron
102	D	-	-	-	-	-	-	-
103	D	-	-	-	-	-	-	-
104	D	-	-	-	-	-	-	-
105	D	-	-	-	-	-	-	-
106	D	-	-	-	-	-	-	-
107	D	-	-	-	-	-	-	-
108	D	-	-	-	-	-	-	-
109	D	-	-	-	-	-	-	-
110	D	-	-	-	-	-	-	-

TABLE 2.1- 46 (Sheet 7 of 9)

Well No.	Well Use	Well Diameter & Type; Length of Casing	Total Depth (ft)	Probable Formation Tapped	Number Served	Est. Present Average Withdrawal (gpd)	Static Water Level (ft. Below Ground)	Comments
111	D	-	-	-	-	-	-	-
112	D	-	-	-	-	-	-	-
113	D	Dug well with stone lining	30-35	Pleistocene sand and gravel	-	-	-	Water has medium hardness with some iron
114	D	-	-	-	-	-	-	-
115	D	Dug well	-	Pleistocene sand and gravel	-	-	-	Good quality water
116	D	-	-	-	-	-	-	-
117	D	Dug well	30	Pleistocene sand and gravel	3 people	180	-	Good quality water
118	C	-	-	-	-	-	-	-
119	C	-	-	-	-	-	-	Water used for rest rooms, not for drinking
120	D,C	-	-	-	-	-	-	Water is hard
121	D,C	4-6", drilled steel casing	75	-	-	150	-	Water is hard, with high iron content. Not used for drinking
122	D	Drilled	-	-	2 people	120	-	Water is hard with some iron
123	D	-	-	-	-	-	-	-
124	D,C	Dug well	40	Pleistocene sand and gravel	-	-	-	Water is very hard and has a high iron content
125	D	-	-	-	-	-	-	-
126	D	-	-	-	-	-	-	-
127	D	-	-	-	-	-	-	-
128	D	-	-	-	-	-	-	-

TABLE 2.1-46 (Sheet 8 of 9)

Well No.	Well Use	Well Diameter & Type; Length of Casing	Total Depth (ft)	Probable Formation Tapped	Number Served	Est. Present Average Withdrawal (gpd)	Static Water Level (ft. Below Ground)	Comments
129	D	-	-	-	-	-	-	-
130	D	-	-	-	-	-	-	-
131	D	-	-	-	-	-	-	-
132	D	-	-	-	-	-	-	-
133	D	-	-	-	-	-	-	-
134	D	Drilled	180	Pleistocene gravel and Bloomsburg Fm.	6 people	360	-	Water is hard but contains no iron
135	I	Drilled	185	Pleistocene gravel and Bloomsburg Fm.	0	-	-	Water is hard but contains no iron
136	D	-	-	-	-	-	-	-
137	D	-	-	-	-	-	-	-
138	D	-	-	-	-	-	-	-
139	D	Drilled	45	Upper Silurian Fms.	2 people	120	-	Water is hard, but otherwise of good quality
140	D	-	-	-	-	-	-	-
141	D	-	-	-	-	-	-	-
142	D	Drilled, 25-30' of casing	75	Upper Silurian Fms.	-	-	-	Water is a bit hard
143	D	Drilled	~65	Upper Silurian Fms.	2 people	120	-	Water is hard, but otherwise good
144	D	-	-	-	-	-	-	-
145	D	-	-	-	-	-	-	-
146	D	-	-	-	-	-	-	-
147	D	-	-	-	-	-	-	-
148	D	-	-	-	-	-	-	-

TABLE 2.1-46 (Sheet 9 of 9)

Well No.	Well Use	Well Diameter & Type; Length of Casing	Total Depth (ft)	Probable Formation Tapped	Number Served	Est. Present Average Withdrawal (gpd)	Static Water Level (ft. Below Ground)	Comments
149	D	-	-	-	-	-	-	-
150	D	-	-	-	-	-	-	-
151	D	-	-	-	-	-	-	-
152	D	-	-	-	-	-	-	-

Note:
gpd - gallons per day
gpm - gallons per minute
1 foot = 0.3048 meters
1 gallon = 3.785 liters

[1]Well Use Key:

C - Commercial
D - Domestic
P - Public Supply
S - Stock
I - Irrigation

[2]Estimated Present Average Withdrawal (gpd) Key:

Average withdrawal was estimated based on the following consumption rates:

1 person (domestic use) uses 60 gpd*
1 person (office use) uses 15 gpd+
1 person (restaurant customer) uses 10 gpd+
1 horse uses 12 gpd*
1 beef cattle uses 12 gpd*
1 cow uses 35 gpd* (Note - Calculations were done assuming half the dairy animals are dry (12 gpd) and half are producing (35 gpd) at any given time.)
1 hog uses 4 gpd*
1 sheep uses 2 gpd*

[3]The location of wells given in this table is shown on Figure 2.1-e.

*Reference: Fairbanks Morse Pump Division, Hydraulic Handbook, Kansas City, Kansas: Fairbanks Morse Pump Division, Colt Industries, (1965).

+Our estimate

TABLE 2.1-47

ESTIMATED GROUND WATER WITHDRAWAL IN 1976

WITHIN TWO MILES OF THE STATION

Geologic Unit	Rate, in gpd From Wells	From Springs	Total
Mahantango Formation	27,800	1,060	28,860
Trimmers Rock Formation	10,790	11,310	22,100
Catskill Formation	0	300	300
Pleistocene Sand & Gravel	2,070	1,550	3,620
Recent Alluvium	210	0	210
Residual Soil	300	0	300
TOTALS	41,170	14,220	55,390

say, 56,000 gpd

Note:

gpd - gallons per day

Metric Conversion Factor:

1 gallon = 3.785 liters

TABLE 2.1-48

PROJECTIONS OF FUTURE GROUND WATER WITHDRAWAL

WITHIN 2 AND 20 MILES OF THE STATION

	Year				
Area	1980	1990	2000	2010	2020
For area within 2-mile radius of station, in mgd	0.060	0.063	0.064	0.066	0.066
For area within 20-mile radius of station, in mgd	11.7	12.1	12.1	11.5	10.9

Notes:

Ground water Withdrawal Projections are based on population projections.

mgd - million gallons per day

Metric Conversion Factor:

1 gallon = 3.785 liters

TABLE 2.1-49

MAJOR GROUND WATER WITHDRAWAL, AND POPULATION

SERVED BY WATER SUPPLY COMPANIES WITHIN 20-MILE AREA

Ground Water User or Water Supply Company	Approximate Population Served Within 20-mile Radius In 1970*	Estimated Average Ground Water Withdrawal In 1975*(gpd)
Keystone Water Company (Berwick Water Company)	16,982	2,900,000
Bloomsburg Water Co.	14,768	0
Benton Water Co.	1,022	60,300
Catawissa Municipal Authority	1,701	175,000
Orangeville Municipal Water Company	431	19,400
Pennsylvania Gas and Water Company	159,705	0
Dallas Water Company	4,292	390,000
Freeland Municipal Water Authority	6,102	316,400
Hazleton City Authority:		
1) Derringer Division	200	27,668+
2) Lattimer Division	378	62,767+
3) Ebervale Division	610	116,644+
4) Tomhicken Division	101	6,748+
5) Delano Division	518	0+
6) Buck Mountain Division	969	0+
7) Hazleton Division	42,501	423,296+
Williams and Son Water Co.	75	0
Conyngham Water Company	1,556	120,600
Citizens Water Company	200	8,200+
Mocanaqua Water Company	1,151	0
Indian Springs Water Company	150	9,500

TABLE 2.1- 49 (Continued)

Ground Water User or Water Supply Company	Approximate Population Served Within 20-mile Radius In 1970*	Estimated Average Ground water Withdrawal In 1975*(gpd)
Beaver Brook Water Co.	232	10,000
Garbush Water Company	16	700
John Fielding	137	12,000
Shavertown Water Co.	1,212	268,300
Midway Manor Water Co.	263	30,000
Trucksville Water Co.	553	0
Shavertown-Kingston Township Water Co.	158	22,000
Hillcrest Water Co.	53	9,600
Meadowcrest Water Co.	369	72,000
William A. Still, Estate Water Company	106	12,000
Oakhill Water Supply Co.	444	50,000
Village Water Company	44	2,800
Shickshinny Water Co.	1,832	0
Warden Place Water Co.	∿30	2,000
Whitebread Water Co.	37	11,200
Harvey's Lake Water Co.	60	5,500
Honey Brook Water Co.	6,133	720,000
Oneida Water Co.	319	23,000
Nuremburg Water Co.	486	33,300
Ringtown Boro Water Co.	909	38,400

TABLE 2.1-49 (Continued)

Ground Water User or Water Supply Company	Approximate Population Served Within 20-mile Radius In 1970*	Estimated Average Ground water Withdrawal In 1975*(gpd)
Shenandoah Boro Municipal Authority	10,311	0
Keystone Water Company, Frackville Division	357	0
Mahanoy Township Authority	7,538	4,000
Weatherly Municipal Authority	1,916	146,700
Beaver Meadows Municipal Authority	1,057	0
Wilbar Realty Company:		
1) Forest Park Division	146	10,000
2) Penn Lake Division	36	2,000
White Haven Municipal Authority	1,323	∿ 0
Native Textiles, Dallas, Pa.	0	3,150
White Haven State School	--	22,460
Pennsylvania Institution For Def. Delinquents	--	167,650
TOTALS	289,498	6,315,283

* Information taken from Reference g

\+ Information taken from the local water department and from Reference g.

Note: gpd - gallons per day

Metric Conversion Factor: 1 gallon = 3.785 liters
1 mile = 1.61 kilometers

TABLE 2.1-50

ESTIMATION OF TOTAL GROUND WATER WITHDRAWAL IN 1975

WITHIN 20-MILE RADIUS OF THE STATION

1.	Total Estimated 1970 population within 20-mile radius*	352,852	
2.	Estimated Population within 20-mile radius served by water companies or municipal water departments in 1970+	289,498	
3.	Estimated population using private wells or springs to supply water needs in 1970	63,354	
4.	Estimated population using private wells or springs in 1975:		
	Approximate ratio of 1975 to 1970 population in area = 1.022**		
	Therefore, 63,354 x 1.022 =	64,748	
5.	Estimated withdrawal from private wells and springs in 1975 (for domestic and livestock used):		
	64,748 x 80 gpd/person =		5,179,840 gpd
6.	Estimated total withdrawal from public supply and industrial wells and from major springs within 20-mile radius, in 1975+		6,315,283 gpd
7.	Total Estimated Ground Water Withdrawal in region in 1975		11,495,123 gpd

*Based on Reference i (U.S. Bureau of the Census, 1970 Census of Population, Number of Inhabitants Pennsylvania PC(1)-A40, U.S. Govt. Printing Office, Washington, D.C.)

+Source is unpublished records and computer printouts from the Division of Comprehensive Resources and Planning of the Pennsylvania Department of Environmental Resources (Reference g). See Table 2.1-i.

**Based on Table 2.1.3-19 in Susquehanna SES Final Safety Analysis Report.

Note: gpd - gallons per day

Metric Conversion Factor: 1 gallon = 3.785 liters
1 mile = 1.61 kilometers

TABLE 2.1- 51

WATER USERS

a)

Municipal Water Company	Map Code	Distance From Site Radial (mi)	Distance From Site Water Course (mi)	1980 Total Use (cfs)	1980 Population Served	2020 Total Use (cfs)	1980 Population Served
Keystone Water Co. Berwick District [1,2]	M1	6	7	6.8	18,302	9.2	24,284
Bloomsburg Water Co.[3]	M2	18	19	5.5	16,587	7.6	21,431
Borough of Danville	M3	26	31	2.9	6,159	3.4	6,877
Municipal Authority of Sunbury[4]	M4	38	44	4.4	13,672	5.2	14,984
Shamokin Dam Water & Sewer Authority	M5	39	45	0.3	1,891	0.6	3,105

1 Wells near main branch
2 River intake not in use
3 Standby water supply
4 Use includes other sources

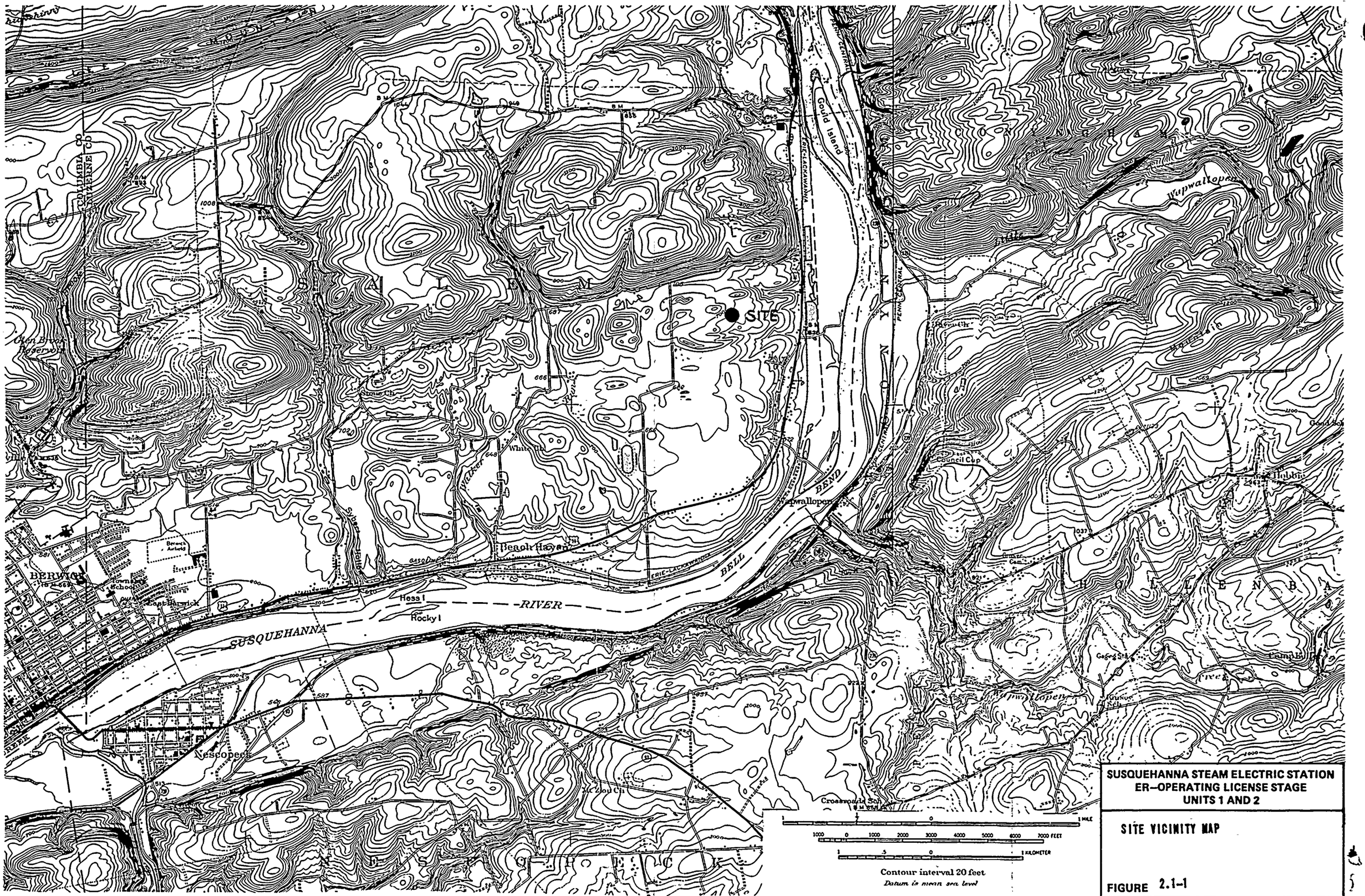
b)

Industrial Water User & Location	Map Code	Distance From Site Radial	Distance From Site Water Route	Present Total Withdrawal (cfs)	Return Rates (cfs)	Projected Withdrawal by User (cfs)
Burletti & Sons, Nescopeck	I1	5	6	1.2+	-+++	-+++
Consolidated Cigar Co., Berwick	I2	6	7	0.5+	-+++	-+++
Champion Valley Farms Inc., Bloomsburg	I3	7	8	0.8	-+++	-+++
Kawneer Co., Inc., Bloomsburg	I4	18	19	0.3	-+++	-+++
Merck Co., Danville	I5	26	31	23	23	23++

\+ Recently converted to municipal water supply and sewerage systems
++ May decrease dut to addition of cooling towers
+++ Estimates not available

c)

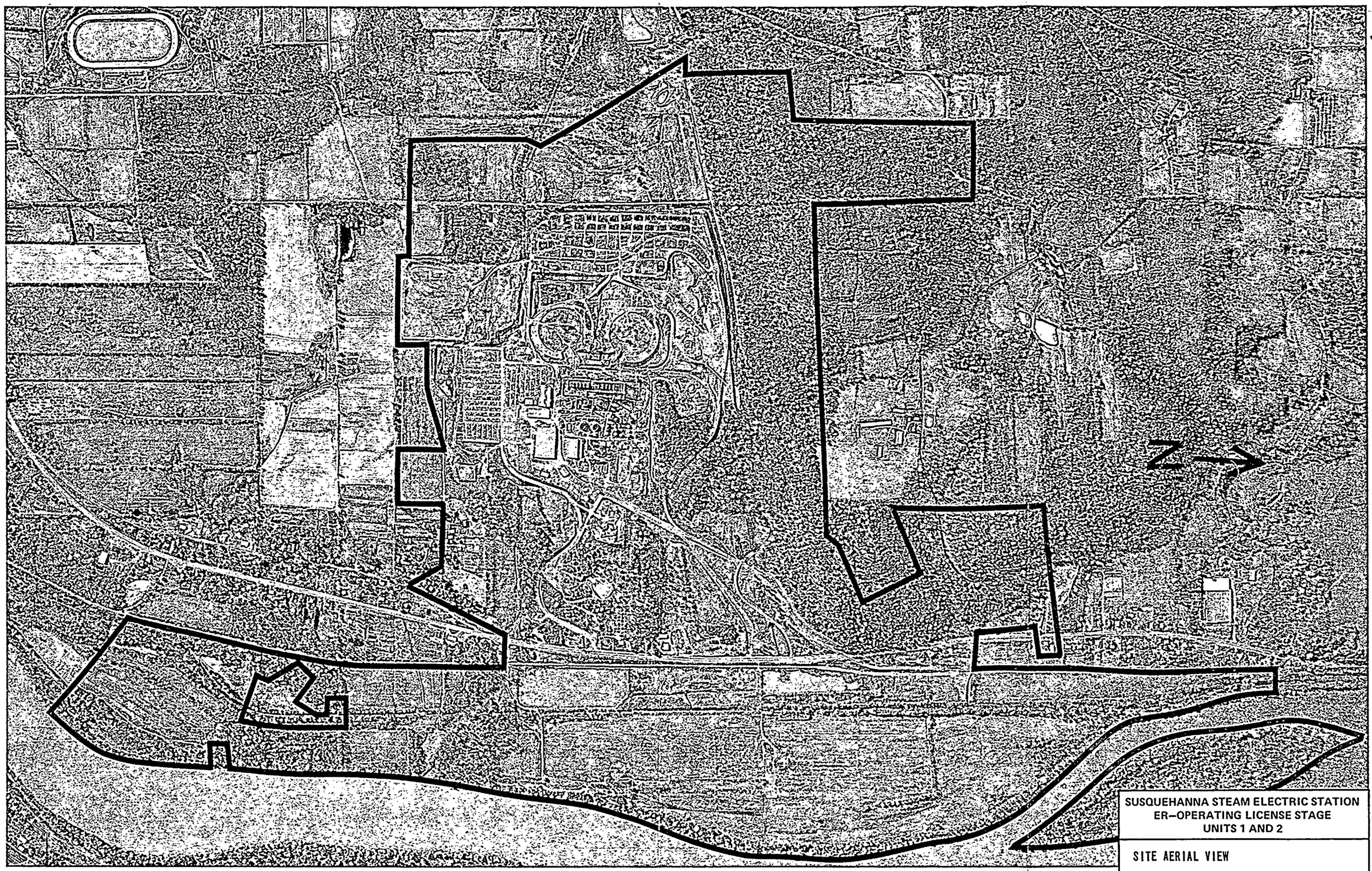
Recreation Area	Map Code	Distance From Site Radial	Distance From Site Water Route	Type of Use
Wapwallopen Creek Area	R1	2	2	Fishing
4-5 Miles Upstream of Northumberland	R2	34	38	Fishing
Shikellamy State Park & Marina	R3	38	42	Boating Activities
PP&L Dam at Shamokin Dam	R4	40	45	Fishing
Hoover's Landing Area	R5	44	52	Fishing
Port Trevorton Area	R6	47	56	Fishing



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

SITE VICINITY MAP

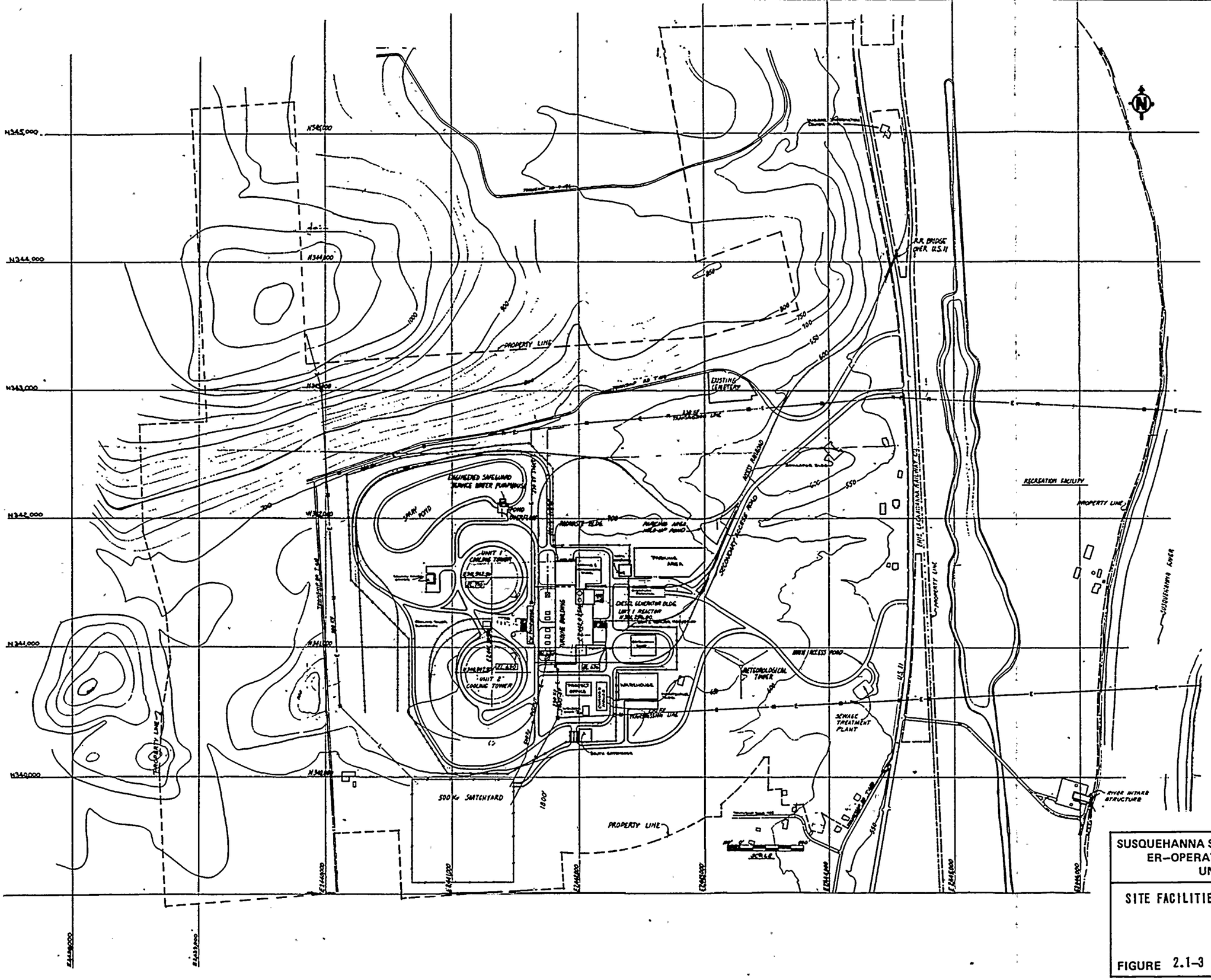
FIGURE 2.1-1



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

SITE AERIAL VIEW

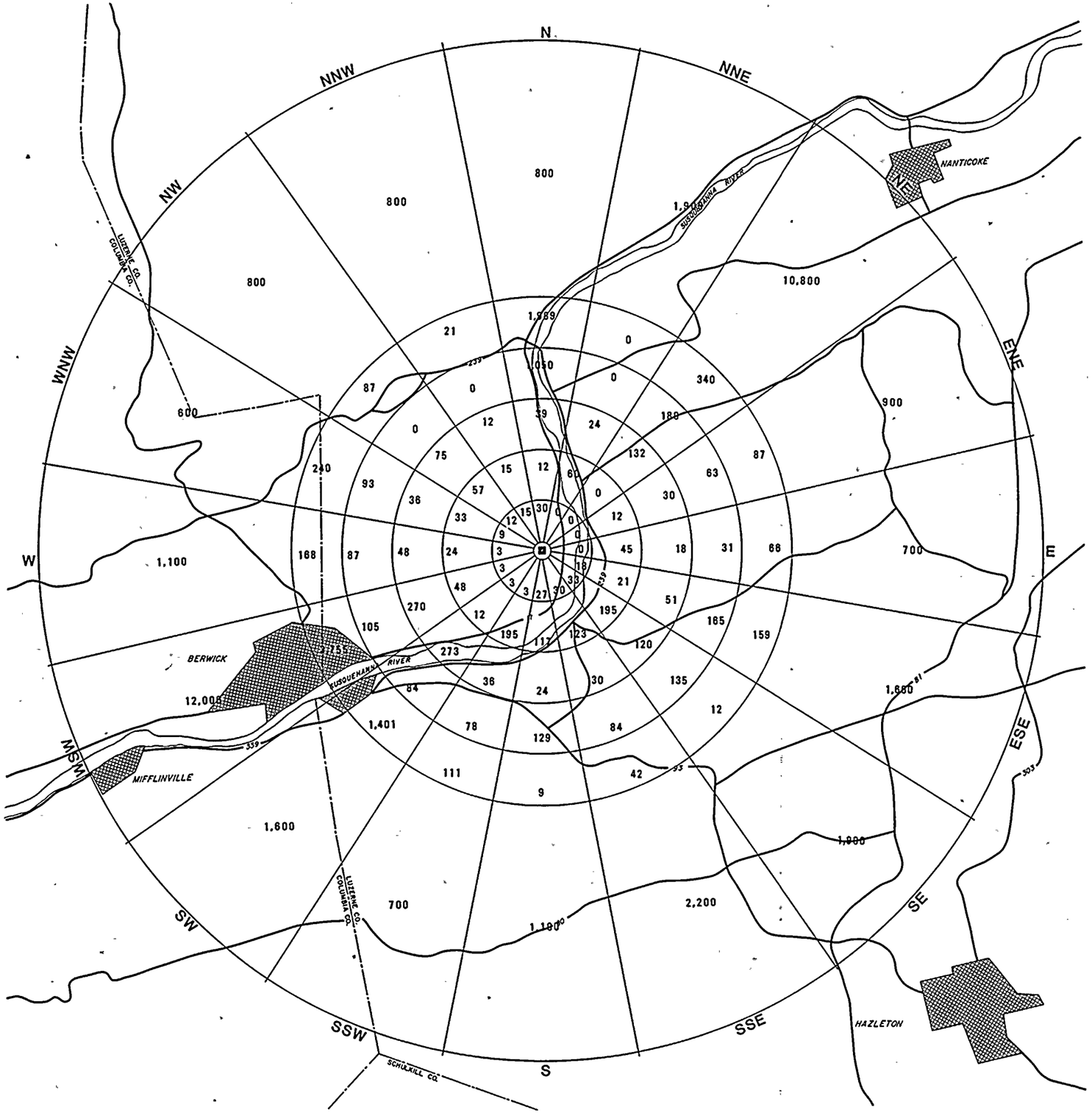
FIGURE 2.1-2



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

SITE FACILITIES PLAN

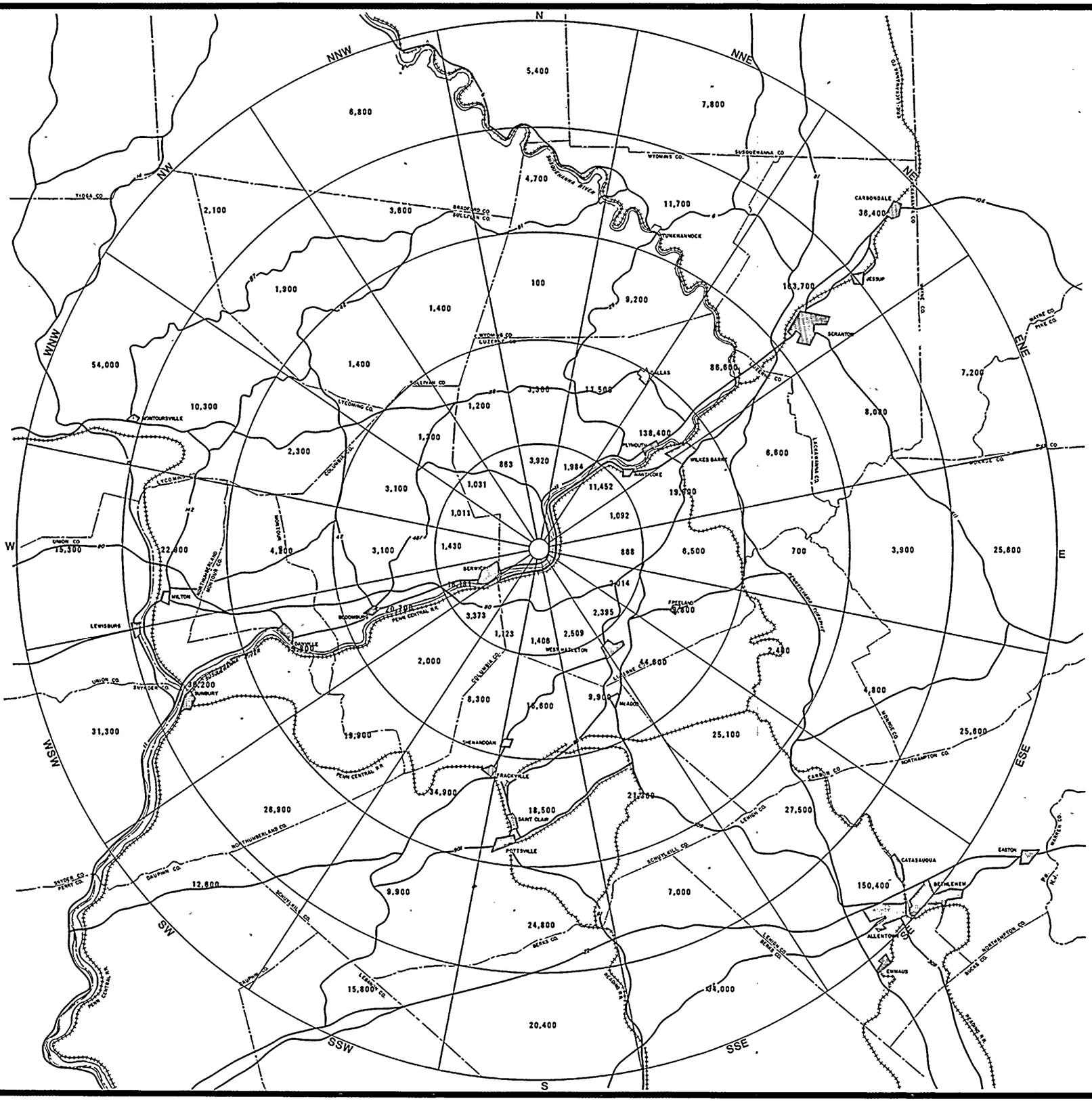
FIGURE 2.1–3



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

POPULATION DISTRIBUTION,
0–10 MILES, 1970.

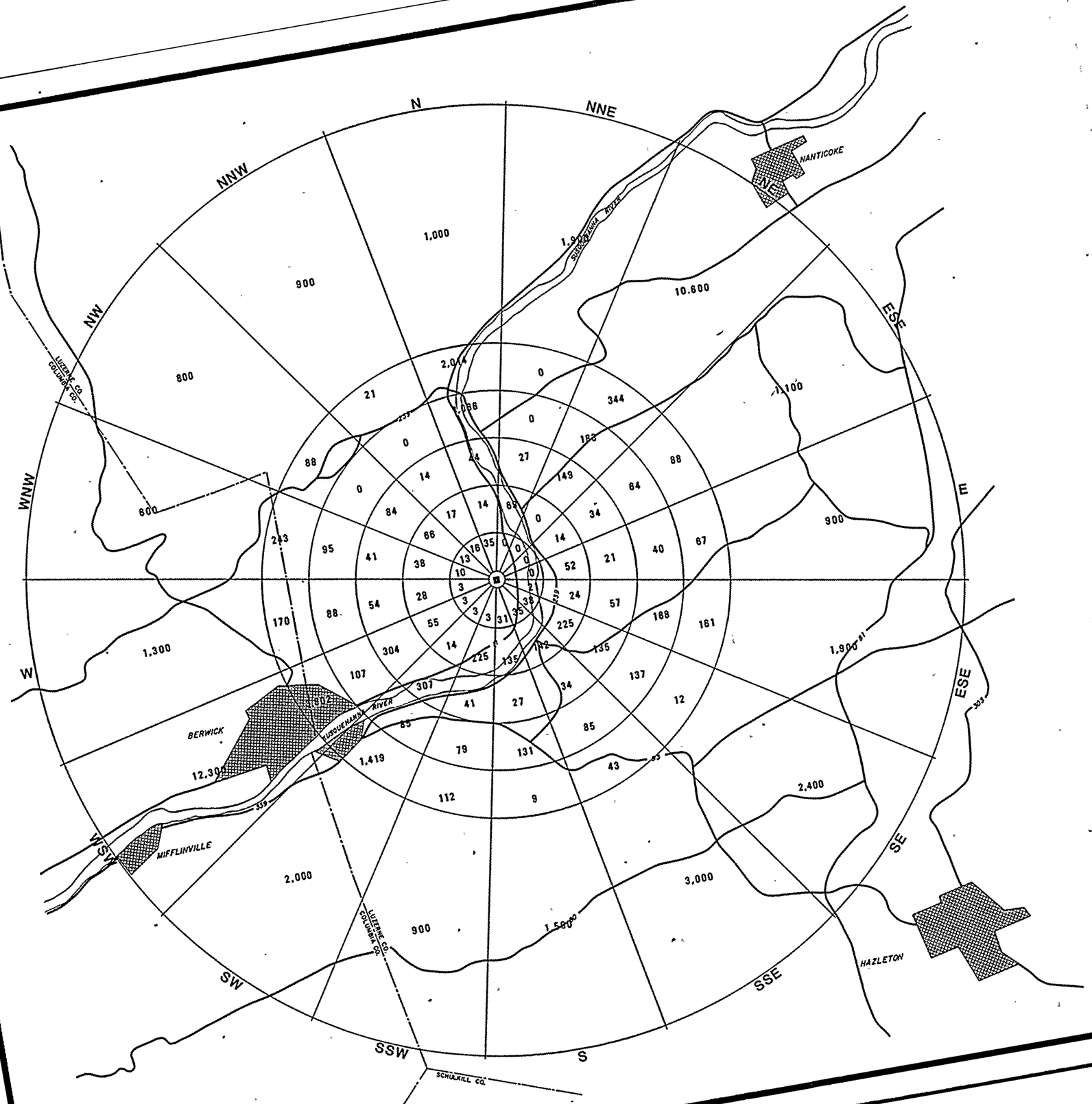
FIGURE 2.1–4



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

POPULATION DISTRIBUTION,
10–50 MILES, 1970.

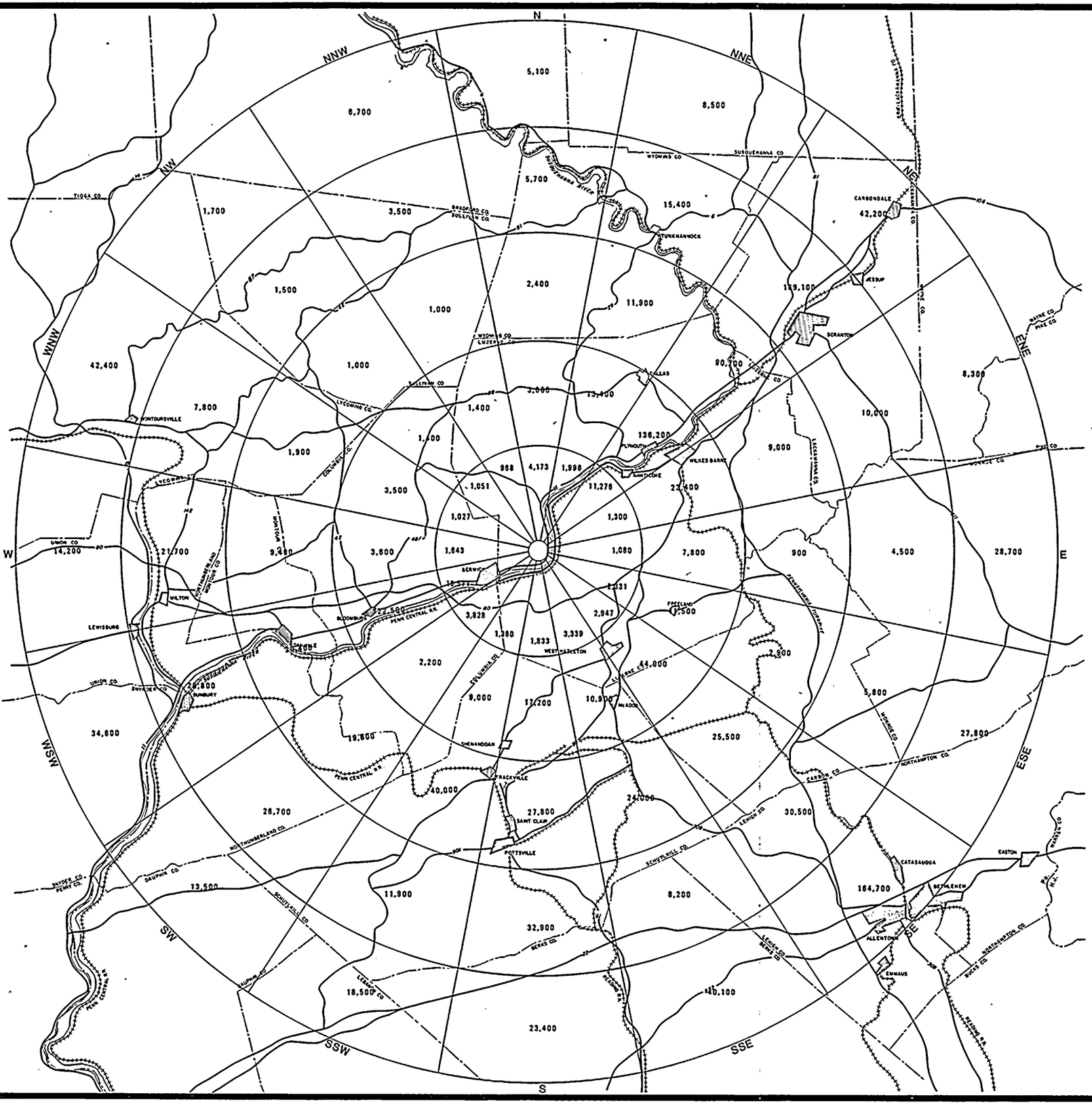
FIGURE 2.1-5



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

POPULATION DISTRIBUTION,
0–10 MILES, 1980.

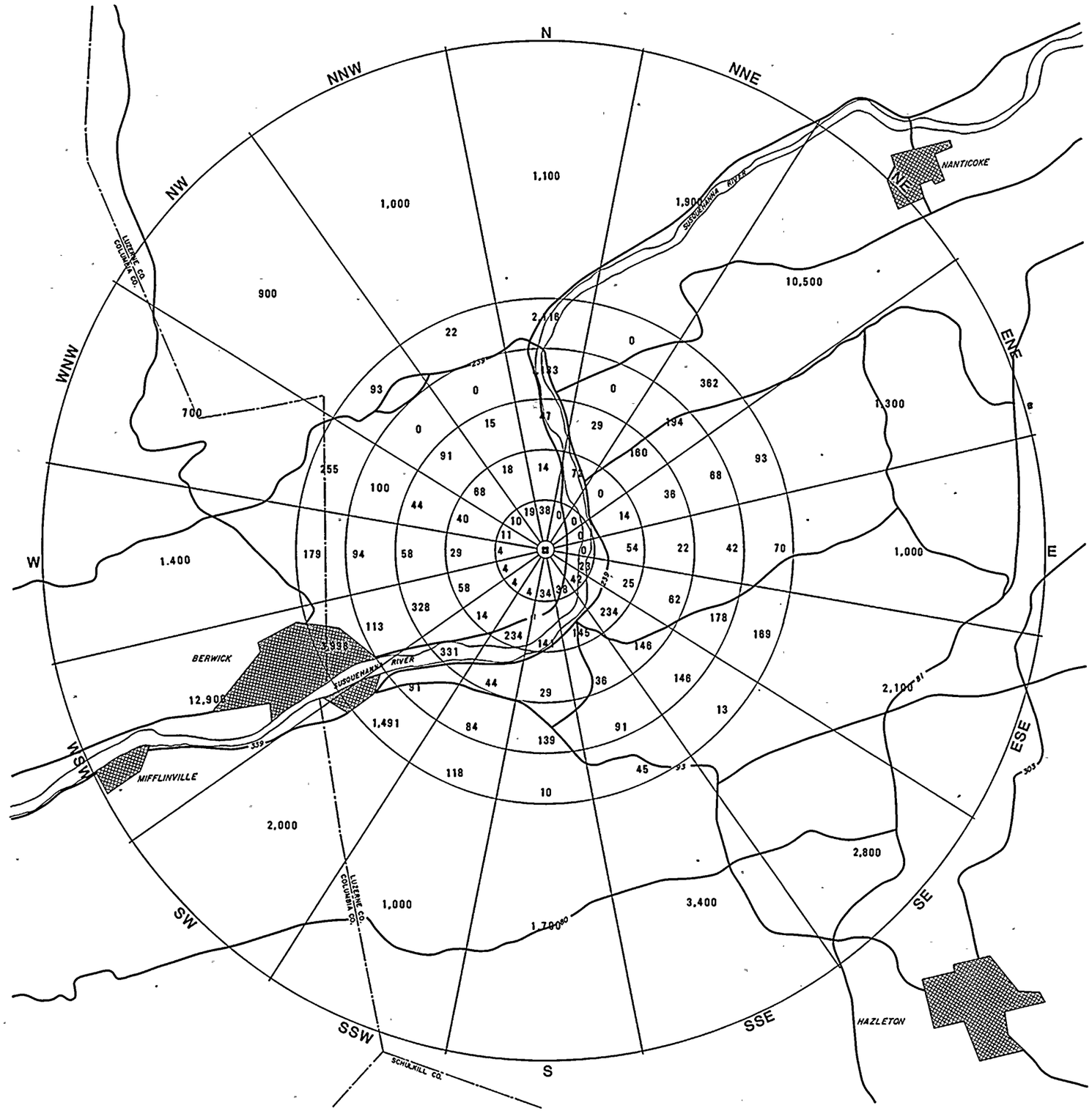
FIGURE 2.1–6



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

POPULATION DISTRIBUTION,
10–50 MILES, 1980.

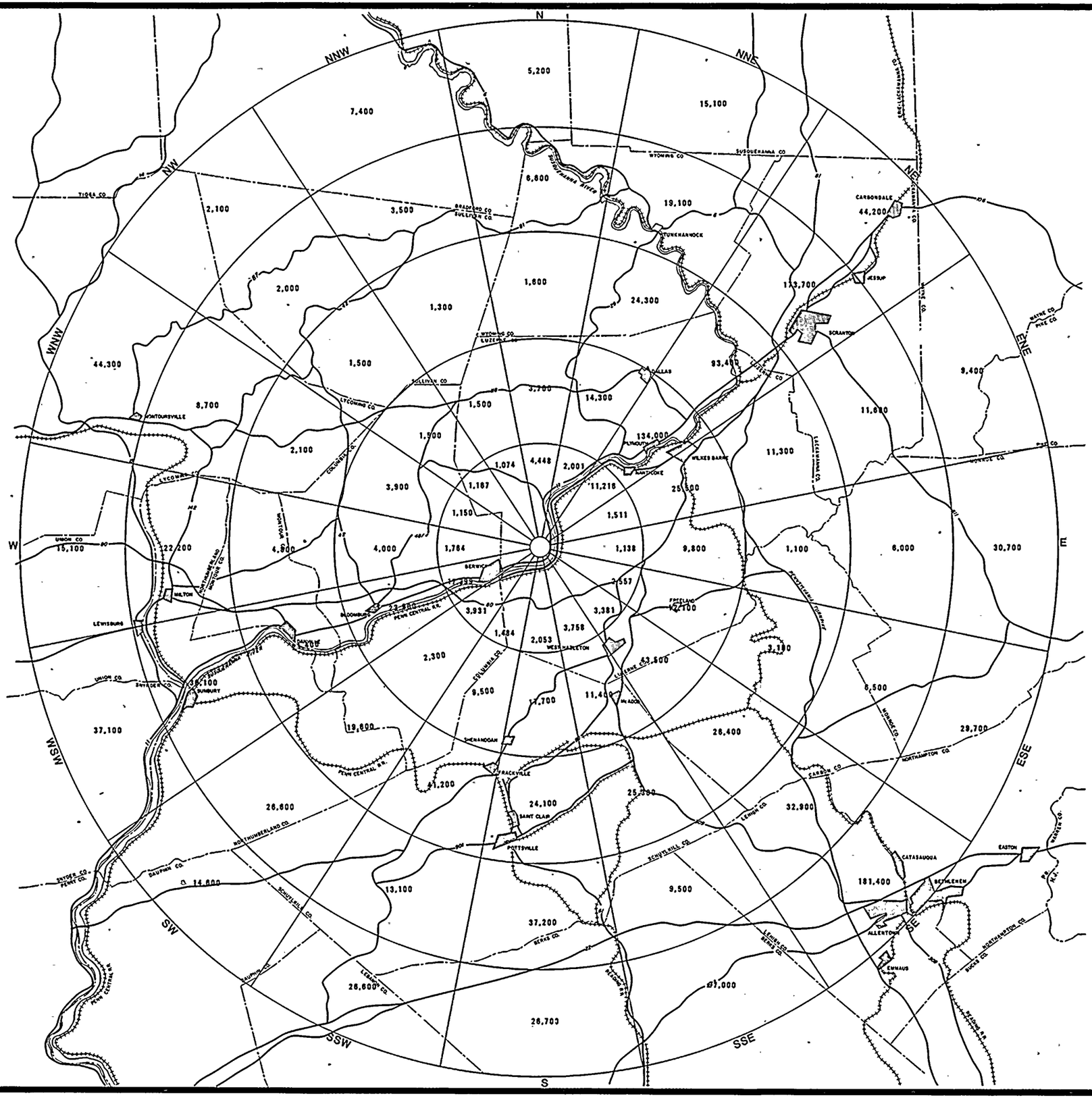
FIGURE 2.1-7



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

POPULATION DISTRIBUTION,
0–10 MILES, 1990.

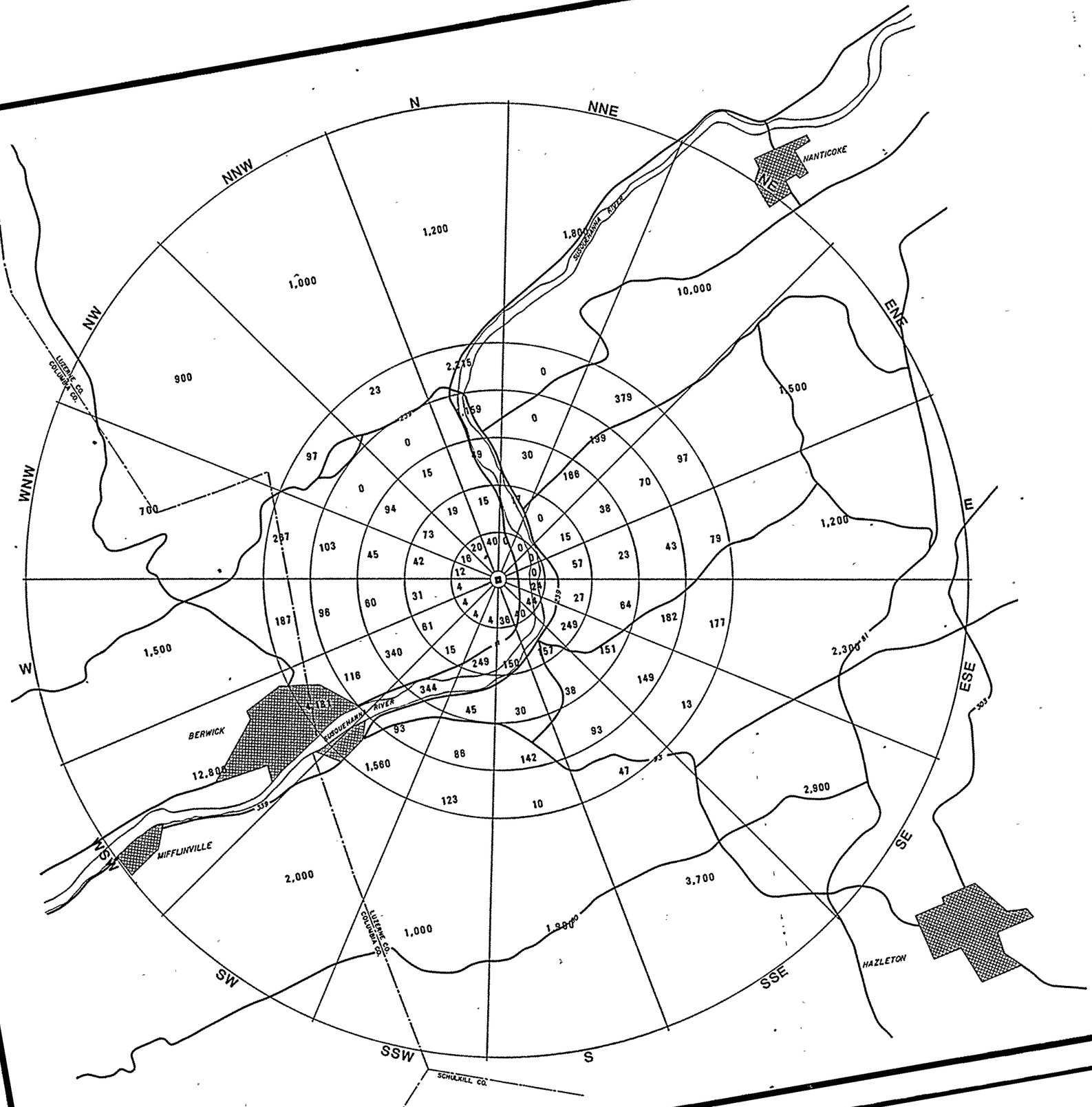
FIGURE 2.1-8



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

POPULATION DISTRIBUTION,
10–50 MILES, 1990.

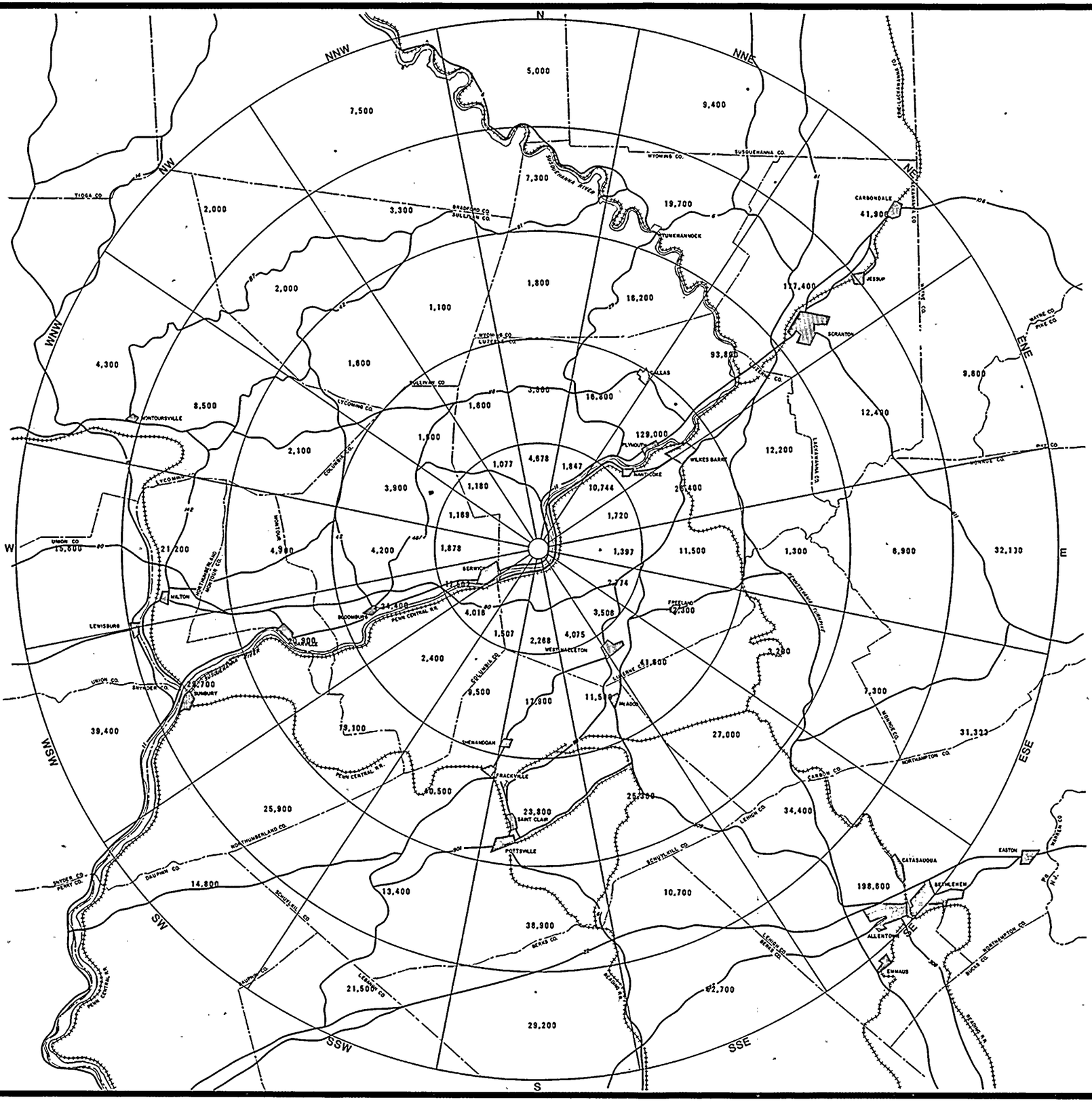
FIGURE 2.1–9



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

POPULATION DISTRIBUTION,
0–10 MILES, 2000.

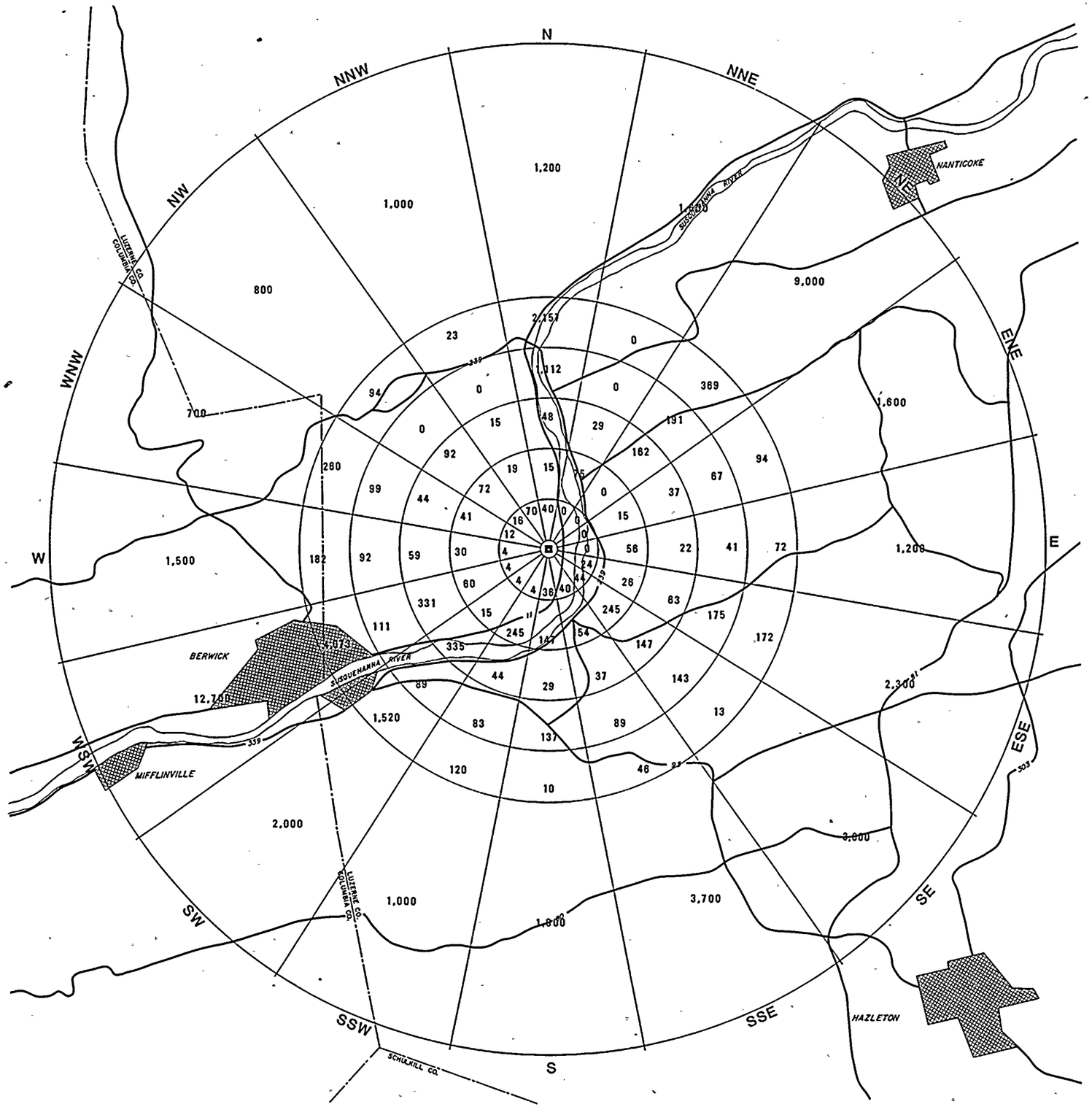
FIGURE 2.1–10



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

POPULATION DISTRIBUTION,
10-50 MILES, 2000.

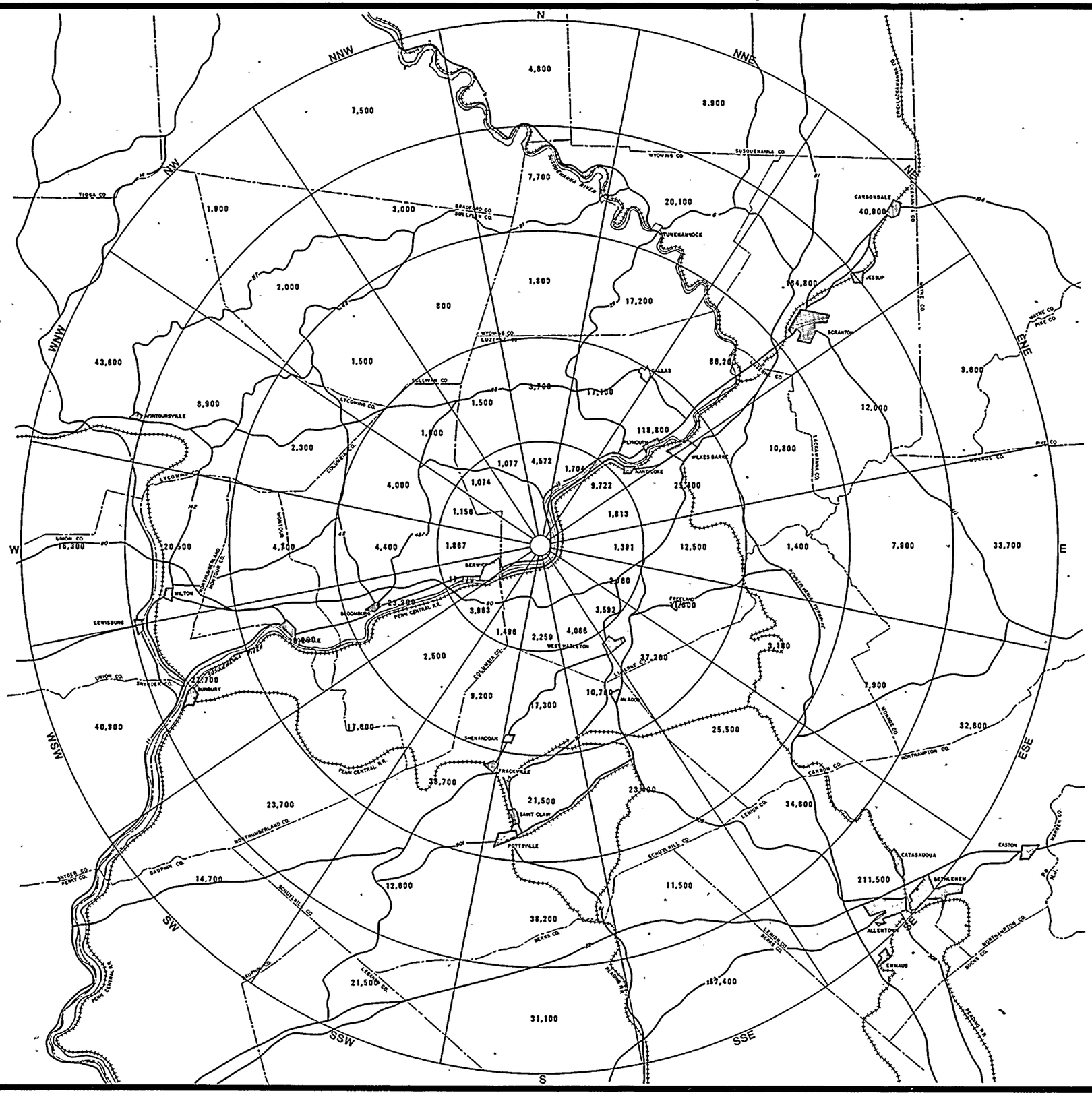
FIGURE 2.1-11



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

POPULATION DISTRIBUTION,
0–10 MILES, 2010.

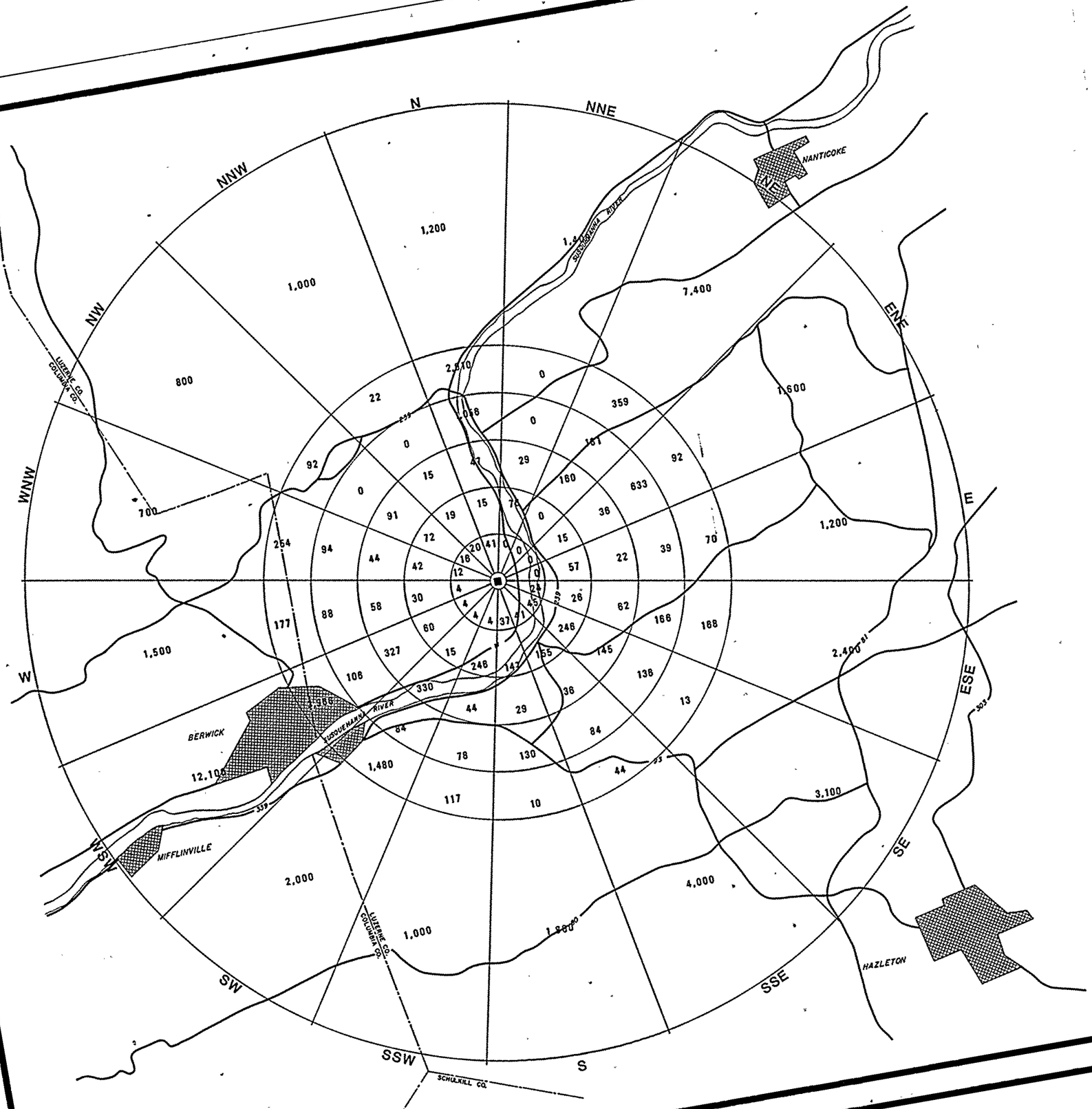
FIGURE 2.1-12



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

POPULATION DISTRIBUTION,
10–50 MILES, 2010.

FIGURE 2.1–13



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

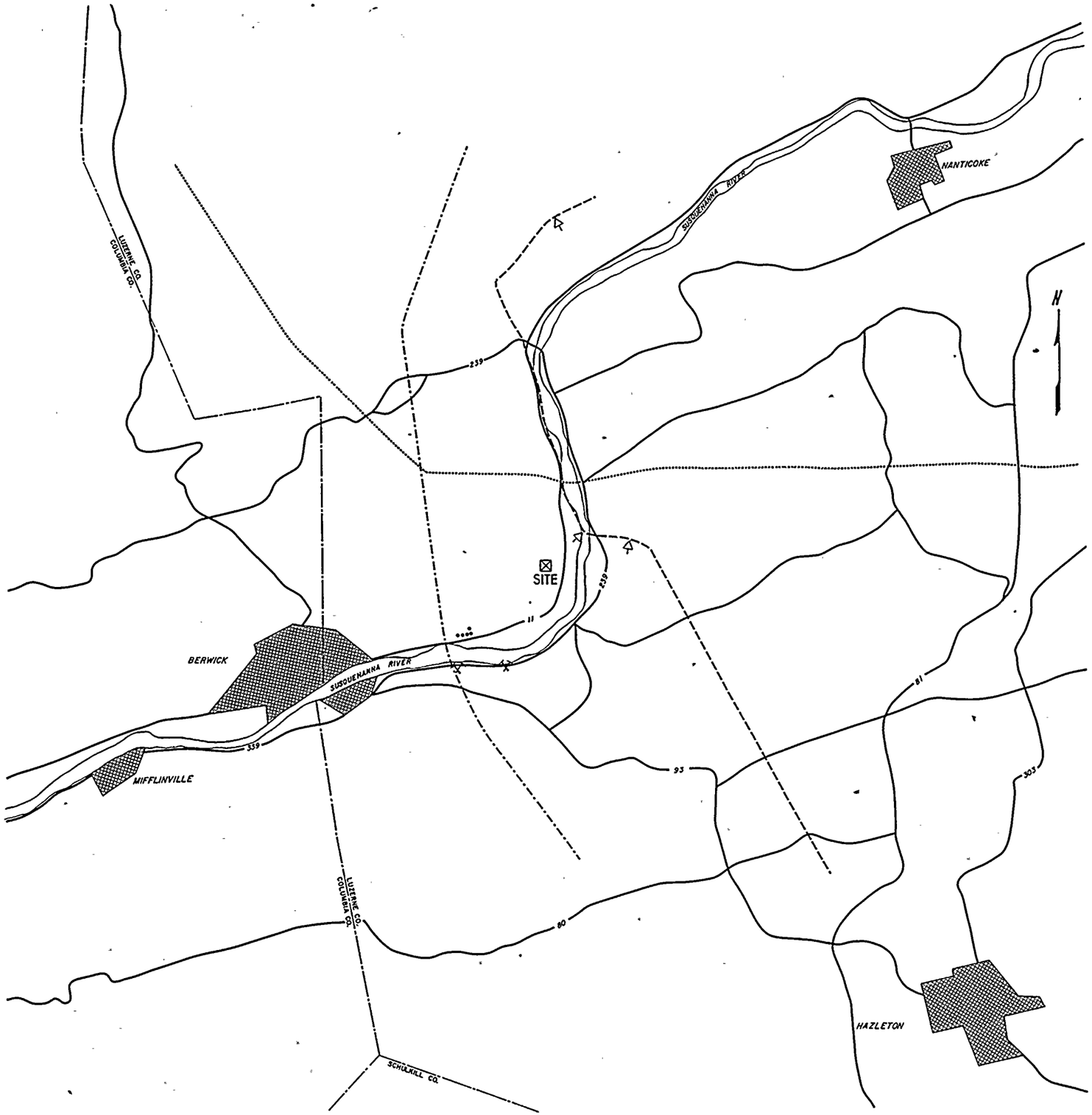
POPULATION DISTRIBUTION,
0–10 MILES, 2020.

FIGURE 2.1–14

SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

POPULATION DISTRIBUTION,
10–50 MILES, 2020.

FIGURE 2.1–15



KEY:

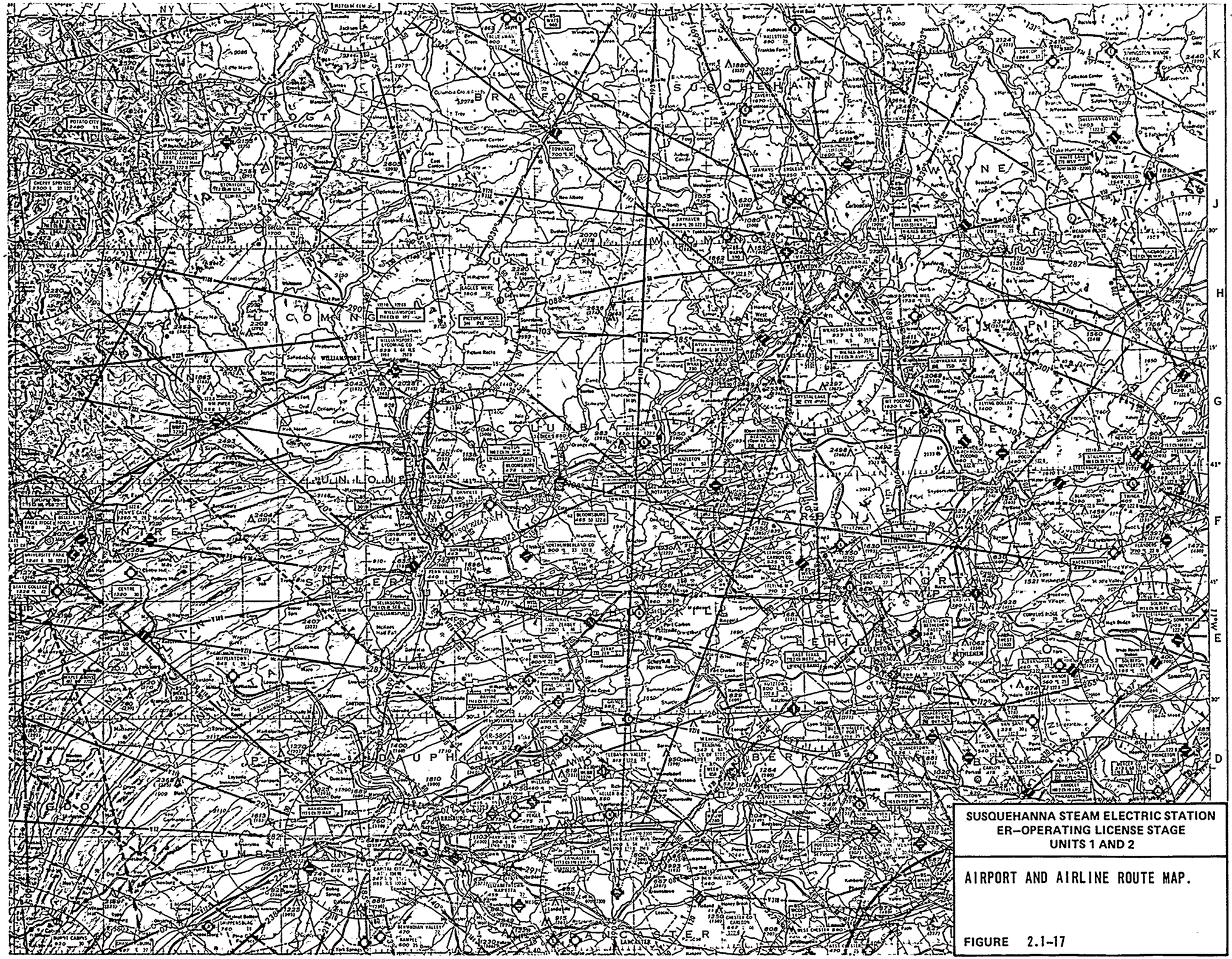
- SUN OIL CO. PIPELINE
- TRANSCONTINENTAL GAS CO. PIPELINE
- ARCO CO. OIL PIPELINE
- SAND QUARRYING
- VALVE

1 0 1 2 MILES

SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

MAJOR TRANSPORTATION ROUTES
AND PIPELINES.

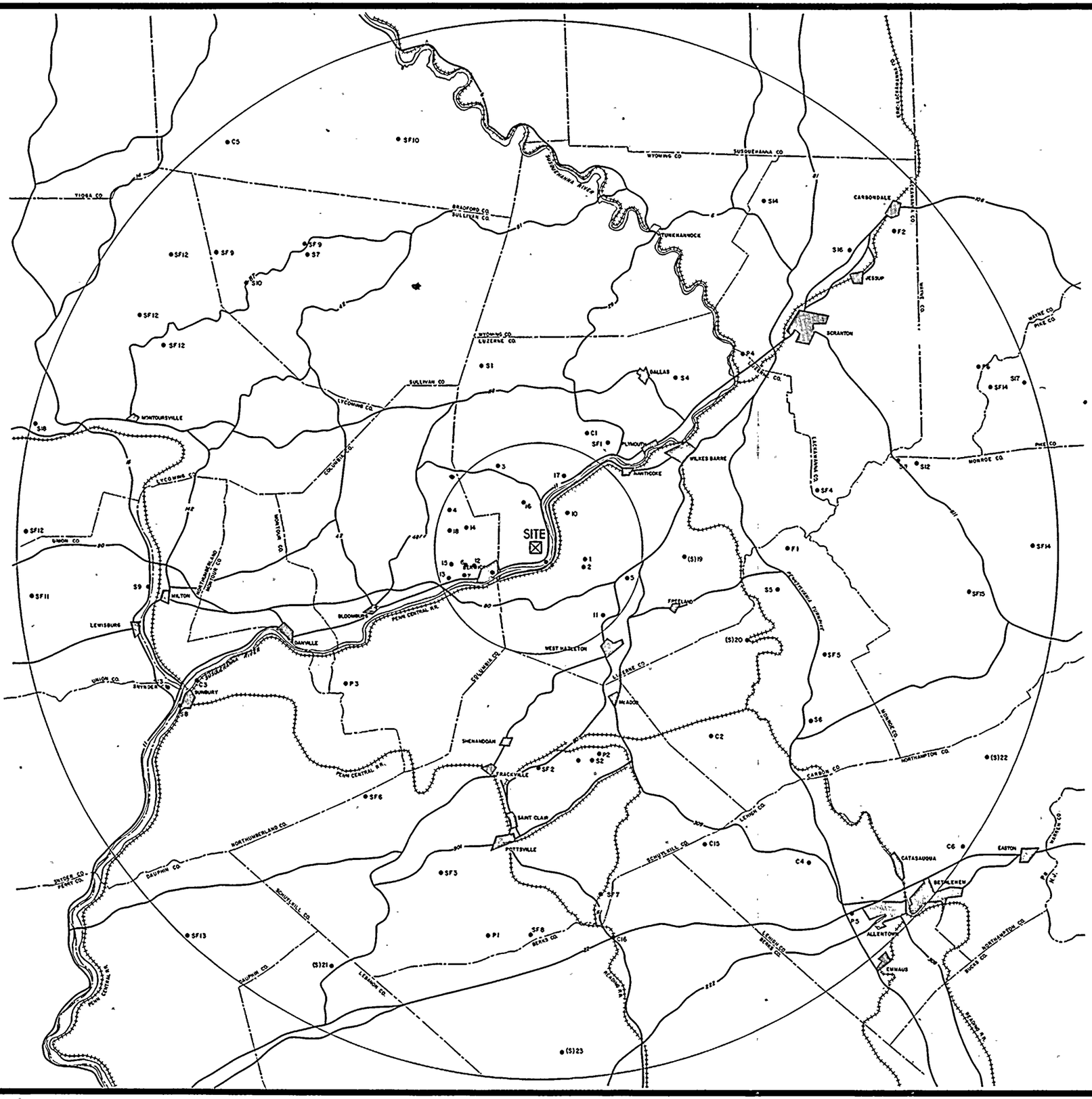
FIGURE 2.1–16



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

AIRPORT AND AIRLINE ROUTE MAP.

FIGURE 2.1-17



LEGEND

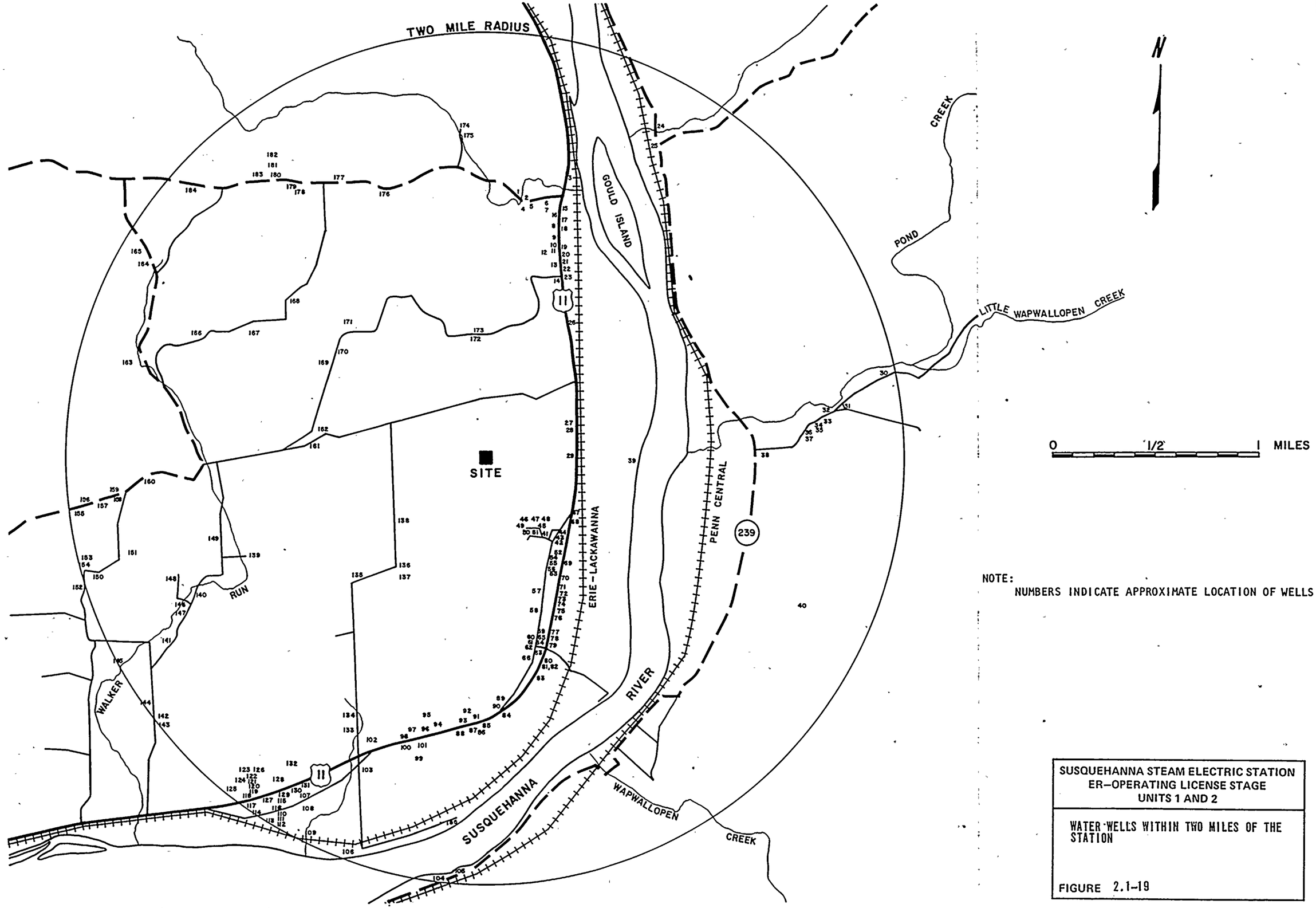
1	CAMP JOY-LO GIRL SCOUT CAMP
2	MOYERS CAMP GROVE
3	HIDDEN LAKE CAMP SITES
4	CAMP LOUISE GIRL SCOUT CAMP
5	HAZLETON - WILKES-BARRE KAMPGROUNDS OF AMERICA
6	BRIAR CREEK LAKE COUNTY PARK
7	BER-VAUGHN PARK
8	WAPWALLOPEN BOAT LAUNCHING FACILITY
9	BERWICK BOAT LAUNCHING FACILITY
10	LILLY LAKE
11	LAKE IRENA
12	BERWICK COUNTRY CLUB
13	BRIAR HEIGHTS LODGE
14	JONESTOWN OVERLOOK
15	OLD STONE CHURCH
16	STATE GAME LANDS #260
17	STATE GAME LANDS #224
18	STATE GAME LANDS #55
19	STATE GAME LANDS #187
F1	FRANCIS WALTER DAM
F2	AYLESWORTH CREEK RESERVOIR PARK
S1	RICKETTS GLEN STATE PARK
S2	TUSCARORA STATE PARK
S3	LOCUST LAKE STATE PARK
S4	FRANCIS SLOCUM STATE PARK
S5	HICKORY RUN STATE PARK
S6	BELTZSVILLE LAKE STATE PARK
S7	WORLD'S END STATE PARK
S8	SHIKELLAMY MARINA STATE PARK
S9	MILTON STATE PARK
S10	HIGH KNOB STATE FOREST MONUMENT
S11	GOULDSBORO STATE PARK
S12	TOBYHANNA STATE PARK
S13	SHIKELLAMY STATE PARK
S14	LACKAWANNA STATE PARK
S15	BIG POCONO STATE PARK
S16	ARCH BALD POTHOLE STATE PARK
S17	PROMISE LAND STATE PARK
S18	SUSQUEHANNA STATE PARK
S19	NESCOPECK CREEK STATE PARK
S20	LEHIGH GORGE STATE PARK
S21	SWATARA GAP STATE PARK
S22	JACOBSBURG STATE PARK
S23	BLUE MARSH STATE PARK
C1	MOON LAKE COUNTY PARK
C2	MAUCH CHUNK CREEK COUNTY PARK
C3	NORTHUMBERLAND COUNTY PARK
C4	TREXLER-LEHIGH GAME PRESERVE
C5	SUN FISH POND COUNTY PARK
C6	LOUISE M. MOORE COUNTY PARK
P1	HAWK MOUNTAIN SANCTUARY
P2	LAKEWOOD PARK
P3	KNOEBEL'S GROVE
P4	GHOST TOWN IN THE GLEN
P5	DORNEY PARK
P6	LEDGEDALE RECREATION
SF1	STATE FOREST LANDS
SF2	STATE FOREST LANDS
SF3	STATE FOREST LANDS
SF4	LACKAWANNA STATE FOREST
SF5	WEISER STATE FOREST LANDS
SF6	STATE FOREST LANDS
SF7	STATE FOREST LANDS
SF8	STATE FOREST LANDS
SF9	WYOMING STATE FOREST
SF10	STATE FOREST LANDS
SF11	BALD EAGLE STATE FOREST
SF12	TIADAGHTON STATE FOREST
SF13	HALDEMAN STATE FOREST
SF14	DELAWARE STATE FOREST
C15	LEASER LAKE
C16	KAERCHER CREEK COUNTY PARK

5 0 5 10
STATUTE MILES

SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

RECREATION WITHIN 50 MILES OF THE SUSQUEHANNA SES.

FIGURE 2.1-18

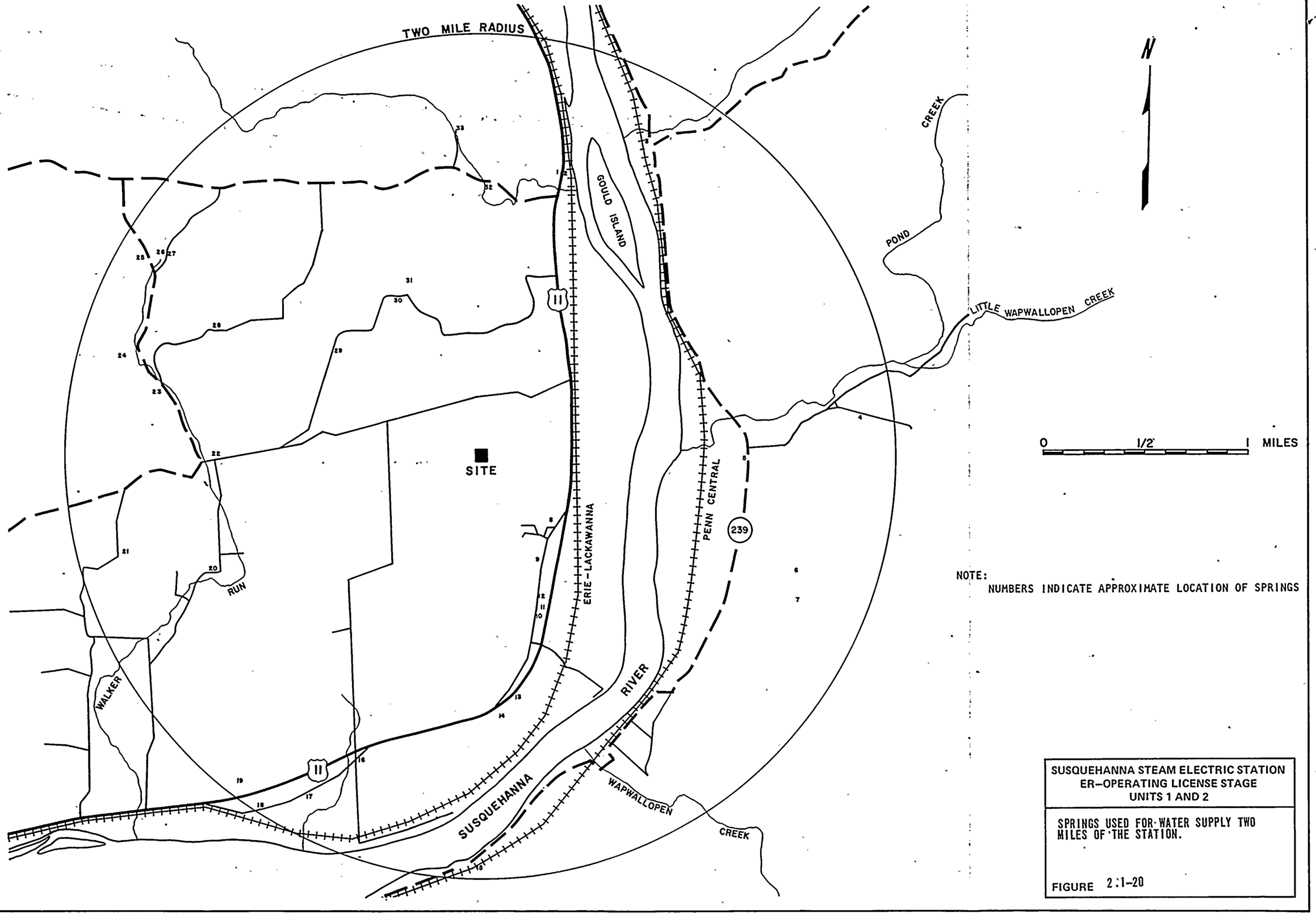


NOTE:
NUMBERS INDICATE APPROXIMATE LOCATION OF WELLS

SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

WATER WELLS WITHIN TWO MILES OF THE STATION

FIGURE 2.1-19

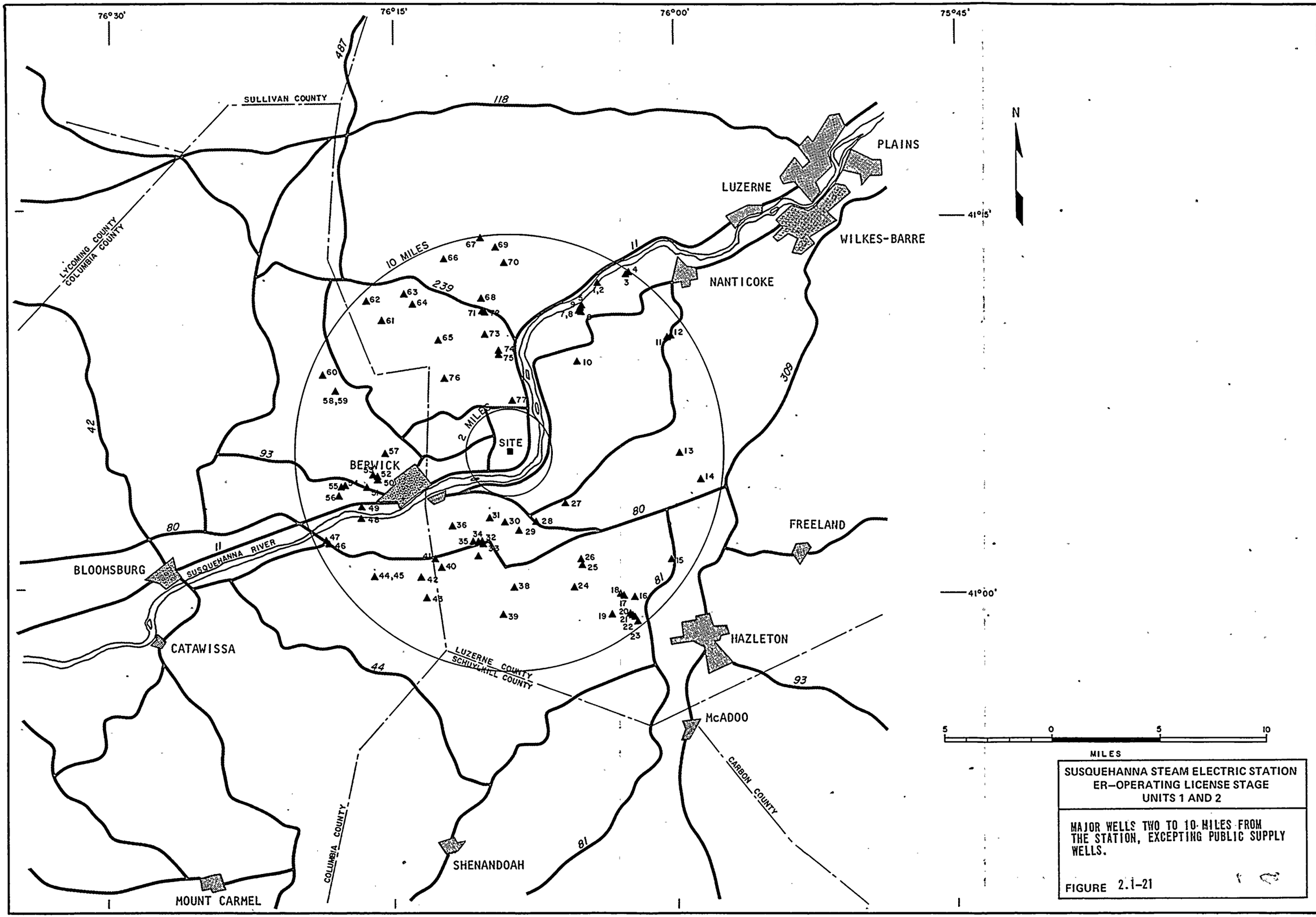


NOTE:
NUMBERS INDICATE APPROXIMATE LOCATION OF SPRINGS

SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

SPRINGS USED FOR WATER SUPPLY TWO MILES OF THE STATION.

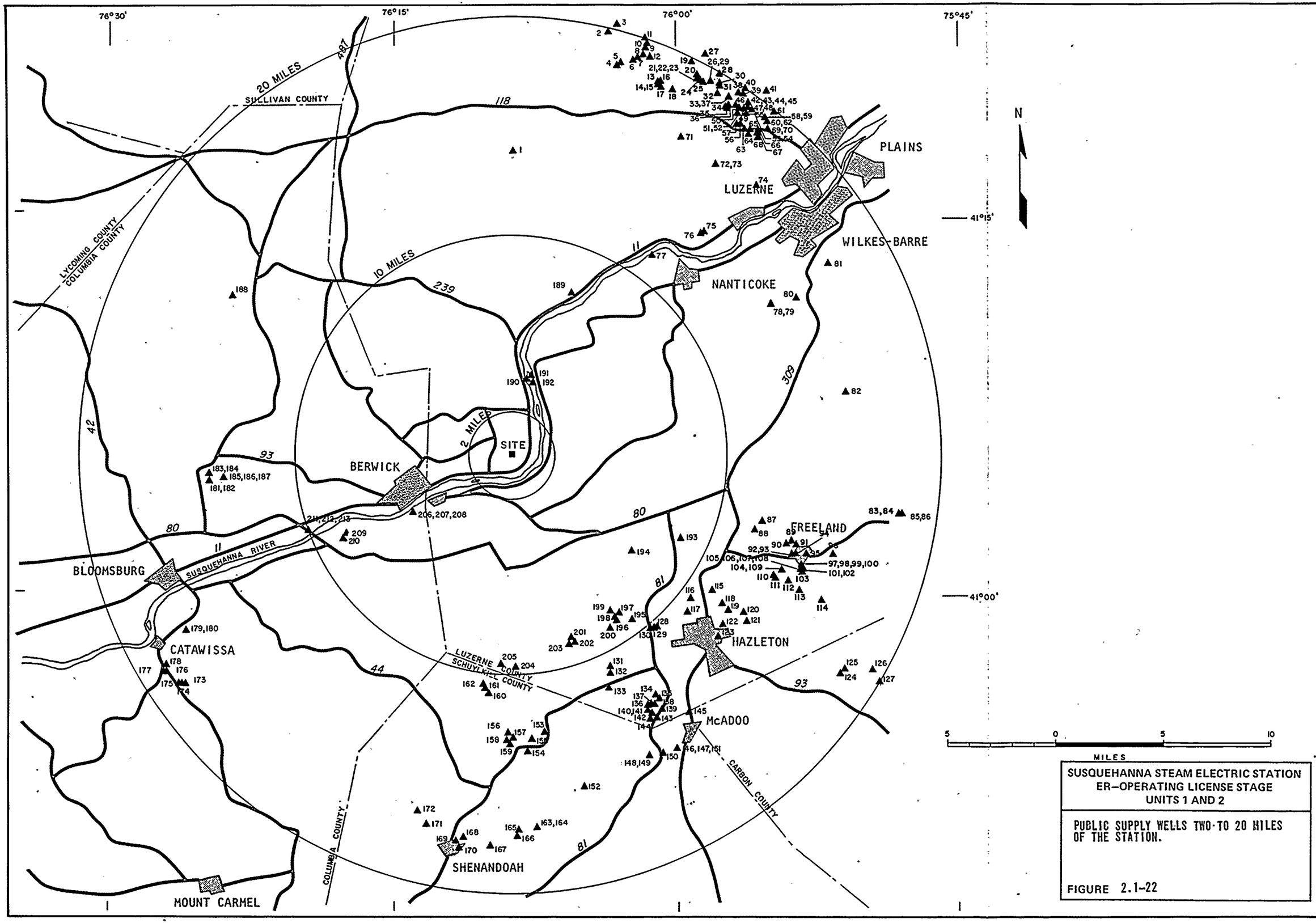
FIGURE 2.1-20



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

MAJOR WELLS TWO TO 10 MILES FROM THE STATION, EXCEPTING PUBLIC SUPPLY WELLS.

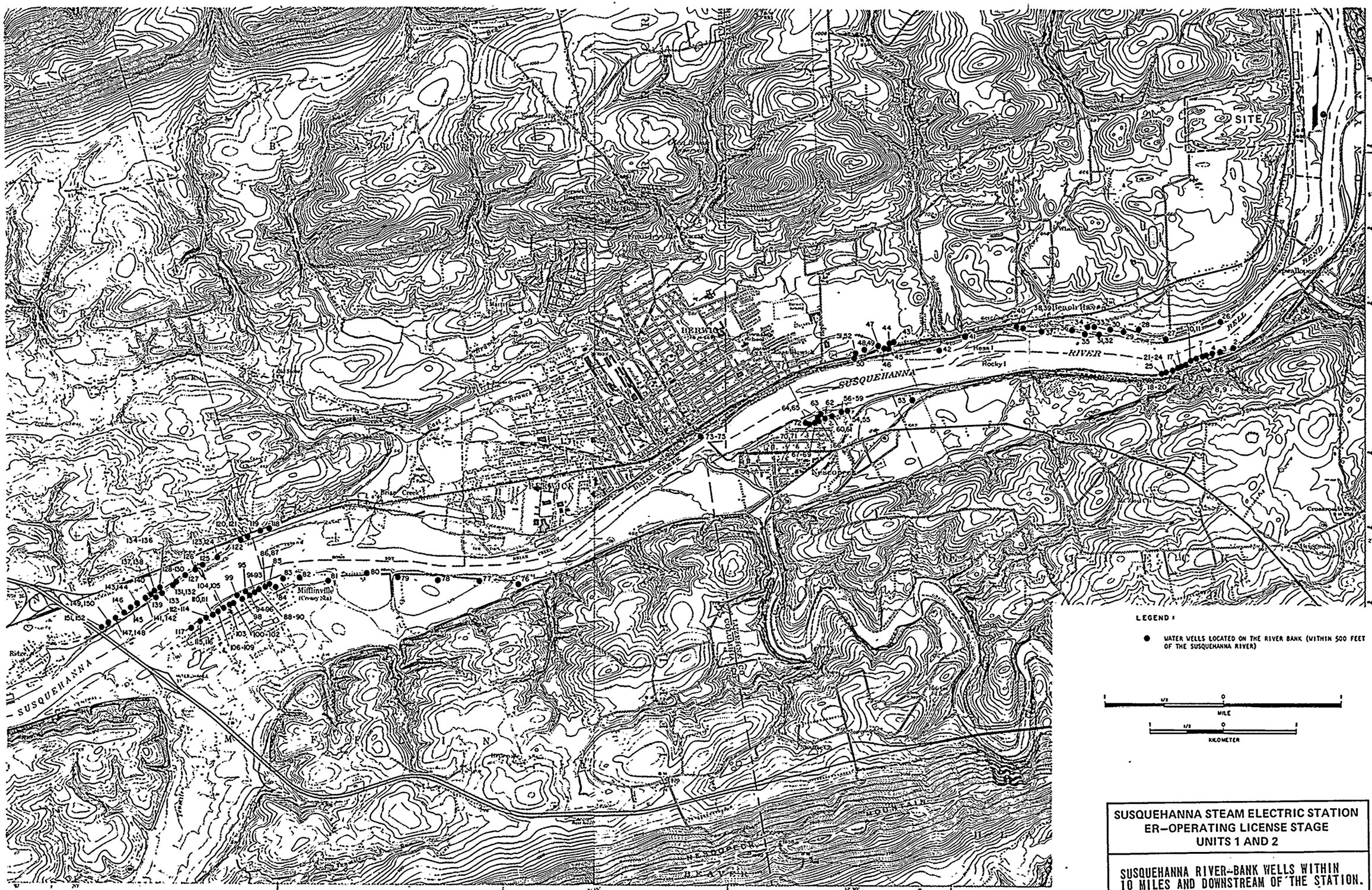
FIGURE 2.1-21



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

PUBLIC SUPPLY WELLS TWO-TO 20 MILES OF THE STATION.

FIGURE 2.1-22



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

SUSQUEHANNA RIVER–BANK WELLS WITHIN 10 MILES AND DOWNSTREAM OF THE STATION.

FIGURE 2.1-23

77°00'

76°00'

41°30'

40°45'

N

WILLIAMSPORT

WEST BRANCH SUSQUEHANNA RIVER

BUFFALO CR.

PENNS CR.

LEWISBURG

CHILISQUAQUE CR.

MAHONING RUN

FISHING CR.

SHICKSHINNY CR.

HUNLOCK CR.

FADES PACE CR.

TOBY CR.

LACKAWANNA RIVER

SCRANTON

MAIN BRANCH SUSQUEHANNA RIVER

WILKES-BARRE

DANVILLE

SECHLER RUN

BLOOMSBURG

BRAIN CR.

SITE

BERWICK

LITTLE WAPWALLOPEN CR.

WAPWALLOPEN CR.

MIDDLE CR.

SUNBURY

GAPPEN RUN

SHAMOKIN CR.

SELINSGROVE

ROARING CR.

CATAWISSA CR.

TEN MILE RUN

NESCOPECK CR.

MAHANOY CR.

PORT TREVORTON

SHENANDOAH

M1 M2 M3 M4 M5

R1 R2 R3 R4 R5 R6

I1 I2 I3 I4 I5

0 3 6 12

MILES

KEY :

- STREAM GAGE
- DAM
- (M1) MUNICIPAL USE LOCATION
- (I3) INDUSTRIAL LOCATION
- (R4) RECREATION AREA

'SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

WATER USERS ON THE SUSQUEHANNA RIVER.

FIGURE 2.1-24

2.2 ECOLOGY

The characterization of the aquatic ecology of the Susquehanna River in the vicinity of the Susquehanna SES site is based upon results of comprehensive, ongoing aquatic studies which have been sponsored by the Applicant since 1971. The overall objective of these studies is to collect sufficient data to establish a baseline of the river ecosystem prior to operation of the Susquehanna SES. Results, including detailed tabulation of data, and descriptions of the sampling procedures have been presented in annual reports from 1971 through 1975 (Ref. 2.2-1 through 2.2-5). Pertinent information from these reports is summarized in Subsection 2.2.1.

Studies of the terrestrial ecology of the Susquehanna SES site were sponsored by the Applicant from 1971 through 1974. Although less extensive than the aquatic studies, the objective was similar, to establish a baseline of the terrestrial ecology of the site before the station began operation. Results, data and methods have been presented in annual reports from 1971 through 1974 (Ref. 2.2-1 through 2.2-4). This information is summarized in Subsection 2.2.2.

The Applicant has provided data on the count and distribution of important domestic fauna, in particular the nearest cows and goats, that may be involved in the radiological exposure of man via the iodine-milk route, (Section 2.1).

2.2.1 AQUATIC ECOLOGY

The slope of the mostly rock and gravel river bed in the vicinity of the site is about 0.3 m/km (1.58 ft/mi). Depth ranges from 1 to 8 m (3.28 ft. to 26.25 ft.) and the width varies from 100 to 480 m (328.1 ft. to 1,574.88 ft.). During periods of low flow in late summer and early autumn, abandoned eel walls help maintain river pools, some of which are several kilometers long. In times of moderate to high flow, the river level increases from 1 to 3 m (3.28 to 9.84 ft.), and its flow characteristics resemble those of an open channel.

The Susquehanna River drains the largest basin (7,255 km^2) (2,801.15 mi^2) in the eastern United States (Ref. 2.2-6). Its northern branch originates at Otsego Lake in central New York, passes south through the mostly wooded hills of northeastern Pennsylvania, through the anthracite coal fields near Scranton and Wilkes-Barre, flows by the Susquehanna SES site 35 river km (21.75 mi) below Wilkes-Barre, joins the West Branch Susquehanna

River at Northumberland, and finally heads southeast to the Chesapeake Bay.

In 1963 the Susquehanna River Basin Coordinating Committee began an intensive study to formulate a master plan for development of the river basin (Ref. 2.2-7). They also drafted a Federal-Interstate Compact for the comprehensive planning and management of the basin (Ref. 2.2-8).

The water quality of the Susquehanna River Basin was most recently evaluated by the Bureau of Water Quality Management, Pennsylvania Department of Environmental Resources (Ref. 2.2-9), and the Susquehanna River Basin Commission (Ref. 2.2-10). These agencies reconfirmed previous findings that the degraded water quality of the river at the Susquehanna SES site is caused by drainages from abandoned anthracite mines and sewage effluents, most of which enter the river in the Wilkes-Barre area. This situation limits fishing and boating in the river at the site. Furthermore, because of the lack of funds to combat these sources of pollution, this stretch of the river is not expected to meet Pennsylvania Water Quality Standards by 1983 (Ref. 2.2-9).

2.2.1.1 Physicochemical Analyses

The water quality of the Susquehanna River was monitored from July 1971 through 1975. In 1972 several parameters were added to the original monitoring program and continuous recordings of river level and temperature were begun in July and August 1973, respectively. The objective since 1971 has been to establish baseline values of physicochemical parameters for evaluation of possible effects on the water quality of the river from the construction and operation of the Susquehanna SES.

Table 2.2-1, Physicochemical Stations lists the samples collected at 25 sampling stations within the study area from Falls to Columbia, Pennsylvania. Also see Figure 2.2-1 Map of River Study Area. Falls was established as the control station since it was located above most sources of pollution (acid mine and sewage effluents) which degrade the water quality of the river at the Susquehanna SES site. Most sampling effort, however, was expended at the four stations adjacent to the site. The remaining stations were established at road bridges up and downriver from the site. Stations were usually sampled in all four seasons.

Methods used to analyze physicochemical parameters are presented in Table 2.2-2 Physicochemical Parameters. Results were summarized, either monthly or annually, by tabulation of minimum and maximum values and calculation of mean, standard deviation, and coefficient of variation.

During the interim of this report, two major floods occurred in the Susquehanna River Basin. In June 1972, Tropical Storm Agnes caused flooding unequaled in the modern history of the region. This storm was so devastating that extensive studies of its meteorology and hydrology (Ref. 2.2-11) and its effects (Ref. 2.2-12) were sponsored by the Department of the Army, Baltimore District, Corps of Engineers. The river crest at the biological laboratory on 25 June, was 157.69 m (517.36 ft.) above mean sea level (msl) at 0300 h and the mean daily flow was 9,340 m^3/s (3.3 X 10^5 $ft.^3/s$) (Table 2.2-3, River Flows (m^3/s) at Susquehanna SES, 1972-75). Hurricane Eloise caused the second flood in September 1975. It was not as severe as Agnes. The daily mean river level and flow at the laboratory on 27 September were 155.45m (510 ft.) above msl (Table 2.2-4, River Levels (meters above msl) at Susquehanna SES, July 1973-Dec. 1975) and 6,850 m^3/s (2.4 X 10^5 $ft.^3$) (Table 2.2-3); the river crested at 156.36 m (513 ft.) above msl at 1700 hours.

In 1972-75 the minimum daily flow past the laboratory was 50.0 m^3/s (1765.5 $ft.^3$) This flow occurred on 11 and 12 September 1972 and again on 22, 26, and 27 August 1974 (Table 2.2-3). The low flows in August produced a minimum river level of 148.32 m (486.64 ft.) above msl (Table 2.2-4). The lowest estimated daily flow at the site during the past 75 years was 15.3 m^3/s (540 $ft.^3/s$) on 27 September 1964 (Ref. 2-13).

During periods of normal flow, the velocity of the river at SSES (1973-74) and SSES-A (1975) ranged from 0.10 to 1.69 m/s (0.33 to 5.54 ft./s) (Table 2.2-5, Summary of Physicochemical Characteristics, 1972-75). However, during the Hurricane Eloise flood, a velocity of 3.1 m/s (10.17 ft/s) was recorded at 1030 h on 27 September 1975, when the river level was 155.60 m (510.52 ft.) above msl.

River temperature at the biological laboratory ranged from -0.8 C in January and February 1974 to 28.7 C in August 1975 (Table 2.2-6, Temperatures (C) of the Susquehanna River at the Site, 1973-75). In general, the mean monthly water temperature was lowest in January and February (<1.0C) and highest in July and August (>22 C). Diel (24-h) studies at SSES (1972-74) and SSES-A (1975) revealed that the river temperature either remained constant or fluctuated a maximum of 3.0 C (Table 2.2-7, Diel River Temperature (C) Studies at the Site, 1972-75). Although the largest fluctuations occurred in the studies conducted from June through October, ranges in other months were usually equal to or greater than 1.0 C.

Despite pollution from mine acid and sewage, concentrations of dissolved oxygen in the river were more than adequate to support aquatic life at stations sampled in 1971-74 (Table 2.2-8, Summary of Dissolved Oxygen Values mg/1). At SSES and SSES-A the values of dissolved oxygen measured in 1972-75 ranged from 5.85 to 14.80

mg/l, (5.85 to 14.80 ppm) and the mean annual concentration always exceeded 10 mg/l (10 ppm) (Table 2.2-5). Studies at these two stations showed that diel fluctuations in dissolved oxygen ranged from 0.15 to 4.00 mg/l (0.15 to 4.00 ppm) (Table 2.2-9, Summary of Diel Dissolved Oxygen Values mg/l); greatest diel fluctuations usually occurred from June through September.

In 1972-75 the mean annual pH of the river at the Susquehanna SES site ranged from 7.0 to 7.2; minimum and maximum values were 6.6 and 8.9 (Table 2.2-5). Diel fluctuations were usually less than 0.3 units and never exceeded 1.1 units (Table 2.2-10, Summary of Diel pH Values). The mean annual pH values at the site ranged from 0.4 to 0.9 units lower than the mean annual pH at Falls in 1971-74; pH values usually increased at successive stations downriver (Table 2.2-11, Summary of pH values). Therefore, in 1971-75 acid from mine drainages, although hardly beneficial, did not decrease the pH of the river to the point where aquatic life was endangered at the site.

A comparison of mean annual total alkalinities at Falls and SSES revealed that mine acid reduced the buffering capacity of the river at SSES by 13% in 1971-74 (Table 2.2-12, Summary of Alkalinity Values (mg/l)). The mean annual total alkalinity at the site was 42 mg/l as $CaCO_3$ in 1974 and 1975 (Table 2.2-5). Values ranged from 15 to 65 mg/l throughout these two years. In most samples, phenolphthalein alkalinity was not present; therefore, all alkalinity was bicarbonate.

Specific conductance was lowest at Falls (mean = 189 micromhos/cm) compared to values at all other stations in nearly every sample series in 1971-74 (Table 2.2-13, Summary of Specific Conductance Values (μ mhos/cm)). Increased values at the stations downriver from Falls were caused by the greater ion load in the River, particularly sulfate ions, from mine effluents. At the site, mean specific conductance was 280 micromhos/cm in 1972-75 (Table 2.2-5); values ranged from 95 to 610 micromhos/cm throughout these years.

High sulfate concentrations in mine effluents caused an increased concentration in the river even though effluent discharges were small relative to the flow of the river. In 1972-75 the Pennsylvania Department of Environmental Resources (DER) found that sulfate values in mine effluents upriver from the site ranged from 176 to 6,750 mg/l (Ref. 2.2-2, 2.2-3, 2.2-14 and 2.2-15). During the same period the mean annual sulfate concentration at the site was from 60 to 108 mg/l (Table 2.2-5), whereas at Falls, it ranged from 17 to 26 mg/l (Table 2.2-14, Summary of Sulfate Values (mg/l)).

Iron is probably the most detrimental pollutant to the river ecosystem in the vicinity of the Susquehanna SES site. It enters the river from acid mine effluents which contain large amounts of

ferrous iron. As these effluents are oxygenated and neutralized by river water, ferrous iron is oxidized into insoluble ferric compounds, mostly ferric hydroxide. Much of this iron precipitates out of the water column, but enough remains suspended in summer to "color" the river brownish-orange at the site. In winter most of the color disappears, but the substrate remains iron-coated, even though much of this coating is scoured away during periods of high river flow. It was demonstrated that water temperature was the major factor controlling iron oxidation in the river and that differences in ferric/ferrous iron ratios reflected seasonal changes in water temperature (Ref. 2.2-16). Ferric/ferrous ratios were high (up to 78) in summer when the river was brownish-orange and low (less than 10) in winter, when the river was nearly clear.

At SSES in 1972-75, the mean concentrations of total and dissolved iron were 3.66 mg/l, and 0.59 mg/l, respectively (Table 2.2-5). In 363 of the 369 samples analyzed during this period, the total iron concentrations either equaled or exceeded the 1.5 mg/l criteria established for the river by the DER (Ref. 2.2-17). High iron concentrations (mg/l) in the river did not necessarily coincide with high iron discharges (kg/s); in 1973 and 1974, the river transported from 16 to 844 metric tons (17.63 to 930 tons) (mean = 358 metric tons) of iron past the site daily (Ref. 2.2-16).

Trends in concentrations of both total and dissolved iron were similar in 1972-74 (Tables 2.2-15, Summary of Total Iron Values (mg/l), and 2.2-16, Summary of Dissolved Iron Values, (mg/l)). Mean annual values of total iron at Falls (1.38 mg/l) were always less than one-half the concentrations at SSES. Total iron concentrations usually decreased at successive stations downriver from SSES. In 1972 and 1973, at Northumberland, total iron values were less than those at Falls.

The distance iron traveled from a major mine effluent, about 26 km (16.16 mi) upriver from the Susquehanna SES site, was inversely related to water temperature, except during periods of high river flow (Ref. 2.2-16). In summer, up to 73% of the iron was removed from the water column within 50 km (31.1 mi) of the effluent. In January, just 4% of the iron was removed in the same distance, and only 52% was removed within 150 km (93.22 mi) of the effluent. Elevated river flow scoured some iron from the rocky substrate and increased iron concentrations in the water. During high river flow in May, iron concentrations remained high, decreasing by just 17% at Columbia, 193 km (119.9 mi) downriver from the site.

Deposition rates of iron on acrylic plates located near the river bottom at the Susquehanna SES site in 1974 ranged from 4 to 393 $mg/m^2/day$ (8.2×10^{-7} to 8×10^{-5} $lbs/ft^2/day$) (Ref. 2.2-16). The deposition rate was lowest in winter and during periods of

elevated flow, and highest in August and September, when water temperature was high and flow was low. Most of the accumulated iron was scoured away by high river flows, but after a long period of low flow up to 27,000 mg/m^2 (5.5 x 10^{-3} lbs/ft^2) were found on plates.

The clarity of the river at the site was usually limited by silt and suspended iron particles. Turbidity increased during periods of elevated flow primarily because of the high silt load and during periods of low flow in summer because of suspended iron particles. Turbidity was high, from five to 400 JTU (mean = 44 JTU), and Secchi disc values ranged from two to 179 cm (0.79 to 70.47 in) (mean = 68 cm; 26.8 in) in 1972-75 (Table 2.2-5). Nonfiltrable residues ranged from four to 1,090 mg/l and fixed nonfiltrable residues varied from two to 1,030 mg/l during the same period. Organic matter usually composed less than 20% of the nonfiltrable residues. Both nonfiltrable and fixed nonfiltrable residues were closely correlated (r =0.86 to 0.94) with ferric iron concentrations in 1973 and 1974 (Ref. 2.2-16).

Phosphate concentrations were always less than 0.5 mg/l at all stations sampled in 1972-74 (Table 2.2-17, Summary of Total Phosphate Values as PO_4 (mg/l)). In 1972 and 1973, the mean concentration at Falls (mean = 0.14 mg/l) was about twofold greater than values found at the site, but in 1974 concentrations at both stations were approximately equal.

Concentrations of nitrate usually varied little among stations in 1972-74 (Table 2.2-18, Summary Of Nitrate Values as NO_3 (mg/l)), with the exception of Falls in 1973 when an unexplainably high value of 40 mg/l (ppm) was recorded. Mean annual values at SSES ranged from 2.74 to 4.63 mg/l (ppm) during these years.

In 1972-75 bacterial densities in the river at the site were high (Table 2.2-19, Summary of Bacterial Densities (colonies/100 ml)). as a result of several sewage effluents (treated and untreated) which entered upriver. The fecal coliform/fecal streptococcus (FC/FS) ratios were highest in 1973 because several sewage treatment plants, damaged during the Agnes flood, apparently were not functioning at peak efficiency. Contamination was undoubtedly worse in 1972, but fecal streptococcus densities were not determined.

In 1974 and 1975 the FC/FS ratios were much lower, ranging from 0.3 to 6.3, but in most instances, particularly in 1975, they indicated that the source of pollution was probably human wastes. The density of sewage bacteria in the river should decrease even more because primary treatment of the major raw sewage effluents in the lower study area was initiated in December 1975.

In 1972-75 the water quality of the river at the Susquehanna SES site steadily improved as values of parameters associated with

acid mine drainage decreased (Table 2.2-5). Mean annual concentrations of total and dissolved iron and sulfate decreased by about one-half. Furthermore, annual decreases in the standard deviation and coefficient of variation of iron and sulfate values reflected a trend towards less variability in the water quality. Although decreases in values of specific conductance and residues were less pronounced, the trend was similar. The mean annual pH increased from 7.0 to 7.2 during these years. Water clarity also improved as mean annual turbidity decreased from 74 to 32 JTU and Secchi disc readings increased from 58 to 77 cm (22.83 to 30.31 in). These changes occurred because mine waters were no longer pumped into the river after Tropical Storm Agnes in 1972.

At present the river is probably in a period of "gradual improvement", although there is little likelihood that values of parameters associated with mine drainage will decrease substantially in the near future. If pumping is discontinued permanently, the flow of mine waters will be somewhat proportional to the river flow as both are controlled, to some degree, by the water table. Eventually mine waters will leach out exposed pyrite and marcasite deposits resulting in further improved water quality, but this process will probably take several decades (Ref. 2.2-18).

2.2.1.2 Phytoplankton

Phytoplankton was sampled monthly from August 1971 through September 1973. In 1971, samples were collected near water chemistry stations. These included Harding (H), upriver from most mine effluents; Wilkes-Barre 1 (WB-1), upriver from Mill Creek, a major contributor of acidic mine effluents prior to Tropical Storm Agnes in June 1972; Wilkes-Barre 2 (WB-2), downriver from Mill Creek; Nanticoke (N); Retreat (R); Mocanaqua (M); and Nescopeck (NE), 1.6 km upriver from State Highway 93 Bridge at Berwick. Starting in November 1971, samples were also collected at Falls (F), a second "clean water" station. A ninth sampling station (S) was added in December 1971 at the Susquehanna SES site (SSES). After completion of the preliminary phytoplankton survey in 1971 and 1972, samples were collected at the four most essential stations: Falls, Nanticoke, SSES and Nescopeck.

Samples were analyzed using procedures detailed in References 2.2-1, 2.2-2, and 2.2-3. Counts of algae cells were made in terms of unit equivalents (Ref. 2.2-1). Both phytoplankton density (number of organisms/unit volume), and standing crop, density times river flow were determined.

In the latter part of 1971, phytoplankton density was relatively low in the river between Harding and Nescopeck (Figure 2.2-2,

Mean Phytoplankton Density For Five Time Intervals and Composition For July-December, 1972.). From August through December 1971, the highest mean density of phytoplankton (5,600,000 units/liter) occurred at Wilkes-Barre 1; density declined progressively downriver to about 3,300,000 phytoplankton units/liter at Nescopeck. The mean phytoplankton density for all stations increased from 3,400,000 units/liter in August to a maximum of 7,100,000 units/liter in October and then declined to about 150,000 units/liter in December. Diatoms were by far the most abundant kinds of algae. Green algae were the second most abundant. The relative abundance of green algae, diatoms, and blue-green algae changed little at various stations (Figure 2.2-2), indicating a nonselective loss of phytoplankton.

In 1972 and 1973, both density and standing crop of phytoplankton were low in January, February, and March at SSES and Falls (Figure 2.2-3, Standing Crop, Density and Composition of Phytoplankton Community, 1972-1973) ranging from 57,000 to 1,160,000 units/liter. Density and standing crop began a marked increase in April (1972) and May (1973). Data from samples collected monthly in 1972 and 1973 indicated that density increased dramatically in August at both stations. Density reached a maximum of 73,400,000 and 71,400,000 units/liter at SSES and 64,400,000 and 101,900,000 units/liter at Falls in 1972 and 1973, respectively. Density declined sharply in autumn. However, upon the basis of samples taken weekly at SSES (Figure 2.2-3), it can be seen that more than one phytoplankton bloom occurred; blooms occurred in July (109,100,000 units/liter) August (71,400,000 units/liter), and September (73,500,000 units/liter). The standing crop of phytoplankton, which tended to be high in summer when river flows were low, increased relatively little in comparison to the great increase in phytoplankton density.

Diatoms, relatively the most abundant kinds of algae during most of the year at Falls and SSES, composed about 90% or more of the total phytoplankton in winter and early spring (Figure 2.2-3). Green algae became relatively more abundant in summer and in 1973 composed the largest percentage of units in the July, August and September blooms at SSES (Figure 2.2-4, Composition of Phytoplankton Community at SSES Determined from Weekly Samples in 1973). Blue-green algae were extremely abundant in August 1972 when they composed about 90% of the August phytoplankton blooms. This great abundance of blue-green algae did not occur at any other time during the study. This bloom may have been caused by additional nutrients in the river from inoperative sewage treatment plants after Tropical Storm Agnes. Generally, about the same numbers of genera were found in the polluted water at SSES as were found in the relatively clean water at Falls (Figure 2.2-5, Diversity and Number of Algae Geneva in Phytoplankton Samples). A substantial number of genera in the plankton samples

were periphytic algae which were probably scoured from river stones by the current.

Generic diversity of algae was similar at both Falls and SSES (Figure 2.2-5). Diversity was usually high (about 2.5 to 3.5), but decreased in August 1972 to less than 1 and to about 2 in August 1973. Diversity was enhanced slightly by periphytic algae in the samples (Figure 2.2-5).

One hundred and two genera of algae were found in the study area. Falls had 81 genera; Nanticoke, 74; SSES, 83; and Nescopeck, 78. Forty-five genera of green algae, 35 genera of diatoms, and 11 genera of blue-green algae were found (Table 2.2-20, Phytoplankton Genera, Susquehanna River, Jan. 1972-Sept. 1973).

In 1972 and 1973, the loss of algae downriver from mine effluents appeared to be nonselective, as it was in 1971. During July, August, and October there were significantly fewer phytoplankton units at Nanticoke, Retreat, Mocanaqua, SSES and Nescopeck (grouped) than there were at Falls, Harding, Wilkes-Barre 1, and Wilkes-Barre 2 (Figure 2.2-2) ($X^2 = 7.01$, DF = 1, $p < 0.05$). Although the Wilkes-Barre 2 station was downriver from mine effluents, data collected there were included with data from stations upriver because there did not seem to be sufficient time for mine effluents to have an effect upon the phytoplankton community. Mine effluents probably had greater impact upon phytoplankton density in summer because of high water temperature and low river discharge. Both factors would contribute to precipitation of iron from the water column. Iron particles seem to form around phytoplankton cells forming clumps too heavy to remain in suspension. During most of the year mine effluents seemed to have little impact upon phytoplankton density (Figure 2.2-2) and the standing crop was not significantly ($p > 0.05$) reduced at the stations downriver from Wilkes-Barre.

2.2.1.3 Periphyton

The periphyton investigation was initiated in 1972 and expanded in 1973 and 1974. In 1973 and 1974, samples were collected from river stones at Falls, SSES, Bell Bend and Nescopeck. New sampling stations at Bloomsburg and Danville were added and sampled quarterly in 1974, at the request of the Applicant. The primary objective of the study was to describe the periphyton community at SSES, where the river was polluted by acid mine drainage, and compare it to a community in an "unpolluted" portion of the river at Falls. Location of sampling stations is shown in Figure 2.2-6, Periphyton and Macroinvertebrate Sampling Stations (Ref. 2.2-30)

Artificial substrate samplers (plates) were used at Falls, SSES, Bell Bend and Nescopeck in an attempt to reduce variability encountered when sampling river stones. The plates provided a more homogeneous surface for algae to colonize than river stones did. Artificial substrates were left submerged at Falls and SSES for periods of one to 12 months so that short-term changes in colonization rates and long-term changes in structure of the algal community could be observed.

Artificial substrates used at SSES and Falls included: (1) Vermont slate (roughened or frosted by sandblasting); (2) sandy slate (flagstone); (3) smooth glass; (4) frosted glass; and (5) frosted acrylic. Plates were fastened in a "detritus-free" acrylic holder on the river bottom facing upstream at 5° from horizontal.

Artificial substrates (Vermont slate and acrylic plates) were placed in the river late in 1973 at Falls and SSES. Two plates were randomly selected and sampled monthly at each station. These were replaced by clean plates that would be sampled the following month. The remaining 13 plates provided cumulative samples of two to 12 month duration. Additional artificial substrates (plates of smooth and roughened glass and sandy slate) were placed in a second holder beside the first one in April 1974. Samples were also taken from river stones near the artificial substrates (Ref. 2.2-30).

Samples were collected by a scuba diver using a bar-clamp sampler (Ref. 2.2-31) that enclosed a 387 mm^2 (0.6 in^2) surface area and cleaned by vibration with an ultrasonic dental cleaning probe. Samples were concentrated by settling and decanting.

Many kinds of periphytic algae were found at all sampling stations. A total of 46 genera of algae was collected in 43 samples from river stones at Falls, SSES, Bell Bend and Nescopeck (Ref. 2.2-30). The largest numbers of genera were found at Falls (38) and SSES (24) where the greatest number of samples was taken. Eighty-eight genera of algae were collected in 165 samples from artificial substrates at the four stations (Ref. 2.2-30). Artificial substrates were sampled more frequently than were river stones. More genera of algae were found on artificial substrates at Falls (68) and SSES (66) than at Bell Bend (44) and Nescopeck (34). Much of the difference was probably due to more frequent sampling and to the greater variety of substrates sampled at Falls and SSES.

Thirty-two species of algae, composing 5% or more of the total units counted in samples from all six sampling stations (Table 2.2-21, Major Periphyton Species, 1974), were identified. Diatoms were more abundant than other forms, as in 1972 and 1973. They were relatively more abundant at Falls (95% of the total) than at SSES (65%), Bell Bend (58%), Nescopeck (61%), Bloomsburg

(71%) and Danville (78%). Overall, diatoms composed 71% of the total at all six stations. Six species of diatoms (Cymbella prostrata, Melosira distans, Melosira granulata, Navicula radiosa, Navicula salinarum and Thalassiosira pseudonana) accounted for over 5% of the total units counted at Falls, but less than 5% of the total at the five downriver stations (Table 2.2-21). Blue-green algae, relatively scarce at Falls, sometimes composed over 5% of the total units counted at SSES, Bell Bend and Nescopeck. Only two species of blue-greens, Phormidium geniculata and Phormidium tenue were identified, but unidentified species of Oscillatoria and Phormidium were also found in abundance. Green algae were more important numerically at SSES than at Falls. Ankistrodesmus falcatus and Scenedesmus abundans composed over 5% of the total units counted at SSES, but less than 5% at Falls.

Most of the algae found at Falls were "clean water" forms and only three of the abundant species were listed by Palmer (Ref. 2.2-32) in the top 10 species of those tolerating much organic pollution. Included were Nitzschia palea, Scenedesmus quadricauda, and Ankistrodesmus falcatus. Only three of the 25 species of abundant diatoms (Table 2.2-21) were rated as acidophilous by Lowe (Ref. 2.2-33); some of the others were rated "indifferent", but most were alkaliphilous.

Algal colonization of clean substrates at Falls and SSES was extremely slow in winter (Figures 2.2-7, 2.2-8, and 2.2-9). Diatoms rapidly colonized substrates at Falls between April and May as the river warmed from 8.9 to 16.6 C. The colonization rate at SSES increased little in May and the increase in June was mostly due to an increase in numbers of green algae. The increase at Falls in May was due, almost entirely, to an increased number of diatoms.

A moderate rate of colonization was observed at Falls from June through September (Figure 2.2-7, Algae on Plates at Falls and SSES, 1974 and Jan. 1975). During this period the colonization rate at SSES, relative to other rates at the station, remained high (Figure 2.2-7). Between September and October the colonization rate rose sharply at Falls and exceeded 8,800 diatom units/mm^2/month on acrylic plates, the highest rate of the year. Although the colonization rate at SSES about doubled, it did not reach 2,000 total algal units/mm^2/month. Between October and November the colonization rate dropped sharply.

River stones were heavily colonized in January and February at Falls (Figure 2.2-7). But cumulative plates of Vermont slate, placed in the river in winter when colonization was slow, had not become heavily colonized by mid-April at either Falls or SSES (Figure 2.2-9, Algae on Monthly Plates 1974 and Jan. 1975). Substrates which were colonized in early winter seemed to retain their flora in spite of low temperatures, and in some instances,

the algal density increased. For example, standing crops almost doubled at Falls between December 1974 and January 1975 (Figure 2.2-7). Standing crops of algae on river stones at Falls also increased during this period.

Changes in the standing crop at SSES did not follow the pattern at Falls. The standing crop decreased in winter at SSES (Figure 2.2-8, Standing Crop of Algae, 1974 and Jan. 1975). Samples from cumulative plates of acrylic and Vermont slate contained almost no cells in December or January. The lack of cells was surprising because water quality of the river seemed best in winter when low temperature slowed oxidation of dissolved ferrous iron to insoluble ferric precipitates (Ref. 2.2-16). In winter, Secchi disc values sometimes exceeded one meter and it seemed that algae should benefit from increased light.

Dynamics of the periphytic algal community at SSES are more understandable when the effects of acid mine drainage upon the river substrate are considered. Iron from mine drainage coats the river bottom at SSES throughout the year, separating most algal cells from the substrate. Increased currents associated with rising river levels scoured much of the iron and algae from the substrate and carried them downriver (Ref. 2.2-16). A single period of elevated river flow in winter may devastate algal communities established on smooth surfaces at SSES and leave them denuded for the remainder of the winter. Fluctuating river discharges probably had a major impact upon the algal community at SSES throughout the year.

The standing crop of algae was nearly always much higher at Falls than at SSES. During 1974 and January 1975 there was an average of 778 algal units/mm^2 on monthly Vermont slates and 1,737 units/mm^2 on monthly acrylic plates at Falls. At SSES much less algae occurred on monthly Vermont slates (141 units/mm^2) and monthly acrylic (429 units/mm^2). From May 1974 through January 1975, cumulative plates averaged 3,972 and 222 units/mm^2 at Falls and SSES, respectively. The lower standing crop at SSES was probably a result of acid mine drainage that entered the river between SSES and Falls. Iron might have inhibited development of the periphyton community by: (1) shading the water and reducing light penetration and (2) coating river stones preventing cells from attaching to them.

It is of particular interest that the standing crop of algae on cumulative acrylic plates and Vermont slate plates at Falls in May exceeded the standing crop of algae on monthly plates. There was a net increase of about 8,000 algal units/mm^2 on cumulative acrylic between April and May and an increase of nearly 6,000 units/mm^2 on Vermont slate. But on monthly acrylic there was an increase of only about 3,000 units/mm^2; on monthly slate the increase was less than 1,000 units/mm^2. The low number of cells on cumulative plates in April may have given rise to the large

standing crop of algae on the plates in May by reproduction, or the surface of cumulative plates may have been altered by exposure to water, making them more readily colonized than monthly plates which had not been previously exposed to water.

During the summer, algal density was as high or higher on cumulative plates at Falls than it was on monthly plates, as would be expected. But during late September and early October, the colonization rate on monthly plates (acrylic, Vermont slate, and others) increased sharply to the highest rate of the year. In October, algal density on monthly slates was about twofold greater than on the cumulative slates. At least five factors might account for this unexpected difference in density. First, colonization of cumulative plates by new cells in October may have been inhibited by dead and living cells colonizing the plates in September, whereas colonization of the clean plates was uninhibited and took place rapidly. Second, cumulative plates may have become coated with silt and miscellaneous detritus which deterred colonization. Third, the cumulative plates may have been more heavily colonized by macroinvertebrates than the monthly plates. Macroinvertebrates may reduce algal density by grazing, drifting, molting, and other activities. Fourth, fish may have selected the cumulative plate for feeding because of a greater abundance of macroinvertebrates on it, and removed algae while feeding. Bottom-feeding fish such as northern hog sucker, Hypentelium nigricans, are abundant in the river at Falls. Fifth, as cells accumulated on cumulative plates, those in bottom layers died and were sloughed away.

As can be seen in Figure 2.2-9, some substrates were colonized more heavily than others. Acrylic and frosted glass were the most heavily colonized. Vermont and sandy slate were usually the least heavily colonized. In surface texture, sandy slate had the greatest resemblance to a river stone. Some small differences in algal density on various substrates may have occurred by chance, but in other instances, they may have reflected genuine differences in substrate quality.

Algal densities on river stones from the channel and nearer to shore (1973 periphyton sampling site) were similar (Figure 2.2-9). Algal density on river stones was usually far different from that on monthly artificial substrates but, in most instances, followed the same trends observed in samples from cumulative plates.

2.2.1.4 Aquatic Vascular Plants

Rivers such as the Susquehanna River present a harsh environment for most aquatic plants. The strong currents, rocky substrates and widely fluctuating levels are not conducive to the

development of extensive plant communities. Even species that might flourish in such an environment, however, were not abundant. In 1971, local fishermen indicated that plant beds had been much more abundant about 40 years earlier. One of the main causes for the decrease in plant abundance has been a major increase in river turbidity, much of which results from acid mine drainage.

A survey of the aquatic and semiaquatic vascular plants in the river in the vicinity of the Susquehanna SES and upriver to Coxton, Pennsylvania, was conducted in 1971-73 (Ref. 2.2-1, 2.2-2, and 2.2-3). Plant beds were photographed during annual aerial surveys and their boundaries mapped. Some beds were examined more closely from a boat so that the plants at one meter intervals on transects could be identified and enumerated. Representatives of each species were placed in a herbarium collection at the biological laboratory at the Susquehanna SES site.

Of the 29 species of aquatic vascular plants found in the study area (Table 2.2-22, Aquatic Vascular Plants, 1971-1972), only six species were attached submergents. Potamogeton nodosus was the most abundant species. Emergent plants, which are usually secured better in the current and whose leaves extend above the water, were less affected by high turbidity and were relatively more abundant than submergents. Justicia americana and Eleocharis acicularis were the most abundant species of emergents.

In 1971, 64 submergent plant beds covered about 6% of the river's bottom between Coxton and Berwick, Pennsylvania. In 1972, submergent plant beds were almost totally destroyed in the flood produced by Tropical Storm Agnes. In 1973, plant beds had reestablished themselves in about the same dimensions as in 1971. Emergent plants were less affected by the flood but flowering was delayed.

Aquatic vascular plants in the study area do not seem to be an important component of the aquatic food chain, partly because of their scarcity, but also because iron compounds coat their stems and leaves. The iron makes them undesirable food and shelter for most aquatic invertebrates. No rare or endangered species of aquatic plants (Ref. 2.2-34 and 2.2-35) were found in the river.

2.2.1.5 Zooplankton

Zooplankton is utilized as food by macroinvertebrates, young fishes and some adult fishes (Ref. 2.2-2 and 2.2-39). The objectives of this study were to determine the kinds of zooplankters in the river, their distribution throughout the

study area and seasonal changes in their densities. The effects of mine drainage pollution on zooplankton were investigated by collecting samples in polluted areas, near the Susquehanna SES, and at a control station (Falls, Pennsylvania) upriver from most major mine effluents.

In 1972, nine stations from Falls to Berwick (Figure 2.2-10, Zooplankton Sampling Stations) were sampled monthly. In 1973, sampling efforts increased nearly tenfold at SSES, and replicate one-liter rotifer samples were collected at that station on most sampling dates (Ref. 2.2-3). In addition, three stations were sampled approximately every six weeks ("river runs"). Zooplankton samples consisted of 40, 80, or 100 liters (10.57, 21.14, or 26.42 gal.) of water pumped through a No. 20 mesh plankton net. Samples were taken from near the river bottom as well as near the surface.

Numbers of organisms in 283 samples were converted to organism density and standing crop. Standing crop, which expresses the number of organisms passing a given point each second, was determined by multiplying organism density by river flow (m^3/s). Differences between the density of organisms collected in surface and bottom samples were not significant ($t = 0.25$, $DF = 94$, $p > 0.10$), probably as a result of vertical mixing in the turbulent river. Because data were similar, they were grouped for analysis.

The zooplankton of the Susquehanna River was numerically dominated by rotifers, as in most rivers (Ref. 2.2-40). These organisms composed 93 and 97% of the zooplankton at SSES in 1972 and 1973, respectively. Brachionus quadridentata, Kellicottia longispina and Keratella spp. were the most common (Table 2.2-23, Invertebrates Collected in Zooplankton Samples, 1972-74). Distinct seasonal fluctuations in rotifer densities were significantly correlated ($r = 0.56$, $DF = 27$, $P < 0.01$) with water temperature (Table 2.2-24, Correlation Coefficients between two Physicochemical Parameters and Zooplankton Density, 1972-73)). Rapid increases in rotifer density (blooms) may be triggered by increases in temperature, light intensity, or nutrients, but blooms are highly variable from year to year (Ref. 2.2-41). In 1972, rotifer blooms at SSES occurred in April (109×10^5 organism/s) and July (510×10^5 org/s), and in 1973, they occurred in May (493×10^5 org/s) (Figure 2.2-11, Rotifer Standing Crop). At other times, rotifer standing crop was usually less than 50×10^5 org/s; in October 1972, it was less than 1×10^5 org/s.

Microcrustaceans were relatively scarce in samples collected in the river channel (Figure 2.2-12, Density and Standing Crop of Microcrustaceans), but large numbers of individuals of several species were found in some backwaters near the Susquehanna SES (Table 2.2-23). Bosmina longirostris, Diaphanosoma brachyurum

and Chydorus sphaericus were the most numerous cladocerans collected; Cyclops vernalis and Eucyclops speratus were the most common copepods. Immature copepods (nauplii and copepodites) about 74% of all drifting microcrustaceans; densities were as high as 1,638 org/m^3 (46 org/ft^3) at Falls and 2,025 org/m^3 (57 org/ft^3) at SSES. Cladoceran and adult copepod densities were usually much less, and never exceeded 350 org/m^3 (10 org/ft^3).

When river levels rise, microcrustaceans are flushed from backwaters and the substrate into the water column. There was a significant positive correlation between river discharge and the densities of both immature copepods ($r = 0.43$, $DF = 27$, $p < 0.05$), and adult copepods ($r = 0.68$, $DF = 27$, $p < 0.01$) at SSES (Table 2.2-24). Densities of microcrustaceans in the water column usually decrease sharply after an initial "wash-out", before river levels begin to decline (Ref. 2.2-40).

Zooplankton species composition was similar between SSES and Falls, but annual mean densities of total zooplankton were considerably higher at SSES due to rotifer blooms which were not observed at Falls (Figure 2.2-11).

Nonzooplankters were usually a minor component of total organisms in zooplankton samples, but occasionally they were abundant and composed up to 60% of all organisms collected. Nematodes (roundworms), were the most numerous nonzooplankters; oligochaetes (especially Chaetogaster langi and Nais pardalis), ostracods (seed shrimp), hydracarinids (water mites), stalked protozoans and tardigrades (water bears) were also commonly collected in low numbers during most months.

2.2.1.6 Macroinvertebrates

The objective of the macroinvertebrate study was to describe and evaluate, with respect to adjacent areas of the river, seasonal changes in the benthic community in the vicinity of the Susquehanna SES, before and during construction of the generating station. Sampling stations were selected so that the effects of mine drainage pollution on the benthos near the Susquehanna SES could be determined concurrently with the collection of baseline data.

In the study area from Falls to Danville, (Figure 2.2-6), the Susquehanna River is up to 8 m (26.25 ft.) deep and has a rocky substrate and strong current (up to 3 m/s; 9.8 ft/s) (Ref. 2.2-1). Conventional grabs, corers, and stream samplers (such as the Surber square foot sampler, Ref. 2.2-42), were inadequate for sampling, and it was necessary to use artificial substrate samplers. In 1971, samplers were fabricated using "Bar-B-Q" baskets (Ref. 2.2-43) filled with concrete spheres (Ref. 2.2-44)

or stones. During 1971-72, baskets were submerged for several weeks, and then retrieved for enumeration of organisms which colonized them (Tables 2.2-25, Macroinvertebrate Density, 1972-75 and 2.2-26, Density of Major Macroinvertebrate Groups Collected with Basket Samplers) (Ref. 2.2-1). Many of the difficulties in basket placement, maintenance and recovery were avoided by use of scuba divers (Ref. 2.2-45 and 2.2-46) but some problems persisted. Baskets were vandalized, buried by shifting substrate and clogged with detritus that produced habitats unlike those in the river. Therefore, a better quantitative sampling technique was devised which sampled the natural substrate. During 1972, a dome (suction) sampler was designed, built, tested, improved upon and retested (Ref. 2.2-47). In 1973-75, the dome sampler was used exclusively to quantitatively sample macroinvertebrates from the river bottom (Table 2.2-27, Density of Major Macroinvertebrate Groups Collected with a Dome Sampler), (Ref. 2.2-3, 2.2-48, and 2.2-49). More recently, use of the dome sampler has been adopted by several other scientists working in similar environments in North America and abroad.

Seasonal changes in benthos density near the Susquehanna SES were characterized by very low numbers (often less than 500 org/m^2; 46 org/ft^2) from late fall through spring and a large increase in numbers in summer (Table 2.2-25, Figure 2.2-13, Macroinvertebrate Densities, 1973-75). Between May and July 1974, the standing crop at SSES I increased by more than 66 fold, from 515 to 34,394 org/m^2 (48 to 3,195 org/ft^2).

As in other aquatic environments stressed by mine pollution (Ref. 2.2-50), chironomid larvae (Diptera: Chironomidae) were the most abundant organisms at all sites on the SSES transect and Bell Bend I (Table 2.2-28, Percent Composition of Major Macroinvertebrates, 1972-75). They composed up to 96% of all macroinvertebrates in this area, with densities reaching 78,000 org/m^2 (7246 org/ft^2) (Ref. 2.2-48). A total of 44 different chironomids have been identified from the study area (Table 2.2-29, Benthic Macroinvertebrates, 1971-75). Rheotanytarsus was the most numerous in the vicinity of the Susquehanna SES, composing between 54 and 72% of all chironomids collected in 1975 at SSES (Ref. 2.2-49). Rheotanytarsus exiguus seemed to be the predominant species, and sharp increases in macroinvertebrate densities from July through September in 1973 and 1974 at SSES (Figure 2.2-13) were due to the abundance of this chironomid. Pupae were found on acrylic plates used in iron experiments (Ref. 2.2-16) on September 22, 1975, although densities declined sharply by October 14.

Besides the chironomids, the hydropsychid caddisflies (Trichoptera: Hydropsychidae) were the most abundant organisms at all sites. Cheumatopsyche was especially common; densities approached 6,000 org/m^2 (557.6 org/ft^2) (50% of all organisms, exclusive of chironomids) at SSES in September 1974.

Cheumatopsyche is known for its tolerance to mine drainage pollution (Ref. 2.2-51), and, like several chironomid species, thrived under conditions at SSES which were too adverse for most other invertebrates.

Four taxa (Oligochaeta, Heptageniidae, Hydropsychidae and Chironomidae) composed from 74.7% (SSES II) to 88.4% (Bell Bend I) of the total damp weight of organisms collected near the Susquehanna SES in 1975. Damp weights ranged from 3.9 to 15.3 kg/ha (3.48 to 13.65 lbs/acre) (mean = 9.2 kg/ha; 8.2 lbs/acre) at SSES I, from 4.3 to 19.5 kg/ha (3.84 to 17.40 lb/acre) (mean = 10.0 kg/ha; 8.9 lbs/acre) at SSES II, and from 3.8 to 43.1 kg/ha (3.39 to 38.46 lb/acre) (mean = 22.7 kg/ha; 20.2 lbs/acre) at Bell Bend I (Table 2.2-30, Percent of Total and Total Damp Weight of Macroinvertebrates, 1975)

Falls, the control station upriver from most major mine effluents, had up to five fold more taxa than the polluted SSES sites during 1973 and 1974. Clean water organisms such as mayflies, stoneflies, and caddisflies (Ref. 2.2-52) were found at Falls in much greater densities than at SSES (Tables 2.2-26 and 2.2-27). For example, in 1973 and 1974, an average of 555 heptageniid mayflies (Ephemeroptera: Heptageniidae)/m^2 (51.56/ft^2) were collected at Falls, whereas only 47 heptageniids/m^2 (4.37/ft^2) were found at SSES I and II (Table 2.2-27). Organism density remained much more stable at Falls (4,878 - 21,693 org/m^2; 453-2,015 org/ft^2) than at SSES I and II (275-83,781 org/m^2; 25-7, 783 org/ft^2) during this same period (Figure 2.2-13). Competition for food and space, as well as heavier predation, was probably responsible for keeping chironomid populations from numerically dominating the bottom fauna at Falls to the same extent as they did near the Susquehanna SES.

Downriver from SSES and Bell Bend I, the effects of mine drainage pollution diminished. Whereas chironomids made up nearly 90% of the benthos at SSES I in September 1974, they composed only 19% at Nescopeck . Ancylid snails (Ferrissia sp.), which are associated with clean cobble substrates (Ref. 2.2-53 and 2.2-54) composed 12% of the benthos at Nescopeck but were absent or rare (0.2%) at the SSES sites. Much of the difference between the benthos at the two stations was because greater river turbulence at Nescopeck inhibited iron deposition, and kept the substrate cleaner. Iron deposition was nearly fourfold higher at SSES (mean = 4,265 mg/m^2; 9.0 x 10^{-5} lbs/ft^2) than at Nescopeck during the summer of 1974(Ref. 2.2-16).

The benthos at Bloomsburg and Danville was numerically dominated by hydropsychid caddisflies (43-45%) and oligochaetes (27-32%); chironomids composed less than 25% of the benthos during any sampling period.

In summary, most macroinvertebrate populations in the vicinity of the Susquehanna SES were suppressed due to the effects of mine drainage pollution. It was neither a lowered pH nor lack of dissolved oxygen which most affected the benthos but rather the results of suspended and settled ferric hydroxide. Invertebrates and their eggs were coated with iron, and some may have been smothered. Iron decreased light penetration and inhibited the growth of algae upon which grazing macroinvertebrates fed. When populations of herbivorous macroinvertebrates are restricted, fish and predaceous macroinvertebrates which feed on these organisms are ultimately affected.

2.2.1.7 Larval Fishes

The larval fish sampling program, initiated in 1972 in the vicinity of the Susquehanna SES, has continued through 1975. The major objective was to estimate the distribution and density of larval fish drifting in the river; a minor objective was to determine where and when fishes spawned.

Because sampling larval fish drift in shallow water is difficult, tests were made to determine the most reliable method. One-half meter tow nets (Ref. 2.2-22) were used initially but discontinued because they did not function well in shallow water. Boat-mounted, fixed and push nets (Ref. 2.2-3) were used in 1973 at three SSES sites (Figure 2.2-14, Monitoring Stations on the Susquehanna River, 1972-75). These nets were an improvement over the tow nets but could not collect samples near the river bottom in the channel. In 1974, a pump sampling system (Ref. 2.2-55) was developed and used in conjunction with sampling by boat-mounted nets. The pump system was found to be as efficient as the boat-mounted nets in catching fish larvae in simultaneous test sampling. With the pump it was possible to sample a given volume of water at any depth and to obtain several replicates with little effort. Data stressed in this report are based upon samples collected with the pump sampler in 1974 at SSES (Ref. 2.2-55 and 2.2-56) and in 1975 at SSES-A (Ref. 2.2-57). To determine where and when fish spawned near SSES, searches for fish eggs were made in 1974 - 1975 using the pump sampler, artificial spawning devices, observations from shore and scuba searches (Ref. 2.2-55).

Eggs or nest larvae of at least 16 species (Figure 2.2-15, Occurrence of Fish Eggs and Larvae 1974-1975) were found in the river near SSES (Figure 2.2-16, Areas Where Fish Eggs were Collected, 1974-1975), despite acid mine drainage (nest larvae of smallmouth bass, found near Shickshinny Creek, are not included in Figure 2.2-16). Fish eggs were found from mid-April through mid-August. Quillback, white sucker, tessellated darter, yellow perch and walleye spawned early.

Eqqs of the spotfin shiner, one of the most abundant species near SSES, were collected at several sites in 1974 and 1975 (Figure 2.2-16); it probably spawned wherever crevices were available (Ref. 2.2-58). Eqqs of this species were collected from early June to mid-August (Figure 2.2-15). Quillback eqqs were the most widely distributed of all encountered (Figure 2.2-16).

In the vicinity of the Susquehanna SES, 25 species of larval fish were identified from net and pump samples (Table 2.2-31, Species of Larval Fish, 1972-75). Of these, 18 species were found drifting past SSES (Figure 2.2-15). Carp, minnows, quillback, white sucker, shorthead redhorse, and perches composed over 95% of the total number of larvae captured in 1973-75 (Table 2.2-32, Total Numbers of Prolarval (Pro) and Postlarval (Post) Fishes). Quillback was the most abundant species captured and composed 46% of the total catch. It was followed in abundance by minnows (26%), carp (13%), and other suckers (8.4%). Only a few sunfishes, perches (excluding tessellated darter), and other game fishes were taken. Sunfishes, the most abundant game fish captured, composed only 2% of the total catch.

Overall, more prolarvae (71% of the total) were captured than postlarvae in net and pump samples near the Susquehanna SES in 1973-75 (Table 2.2-32). More prolarval quillback (86%), perches (84%), carp (75%) and minnows (56%) were captured than postlarvae, whereas more catfish (100%), sunfish (90%) and sucker (68%) postlarvae were taken than prolarvae (Table 2.2-32).

The larval fish density was greatest in June (Tables 2.2-33, Mean Density of Larval Fishes/10m^3, and 2.2-34, Percent Total and Mean Density of Larval Fishes/10m^3), and more larvae were collected near the surface than the bottom (Figures 2.2-17, Mean Numbers of Drifting Fish Larvae/90.4m^3). For example, in 1975 the mean larval fish density was twice as high near the surface as near the bottom (Ref. 2.2-57). Most larval carp, minnows, quillback, white sucker, and shorthead redhorse were found near the surface between 2100 and 0300 hours. The majority (86%) of larvae were taken at night; in 1975 the mean density was sixfold higher at night than during the day.

In both push and fixed-net samples from 1974, more larvae were collected near either shore than in the channel (Ref. 2.2-55 and 2.2-56). Catch per unit effort was higher near the east shore than the west (Tables 2.2-35, Percent Total and Mean Density of Larval Fishes/10m^3 in 275 Push Net Samples, and 2.2-36, Percent Total and Mean Density of Larval Fishes/10m^3 276 in Fixed-Net Samples). The larger number of larvae being collected near shore probably resulted from a shoreward migration of the postlarval fishes.

2.2.1.8 Fishes

The fishes of the Susquehanna River were studied in 1971-75. The major objectives of the program were to identify the species present, determine their distribution and relative abundance, and to describe the food habits and movements of selected species in the vicinity of the Susquehanna SES. Although collections were made at many sites in the river, for the purposes of this summary, fish collected at Falls, Nanticoke, SSES, Bell Bend, Nescopeck, and Bloomsburg-Danville were considered (Figure 2.2-18, Fish Monitoring Stations, 1971-75). Of these sites, Falls the control station was relatively unpolluted, whereas Nanticoke was most severely polluted by mine drainage. The water quality gradually improved from SSES to Bloomsburg-Danville.

In 1971-75 over 57,000 fish of 49 species (Tables 2.2-37, Species of Fish Captured, 1971-75 and 2.2-38, Number and Species Composition (%) of Fish Captured at Six Stations) were captured using trapnets, seines, setlines and the electrofisher. Carp, spotfin shiner, quillback, white sucker, shorthead redhorse and bluegill were the most abundant fishes captured; they composed 62% of the total catch. No threatened or endangered fishes were captured according to the Federal Register (Ref. 2.2-60). However, two cisco, listed as "rare" by the Pennsylvania Fish Commission, were collected. The first specimen was taken 6.4 km (4.0 mi) downstream from Nanticoke on 11 February 1973 and the second was captured 3.1 km (2.0 mi) below the station discharge on 13 June 1973. Both fish probably entered the river near Nanticoke by way of Harvey's Creek which is the outlet of Harvey's Lake. The Pennsylvania Fish Commission introduced the cisco into Harvey's Lake from 1969 to 1972 (Ref. 2.2-61a). There is little likelihood that a population of cisco has been established in the river as a result of escapement from Harvey's Lake.

In 1973 samples were collected using about equal effort at Falls, Nanticoke and SSES to determine the effects of the acid mine effluents on fish at these stations. At Falls more fish and species were taken than at either Nanticoke or SSES (Tables 2.2-39 through 2.2-41, Total Number of Fishes at Falls, Nanticoke and SSES, 1973). Fallfish, northern hog sucker, shorthead redhorse, rock bass, pumpkinseed, smallmouth bass and tessellated darter were captured more often at Falls than at Nanticoke or SSES. Also, the margined madtom was taken only at Falls. At Nanticoke, fallfish, northern hog sucker, pumpkinseed and tessellated darter were not captured; these fishes were, however, captured at SSES. Carp, quillback and white sucker were the most abundant fishes taken at Nanticoke.

In 1971-75 the relative importance of the northern hog sucker and smallmouth bass in the catch increased at SSES (Table 2.2-42,

Number and Species Composition (%) of Fish Captured at SSES) and two km farther downriver at Bell Bend (Table 2.2-43, Number and Species Composition (%) of Fish Captured at Bell Bend). The relative numbers of these species may have increased because of improved water quality. Levels of total iron, dissolved iron, sulfate, conductivity, total residue and turbidity decreased in 1972-75 at SSES (Table 2.2-5). Spotfin shiner, white sucker, bluegill, white crappie and spottail shiner were the most abundant species captured at SSES (Table 2.2-42). At Bell Bend the chain pickerel, comely and spotfin shiners, and rock bass were more common than at any other station (Table 2.2-38). White sucker, spotfin shiner, quillback, bluntnose minnow, spottail shiner and smallmouth bass were the most abundant species captured at Bell Bend (Table 2.2-43).

Downriver at Nescopeck and Bloomsburg-Danville, the white sucker was the most abundant species (Table 2.2-38). At Nescopeck the white sucker was followed in abundance by the shorthead redhorse, carp, quillback and northern hog sucker; at Bloomsburg-Danville it was followed in abundance by carp, northern hog sucker, spotfin shiner and quillback.

The food habits of 31 fishes (1,377 individuals) collected at Falls, Wilkes-Barre and SSES were studied in 1972 and 1973 (Ref. 2.2-2 and 2.2-3). Percent stomach composition by volume of each food item consumed for each species was determined (Table 2.2-44, Fish Stomach Composition (% total volume) of fish, 1972-1973).

Invertebrates made up the largest percentage of food items consumed by most fishes. They composed over 50% of the food eaten by the comely shiner, spotfin shiner, fallfish, northern hog sucker, rock bass, pumpkinseed, bluegill, smallmouth bass, largemouth bass and yellow perch.

Detritus and organic material were found in the stomachs of most fishes. Carp, spottail shiner, quillback, white sucker and shorthead redhorse contained the largest amounts of detritus. Plant material was an important food for carp, spottail shiner and brown bullhead.

Walleye, chain pickerel, smallmouth bass, largemouth bass, white crappie and black crappie utilized fish to the largest extent. Fish composed 70% of the food (by volume) in walleye. Sunfish were the most common forage of walleye (17.5-63.0 cm or 6.89-24.8 inches long); they composed 28% of the number of fish consumed, followed by minnows and carp (25%), suckers (21%), perches (15%) and catfishes (11%) (Ref. 2.2-2).

The food habits of the northern hog sucker differed from the other suckers in the river in that it consumed a comparatively larger percentage of invertebrates and a smaller percentage of detritus. Invertebrates composed over 50% of the volume of

material in the stomachs of the northern hog sucker and less than 32% of the material in the stomachs of quillback, white sucker and shorthead redhorse.

The food habits of young-of-the-year white sucker differed at Falls and SSES in 1973. At Falls less than one-third the amount of organic material and over four times the number of chironomids were found in white sucker stomachs compared to those at SSES (Figure 2.2-19, Percentage by Volume of Major Food Items in Fish Stomachs), even though more chironomids were found in benthos samples at SSES than at Falls in June and August 1973 (Table 2.2-27). Young-of-the-year smallmouth bass at Falls consumed no fish and ate mostly mayflies and caddisflies (about 40% by volume), whereas at SSES, fish composed over 40% of the food consumed. Mayflies and caddisflies were an unimportant food source at SSES (Figure 2.2-19). The large number of mayflies and caddisflies consumed at Falls in the summer was probably due to a fiftyfold larger density of the insects at that station (Table 2.2-27).

In 1971-75, 1,118 fish of 21 species captured by electrofishing and trapnetting, were tagged. Of these, 300 fish (27%) were recaptured by angling, electrofishing and trapnetting (Table 2.2-45, Number of Fish Tagged and Percentage Recovered, 1972-75).

Thirty-six largemouth bass were tagged since 1972 and nine recaptured. Five were recaptured downriver and four in the area where they were tagged. The mean distance traveled downriver was 39.0 km (24.2 mi.); the maximum was 71.4 km (44.4 mi).

Since 1972, 65 muskellunge were tagged and 18 recovered. Most of those recovered were recaptured either in the tagging area or downriver . Mean distances traveled were 35.0 km (21.7 mi) (maximum = 123.0 km; 76.4 mi) and 40.5 km (25.2 mi.) (maximum = 84.5 km; 52.5 mi) up and downriver, respectively.

A total of 739 walleye was tagged in 1972-75; of these, 245 were recaptured. More walleye were recaptured downriver than upriver or in the area where they were tagged. The mean distances traveled were 72.6 km (45.1 mi) (maximum = 256.0 km; 159.1 mi) upriver and 35.5 km (22.05 mi.) (maximum = 171.3 km; 106.4 mi) downriver.

2.2.1.9 Waterfowl

The Susquehanna SES lies within a major corridor for migrating geese; from 50,000 to 300,000 geese pass through the corridor annually (Ref. 2.2-66). The corridor is relatively less important to migrating ducks, even though it is used by 50,000 to 225,000 ducks each year. Waterfowl use of the river near the

Susquehanna SES was investigated in 1971-73 (Ref. 2.2-1, 2.2-2, and 2.2-3).

In 1971 counts of ducks, geese and swans between Mocanaqua and Berwick (17 river km or 10.6 mi.) were made from an automobile at irregular intervals. The area censused was increased in 1972 to include all of the river between Berwick and Falls (75 river km or 46.6 mi.). Counts were made from a boat or from an airplane throughout 1972 on an irregular basis. Most counts were made during fall and spring migrations when numbers of waterfowl on the river changed frequently. Fewer counts were made in 1973 than in 1972.

Ducks, geese and swans were not abundant on the river at any time during this investigation but many different kinds of waterfowl were sighted and 26 species were observed in 1971 (Table 2.2-46, Status and Relative Abundance of Waterfowl); few of these, however, remained in the study area for more than a few days. In autumn, bad weather sometimes forced small numbers of sea ducks and other migrants, which normally fly over the area, to land on the river. These ducks usually resumed their migration within 48 hours.

Overall waterfowl use of the area (waterfowl-days) was greatest in winter and spring months and least in the summer months (Table 2.2-47, Waterfowl-Days, 1972). An overwintering population of mallards and black ducks accounted for much of the waterfowl-days of use in December, January and February; common mergansers accounted for most of the remaining days. The influx of spring migrants in April 1972, mostly lesser scaup, raised waterfowl-days use to 25% in a short period of time. The phenology of occurrence of the 21 species of waterfowl which were observed on the study area in 1972 is shown in Figure 2.2-20, Occurrence of Waterfowl From Falls to Berwick, 1972).

Mallards were the only duck that remained in the study area throughout the year. Several species overwintered in the area but only black ducks, mallards and common mergansers were abundant enough to be seen regularly. Mallards and black ducks were most often observed near islands and shoals in flocks containing 20-80 individuals; they obtained much of their food in cornfields adjacent to the river. Common mergansers were well distributed along the river in winter, usually in flocks of less than 20 birds. Low winter temperatures slow the oxidation of iron in the river thereby increasing the visibility for predators, such as mergansers, which prey on fish. No divers which feed by filtering plant and animal food from the river bottom overwintered in the area. In 1972, three whistling swans and five Canada geese overwintered near Berwick.

In late March and early April 1972, migrating waterfowl enroute to northern nesting grounds moved through the study area. In

April, there were greater numbers of birds and more diversity of species than at other times of the year. Species observed during March or April of 1972 included whistling swan, Canada goose, mallard, black duck, pintail, widgeon, teals (green-winged and blue-winged), wood duck, redhead, ring-necked duck, canvasback, scaups (greater and lesser), goldeneye, bufflehead, old squaw, white-winged scoter and mergansers (hooded and common). At least two species, mallard and wood duck, nest in the study area. No threatened or endangered species of waterfowl (Ref. 2.2-60) were observed in the study area.

Waterfowl hunting is relatively unimportant in the study area because of a lack of birds and poor hunter success. The opening day of duck hunting season, however, attracts several hunters from nearby communities. On opening day in 1972 (7 October), 31 hunters were contacted along the river from Gould Island to Wapwallopen Creek. Of these, 13 were from the Hazleton-Freeland area, seven from Dallas and Wyoming, five from Shickshinny, five from Wapwallopen, and one from Berwick (probably most hunters from Berwick hunt the stretch of river between Beach Haven and Briar Creek; hunters were not contacted in that area).

The hunters bagged only nine wood ducks, a blue-winged teal, and a mallard. The islands below Mocanaqua and above Berwick also held many hunters but none were contacted. Most of the hunters interviewed did not use calls, decoys or retrievers and most hunted ducks only on the opening weekend.

2.2.2 TERRESTRIAL ECOLOGY

The Susquehanna SES site covers an area of 435 ha (1075 acres). Approximately 40% of the site is flat, and the remainder is hilly rather than mountainous. Elevation ranges from 150 m (492.15 ft.) above mean sea level on the river floodplain to 325 m (1066 ft.) near the northwest property line. Physiographically, it is located within the Ridge and Valley Section of the Appalachian Valley Province. This Province is characterized by many narrow and even-crested ridges which run more or less parallel in a northeasterly to southwesterly direction (Ref. 2.2-63).

The eight major soil series found on the site have resulted from the Wisconsin Glaciation. In general, glacial deposit soils (Oquaga) occupy the northwestern one-third of the property; glacial outwash soils (Braceville, Chenango, and Red Hook) occupy the southwestern one-third; and floodplain soils (Basher, Holly, Papakating, and Tioga) occupy the eastern one-third of the site.

The occurrence of the various soil series has affected land use and thus the present vegetation formation. Glacial deposit soils were used for either grazing or lumbering rather than cropping.

Flat areas were used for both grain and forage crops but steeper areas were used for grazing and timber removal. The well-drained floodplain soils (Tioga and Basher) were most productive under agricultural practices for truck crops and grains. The poorly-drained floodplain soils remained as either marsh or moist woodland.

2.2.2.1 Vegetation

Historically, the Susquehanna SES site was part of the oak-chestnut region of the eastern deciduous forest. Oak and chestnut trees dominated the original forest and lesser communities of pine, hemlock and birch-sycamore occupied specific sites (Ref. 2.2-64). This original vegetation complex has been changed by man to the extent that second growth maple, birch, cherry, and oaks are now dominant.

Trees and saplings were sampled along 12 transect lines (Table 2.2-48, Locations of Vegetation Transects on the Site) using the plotless quarter method (Ref. 2.2-65). The transects were located in wooded areas interspersed with old field. Transects 1-8 and 9-12 were surveyed in 1973 and 1974, respectively (Figure 2.2-21, Vegetational Transects (1-12) and the Bird-Count Route on the Site, 1974). A total of 72 species of trees, saplings, and shrubs was observed on these transects (Table 2.2-49, Trees, Saplings and Shrubs Observed on the Susquehanna Site, October 1972-Dec. 1974).

With few exceptions, red maple (17.8%), black birch (13.2%) and black cherry (10.5%) were the three most common tree species on transects 1-8. The same three species were also the most common saplings, composing 19.6, 15.8 and 8.8%, respectively, of the total saplings observed. Transects 1-8 were located on nearly level ground within the exclusion zone (Ref. 2.2-3 and 2.2-66).

Transects 9-12, located along ridges on the Susquehanna SES site, were dominated by red maple (16.2%), black oak (21.8%), sweet birch (8.0%) and eastern hemlock (8.9%). The most common saplings were flowering dogwood (22.1%), red maple (14.7%) and eastern hemlock (11.2%) (Ref. 2.2-66).

Each transect was categorized into six major timber associations. The percent relative density of the predominant trees in each of these associations is listed in Table 2.2-50, (Percent Relative Density of Predominant Trees in Vegetation Transects on the Site 1973-74). The similarity in composition of the canopy (trees) and subcanopy (saplings) associations suggests that the predominant trees are successfully reproducing.

Spicebush was the most common shrub in the understory; blackberries, viburnums, witch hazel, laurel, dogwood and rhododendron were also present (Ref. 2.2-3 and 2.2-66).

There were 188 species of 51 families of herbaceous plants collected on the site in 1973 and 1974 (Table 2.2-51, Herbaceous Plants Collected on the Site, Oct. 1972-Dec. 1974). Species in the composite family (Asteraceae) composed 15.2% of the total herbaceous species collected. Legumes (Fabaceae), lilies (Liliaceae), and ferns (Polypodiaceae and Ophioglossaceae) each composed 6% of the total species. Old fields contained asters, goldenrods, ragweed, smartweeds and mustards; wetland communities were composed of skunk cabbage, tearthumb, cattail, sedges, rushes and day-flower (Ref. 2.2-66). None of the species of woody or herbaceous plants found on the Susquehanna SES site is considered threatened or endangered (Ref. 2.2-34 and 2.2-35).

2.2.2.2 Amphibians and Reptiles

Twenty-three species of amphibians and reptiles representing 11 families were collected in 1972 and 1973 (Table 2.2-52, Reptiles and Amphibians Collected or Observed on the Site 1972-1973), (Ref. 2.2-2 and 2.2-3).

Of the seven species of turtles observed, the eastern painted turtle was most common. The largest turtle captured was a snapping turtle that weighed 11.3 kg (24.91 lbs). Snapping turtles were often taken in trapnets set in the river.

Toads and frogs were abundant in the marshes and ponds east of U.S. Highway 11. The spring peeper and American toad formed a vociferous duet in the spring. The green frog, bull frog and leopard frog continued this cacophony of voices throughout the warmer summer months. Frogs are not limited to the wetlands; two wood frogs were found in a Virginia pine stand on the northern ridge of the site.

Three species each of aquatic and terrestrial salamanders were collected. The red-backed salamander was the most abundant terrestrial species and the northern dusky salamander was the most abundant aquatic species.

The common garter snake was the most abundant and widely distributed snake on the site. The common water snake and northern black racer were the only other species of snakes found. Other species of nonpoisonous and venomous snakes are expected to occur in the area but none have been observed as of this writing. No threatened or endangered species of reptiles (Ref. 2.2-60) were found on the site.

2.2.2.3 Birds

Systematic bird counts were conducted one to three times monthly, through representative vegetational habitats on the site (Figure 2.2-21). Maximum effort was expended during spring and fall migrations. Chance observations or nonsystematic counts were also recorded. In 1973 and 1974, 128 species of 15 orders were identified on or near the Susquehanna SES site in both systematic and nonsystematic counts (Table 2.2-53, Species of Birds Other Than Waterfowl Observed Near the Site). None of these species was considered threatened or endangered (Ref. 2.2-60).

The greatest number of species and individuals were observed during the spring migration, followed closely by the fall migration count. Summer counts evidenced more species and individuals than winter counts, but less than migration counts. Table 2.2-54, (Species Occurrence and Family Composition of Birds Observed Near the Site), shows the monthly occurrences of species observed during the systematic counts in 1973 and 1974.

Icteridae, mostly blackbirds, composed 50% of the total number of birds counted in the spring. Fringillidae (sparrows, cardinals, finches, etc.) made up 20% of the count from March through September; the percentage increased in the fall and winter months. Corvidae (crows), Picidae (woodpeckers), Paridae (chickadee and titmouse) and Columbidae (doves) composed the majority of the year-round resident population, averaging 15% of the count year-round, and 30% in the winter. Mimidae (catbird and mockingbird) and Parulidae (warblers) averaged less than 10% of the count from April through October. Sturnidae (starling) were relatively common from late April through November, but can be observed the entire year.

2.2.2.4 Mammals

The mammals found on the Susquehanna SES site vary in size from the tiny short-tailed shrew to the white-tailed deer. A total of 26 species, none of which was considered threatened or endangered (Ref. 2.2-60), was observed on the site (Table 2.2-55, Mammals Collected or Observed on the Site, Oct. 1972-Dec. 1974) (Ref. 2.2-2, 2.2-3 and 2.2-66).

Peromyscus were the most abundant small rodents; they composed 62% of the total rodent catch. The eastern chipmunk, short-tailed shrew and woodland jumping mouse followed Peromyscus in abundance, respectively. Peromyscus was found in all the habitats on the site. The chipmunk and woodland jumping mouse were primarily forest dwellers. The short-tailed shrew was found

mostly in field habitats. The star-nosed mole and meadow vole were occasionally found in fields and marshlands.

Specimens of larger game and fur-bearing mammals were also collected on the site. These included opossum, eastern cottontail, eastern woodchuck, raccoon, muskrat and gray squirrel. Red and gray foxes were observed on a few occasions, but none were collected. Muskrats, in particular, were trapped extensively by local trappers. In 1973, trappers also caught four beavers on Gould Island which is located adjacent to the site.

The white-tailed deer is the most important game species on the site. The cottontail and gray squirrel are ranked second and third in importance of game species.

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TABLE 2.2-1

PHYSICOCHEMICAL STATIONS

Station	Location (1 m = 3.28 ft)	River Distance from SSES (km)[a] (1 km = 0.62 mi)
Falls	Approximately 140 m from west side of State Highway 92 Bridge, Falls, Pennsylvania.	64.4
Harding	Approximately 100 m from east side of Lehigh Valley Railroad Bridge at Coxton Yards near Harding, Pennsylvania.	49.0
Wilkes-Barre (1)	Approximately 150 m from east side of Wilkes-Barre Connecting Railroad Bridge, Wilkes-Barre, Pennsylvania.	35.4
Wilkes-Barre (2)	Approximately 100 m from east side of North Street (Pierce Street) Bridge, Wilkes-Barre, Pennsylvania.	34.2
Nanticoke	Approximately 100 m from west side of "old" Nanticoke Bridge, Nanticoke, Pennsylvania.	21.7
Retreat	Approximately 170 m from west side of Retreat State Hospital Bridge near Hunlock Creek, Pennsylvania.	13.4
Mocanaqua	Approximately 60 m from east side of State Highway 239 Bridge, Mocanaqua, Pennsylvania.	6.4
Biological Laboratory[b]	On the west River bank, 1220 m east of the Susquehanna SES and approximately 490 m upriver from its proposed intake.	0
SSES[b]	Midriver, approximately 460 m upriver from the proposed intake of the Susquehanna SES.	0
SSES-A[b]	Approximately 40 m from the west bank, about 220 m upriver from the proposed intake of the Susquehanna SES.	0.2
Bell Bend[b]	Midriver, approximately 1400 m downriver from the proposed effluent of the Susquehanna SES.	2.0
Berwick	Approximately 170 m from west side of State Highway 93 Bridge, Berwick, Pennsylvania.	10.9
Mifflinville	Approximately 140 m from east side of Mifflinville Bridge, Mifflinville, Pennsylvania.	18.4
Bloomsburg	Approximately 160 m from east side of State Highway 487 Bridge, Bloomsburg, Pennsylvania.	29.4
Catawissa	Approximately 130 m from west side of State Highway 42 Bridge, Catawissa, Pennsylvania.	34.9
Danville	Approximately 220 m from west side of State Highway 54 Bridge, Danville, Pennsylvania.	50.6
Northumberland North Branch	Approximately 120 m from east side of State Highway 147 Bridge, Northumberland, Pennsylvania.	68.0
Northumberland West Branch	Approximately 130 m from east side of State Highway 11 Bridge, Northumberland, Pennsylvania.	69.0
Sunbury east bank	Approximately 150 m from east side of Sunbury Bridge, Sunbury, Pennsylvania.	73.6
Sunbury west bank	Approximately 210 m from west side of Sunbury Bridge, Sunbury, Pennsylvania.	73.6
Clarks Ferry east bank	Approximately 130 m from east side of Clarks Ferry Bridge, Clarks Ferry, Pennsylvania.	126.9
Clarks Ferry west bank	Approximately 120 m from west side of Clarks Ferry Bridge, Clarks Ferry, Pennsylvania.	126.9
Juniata River	Approximately 150 m from east side of State Highway 11 Bridge near Clarks Ferry, Pennsylvania, at the mouth of Juniata River.	127.8
Columbia east bank	Approximately 470 m from east side of State Highway 462 Bridge, Columbia, Pennsylvania.	193.1
Columbia west bank	Approximately 400 m from west side of State Highway 462 Bridge, Columbia, Pennsylvania.	193.1

[a]Listed from upriver to downriver.

[b]Located on the Susquehanna SES site.

TABLE 2.2-2

PHYSICOCHEMICAL PARAMETERS

Parameter	Method	Reference	Year
River level	Calibrated chain gauge.	Ref. 2.2-19	1972-73
	Seven-day continuous recordings from an ACCO Bristol, Model No. G500-15 bubbler-type water level gauge.	Ref. 2.2-20	1973-75
River velocity	Direct reading current meter, Gurley (Price), Model No. 665, suspended from an anchored boat to 0.6 depth. Current was a mean of readings at 5-sec intervals for 2 min.	Ref. 2.2-21	1973-75
River flow	River flow = 0.222 (a-b) + b, where a and b are mean daily river flows at Danville and Wilkes-Barre, respectively. Data provided by U.S. Geological Survey.	Ref. 2.2-22	1973-75
Water temperature	Seven-day continuous recordings from a Leeds and Northrup Speedomax Thermistor-type, Model R temperature recorder.	Ref. 2.2-23	1973-75
	Temperature probe (Model 54 oxygen meter, Yellow Springs Instrument Co.).	Ref. 2.2-23	1971-74
	Hand-held mercury thermometer.	Ref. 2.2-23	1971-75
Dissolved oxygen	Membrane electrode method, Model 54 oxygen meter, Yellow Springs Instrument Co.	Ref. 2.2-23	1971-74
	Modified Winkler full-bottle technique, proprietory reagents.	Ref. 2.2-24	1972-75
pH	Glass electrode.	Ref. 2.2-23	1971
	Colorimetric Hach Model DR-EL Portable Water Engineer's Laboratory.	Ref. 2.2-25	1971-73
	Colorimetric Hach Kit, Model No. 17-D, 17-F, 17-J.	Ref. 2.2-26	1972-75
Total alkalinity	Potentiometric titration.	Ref. 2.2-23	1974-75
Specific conductance	Self-contained conductance meters, Aquatronics, Model No. 320, Hydrolab, Model No. TC-2, or Hach, Model DR-EL Portable Water Engineer's Laboratory.	Ref. 2.2-23	1971-75
Sulfate	Turbidimetric, Hach Model DR-EL Portable Water Engineer's Laboratory.	Ref. 2.2-25	1971-75
Total iron	Phenanthroline.	Ref. 2.2-23	1971-75
Dissolved iron	Phenanthroline.	Ref. 2.2-23	1971-72
	Atomic absorption spectrophotometric determination of filtrable iron.	Ref. 2.2-23	1972-75
Total residue	Evaporation at 105 C (221 F).	Ref. 2.2-23	1974-75
Fixed total residue	Ignition of total residue at 550 C (1022 F).	Ref. 2.2-23	1974-75
Nonfiltrable residue	Suspended solids analysis by membrane filter technique (matched-weight filters).	Ref. 2.2-27	1972-75
Fixed nonfiltrable residue	Ignition of nonfiltrable residue at 550 C (1022 F).	Ref. 2.2-23	1972-75
Total phosphate	Stannous chloride method.	Ref. 2.2-23	1972-74
Nitrate	Phenoldisulfonic acid method.	Ref. 2.2-23	1972-74
Turbidity	Colorimetric, Hach Model DR-EL Portable Water Engineer's Laboratory.	Ref. 2.2-25	1972-75
Secchi disc depth	Limit of visibility.	Ref. 2.2-28	1972-75
Bacteria	Membrane filter technique for total bacteria, coliforms, and fecal streptococci.	Ref. 2.2-23 Ref. 2.2-29	1972-75

TABLE 2.2-3

RIVER FLOWS (M^3/S) AT THE SUSQUEHANNA SES, 1972-75[a]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1972	N	31	29	31	30	31	30	31	31	30	31	30	31
	Min	278	108	231	564	232	314	127	77.0	50.0	56.1	98.0	51.0
	Max	866	297	3480	2290	2400	9340	1210	189	77.9	109	2350	2420
	$\bar{x}$	475	187	1240	1100	858	1600	433	117	61.2	70.4	844	1080
	SD	148	61.3	719	495	515	2460	293	35.1	8.22	15.2	594	509
	C.V.%	31.1	32.7	58.0	44.7	60.0	153.9	67.7	30.0	13.4	21.6	70.4	47.4
1973	N	31	28	31	30	31	30	31	31	30	31	30	31
	Min	246	170	164	306	311	194	92.9	64.8	60.3	55.2	82.4	212
	Max	1490	2240	2070	2510	1260	699	833	145	165	121	309	2520
	$\bar{x}$	571	504	755	888	612	318	230	101	102	71.2	142	956
	SD	354	498	406	601	230	124	191	24.4	33.4	14.0	61.8	672
	C.V.%	62.0	98.8	53.8	67.6	37.5	39.1	83.0	24.1	33.0	19.7	43.6	70.3
1974	N	31	28	31	30	31	30	31	31	30	31	30	31
	Min	258	236	433	300	233	118	79	50	103	93	83	262
	Max	1660	1660	1190	2140	1040	283	450	132	317	171	620	1870
	$\bar{x}$	679	538	675	1060	414	163	181	75	180	122	242	595
	SD	439	363	239	559	211	42.4	115	24.9	61.6	24.9	180	399
	C.V.%	64.6	67.5	35.3	52.7	51.0	26.1	63.6	33.4	34.4	20.5	52.8	67.0
1975	N	31	28	31	30	31	30	31	31	30	31	30	31
	Min	218	203	331	314	203	135	85.2	57.5	104	233	217	247
	Max	2010	4360	1610	1060	1760	1200	206	163	6850	2420	733	629
	$\bar{x}$	605	845	742	542	571	339	123	82.0	829	734	411	440
	SD	429	1130	396	190	363	268	32.4	18.3	1700	607	150	97.7
	C.V.%	71.0	133.5	53.3	35.0	63.6	79.0	26.4	22.3	204.5	82.7	36.5	22.2

[a]Minimum and maximum flows are daily means based on 24 values recorded hourly from 0100-2400 hours (N = number of days monitored; $\bar{x}$ = monthly mean; SD = standard deviation; C.V. = coefficient of variation; and 1 m^3 = 35.31 ft^3).

TABLE 2.2-4

RIVER LEVELS (METERS ABOVE MSL) AT THE SUSQUEHANNA SES, JULY 1973-DECEMBER 1975[a]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1973	N	--	--	--	--	--	--	31	31	30	31	30	31
	Min	--	--	--	--	--	--	148.53	148.41	148.38	148.38	148.53	149.02
	Max	--	--	--	--	--	--	150.24	148.74	148.83	148.59	149.29	152.40
	$\bar{x}$	--	--	--	--	--	--	148.97	148.57	148.58	148.47	148.74	150.34
	SD	--	--	--	--	--	--	0.48	0.10	0.15	0.05	0.22	1.03
	C.V.%	--	--	--	--	--	--	0.3	0.1	0.1	0.0	0.1	0.7
1974	N	31	28	31	32	31	30	31	31	30	31	30	31
	Min	149.05	149.11	149.60	149.29	149.11	148.68	148.53	148.32	148.56	148.56	148.53	149.20
	Max	151.49	151.55	150.82	152.06	150.66	149.29	149.63	148.71	149.35	148.86	149.99	151.64
	$\bar{x}$	149.96	149.75	150.05	150.61	149.53	148.85	148.89	148.45	148.88	148.69	149.31	149.82
	SD	0.77	0.64	0.41	0.84	0.42	0.16	0.35	0.11	0.22	0.09	0.49	0.64
	C.V.%	0.5	0.4	0.3	0.6	0.3	0.1	0.2	0.1	0.1	0.1	0.3	0.4
1975	N	31	28	31	30	31	30	31	21	30	31	30	31
	Min	149.05	149.05	149.32	149.29	148.96	148.74	148.50	148.38	148.59	149.08	149.02	149.08
	Max	151.82	153.95	151.42	150.69	151.61	150.82	148.99	148.59	155.45	152.28	150.17	149.90
	$\bar{x}$	149.82	150.01	150.09	149.78	149.78	149.27	148.66	148.50	149.60	150.00	149.51	149.52
	SD	0.70	1.41	0.66	0.36	0.65	0.55	0.12	0.09	1.88	0.91	0.34	0.24
	C.V.%	0.5	0.9	0.4	0.2	0.4	0.4	0.1	0.1	1.2	0.6	0.2	0.2

[a]Minimum and maximum levels are daily means based on 24 values recorded hourly from 0100-2400 hours (N = number of days monitored; $\bar{x}$ = monthly mean; SD = standard deviation; C.V. = coefficient of variation; and 1 m = 2.28 ft).

TABLE 2.2-5

SUMMARY OF PHYSICOCHEMICAL CHARACTERISTICS, 1972-75[a]

		River Level (m above msl)	River Velocity (m/s)	Water Temp. (C)	Dissolved Oxygen (mg/l)	pH	Total Alkalinity (mg/l)	Specific Conductance (umhos/cm)
1972	N	110	--	110	106	106	--	38[b]
	Min	148.23	--	0.0	7.25	6.6	--	95
	Max	152.58	--	27.8	13.30	7.8	--	610
	$\bar{x}$	149.64	--	14.3	10.08	7.0	--	303
	SD	1.18	--	7.8	1.56	0.2	--	166
	C.V.%	0.8	--	54.4	15.5	3.1	--	54.9
1973	N	151	99[c]	151	151	151	--	150
	Min	148.34	0.24	0.0	5.85	6.7	--	110
	Max	152.48	1.69	28.0	13.80	7.6	--	575
	$\bar{x}$	149.36	0.74	12.7	10.08	7.0	--	306
	SD	0.91	0.31	9.1	1.94	0.2	--	123
	C.V.%	0.6	42.2	71.6	19.2	2.2	--	40.2
1974	N	106	106	106	106	106	106	106
	Min	148.21	0.10	0.0	6.75	6.7	15	122
	Max	152.22	1.65	25.5	13.70	8.2	65	480
	$\bar{x}$	149.36	0.73	11.3	10.84	7.1	42	266
	SD	0.85	0.36	9.1	1.85	0.3	10	85
	C.V.%	0.6	48.7	80.5	17.1	4.3	24.7	32.1
1975	N	51	45[d]	52	52	52	52	48
	Min	148.50	0.16	0.0	6.35	6.7	22	120
	Max	151.82	1.28	27.0	14.80	8.9	65	456
	$\bar{x}$	149.48	0.59	12.8	11.25	7.2	42	245
	SD	0.68	0.28	9.5	1.88	0.5	10	81
	C.V.%	0.5	47.1	74.6	16.7	6.6	24.6	33.0

		Sulfate (mg/l)	Iron (mg/l)		Residues (mg/l)				Turbidity (JTU)	Secchi Disc (cm)
			Total	Dissolved	Total	Fixed Total	Nonfiltrable	Fixed Nonfiltrable		
1972	N	97	60[e]	31[f]	--	--	110	109	9[g]	106
	Min	12	1.11	0.05	--	--	7	3	15	7
	Max	250	27.00	2.50	--	--	796	731	400	150
	$\bar{x}$	108	5.00	0.74	--	--	43	36	74	58
	SD	77	5.58	0.67	--	--	88	81	124	26
	C.V.%	71.7	111.5	91.2	--	--	203.3	223.5	167.8	44.6
1973	N	151	151	151	--	--	151	151	151	148
	Min	17	1.42	0.01	--	--	6	3	5	2
	Max	460	38.5	5.88	--	--	1090	1030	305	128
	$\bar{x}$	79	4.23	0.66	--	--	46	40	46	60
	SD	50	3.75	0.96	--	--	104	98	43	24
	C.V.%	64.0	88.5	145.4	--	--	226.3	243.8	93.9	39.9
1974	N	106	106	106	105	105	106	106	106	105
	Min	28	1.50	0.02	100	73	4	2	9	11
	Max	140	14.80	2.00	460	342	285	249	187	179
	$\bar{x}$	62	2.98	0.50	214	154	28	23	34	75
	SD	24	1.60	0.54	62	45	41	37	22	35
	C.V.%	38.4	53.8	108.4	28.7	29.2	144.9	162.9	64.7	46.8
1975	N	52	52	52	51	51	52	52	52	52
	Min	32	1.30	0.01	100	81	4	4	6	11
	Max	130	9.05	1.33	327	281	224	203	215	160
	$\bar{x}$	60	2.44	0.45	183	141	26	20	35	77
	SD	21	1.15	0.37	53	44	32	30	32	39
	C.V.%	35.7	47.2	82.9	29.1	31.1	124.2	147.6	92.4	51.0

[a]Samples were collected at SSES, April 1972-January 1975 and at SSES-A, February-December 1975 (N = number of samples; $\bar{x}$ = mean value; SD = standard deviation; and C.V. = coefficient of variation). Samples were collected trice weekly in 1972 (initiated in April) and 1973, twice weekly in 1974, and weekly in 1975. (1 m = 2.28 ft, F = 9/5(C) + 32, and 1 cm = 0.39 in).

[b]Sampling initiated on 22 September 1972.

[c]Sampling initiated on 8 March 1973.

[d]Velocity measured at SSES-A only.

[e]Sampling initiated on 24 July 1972.

[f]Sampling initiated on 9 October 1972.

[g]Sampling initiated on 4 December 1972.

TABLE 2.2-6

TEMPERATURES (C) OF THE SUSQUEHANNA RIVER AT THE SUSQUEHANNA SES, AUGUST 1973-DECEMBER 1975[a]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1973	N	--	--	--	--	--	--	--	31	30	31	27	31
	Min	--	--	--	--	--	--	--	20.6	15.0	10.1	4.4	-0.9
	Max	--	--	--	--	--	--	--	25.9	25.7	17.5	9.4	6.3
	$\bar{x}$	--	--	--	--	--	--	--	23.5	19.3	13.8	6.7	2.1
	SD	--	--	--	--	--	--	--	1.5	3.7	2.4	1.4	2.4
	C.V.%	--	--	--	--	--	--	--	6.5	19.2	17.7	20.5	110.5
1974	N	31	28	31	30	31	30	31	31	30	31	30	31
	Min	-0.8	-0.8	0.8	2.6	10.9	17.2	20.0	22.0	13.6	7.6	1.6	0.5
	Max	2.5	2.4	4.8	15.0	19.4	23.1	25.5	24.5	22.0	14.7	12.9	2.7
	$\bar{x}$	0.2	0.1	3.1	8.2	15.2	20.6	22.8	23.1	18.3	10.9	7.2	1.6
	SD	0.9	0.9	1.0	3.2	2.8	1.5	1.6	0.6	2.6	2.2	3.7	0.5
	C.V.%	512.3	1219.1	32.5	38.5	18.7	7.1	7.0	2.8	14.0	19.9	51.2	32.1
1975	N	31	28	31	30	25	30	31	31	30	31	30	29
	Min	-0.7	-0.4	0.6	1.5	10.4	16.6	23.7	21.7	13.0	9.0	3.7	0.0
	Max	3.0	2.7	5.3	10.5	21.8	25.2	25.9	28.7	20.7	15.0	12.3	4.9
	$\bar{x}$	0.6	0.6	2.7	6.6	15.9	21.0	24.8	24.1	17.4	12.6	7.7	1.5
	SD	1.0	1.1	1.4	3.0	4.7	2.7	0.7	2.0	2.4	1.3	2.7	1.3
	C.V.%	170.5	176.3	50.9	46.5	29.7	12.7	2.8	8.4	13.6	10.4	35.8	85.7

[a]Minimum and maximum temperatures are daily means based on 24 values recorded hourly from 0100-2400 hours (N = number of days monitored; $\bar{x}$ = monthly mean; SD = standard deviation; C.V. = coefficient of variation; and F = 9/5(C) + 32).

TABLE 2.2-7

DIEL RIVER TEMPERATURE (C) STUDIES AT THE SUSQUEHANNA SES, 1972-75[a]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1972	N	8	8	8	7	--	9	9	9	9	9	9	9
	Min	1.3	1.5	4.0	8.0	--	18.5	22.5	20.0	20.5	16.5	2.5	2.5
	Max	2.1	3.0	4.5	9.0	--	19.5	24.0	22.0	22.5	17.0	3.5	4.0
	$\bar{x}$	1.8	1.9	4.1	8.4	--	19.2	23.4	21.4	21.4	16.9	3.2	3.3
	SD	0.3	0.6	0.2	0.5	--	0.4	0.5	0.6	0.6	0.2	0.4	0.5
	C.V.%	14.2	31.1	4.4	6.3	--	2.0	2.1	3.0	2.8	1.0	11.2	15.5
1973	N	9	9	9	9	9	9	9	9	9	9	9	9
	Min	0.0	0.0	6.0	15.0	12.5	23.0	23.0	23.0	20.0	12.5	6.0	6.5
	Max	0.0	2.0	7.0	16.0	13.5	25.0	25.0	25.0	22.5	15.5	7.5	7.5
	$\bar{x}$	0	0.6	6.6	15.6	12.9	23.9	23.9	24.1	20.8	14.3	6.9	6.9
	SD	0	0.6	0.3	0.5	0.5	0.7	0.9	0.8	0.9	1.0	0.5	0.4
	C.V.%	0	106.5	4.6	3.4	3.6	2.9	3.8	3.4	4.3	7.2	6.7	5.6
1974	N	--	--	9	--	9	--	9	--	9	--	--	9
	Min	--	--	1.0	--	19.0	--	23.5	--	18.5	--	--	1.5
	Max	--	--	2.0	--	20.5	--	26.0	--	19.5	--	--	2.5
	$\bar{x}$	--	--	1.6	--	19.8	--	24.7	--	19.1	--	--	1.9
	SD	--	--	0.4	--	0.4	--	1.0	--	0.3	--	--	0.3
	C.V.%	--	--	25.9	--	2.2	--	4.0	--	1.6	--	--	15.4
1975	N	--	--	--	9	9	9	9	9	9	--	--	--
	Min	--	--	--	11.0	21.0	23.0	25.0	25.0	20.0	--	--	--
	Max	--	--	--	11.0	22.5	25.0	26.0	27.0	23.0	--	--	--
	$\bar{x}$	--	--	--	11.0	21.8	24.4	25.5	25.8	21.4	--	--	--
	SD	--	--	--	0	0.6	0.7	0.4	0.8	1.1	--	--	--
	C.V.%	--	--	--	0	2.6	2.8	1.7	3.1	5.3	--	--	--

[a]Determinations were made at 3-h intervals throughout each 24-h study, SSES (1972-74) and SSES-A (1975) (N = number of determinations/study; $\bar{x}$ = mean value; SD = standard deviation; C.V.= coefficient of variation; and F = 9/5(C) + 32).

TABLE 2.2-8

SUMMARY OF DISSOLVED OXYGEN VALUES (mg/l)[a]

		Falls	Harding	Wilkes-Barre (1)	Wilkes-Barre (2)	Nanticoke	Retreat	Mocanaqua	SSES	Bell Bend	Berwick	MI
1971	N	3	8	8	8	8	8	8	2	--	7	
	Min	13.0	7.6	6.6	5.5	5.0	5.4	6.4	13.2	--	6.4	
	Max	15.4	15.5	15.4	15.2	15.2	15.2	15.2	15.2	--	15.1	
	$\bar{x}$	13.83	11.51	10.49	9.98	9.74	9.60	9.89	14.20	--	10.23	
	SD	1.36	2.64	2.98	3.38	3.57	3.47	3.10	1.41	--	2.91	
	C.V.%	9.8	22.9	28.4	33.9	36.7	36.2	31.4	10.0	--	28.4	
1972	N	22	22	21	21	21	21	21	22	--	21	
	Min	7.40	7.10	6.10	6.10	6.20	6.10	6.30	6.20	--	7.50	
	Max	15.50	15.10	13.40	13.55	14.00	14.00	14.10	14.20	--	15.30	
	$\bar{x}$	10.95	11.15	10.72	10.67	10.45	10.30	10.52	10.62	--	10.94	
	SD	2.24	2.10	1.84	1.87	2.00	2.03	2.06	2.09	--	2.06	
	C.V.%	20.5	18.9	17.2	17.5	19.1	19.7	19.6	19.7	--	18.8	
1973	N	12	--	--	--	12	--	--	12	--	12	
	Min	7.35	--	--	--	6.85	--	--	6.00	--	6.65	
	Max	14.00	--	--	--	13.60	--	--	13.80	--	12.80	
	$\bar{x}$	10.61	--	--	--	10.16	--	--	10.25	--	10.48	
	SD	2.28	--	--	--	2.20	--	--	2.31	--	1.93	
	C.V.%	21.5	--	--	--	21.7	--	--	22.6	--	18.4	
1974	N	5	--	--	--	5	--	--	5	5	5	
	Min	8.10	--	--	--	8.00	--	--	8.25	9.00	9.20	
	Max	13.60	--	--	--	12.80	--	--	12.80	12.80	13.00	
	$\bar{x}$	10.73	--	--	--	10.40	--	--	10.55	10.76	11.51	
	SD	2.36	--	--	--	2.18	--	--	2.03	1.80	1.45	
	C.V.%	22.0	--	--	--	21.0	--	--	19.3	16.7	12.6	

		Bloomsburg	Catawissa	Danville	Northumberland N. Branch	Northumberland W. Branch	Sunbury E. bank	Sunbury W. bank	Clarks Ferry E. bank	Clarks Ferry W. bank	Juniata River	E.
1971	N	--	--	--	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--	--	--	--
	Max	--	--	--	--	--	--	--	--	--	--	--
	$\bar{x}$	--	--	--	--	--	--	--	--	--	--	--
	SD	--	--	--	--	--	--	--	--	--	--	--
	C.V.%	--	--	--	--	--	--	--	--	--	--	--
1972	N	2	2	2	2	2	2	2	2	2	2	2
	Min	7.7	8.3	9.2	10.2	9.1	9.6	9.6	11.7	9.7	11.6	11.
	Max	10.0	10.0	10.0	10.8	9.6	10.2	11.8	11.8	12.4	14.0	11.
	$\bar{x}$	8.85	9.15	9.60	10.50	9.35	9.90	10.70	11.75	11.05	12.80	11.
	SD	1.63	1.20	0.57	0.42	0.35	0.42	1.56	0.07	1.91	1.70	0.
	C.V.%	18.4	13.1	5.9	4.0	3.8	4.3	14.5	0.6	17.3	13.3	2.
1973	N	4	4	4	4	4	4	4	4	4	4	4
	Min	10.40	10.40	10.40	10.40	8.70	10.50	8.95	10.60	10.90	10.40	10.
	Max	13.00	13.10	13.25	13.20	13.65	13.35	13.95	13.60	13.90	14.30	13.
	$\bar{x}$	11.28	11.46	11.75	12.15	10.56	11.96	10.96	12.05	12.34	12.16	11.
	SD	1.23	1.17	1.17	1.28	2.17	1.17	2.12	1.39	1.23	1.61	1.
	C.V.%	10.9	10.2	10.0	10.5	20.6	9.8	19.3	11.5	10.0	13.2	11.
1974	N	5	--	5	--	--	--	--	--	--	--	--
	Min	9.70	--	9.40	--	--	--	--	--	--	--	--
	Max	13.00	--	13.05	--	--	--	--	--	--	--	--
	$\bar{x}$	11.90	--	11.77	--	--	--	--	--	--	--	--
	SD	1.38	--	1.42	--	--	--	--	--	--	--	--
	C.V.%	11.6	--	12.1	--	--	--	--	--	--	--	--

[a]Determinations were made at stations up- and downriver from the Susquehanna SES, 1971-74 (N = number of samples collected; $\bar{x}$ = mean value SD = standard deviation; and C.V. = coefficient of variation).

SUSQUEHANNA SES-ER-OL

TABLE 2.2-9

SUMMARY OF DIEL DISSOLVED OXYGEN VALUES (mg/l)[a]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1972	N	8	8	8	7	--	9	9	9	9	9	9	9
	Min	13.40	10.80	10.30	9.80	--	8.30	8.80	6.80	6.90	8.20	12.20	12.30
	Max	14.00	12.20	11.60	11.30	--	8.60	10.35	8.90	8.40	9.00	12.40	12.65
	$\bar{x}$	13.60	11.45	10.66	10.87	--	8.38	9.59	8.22	7.54	8.49	12.28	12.46
	SD	0.19	0.48	0.52	0.50	--	0.9	0.45	0.75	0.50	0.28	0.07	0.11
	C.V.%	1.4	4.1	4.9	4.6	--	1.1	4.7	9.1	6.6	3.3	0.5	0.9
1973	N	9	9	9	9	9	9	9	9	9	9	9	9
	Min	12.60	11.70	11.30	9.15	9.30	7.50	7.20	6.10	9.75	8.20	10.35	9.05
	Max	13.20	12.55	11.50	9.60	9.65	11.00	9.90	7.85	13.65	9.70	11.20	10.85
	$\bar{x}$	12.94	12.27	11.39	9.44	9.42	9.22	8.34	7.13	11.35	8.82	10.80	10.10
	SD	0.21	0.25	0.08	0.14	0.11	1.22	0.80	0.57	1.54	0.59	0.37	0.73
	C.V.%	1.6	2.0	0.7	1.5	1.2	13.2	9.6	8.0	13.6	6.7	3.4	7.3
1974	N	--	--	9	--	9	--	9	--	9	--	--	9
	Min	--	--	12.75	--	8.65	--	8.55	--	8.35	--	--	12.20
	Max	--	--	13.35	--	9.30	--	12.10	--	10.35	--	--	12.45
	$\bar{x}$	--	--	13.04	--	9.00	--	9.87	--	9.33	--	--	12.29
	SD	--	--	0.19	--	0.21	--	1.21	--	0.69	--	--	0.11
	C.V.%	--	--	1.4	--	2.4	--	12.2	--	7.4	--	--	0.9
1975	N	--	--	--	9	9	9	9	9	9	--	--	--
	Min	--	--	--	10.75	8.65	8.90	6.60	9.00	9.25	--	--	--
	Max	--	--	--	10.90	10.70	11.00	9.10	13.00	12.15	--	--	--
	$\bar{x}$	--	--	--	10.83	9.49	9.96	7.87	10.67	10.28	--	--	--
	SD	--	--	--	0.06	0.68	0.62	0.83	1.38	1.02	--	--	--
	C.V.%	--	--	--	0.6	7.2	6.2	10.5	13.0	9.9	--	--	--

[a]Determinations were made at 3-h intervals throughout each 24-h study at SSES (1972-74) and SSES-A (1975) (N = number of determinations/study; $\bar{x}$ = mean value; SD = standard deviation; and C.V. = coefficient of variation).

SUSQUEHANNA SES-ER-OL

TABLE 2.2-10

SUMMARY OF DIEL pH VALUES[a]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1972	N	8	8	8	7	--	9	9	9	9	9	9	9
	Min	7.2	7.4	7.2	7.0	--	6.9	7.0	6.8	6.5	6.7	6.9	7.0
	Max	7.5	7.5	7.2	7.2	--	7.0	7.3	7.2	6.7	6.9	7.0	7.3
	$\bar{x}$	7.4	7.4	7.2	7.1	--	7.0	7.1	7.0	6.6	6.8	6.9	7.1
	SD	0.1	0.0	0	0.1	--	0.0	0.1	0.1	0.1	0.1	0.0	0.1
	C.V.%	1.4	0.5	0	0.9	--	0.7	1.8	2.0	1.3	0.9	0.4	1.8
1973	N	9	9	9	9	9	9	9	9	9	9	9	9
	Min	6.9	6.8	6.9	6.9	6.9	7.1	6.9	6.8	7.1	7.0	6.8	6.9
	Max	7.2	6.9	7.0	7.0	7.0	7.4	7.1	7.0	8.0	7.2	6.9	7.0
	$\bar{x}$	7.0	6.9	6.9	6.9	6.9	7.3	7.0	6.9	7.5	7.1	6.8	7.0
	SD	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.3	0.1	0.1	0.0
	C.V.%	1.2	0.6	0.7	0.7	0.5	1.7	0.7	1.3	4.0	1.0	0.7	0.6
1974	N	--	--	9	--	9	--	9	--	9	--	--	9
	Min	--	--	6.7	--	7.0	--	7.4	--	7.0	--	--	6.9
	Max	--	--	6.9	--	7.1	--	8.1	--	7.2	--	--	7.0
	$\bar{x}$	--	--	6.8	--	7.1	--	7.7	--	7.2	--	--	6.9
	SD	--	--	0.1	--	0.1	--	0.2	--	0.1	--	--	0.1
	C.V.%	--	--	1.0	--	0.7	--	3.0	--	1.0	--	--	0.8
1975	N	--	--	--	9	9	9	9	9	9	--	--	--
	Min	--	--	--	7.2	7.4	7.3	6.9	7.4	7.4	--	--	--
	Max	--	--	--	7.3	7.7	7.9	7.1	8.5	8.3	--	--	--
	$\bar{x}$	--	--	--	7.3	7.6	7.6	7.0	7.8	7.8	--	--	--
	SD	--	--	--	0.0	0.1	0.2	0.1	0.4	0.3	--	--	--
	C.V.%	--	--	--	0.5	1.3	2.3	1.2	5.7	3.4	--	--	--

[a]Determinations were made at 3-h intervals throughout each 24-h study at SSES (1972-74) and SSES-A (1975) (N = number of determinations/study; $\bar{x}$ = mean value; SD = standard deviation; and C.V. = coefficient of variation).

TABLE 2.2-11

SUMMARY OF pH VALUES[a]

		Falls	Harding	Wilkes-Barre (1)	Wilkes-Barre (2)	Nanticoke	Retreat	Mocanaqua	SSES	Bell Bend	Berwick	Mifflinville
1971	N	2	7	7	7	7	7	7	2	--	7	--
	Min	7.7	7.6	6.8	6.0	6.5	6.5	7.0	7.3	--	7.0	--
	Max	7.8	9.8	7.6	7.6	7.8	7.5	8.0	7.4	--	8.1	--
	$\bar{x}$	7.8	8.3	7.3	7.1	7.2	7.2	7.3	7.4	--	7.5	--
	SD	0.1	0.8	0.3	0.6	0.4	0.6	0.4	0.1	--	0.4	--
	C.V. %	0.9	9.2	3.5	7.7	5.6	5.1	4.8	1.0	--	4.9	--
1972	N	21	22	21	22	22	21	23	23	--	22	2
	Min	7.2	6.8	6.6	6.7	6.6	6.7	6.7	6.8	--	6.6	6.9
	Max	8.9	8.9	8.5	8.1	7.5	7.2	7.2	7.6	--	8.7	7.0
	$\bar{x}$	7.9	7.7	7.2	7.2	7.0	7.0	7.0	7.1	--	7.2	7.0
	SD	0.5	0.6	0.5	0.3	0.2	0.1	0.1	0.2	--	0.4	0.1
	C.V.%	7.0	7.5	6.4	4.3	2.7	1.9	2.0	3.1	--	6.0	1.0
1973	N	12	--	--	--	12	--	--	12	--	12	4
	Min	7.1	--	--	--	6.7	--	--	6.8	--	6.9	6.9
	Max	9.0	--	--	--	7.3	--	--	7.6	--	8.1	7.1
	$\bar{x}$	7.8	--	--	--	7.0	--	--	7.0	--	7.1	7.1
	SD	0.6	--	--	--	0.2	--	--	0.2	--	0.3	0.1
	C.V.%	7.7	--	--	--	2.8	--	--	3.4	--	4.6	1.4
1974	N	5	--	--	--	5	--	--	5	5	5	--
	Min	7.1	--	--	--	7.1	--	--	6.9	6.9	6.9	--
	Max	8.9	--	--	--	7.5	--	--	7.5	7.7	8.3	--
	$\bar{x}$	8.0	--	--	--	7.2	--	--	7.1	7.2	7.5	--
	SD	0.7	--	--	--	0.2	--	--	0.2	0.3	0.5	--
	C.V.%	8.2	--	--	--	2.8	--	--	3.4	4.6	7.2	--

		Bloomsburg	Catawissa	Danville	Northumberland N. Branch	Northumberland W. Branch	Sunbury E. bank	Sunbury W. bank	Clarks Ferry E. bank	Clarks Ferry W. bank	Juniata River	Columbia E. bank	Columbia W. bank
1971	N	--	--	--	--	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--	--	--	--	--
	Max	--	--	--	--	--	--	--	--	--	--	--	--
	$\bar{x}$	--	--	--	--	--	--	--	--	--	--	--	--
	SD	--	--	--	--	--	--	--	--	--	--	--	--
	C.V.%	--	--	--	--	--	--	--	--	--	--	--	--
1972	N	2	2	2	2	2	2	2	2	2	2	2	2
	Min	7.0	7.1	7.2	7.4	7.3	7.3	7.5	8.0	8.3	8.8	8.4	8.4
	Max	7.2	7.3	8.0	8.3	7.7	8.2	8.0	8.8	8.4	9.0	9.1	8.8
	$\bar{x}$	7.1	7.2	7.6	7.8	7.5	7.7	7.8	8.4	8.4	8.9	8.7	8.6
	SD	0.1	0.1	0.6	0.7	0.3	0.7	0.4	0.6	0.1	0.1	0.5	0.3
	C.V.%	2.0	2.0	7.4	8.6	3.8	8.7	4.6	6.7	0.9	1.6	6.1	3.3
1973	N	4	4	4	4	4	4	4	4	4	4	4	4
	Min	7.0	7.0	7.1	7.0	6.8	6.9	6.9	7.0	7.1	8.0	7.2	7.6
	Max	7.4	7.8	8.2	8.7	7.7	8.4	7.8	8.5	9.2	9.1	9.2	9.2
	$\bar{x}$	7.2	7.4	7.5	7.9	7.1	7.7	7.1	7.9	8.2	8.4	8.2	8.3
	SD	0.2	0.3	0.5	0.8	0.4	0.7	0.5	0.8	0.9	0.5	0.9	0.7
	C.V.%	2.9	4.5	6.8	10.0	5.7	9.1	6.3	9.8	10.8	6.2	10.6	8.5
1974	N	5	--	5	--	--	--	--	--	--	--	--	--
	Min	6.8	--	7.1	--	--	--	--	--	--	--	--	--
	Max	8.7	--	8.9	--	--	--	--	--	--	--	--	--
	$\bar{x}$	7.6	--	7.7	--	--	--	--	--	--	--	--	--
	SD	0.7	--	0.7	--	--	--	--	--	--	--	--	--
	C.V.%	9.2	--	9.4	--	--	--	--	--	--	--	--	--

[a]Determinations were made at sampling stations up- and downriver from the Susquehanna SES, 1971-74 (N = number of samples collected; $\bar{x}$ = mean value; SD = standard deviation; and C.V. = coefficient of variation).

TABLE 2.2-12

SUMMARY OF ALKALINITY VALUES (mg/l)[a]

		Falls	Harding	Wilkes-Barre (1)	Wilkes-Barre (2)	Nanticoke	Retreat	Mocanaqua	SSES	Bell Bend	Berwick	Mifflinville
1972	N	6	6	6	6	6	6	6	6	--	6	1
	Min	35	35	40	35	40	35	30	35	--	30	65
	Max	100	100	90	85	80	70	70	75	--	70	65
	$\bar{x}$	60	63	58	58	54	51	50	52	--	49	--
	SD	28	30	23	21	19	16	17	17	--	17	--
	C.V.%	46.2	47.7	39.3	36.8	34.2	30.7	33.5	32.8	--	34.3	--
1973	N	12	--	--	--	12	--	--	12	--	12	4
	Min	30	--	--	--	35	--	--	30	--	30	40
	Max	80	--	--	--	70	--	--	70	--	60	55
	$\bar{x}$	57	--	--	--	53	--	--	48	--	47	50
	SD	16	--	--	--	13	--	--	13	--	11	7
	C.V.%	28.1	--	--	--	25.3	--	--	27.2	--	22.5	14.1
1974	N	5	--	--	--	5	--	--	5	5	5	--
	Min	37	--	--	--	23	--	--	32	33	32	--
	Max	69	--	--	--	59	--	--	56	55	55	--
	$\bar{x}$	53	--	--	--	46	--	--	48	48	48	--
	SD	13	--	--	--	14	--	--	10	9	10	--
	C.V.%	24.9	--	--	--	30.4	--	--	20.1	19.0	21.0	--

		Bloomsburg	Catawissa	Danville	Northumberland N. Branch	Northumberland W. Branch	Sunbury E. bank	Sunbury W. bank	Clarks Ferry E. bank	Clarks Ferry W. bank	Juniata River	Columbia E. bank	Columbia W. bank
1972	N	1	1	1	1	1	1	1	1	1	1	1	1
	Min	65	65	65	60	45	50	35	50	45	120	80	70
	Max	65	65	65	60	45	50	35	50	45	120	80	70
	$\bar{x}$	--	--	--	--	--	--	--	--	--	--	--	--
	SD	--	--	--	--	--	--	--	--	--	--	--	--
	C.V.%	--	--	--	--	--	--	--	--	--	--	--	--
1973	N	4	4	4	4	4	4	4	4	4	4	4	4
	Min	45	40	40	40	20	45	20	35	20	60	40	30
	Max	60	60	55	55	30	55	30	45	40	85	50	60
	$\bar{x}$	53	49	46	46	23	48	23	40	29	76	44	48
	SD	6	9	6	6	5	5	5	4	9	11	5	13
	C.V.%	12.3	17.5	13.6	13.6	22.2	10.5	22.2	10.2	29.7	14.5	10.9	26.5
1974	N	5	--	5	--	--	--	--	--	--	--	--	--
	Min	30	--	30	--	--	--	--	--	--	--	--	--
	Max	50	--	55	--	--	--	--	--	--	--	--	--
	$\bar{x}$	44	--	45	--	--	--	--	--	--	--	--	--
	SD	9	--	10	--	--	--	--	--	--	--	--	--
	C.V.%	19.7	--	22.0	--	--	--	--	--	--	--	--	--

[a]Determinations were made at sampling stations up- and downriver from the Susquehanna SES, 1972-74 (N = number of samples collected; $\bar{x}$ = mean value; SD = standard deviation; and C.V. = coefficient of variation).

TABLE 2.2-13

SUMMARY OF SPECIFIC CONDUCTANCE VALUES (μmhos/cm)[a]

		Falls	Harding	Wilkes-Barre (1)	Wilkes-Barre (2)	Nanticoke	Retreat	Mocanaqua	SSES	Bell Bend	Berwick	Mifflinville
1971	N	3	6	6	6	6	6	6	2	--	6	--
	Min	108	114	132	180	143	139	144	140	--	137	--
	Max	295	350	470	550	580	610	595	205	--	575	--
	$\bar{x}$	172	256	339	406	409	431	427	173	--	409	--
	SD	106	109	139	172	189	201	195	46	--	190	--
	C.V.%	61.7	42.4	41.0	42.3	46.2	46.6	45.6	26.6	--	46.5	--
1972	N	14	14	13	14	14	14	14	14	--	14	1
	Min	100	105	110	110	108	112	115	118	--	120	449
	Max	300	305	410	440	500	500	530	520	--	500	449
	$\bar{x}$	182	188	232	245	265	270	273	265	--	271	--
	SD	78	77	109	117	140	140	144	144	--	142	--
	C.V.%	43.0	41.0	47.0	47.9	52.7	51.8	52.8	54.3	--	52.3	--
1973	N	12	--	--	--	12	--	--	12	--	12	4
	Min	122	--	--	--	140	--	--	138	--	115	250
	Max	310	--	--	--	453	--	--	478	--	460	460
	$\bar{x}$	204	--	--	--	290	--	--	320	--	300	355
	SD	67	--	--	--	121	--	--	122	--	113	116
	C.V.%	32.8	--	--	--	41.7	--	--	38.1	--	37.7	32.6
1974	N	5	--	--	--	5	--	--	5	5	5	--
	Min	150	--	--	--	158	--	--	160	155	168	--
	Max	234	--	--	--	350	--	--	339	343	331	--
	$\bar{x}$	199	--	--	--	270	--	--	271	269	270	--
	SD	30	--	--	--	71	--	--	67	70	62	--
	C.V.%	15.3	--	--	--	26.3	--	--	24.9	25.9	22.8	--

		Bloomsburg	Catawissa	Danville	Northumberland N. Branch	Northumberland W. Branch	Sunbury E. bank	Sunbury W. bank	Clarks Ferry E. bank	Clarks Ferry W. bank	Juniata River	Columbia E. bank	Columbia W. bank
1971	N	--	--	--	--	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--	--	--	--	--
	Max	--	--	--	--	--	--	--	--	--	--	--	--
	$\bar{x}$	--	--	--	--	--	--	--	--	--	--	--	--
	SD	--	--	--	--	--	--	--	--	--	--	--	--
	C.V.%	--	--	--	--	--	--	--	--	--	--	--	--
1972	N	1	1	1	1	1	1	1	1	1	1	1	1
	Min	452	452	467	460	348	497	320	540	351	296	397	467
	Max	452	452	467	460	348	497	320	540	351	296	397	467
	$\bar{x}$	--	--	--	--	--	--	--	--	--	--	--	--
	SD	--	--	--	--	--	--	--	--	--	--	--	--
	C.V.%	--	--	--	--	--	--	--	--	--	--	--	--
1973	N	4	4	4	4	4	4	4	4	4	4	4	4
	Min	250	248	248	241	150	239	149	251	148	181	233	193
	Max	468	465	440	420	320	440	310	450	320	300	400	350
	$\bar{x}$	358	356	345	331	216	337	212	355	217	240	298	255
	SD	118	177	104	93	77	113	73	91	76	57	76	72
	C.V.%	32.9	32.9	30.2	28.2	35.5	33.5	34.3	25.6	35.0	23.7	25.5	28.1
1974	N	5	--	5	--	--	--	--	--	--	--	--	--
	Min	170	--	162	--	--	--	--	--	--	--	--	--
	Max	328	--	315	--	--	--	--	--	--	--	--	--
	$\bar{x}$	268	--	259	--	--	--	--	--	--	--	--	--
	SD	59	--	57	--	--	--	--	--	--	--	--	--
	C.V.%	22.0	--	22.2	--	--	--	--	--	--	--	--	--

[a]Determinations were made at sampling stations up- and downriver from the Susquehanna SES, 1971-74 (N = number of samples collected; $\bar{x}$ = mean value; SD = standard deviation; and C. V. = coefficient of variation).

TABLE 2.2-14

SUMMARY OF SULFATE VALUES (mg/l)[a]

		Falls	Harding	Wilkes-Barre (1)	Wilkes-Barre (2)	Nanticoke	Retreat	Mocanaqua	SSES	Bell Bend	Berwick	Mifflinville
1971	N	3	6	6	6	6	6	6	2	--	6	--
	Min	22	22	26	26	28	28	33	27	--	27	--
	Max	25	36	120	190	210	240	235	58	--	225	--
	$\bar{x}$	24	29	78	126	135	147	144	43	--	139	--
	SD	2	5	36	72	79	86	82	22	--	81	--
	C.V.%	7.2	16.3	46.9	57.1	58.5	58.3	56.9	51.6	--	58.6	--
1972	N	19	19	18	19	19	19	19	19	--	19	2
	Min	2	1	6	13	11	18	21	17	--	18	140
	Max	40	41	150	150	200	210	225	215	--	225	180
	$\bar{x}$	17	19	55	68	83	91	95	89	--	92	160
	SD	10	10	44	51	65	68	74	70	--	70	28
	C.V.%	55.8	54.7	78.7	74.3	78.5	74.9	78.0	78.6	--	76.4	17.7
1973	N	12	--	--	--	12	--	--	12	--	12	4
	Min	8	--	--	--	27	--	--	28	--	26	58
	Max	37	--	--	--	135	--	--	150	--	140	140
	$\bar{x}$	22	--	--	--	67	--	--	77	--	74	97
	SD	9	--	--	--	39	--	--	41	--	38	36
	C.V.%	40.9	--	--	--	58.2	--	--	53.2	--	51.4	36.6
1974	N	5	--	--	--	5	--	--	5	5	5	--
	Min	23	--	--	--	34	--	--	38	38	42	--
	Max	28	--	--	--	83	--	--	82	78	79	--
	$\bar{x}$	26	--	--	--	62	--	--	64	62	63	--
	SD	2	--	--	--	20	--	--	18	17	14	--
	C.V.%	7.1	--	--	--	32.7	--	--	27.5	26.8	22.7	--

		Bloomsburg	Catawissa	Danville	Northumberland N. Branch	Northumberland W. Branch	Sunbury E. bank	Sunbury W. bank	Clarks Ferry E. bank	Clarks Ferry W. bank	Juniata River	Columbia E. bank	Columbia W. bank
1971	N	--	--	--	--	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--	--	--	--	--
	Max	--	--	--	--	--	--	--	--	--	--	--	--
	$\bar{x}$	--	--	--	--	--	--	--	--	--	--	--	--
	SD	--	--	--	--	--	--	--	--	--	--	--	--
	C.V.%	--	--	--	--	--	--	--	--	--	--	--	--
1972	2	2	2	2	2	2	2	2	2	2	2	2	2
	Min	125	130	130	125	87	140	87	220	80	37	135	78
	Max	180	180	190	180	145	210	135	275	135	38	185	180
	$\bar{x}$	153	155	160	153	116	175	111	248	108	38	160	129
	SD	39	35	42	39	41	50	34	39	39	1	35	72
	C.V.%	25.5	22.8	26.5	25.5	35.4	28.3	30.6	15.7	36.2	1.9	22.1	55.9
1973	N	4	4	4	4	4	4	4	4	4	4	4	4
	Min	60	58	54	48	37	58	45	62	41	17	53	22
	Max	140	140	135	120	70	125	73	140	72	32	89	63
	$\bar{x}$	96	94	91	85	58	88	59	108	58	25	75	47
	SD	34	35	34	32	15	30	13	33	15	8	16	19
	C.V.%	34.8	37.6	37.8	37.0	25.9	34.1	21.3	30.4	26.2	31.7	21.4	40.5
1974	N	5	--	5	--	--	--	--	--	--	--	--	--
	Min	45	--	42	--	--	--	--	--	--	--	--	--
	Max	81	--	82	--	--	--	--	--	--	--	--	--
	$\bar{x}$	65	--	62	--	--	--	--	--	--	--	--	--
	SD	14	--	15	--	--	--	--	--	--	--	--	--
	C.V.%	21.5	--	23.7	--	--	--	--	--	--	--	--	--

[a]Determinations were made at sampling stations up- and downriver from the Susquehanna SES, 1971-74 (N = number of samples collected; $\bar{x}$ = mean value; SD = standard deviation; and C.V. = coefficient of variation).

TABLE 2.2-15

SUMMARY OF TOTAL IRON VALUES (mg/l)[a]

		Falls	Harding	Wilkes-Barre (1)	Wilkes-Barre (2)	Nanticoke	Retreat	Mocanaqua	SSES	Bell Bend	Berwick	Mifflinville
1972	N	22	22	21	22	22	22	22	22	--	21	2
	Min	0.12	0.14	0.89	1.45	1.18	1.42	1.50	1.30	--	0.55	1.98
	Max	16.88	11.88	13.80	13.76	14.60	27.84	32.80	32.96	--	34.56	2.90
	$\bar{x}$	1.64	1.46	2.80	3.38	4.27	4.63	4.74	4.35	--	4.54	2.44
	SD	3.50	2.48	2.76	2.73	2.82	5.37	6.40	6.51	--	6.99	0.65
	C.V.%	214.1	169.8	98.6	80.8	66.2	116.2	135.2	149.7	--	154.1	26.7
1973	N	12	--	--	--	12	--	--	12	--	12	4
	Min	0.18	--	--	--	1.01	--	--	2.22	--	1.79	1.51
	Max	7.80	--	--	--	14.30	--	--	12.70	--	6.90	4.70
	$\bar{x}$	2.07	--	--	--	4.68	--	--	4.39	--	3.72	2.82
	SD	2.38	--	--	--	3.33	--	--	2.81	--	1.73	1.38
	C.V.%	115.0	--	--	--	71.2	--	--	64.0	--	46.5	48.9
1974	N	5	--	--	--	5	--	--	5	5	5	--
	Min	0.29	--	--	--	1.00	--	--	1.50	1.56	1.25	--
	Max	0.60	--	--	--	5.16	--	--	3.55	3.38	3.30	--
	$\bar{x}$	0.43	--	--	--	3.24	--	--	2.63	2.57	2.37	--
	SD	0.13	--	--	--	1.54	--	--	0.85	0.84	1.00	--
	C.V.%	31.1	--	--	--	47.6	--	--	32.4	32.7	42.1	--

		Bloomsburg	Catawissa	Danville	Northumberland N. Branch	Northumberland W. Branch	Sunbury E. bank	Sunbury W. bank	Clarks Ferry E. bank	Clarks Ferry W. bank	Juniata River	Columbia E. bank	Columbia W. bank
1972	N	2	2	2	2	2	2	2	2	2	2	2	2
	Min	1.95	2.00	2.02	0.35	0.15	0.19	0.10	0.16	0.14	0.08	0.23	0.14
	Max	2.02	2.43	2.47	1.73	0.17	1.97	0.16	1.03	0.21	0.09	0.34	0.24
	$\bar{x}$	1.99	2.22	2.25	1.04	0.16	1.08	0.13	0.60	0.18	0.09	0.29	0.19
	SD	0.05	0.30	0.32	0.98	0.01	1.26	0.04	0.62	0.05	0.01	0.08	0.07
	C.V.%	2.5	13.7	14.2	93.8	8.8	116.5	32.6	103.4	28.3	8.3	27.3	37.2
1973	N	4	4	4	4	4	4	4	4	4	4	4	4
	Min	0.83	1.39	0.45	0.27	0.32	0.28	0.17	0.34	0.28	0.23	0.34	0.30
	Max	4.65	4.32	3.97	3.37	0.66	3.25	0.79	2.82	0.81	0.71	2.28	0.85
	$\bar{x}$	2.33	2.52	2.09	1.70	0.42	1.65	0.38	1.58	0.44	0.46	0.88	0.59
	SD	1.74	1.38	1.57	1.33	0.16	1.52	0.28	1.41	0.25	0.20	0.94	0.23
	C.V.%	74.8	54.7	75.1	78.2	37.8	92.5	71.9	88.8	56.0	42.4	10.63	38.3
1974	N	5	--	5	--	--	--	--	--	--	--	--	--
	Min	0.75	--	0.62	--	--	--	--	--	--	--	--	--
	Max	2.93	--	3.04	--	--	--	--	--	--	--	--	--
	$\bar{x}$	2.08	--	1.95	--	--	--	--	--	--	--	--	--
	SD	0.93	--	0.93	--	--	--	--	--	--	--	--	--
	C.V.%	44.6	--	48.0	--	--	--	--	--	--	--	--	--

[a]Determinations were made at sampling stations up- and downriver from the Susquehanna SES, 1972-74 (N = number of samples collected; $\bar{x}$ = mean value; SD = standard deviation; and C.V. = coefficient of variation).

TABLE 2.2-16

SUMMARY OF DISSOLVED IRON VALUES (mg/l)[a]

		Falls	Harding	Wilkes-Barre (1)	Wilkes-Barre (2)	Nanticoke	Retreat	Mocanaqua	SSES	Bell Bend	Berwick	Mifflinville
1972	N	17	17	17	17	17	17	17	17	--	16	1
	Min	0.00	0.00	0.02	0.06	0.01	0.00	0.02	0.00	--	0.00	0.04
	Max	0.16	0.16	0.75	1.80	2.50	2.40	2.20	1.43	--	1.55	0.04
	$\bar{x}$	0.09	0.08	0.32	0.60	0.94	0.80	0.72	0.50	--	0.50	--
	SD	0.05	0.05	0.21	0.50	0.81	0.70	0.61	0.45	--	0.50	--
	C.V.%	56.8	53.2	67.0	83.5	86.8	87.0	85.2	89.8	--	100.2	--
1973	N	12	--	--	--	12	--	--	12	--	12	4
	Min	0.06	--	--	--	0.04	--	--	0.03	--	0.04	0.03
	Max	0.19	--	--	--	3.20	--	--	3.36	--	2.85	2.50
	$\bar{x}$	0.10	--	--	--	0.84	--	--	0.72	--	0.58	0.88
	SD	0.04	--	--	--	1.07	--	--	0.96	--	0.81	1.11
	C.V.%	40.0	--	--	--	127.4	--	--	133.3	--	140.0	126.8
1974	N	5	--	--	--	5	--	--	5	5	5	--
	Min	0.05	--	--	--	0.09	--	--	0.07	0.05	0.10	--
	Max	0.12	--	--	--	1.76	--	--	1.74	1.51	1.30	--
	$\bar{x}$	0.07	--	--	--	0.53	--	--	0.51	0.51	0.47	--
	SD	0.03	--	--	--	0.70	--	--	0.72	0.60	0.49	--
	C.V.%	40.4	--	--	--	133.2	--	--	141.0	117.2	104.9	--

		Bloomsburg	Catawissa	Danville	Northumberland N. Branch	Northumberland W. Branch	Sunbury E. bank	Sunbury W. bank	Clarks Ferry E. bank	Clarks Ferry W. bank	Juniata River	Columbia E. bank	Columbia W. bank
1972	N	1	1	1	1	1	1	1	1	1	1	1	1
	Min	0.04	0.04	0.01	0.04	0.05	0.04	0.04	0.05	0.06	0.05	0.04	0.04
	Max	0.04	0.04	0.01	0.04	0.05	0.04	0.04	0.05	0.06	0.05	0.04	0.04
	$\bar{x}$	--	--	--	--	--	--	--	--	--	--	--	--
	SD	--	--	--	--	--	--	--	--	--	--	--	--
	C.V.%	--	--	--	--	--	--	--	--	--	--	--	--
1973	N	4	4	4	4	4	4	4	4	4	4	3	3
	Min	0.04	0.03	0.03	0.04	0.00	0.03	0.00	0.03	0.00	0.03	0.03	0.03
	Max	2.10	2.05	1.75	1.15	0.14	1.15	0.10	0.48	0.08	0.22	0.32	0.06
	$\bar{x}$	0.66	0.61	0.57	0.46	0.07	0.40	0.04	0.21	0.04	0.10	0.14	0.05
	SD	0.97	0.97	0.80	0.51	0.06	0.52	0.04	0.21	0.03	0.08	0.16	0.02
	C.V.%	146.2	159.1	139.8	110.6	88.2	130.6	91.6	100.7	81.6	90.3	116.7	32.7
1974	N	5	--	5	--	--	--	--	--	--	--	--	--
	Min	0.09	--	0.04	--	--	--	--	--	--	--	--	--
	Max	0.83	--	0.52	--	--	--	--	--	--	--	--	--
	$\bar{x}$	0.31	--	0.23	--	--	--	--	--	--	--	--	--
	SD	0.32	--	0.23	--	--	--	--	--	--	--	--	--
	C.V.%	103.2	--	100.8	--	--	--	--	--	--	--	--	--

[a]Determinations were made at sampling stations up- and downriver from the Susquehanna SES, 1972-74 (N = number of samples collected; $\bar{x}$ = mean value; SD = standard deviation; and C.V. = coefficient of variation).

TABLE 2.2-17

SUMMARY OF TOTAL PHOSPHATE VALUES AS PO_4 (mg/l)[a]

		Falls	Harding	Wilkes-Barre (1)	Wilkes-Barre (2)	Nanticoke	Retreat	Mocanaqua	SSES	Bell Bend	Berwick	Mifflinville
1972	N	22	22	21	22	22	22	22	22	--	21	1
	Min	0.07	0.05	0.04	0.02	0.03	0.02	0.02	0.02	--	0.01	0.02
	Max	0.33	0.27	0.16	0.19	0.28	0.17	0.16	0.48	--	0.49	0.02
	$\bar{x}$	0.14	0.13	0.10	0.09	0.09	0.06	0.07	0.08	--	0.09	--
	SD	0.08	0.06	0.03	0.04	0.06	0.03	0.04	0.10	--	0.10	--
	C.V.%	52.2	49.2	27.0	47.9	61.8	52.1	58.7	114.5	--	1.1	--
1973	N	12	--	--	--	12	--	--	12	--	12	4
	Min	0.04	--	--	--	0.03	--	--	0.03	--	0.02	0.03
	Max	0.23	--	--	--	0.19	--	--	0.10	--	0.12	0.09
	$\bar{x}$	0.13	--	--	--	0.08	--	--	0.06	--	0.06	0.05
	SD	0.06	--	--	--	0.05	--	--	0.02	--	0.03	0.03
	C.V.%	46.2	--	--	--	62.5	--	--	33.3	--	50.0	50.1
1974	N	5	--	--	--	5	--	--	5	5	5	--
	Min	0.05	--	--	--	0.06	--	--	0.05	0.04	0.05	--
	Max	0.13	--	--	--	0.13	--	--	0.12	0.12	0.12	--
	$\bar{x}$	0.09	--	--	--	0.10	--	--	0.08	0.09	0.09	--
	SD	0.03	--	--	--	0.03	--	--	0.03	0.04	0.04	--
	C.V.%	39.1	--	--	--	31.8	--	--	38.2	49.1	40.8	--

		Bloomsburg	Catawissa	Danville	Northumberland N. Branch	Northumberland W. Branch	Sunbury E. bank	Sunbury W. bank	Clarks Ferry E. bank	Clarks Ferry W. bank	Juniata River	Columbia E. bank	Columbia W. bank
1972	N	1	1	1	1	1	1	1	1	1	1	1	1
	Min	0.03	0.01	0.02	0.03	0.21	0.03	0.02	0.02	0.02	0.02	0.12	0.16
	Max	0.03	0.01	0.02	0.03	0.21	0.03	0.02	0.02	0.02	0.02	0.12	0.16
	$\bar{x}$	--	--	--	--	--	--	--	--	--	--	--	--
	SD	--	--	--	--	--	--	--	--	--	--	--	--
	C.V.%	--	--	--	--	--	--	--	--	--	--	--	--
1973	N	4	4	4	4	4	4	4	4	4	4	4	4
	Min	0.02	0.01	0.02	0.02	0.01	0.02	0.01	0.02	0.00	0.07	0.03	0.07
	Max	0.05	0.05	0.04	0.17	0.09	0.21	0.04	0.13	0.03	0.22	0.09	0.14
	$\bar{x}$	0.03	0.03	0.03	0.08	0.04	0.08	0.02	0.06	0.02	0.13	0.07	0.11
	SD	0.02	0.02	0.01	0.06	0.04	0.09	0.02	0.05	0.02	0.06	0.03	0.03
	C.V.%	46.2	62.1	34.8	73.5	82.2	114.6	69.3	92.1	85.7	49.8	40.4	28.7
1974	N	5	--	5	--	--	--	--	--	--	--	--	--
	Min	0.06	--	0.03	--	--	--	--	--	--	--	--	--
	Max	0.16	--	0.13	--	--	--	--	--	--	--	--	--
	$\bar{x}$	0.09	--	0.07	--	--	--	--	--	--	--	--	--
	SD	0.04	--	0.04	--	--	--	--	--	--	--	--	--
	C.V.%	46.4	--	54.4	--	--	--	--	--	--	--	--	--

[a]Determinations were made at sampling stations up- and downriver from the Susquehanna SES, 1972-74 (N = number of samples collected; $\bar{x}$ = mean value; SD = standard deviation; and C.V. = coefficient of variation).

SUSQUEHANNA SES-ER-OL
TABLE 2.2-18

SUMMARY OF NITRATE VALUES AS NO_3 (mg/l)[a]

		Falls	Harding	Wilkes-Barre (1)	Wilkes-Barre (2)	Nanticoke	Retreat	Mocanaqua	SSES	Bell Bend	Berwick	Mifflinville
1972	N	22	22	21	22	22	22	22	22	--	21	1
	Min	0.64	0.44	0.49	0.24	0.48	0.58	0.46	0.29	--	0.27	4.00
	Max	4.00	3.80	3.95	4.15	3.90	4.15	3.90	4.15	--	4.45	4.00
	$\bar{x}$	2.39	2.65	2.61	2.67	2.75	2.74	2.75	2.74	--	2.71	--
	SD	0.76	0.77	0.81	0.98	0.84	0.79	0.78	0.83	--	0.94	--
	C.V.%	29.2	29.2	31.0	36.8	30.7	29.0	28.3	30.1	--	34.7	--
1973	N	12	--	--	--	12	--	--	12	--	12	4
	Min	1.90	--	--	--	1.47	--	--	1.40	--	1.29	2.75
	Max	40.00	--	--	--	8.00	--	--	8.70	--	7.80	5.10
	$\bar{x}$	7.56	--	--	--	3.89	--	--	4.29	--	3.69	4.02
	SD	10.77	--	--	--	1.71	--	--	2.05	--	1.76	0.98
	C.V.%	142.5	--	--	--	44.0	--	--	50.1	--	47.7	24.4
1974	N	5	--	--	--	5	--	--	5	5	5	--
	Min	1.82	--	--	--	3.50	--	--	3.80	2.70	2.95	--
	Max	5.94	--	--	--	6.30	--	--	6.45	6.00	7.80	--
	$\bar{x}$	3.56	--	--	--	5.16	--	--	4.63	4.27	5.05	--
	SD	1.56	--	--	--	1.41	--	--	1.08	1.28	2.03	--
	C.V.%	43.7	--	--	--	27.3	--	--	23.3	30.0	40.2	--

		Bloomsburg	Catawissa	Danville	Northumberland		Sunbury		Clarks Ferry		Juniata River	Columbia	
					N. Branch	W. Branch	E. bank	W. bank	E. bank	W. bank		E. bank	W. bank
1972	N	1	1	1	1	1	1	1	1	1	1	1	1
	Min	4.15	3.85	4.45	4.10	3.50	3.45	2.85	2.80	2.25	1.45	2.50	3.20
	Max	4.15	3.85	4.45	4.10	3.50	3.45	2.85	2.80	2.25	1.45	2.50	3.20
	$\bar{x}$	--	--	--	--	--	--	--	--	--	--	--	--
	SD	--	--	--	--	--	--	--	--	--	--	--	--
	C.V.%	--	--	--	--	--	--	--	--	--	--	--	--
1973	N	4	4	4	4	4	4	4	4	4	4	4	4
	Min	2.87	2.80	2.35	2.50	1.10	2.45	1.30	0.42	0.82	1.43	0.71	1.49
	Max	4.65	4.80	5.75	5.10	5.10	4.45	5.75	3.95	2.20	5.35	5.25	5.20
	$\bar{x}$	4.00	4.01	3.75	3.64	3.00	3.46	2.81	2.30	1.46	3.84	3.69	4.08
	SD	0.81	0.87	1.47	1.19	1.66	0.98	2.00	1.47	0.57	1.81	2.12	1.75
	C.V.%	20.1	21.7	39.1	32.8	55.2	28.4	71.3	63.9	39.1	47.0	57.4	42.8
1974	N	5	--	5	--	--	--	--	--	--	--	--	--
	Min	3.75	--	1.90	--	--	--	--	--	--	--	--	--
	Max	6.20	--	15.34	--	--	--	--	--	--	--	--	--
	$\bar{x}$	4.84	--	5.99	--	--	--	--	--	--	--	--	--
	SD	0.95	--	5.33	--	--	--	--	--	--	--	--	--
	C.V.%	19.6	--	88.9	--	--	--	--	--	--	--	--	--

[a]Determinations were made at sampling stations up- and downriver from the Susquehanna SES, 1972-74 (N = number of samples collected; $\bar{x}$ = mean value; SD = standard deviation; and C.V. = coefficient of variation).

TABLE 2.2-19

SUMMARY OF BACTERIAL DENSITIES (colonies/100 ml)[a]

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1972												
Total bacteria	--	--	--	--	--	--	170,000	230,000	1,300,000	2,200,000[b]	82,000[b]	33,000
Total coliform	--	--	--	--	--	--	--[b]	80,000	68,000[b]	180,000[b]	35,000[b]	18,000
Fecal coliform	--	--	--	--	--	--	2,100[b]	3,300	1,900[b]	20,000[b]	1,200	2,200
Fecal streptococcus	--	--	--	--	--	--	--	--	--	--	--	--
FC/FS ratio	--	--	--	--	--	--	--	--	--	--	--	--
1973												
Total bacteria	--	--	--	--	--	--	--	--	--	--	--	--[b]
Total coliform	14,000	12,000	21,000	250,000	100,000[b]	260,000	200,000	67,000[b]	300,000	35,000	3,700	170,000[b]
Fecal coliform	750	900	1,200	7,600	9,200[b]	40,000	53,000	2,500[b]	2,000	1,800	370	19,000
Fecal streptococcus	290	460	470	1,100	330	480	260	40[b]	100	96	90	710
FC/FS ratio	2.6	2.0	2.6	7.0	28	83	200	62	20	19	4.0	26
1974												
Total bacteria	--	--	--	--	--	--	--	--	--	--	--	--
Total coliform	--	--	14,000[b]	--	16,000	--	43,000	--	93,000	--	--	9,100
Fecal coliform	--	--	90[b]	--	240	--	420	--	1,300	--	--	260
Fecal streptococcus	--	--	300	--	110	--	340	--	240	--	--	230
FC/FS ratio	--	--	0.3	--	2.2	--	1.2	--	5.0	--	--	1.1
1975												
Total bacteria	--	--	--	--	--	--	--	--	--	--	--	--
Total coliform	--	--	--	1,600	6,900	7,200	6,300	98,000	11,000	--	--	--
Fecal coliform	--	--	--	320	1,100	1,400	1,100	1,100	3,300	--	--	--
Fecal streptococcus	--	--	--	63	230	320	580	11,000	520	--	--	--
FC/FS ratio	--	--	--	5.1	4.8	4.4	1.9	0.1	6.3	--	--	--

[a]Samples were collected at SSES (1972-74) and SSES-A (1975).

[b]Estimated from a non-ideal colony count.

TABLE 2.2-20

PHYTOPLANKTON GENERA, SUSQUEHANNA RIVER, JANUARY 1972-SEPTEMBER 1973

Taxon	Falls		Nanticoke		SSES		Nescopeck	
	1972	1973	1972	1973	1972	1973	1972	1973
CHLOROPHYTA								
Actinastrum	X	X	X	X	X	X	X	X
Ankistrodesmus	X	X	X	X	X	X	X	X
Arthrodesmus	X			X	X	X[a]		
Botryococcus					X			
Carteria		X[b]						X[b]
Cephalomonas	X						X	
Cerasterias	X	X	X	X	X	X[a]	X	X[b]
Chlamydomonas	X	X	X	X	X	X	X	X
Chlorella		X		X		X		X
Chodatella	X	X[b]	X	X	X	X	X	X
Closteriopsis	X	X[b]	X	X[b]	X	X[a]	X	
Closterium	X	X	X	X	X	X	X	X
Coelastrum	X	X	X	X	X	X	X	X
Cosmarium	X	X	X	X	X	X[a]	X	
Crucigenia	X	X	X	X	X	X	X	X
Dicellula		X		X		X		X
Dictyosphaerium	X	X	X	X	X	X	X	X
Dimorphococcus		X	X	X	X	X[a]	X	X
Eudorina	X	X	X		X			
Franceia							X	
Gloeocystis	X		X		X			
Golenkinia	X	X	X	X	X	X	X	X
Gonium	X	X						
Kirchneriella	X	X	X	X	X	X	X	X
Micractinium	X	X	X	X	X	X	X	X
Micrasterias		X				X		
Nephrocytium			X		X	X[a]		X
Oedogonium							X[c]	
Oocystis	X		X	X		X		X
Palmella		X[b]						
Pandorina		X[b]				X[b]		X
Pediastrum	X	X	X	X	X	X	X	X
Phacotus		X						
Polyedriopsis		X				X[a]		X[b]
Quadrigula				X[b]	X	X[a]	X	X
Scenedesmus	X	X	X	X	X	X	X	X
Schroederia		X		X		X[a]		X
Selenastrum	X	X	X	X	X	X		X
Sorastrum		X	X	X				
Staurastrum			X			X	X	
Tetradesmus			X					
Tetraedron	X	X	X	X	X	X	X	X
Tetrastrum	X	X	X	X	X	X	X	X
Treubaria			X			X[a]		
Ulothrix	X	X	X		X		X	
BACILLARIOPHYTA								
Achnanthes	X	X	X	X	X	X	X	X
Amphora	X		X		X	X	X	
Asterionella	X	X	X	X	X	X	X	X
Caloneis	X		X				X	
Cocconeis	X	X	X	X	X	X	X	X
Cyclotella	X	X	X	X	X	X	X	X
Cymatopleura	X	X	X	X	X	X	X	X
Cymbella	X	X	X	X	X	X	X	X
Diatoma	X	X	X	X	X	X	X	X
Diploneis	X							
Epithemia	X	X[b]	X	X	X	X	X	

TABLE 2.2-20 (cont.)

Taxon	Falls 1972	Falls 1973	Nanticoke 1972	Nanticoke 1973	SSES 1972	SSES 1973	Nescopeck 1972	Nescopeck 1973
BACILLARIOPHYTA (cont.)								
Eunotia	X	X	X	X	X	X	X	
Fragilaria	X	X	X	X	X	X	X	X
Frustulia						X	X	
Gomphoneis	X		X	X[b]	X	X[a]	X	
Gomphonema	X	X	X	X	X	X	X	X
Gyrosigma	X	X	X	X[b]	X	X	X	
Hannaea	X		X	X	X	X	X	X
Hantzschia	X	X[b]		X	X	X	X	
Melosira	X	X	X	X	X	X	X	X
Meridion	X	X	X	X	X	X	X	X
Navicula	X	X	X	X	X	X	X	X
Neidium	X				X			
Nitzschia	X	X	X	X	X	X	X	X
Opephora	X							
Pinnularia	X	X	X	X	X	X[a]		
Rhoicosphenia	X	X	X	X	X	X	X	X
Rhopalodia		X	X	X				
Spondylosium						X[a]		
Stauroneis					X[c]			
Stephanodiscus	X	X	X	X	X	X	X	X
Surirella	X	X	X	X	X	X	X	X
Synedra	X	X	X	X	X	X	X	X
Tabellaria	X	X	X	X	X	X[a]	X	X
Tropidoneis							X	
CYANOPHYTA								
Anabaena			X		X	X	X	
Aphanothece							X	
Arthrospira					X			
Chroococcus	X	X	X	X	X	X	X	X
Gomphosphaeria		X	X		X	X		X[b]
Lyngbya			X					
Merismopedia	X	X	X	X	X	X	X	X
Microcystis	X	X	X	X	X	X	X	X
Nodularia						X[a]		
Oscillatoria	X	X	X	X	X	X	X	X
Spirulina					X			
CHRYSOPHYTA								
Chrysophaerella							X	
Dinobyron	X	X	X	X	X	X	X	X
Synura	X		X	X	X	X	X	
EUGLENOPHYTA								
Euglena	X	X		X[b]	X	X	X	X
Phacus				X	X	X[a]		X
Trachelomonas	X	X	X		X	X[a]	X	X
PYRRHOPHYTA								
Ceratium		X						
Glenodinium		X			X	X		X
Gymnodinium						X		
Peridinium		X					X	X
CRYPTOPHYTA								
Cryptomonas		X				X[b]		X

[a]Found in weekly SSES samples.
[b]Found only during simultaneous diurnals.
[c]Found only in the last three months of 1972.

TABLE 2.2-21

MAJOR PERIPHYTON SPECIES, 1974[a]

		Falls	SSES	Bell Bend	Nescopeck	Bloomsburg	Danville
CHLOROPHYTA							
Ankistrodesmus convolutus		Jun-Aug	Jun-Aug	Jun-Aug	Jun		
A. falcatus			Jun-Sep	Jun			
Dictyosphaerium pulchellum		Aug	Aug				
Scenedesmus abundans			Sep				
S. quadricauda		Jul, Aug	Jul-Sep	Jul, Aug		Sep	
BACILLARIOPHYTA							
Achnanthes minutissima	(1,3)				Jun, Jul	Sep	
Cocconeis placentula	(1)	May, Dec			Sep		Sep
Cyclotella meneghiniana	(1)	Jul, Aug	Jul-Sep	Jul			
C. pseudostelligera	(1,3)	Jun-Sep, Nov	Jun-Oct	Jul-Sep	Aug		
C. stelligera	(1,3)	Aug, Sep	Aug, Sep, Dec	Sep	Aug	Sep	Sep
Cyclotella sp.		Jun					
Cymbella prostrata	(1)	Oct					
C. ventricosa	(1,3)	May			May, Oct		
Gomphonema olivaceum	(1)	Apr					
G. parvulum	(1,3)			Nov	May, Jun, Nov		
Melosira distans	(1,2)	May					
M. granulata	(1)	May					
M. varians	(1)	Oct	Dec				
Navicula cryptocephala	(1)	May, Jun, Sep	May, Jun, Nov		Aug	May	May, Sep, Dec
N. cryptocephala var. veneta	(1)	May-Jul, Oct, Dec	Jul, Nov				Dec
N. heufleri	(4)						Sep, Dec
N. lanceolata	(1)		Dec				
N. radiosa	(1,2,3)	Apr					
N. salinarum	(4)	Jun					
N. salinarum var. intermedia	(4)	Sep-Dec	Sep-Dec	Jun, Oct, Nov	Sep, Oct	Sep, Dec	Sep, Dec
N. symmetrica	(4)	Oct		Oct			Sep
N. tripunctata	(1)	Apr, May, Jun, Sep-Dec	Nov, Dec			Dec	Sep, Dec
N. viridula	(1,2)	May, Jun	Dec			Dec	
Nitzschia acicularis	(1)		May	May	May		
N. dissipata	(1)	Jan-Mar, May, Jun, Oct-Dec	May, Dec	Nov		Dec	Dec
N. palea	(1,3)	May, Jun, Oct-Dec	May, Oct	May, Nov	May	May	May
Stephanodiscus invisitatus	(4)	Jul-Sep	May-Aug, Oct				
Synedra sp.			May	May	May		
Thalassiosira pseudonana	(3)	Sep					
CYANOPHYTA							
Oscillatoria sp.			May		Sep		
Phormidium geniculata			Nov				
P. tenue			Oct				
Phormidium sp.			Dec	Dec	Dec		
RHODOPHYTA							
Rhodochorton sp.			Sep				May

[a]Each species composed at least 5% of the total units counted in samples at six stations on the Susquehanna River, 1974. Numbers following diatoms indicate the species affinity for pH (Ref. 2.2-33), (1 = alkaliphilous; 2 = acidophilous; 3 = indifferent to pH; and 4 = unknown).

TABLE 2.2-22

AQUATIC VASCULAR PLANTS[a], 1971-1972[b]

Species	Life Form	Substrate
Potamogetonaceae - Pondweed Family		
Potamogeton crispus	AS	G
P. filiformis	AS	G
P. nodosus*	AS	G
P. pectinatus	AS	G
Hydrocharitaceae - Frogbit Family		
Vallisneria americana	AS	G, S
Gramineae - Grass Family		
Eragrostis pectinacea	AE	G
Cyperaceae - Sedge Family		
Cyperus ferruginescens	AE	G
C. polystachyos	AE	G
Eleocharis acicularis*	AE	G, S
E. olivacea	AE	G, S
Scirpus americanus*	AE	G
S. validus	AE	G
S. fluviatilis	AE	G
Lemnaceae - Duckweed Family		
Lemna minor*	FF	--
Commelinaceae - Spiderwort Family		
Commelina communis	AE	G
Pontederiaceae - Pickerelweed Family		
Heteranthera dubia*	AS	G, S
Salicaceae - Willow Family		
Salix cordata	AE	G
Betulaceae - Birch Family		
Alnus incana*	AE	G
Polygonaceae - Buckwheat Family		
Polygonum punctatum*	AE	S
P. pensylvanicum	AE	S
Cruciferae - Mustard Family		
Rorippa sylvestris*	AE	G
Onagraceae - Evening Primrose Family		
Ludwigia palustris*	AE	G, S
Primulaceae - Primrose Family		
Lysimachia hybrida	AE	G
Acanthaceae - Acanthus Family		
Justicia americana*	AE	G, S
Compositae - Composite Family		
Bidens bidentoides	AE	G
B. discoidea	AE	G, S
B. comosa*	AE	G
Eupatorium rugosum	AE	G
Equisetaceae - Horsetail Family		
Equisetum litorale	AE	S

[a]These identifications are by M. L. or J. D. Thompson, Clearbrook, Minnesota from texts by Muenscher (Ref. 2.2-34) and Fasset (Ref. 2.2-35).

[b]Collections were made on or near the site. Life form (Sculthorpe, Ref. 2.2-36): AE = Attached Emergent, AS = Attached Submergent, FF = Free Floating; Substrate: S = Silt, G = Gravel and Sand. An asterisk denotes species common in the river.

TABLE 2.2-23

INVERTEBRATES COLLECTED IN ZOOPLANKTON SAMPLES, 1972-74

- Protozoa
  - Ciliata
    - Peritricha
      - Vorticellidae
        - *Zoothamnium* sp.
- Coelenterata
  - Hydroida
    - *Hydra* sp.
  - Trachylina
    - *Craspedacusta sowerbii*
- Rotatoria
  - Monogononta
    - Flosculariacea
      - Filiniidae
        - *Filinia* sp.
    - Ploima
      - Notommatidae
        - *Cephalodella* sp.
      - Synchaetidae
        - *Polyarthra* sp.
      - Asplanchnidae
        - *Asplanchna* sp.
      - Brachionidae
        - *Brachionus quadridentata*
        - *Kellicottia longispina*
        - *Keratella* spp.
- Tardigrada
  - Eutardigrada
    - Macrobiotoidea
      - Macrobiotidae
        - *Macrobiotus* sp.
- Arthropoda
  - Crustacea
    - Cladocera
      - Sididae
        - *Diaphanosoma brachyurum*
        - *Latona setifera*
        - *Sida crystallina*
      - Chydoridae
        - *Alona guttata*
        - *A. quadrangularis*
        - *Alonella acutirostris*
        - *Chydorus sphaericus*
        - *Eurycercus lamellatus*
      - Daphnidae
        - *Daphnia parvulus*
        - *D. pulex*
        - *Daphnia* spp.
        - *Moina macrocopa*
        - *Scapholeberis kingi*
        - *Simocephalus* sp.
      - Bosminidae
        - *Bosmina coregoni*
        - *B. longirostris*
      - Macrothricidae
        - *Ilyocryptus sordidus*
        - *I. spinifer*
        - *Macrothrix laticornis*
    - Copepoda
      - Calanoida
        - Diaptomidae
          - *Diaptomus* spp.
      - Cyclopoida
        - Cyclopidae
          - *Cyclops vernalis*
          - *Eucyclops speratus*
      - Harpacticoida
    - Ostracoda

TABLE 2.2-24

CORRELATION COEFFICIENTS BETWEEN TWO PHYSICOCHEMICAL PARAMETERS AND ZOOPLANKTON DENSITY, 1972-1973

	Water Temperature	River Discharge
No. cladocerans/m^3	+0.247	+0.182
No. copepods (immature)/m^3	+0.215	+0.425*
No. copepods (adults)/m^3	-0.081	+0.677**
No. rotifers/m^3	+0.558**	-0.218

*Significant at 5% level.

**Significant at 1% level.

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TABLE 2.2-25

MACROINVERTEBRATE DENSITY, 1972-75[a]

	1972					1973					
Sampling gear	basket					dome					
No. samples collected	122					63					
No. organisms collected	162,463					83,725					
No. taxa identified											
(Families)	47					56					
(Genera)	96					114					
(Species)	65					65					
(Total)	99					119					
Sampling stations[b]	FL	WB	NT	SS	NS	FL	S1	S2	S3	S4	NS
No. org/m^2 [c]											
Jan	--	--	--	--	--	6,778	972	4,237	174	185	629
Feb	--	--	--	--	--	9,172	275	4,134	90	1,102	1,551
Mar	--	--	--	--	--	--	--	--	--	--	--
Apr	--	--	--	--	--	6,722	483	1,538	229	995	860
May	--	--	--	--	--	--	--	--	--	--	--
Jun	--	--	--	--	--	4,878	1,950	2,951	1,263	939	5,148
Jul	5,648	618	704	818	913	--	--	--	--	--	--
Aug	--	--	--	--	--	14,421	10,375	15,972	22,990	2,574	33,832
Sep	10,148	7,638	447	5,902	65,355	9,442	29,859	52,103	7,851	641	6,862
Oct	--	4,642	306	1,059	24,723	--	--	--	--	--	--
Nov	--	--	--	--	--	21,693	2,788	2,130	532	528	11,454
Dec	995	--	1,664	1,474	91	--	--	--	--	--	--

	1974							1975		
Sampling gear	dome							dome		
No. samples collected	81							27		
No. organisms collected	168,666							12,555		
No. taxa identified										
(Families)	68							70		
(Genera)	155							177		
(Species)	87							100		
(Total)	157							179		
Sampling stations[b]	FL	SI	SII	BB	NS	BL	DN	SI	SII	BB
No. org/m^2 [c]										
Jan	--	389	2,100	429	--	--	--	--	--	--
Feb	--	--	--	--	--	--	--	--	--	--
Mar	--	--	--	--	--	--	--	2,727	1,558	798
Apr	--	--	--	--	--	--	--	--	--	--
May	9,524	515	759	673	2,660	1,873	2,975	--	--	--
Jun	--	--	--	--	--	--	--	8,267	2,234	4,077
Jul	--	34,394	39,954	11,868	--	--	--	--	--	--
Aug	--	--	--	--	--	--	--	--	--	--
Sep	14,570	83,780	47,461	6,309	9,976	4,634	23,132	--	--	--
Oct	--	--	--	--	--	--	--	641	663	1,666
Nov	--	--	--	--	--	--	--	--	--	--
Dec	14,239	16,551	10,093	2,767	9,736	4,354	23,540	--	--	--

[a]With sampling gear and total number of samples, organisms, and taxa collected.

[b]Sampling stations: FL (Falls); WB (Wilkes-Barre); NT (Nanticoke); SS, S1, S2, S3, S4, SI, SII (SSES sites); BB (Bell Bend I); NS (Nescopeck); BL (Bloomsburg); DN (Danville).

[c]Replicate mean value (1 m^2 = 10.76 ft^2).

TABLE 2.2-26

DENSITY OF MAJOR MACROINVERTEBRATE GROUPS COLLECTED WITH BASKET SAMPLERS, 1972

Taxa	Station[a]	No. org/m^2 (1 m^2 = 10.76 ft^2)				
		Jul	Sep	Oct	Dec	Mean[b]
Oligochaeta	FL	47	0	--	21	26
	WB	244	31	2,765	--	1,014
	NT	529	27	59	316	229
	SS	401	0	7	224	185
	NS	124	20	47	0	52
Heptageniidae	FL	227	1,355	--	185	618
	WB	5	59	32	--	32
	NT	1	5	0	39	<1
	SS	18	44	0	84	34
	NS	11	34	20	0	18
Hydropsychidae	FL	2,682	1,419	--	461	1,844
	WB	<1	10	4	--	5
	NT	0	2	5	511	113
	SS	<1	3	26	532	125
	NS	340	14,192	5,963	48	5,581
Chironomidae	FL	2,103	6,917	--	254	3,476
	WB	316	7,396	1,733	--	3,148
	NT	130	233	53	644	249
	SS	349	5,809	799	572	1,719
	NS	220	50,999	18,455	42	19,036
Other	FL	589	457	--	74	452
	WB	53	142	108	--	101
	NT	44	180	189	154	135
	SS	50	46	227	62	91
	NS	218	110	238	1	151

[a]Sampling stations: FL (Falls), WB (Wilkes-Barre), NT (Nanticoke), SS (SSES), and NS (Nescopeck).

[b]Based upon all samples collected at a station.

TABLE 2.2-27

DENSITY OF MAJOR MACROINVERTEBRATE GROUPS COLLECTED WITH A DOME SAMPLER, 1973-75

Taxa	Station[a]	No. org/m² (1 m² = 10.76 ft²)														
		1973							1974					1975		
		Jan	Feb	Apr	Jun	Aug	Sep	Nov	Jan	May	Jul	Sep	Dec	Mar	Jun	Oct
Oligochaeta	FL	174	225	579	427	455	483	230	--	526	--	334	530	--	--	--
	SI	0	0	146	112	118	0	0	9	13	204	76	3,372	273	3,184	58
	SII	23	278	277	249	169	149	83	43	279	189	25	373	98	350	9
	NS	34	590	169	405	174	135	0	--	114	--	174	3,074	--	--	--
Heptageniidae	FL	624	927	377	753	326	191	905	--	472	--	259	714	--	--	--
	SI	17	6	11	6	0	0	0	11	4	24	11	28	25	383	153
	SII	11	93	34	45	0	0	0	54	30	0	3	13	52	98	288
	NS	6	0	39	118	11	0	11	--	21	--	67	14	--	--	--
Hydropsychiidae	FL	1,338	792	910	978	1,866	961	1,900	--	969	--	528	590	--	--	--
	SI	45	0	28	6	11	450	1,990	60	96	2,008	7,312	4,043	64	1,475	141
	SII	112	127	21	6	81	1,931	1,570	847	156	1,002	8,416	3,430	540	558	135
	NS	141	124	56	534	7,019	4,530	6,817	--	1,561	--	3,546	3,223	--	--	--
Chironomidae	FL	4,030	6,300	3,957	1,444	10,183	5,165	16,731	--	6,261	--	11,442	10,849	--	--	--
	SI	686	129	146	1,579	9,610	28,572	354	230	341	30,841	72,245	7,396	1,837	1,932	83
	SII	3,350	2,771	1,006	2,291	15,341	49,321	268	955	242	38,201	35,746	5,328	660	801	104
	NS	382	635	433	3,310	26,223	2,006	4,221	--	821	--	1,259	1,607	--	--	--
Other	FL	613	928	900	1,276	1,591	2,642	1,928	--	1,296	--	2,007	1,557	--	--	--
	SI	225	140	152	247	636	837	444	78	62	1,317	4,136	1,712	528	1,258	193
	SII	741	866	200	2,591	382	703	208	201	53	562	3,271	949	193	433	126
	NS	67	197	163	781	404	191	405	--	144	--	4,929	1,817	--	--	--

[a]Sampling stations: FL (Falls), SI (SSES I), SII (SSES II), and NS (Nescopeck).

TABLE 2.2-28

PERCENT COMPOSITION OF MAJOR MACROINVERTEBRATES, 1972-75

Station[a]	1972 FL	1972 WB	1972 NT	1972 SS	1972 NS	1973 FL	1973 S1	1973 S2	1973 S3	1973 S4	1973 NS
Taxa											
Annelida											
Oligochaeta	<1.0	23.6	31.5	8.6	<1.0	3.5	<1.0	1.7	8.8	22.7	2.5
Arthropoda											
Insecta											
Ephemeroptera											
Heptageniidae	9.6	<1.0	1.4	1.6	<1.0	5.6	<1.0	<1.0	<1.0	2.4	<1.0
Stenonema						4.4	<1.0	<1.0	<1.0	1.9	<1.0
Trichoptera											
Hydropsychidae	28.7	<1.0	15.5	5.8	22.5	12.0	5.4	5.0	3.8	1.3	31.9
Cheumatopsyche						6.1	3.2	3.0	3.0	1.2	24.6
Hydropsyche						5.9	2.2	2.0	<1.0	<1.0	7.3
Diptera											
Chironomidae	54.2	73.2	34.2	79.7	76.6	65.4	88.0	89.0	65.3	60.0	61.7
Conchapelopia											
Polypedilum											
Rheotanytarsus											
Cricotopus											
Mollusca											
Pelecypoda											
Sphaeriidae	<1.0	<1.0	<1.0	<1.0	<1.0	2.8	<1.0	<1.0	<1.0	1.1	<1.0
Other	3.0	2.0	10.3	1.9	<1.0	10.7	4.4	3.7	4.9	12.5	3.5

Station[a]	1974 FL	1974 SI	1974 SII	1974 BB	1974 NS	1974 BL	1974 DN	1975 SI	1975 SII	1975 BB
Taxa										
Annelida										
Oligochaeta	3.8	3.4	1.1	3.5	17.4	38.3	27.2	30.2	10.2	21.1
Arthropoda										
Insecta										
Ephemeroptera										
Heptageniidae	4.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	4.8	9.8	13.6
Stenonema	2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.7	1.3
Trichoptera										
Hydropsychidae	5.7	10.2	13.1	4.6	31.9	32.2	44.2	14.4	27.6	8.2
Cheumatopsyche	3.2	8.4	9.8	3.9	24.8	29.9	30.2	2.8	14.8	2.4
Hydropsyche	2.1	<1.0	1.2	<1.0	4.3	<1.0	6.4	<1.0	1.1	<1.0
Diptera										
Chironomidae	73.9	80.9	80.9	73.3	14.3	6.7	18.2	33.1	35.1	27.4
Conchapelopia								1.8	3.0	3.9
Polypedilum								2.3	3.2	1.0
Rheotanytarsus								23.3	18.5	9.8
Cricotopus								1.6	3.5	1.9
Mollusca										
Pelecypoda										
Sphaeriidae	1.7	<1.0	<1.0	2.3	5.1	2.0	<1.0	<1.0	<1.0	1.1
Other	10.8	5.2	4.3	15.7	31.0	20.4	10.0	17.0	16.8	28.6

[a]Sampling stations: FL (Falls); WB (Wilkes-Barre); NT (Nanticoke); SS, S1, S2, S3, S4, SI, SII (SSES sites); BB (Bell Bend I); NS (Nescopeck); BL (Bloomsburg); and DN (Danville).

TABLE 2.2-29

BENTHIC MACROINVERTEBRATES, 1971-75

- Porifera
  - Spongillidae
    - *Spongilla lacustris*
- Coelenterata
  - Hydroida
    - *Hydra* sp.
  - Trachylina
    - *Craspedacusta sowerbii*
- Platyhelminthes
  - Turbellaria
    - *Dugesia tigrina*
- Nematoda
- Bryozoa
  - Lophopodidae
    - *Lophopodella carteri*
    - *Pectinatella magnifica*
  - Plumatellidae
    - *Plumatella repens*
- Endoprocta
  - *Urnatella gracilis*
- Annelida
  - Oligochaeta
    - Lumbricidae
    - Aeolosomatidae
      - *Aeolosoma* sp.
    - Naididae
      - *Chaetogaster langi*
      - *Nais behningi*
      - *N. elinguis*
      - *N. pardalis*
      - *Pristina schmiederi*
      - *P. sima*
      - *Slavina appendiculata*
    - Tubicidae
      - *Branchiura sowerbyi*
      - *Limnodrilus hoffmeisteri*
      - *Peloscolex multisetosus*
    - Lumbriculidae
      - *Lumbriculus variegatus*
  - Hirudinea
    - Rhynchobdellida
      - Glossiphoniidae
        - *Actinobdella inequiannulata*
        - *Helobdella stagnalis*
        - *Placobdella ornata*
        - *P. parasitica*
      - Piscicolidae
        - *Myzobdella lugubris*
    - Pharyngobdellida
      - Erpobdellidae
        - *Erpobdella punctata*
- Arthropoda
  - Crustacea
    - Branchiura
      - *Argulus* sp.
    - Isopoda
      - *Asellus communis*
    - Amphipoda
      - *Gammarus* sp.
      - *Hyalella azteca*
    - Decapoda
      - *Cambarus bartoni*
      - *Orconectes limosus*
      - *O. propinquus*
  - Arachnoidea
    - Hydracarina
  - Insecta
    - Collembola
      - Sminthuridae
        - *Sminthurides aquaticus*
      - Isotomidae
        - *Isotomurus palustris*
    - Plecoptera
      - Pteronarcidae
        - *Allonarcys biloba*
        - *Pteronarcys* sp.
      - Nemouridae
        - *Amphinemura delosa*
        - *Nemoura* sp.
      - Capniidae
        - *Allocapnia* sp.
      - Perlidae
        - *Acroneuria abnormis*
        - *A. arida*
        - *A. lycorias*
        - *A. ruralis*
        - *Neoperla clymene*
        - *Neophasganophora capitata*
        - *Paragnetina media*
        - *Perlesta* sp.
      - Perlodidae
        - *Isoperla richardsoni*
    - Ephemeroptera
      - Ephemeridae
        - *Ephemera guttulata*
        - *Hexagenia limbata*
      - Potamanthidae
        - *Potamanthus verticus*
      - Polymitarcidae
        - *Ephoron leukon*
      - Canidae
        - *Caenis* sp.
      - Tricorythidae
        - *Tricorythodes* sp.
      - Ephemerellidae
        - *Ephemerella bicolor*
        - *E. coxalis*
        - *E. deficiens*
        - *E. dorothea*
        - *E. invaria*
        - *E. needhami*
        - *E. septentrionalis*
        - *E. verisimilis*
        - *E. walkeri*
      - Leptophlebiidae
        - *Choroterpes* sp.
        - *Habrophlebia* sp.
        - *Paraleptophlebia* sp.
      - Baetidae
        - *Baetis* sp.
        - *Callibaetis* sp.
        - *Centroptilum* sp.
      - Siphlonuridae
        - *Isonychia* sp.
        - *Siphlonurus quebecensis*

TABLE 2.2-29 (cont.)

- Insecta (cont.)
  - Heptageniidae
    - Epeorus
    - Heptagenia lucidipennis
    - Heptagenia sp.
    - Rhithrogena sp.
    - Stenonema carolina
    - S. fuscum
    - S. interpunctatum
    - S. ithaca
  - Odonata
    - Gomphidae
      - Dromogomphus spinosus
    - Aeschnidae
      - Boyeria vinosa
    - Libellulidae
      - Didymops transversa
      - Macromia illinoinesis
      - Somatochlora sp.
    - Agrionidae
      - Agrion sp.
    - Coenagrionidae
      - Argia sp.
  - Hemiptera
    - Gerridae
      - Gerris sp.
      - Metrobates sp.
      - Trepobates sp.
    - Notonectidae
      - Notonecta sp.
    - Nepidae
      - Ranatra sp.
    - Belostomatidae
      - Belostoma sp.
  - Megaloptera
    - Sialidae
      - Sialis vagans
    - Corydalidae
      - Chauliodes sp.
      - Corydalus cornutus
  - Trichoptera
    - Glossosomatidae
      - Agapetus sp.
      - Glossosoma nigrior
      - Glossosoma sp.
      - Protoptila sp.
    - Philopotamidae
      - Chimarra obscura
    - Psychomyiidae
      - Neureclipsis sp.
      - Polycentropus sp.
      - Psychomyia flavida
      - Psychomyia sp.
    - Hydropsychidae
      - Cheumatopsyche campyla
      - C. speciosa
      - Hydropsyche betteni
      - H. bifida grp.
      - H. cheilonis
      - H. morosa
      - H. phalerata
      - Macronema carolina
      - M. zabratum
      - Potamyia sp.
    - Hydroptilidae
      - Agralea sp.
    - Limnephilidae
      - Limnephilus sp.
      - Pycnopsyche guttifer
    - Leptoceridae
      - Ceraclea maculata
      - C. tarsipunctata
      - Ceraclea sp.
      - Nectopsyche sp.
      - Oecetis cineracens
      - Oecetis sp.
      - Triaenoides injusta
    - Lepidostomatidae
      - Lepidostoma sp.
  - Lepidoptera
    - Pyralidae
      - Nymphula sp.
      - Paragyractis sp.
  - Coleoptera
    - Haliplidae
      - Peltodytes sp.
    - Gyrinidae
      - Dineutus sp.
    - Hydrophilidae
      - Berosus peregrinus
      - Helophorus sp.
      - Hydrobius sp.
      - Tropisternus sp.
    - Psephenidae
      - Psephenus herricki
    - Dryopidae
      - Helichus sp.
    - Elmidae
      - Dubiraphia vittata
      - Macronychus glabratus
      - Optioservus sp.
      - Promoresia tardella
      - Stenelmis bicarinata
  - Diptera
    - Tipulidae
      - Antocha saxicola
      - Tipula spp.
    - Psychodidae
    - Chaoboridae
      - Chaoborus sp.
    - Simuliidae
      - Simulium vittatum
    - Stratiomyiidae
    - Rhagionidae
      - Atherix variegata
    - Empididae
      - Hemerodromia sp.
      - Roederiodes sp.
    - Chironomidae
      - Tanypodinae
        - Ablabesmyia auriensis
        - A. mallochi
        - A. ornata
        - A. peleensis
        - A. rhamphe
        - Conchapelopia grp.
        - Procladius sp.

TABLE 2.2-29 (cont.)

- Chironomidae (cont.)
  - Chironominae
    - Chironomus attenuatus
    - C. stigmaterus
    - Cladotanytarsus sp.
    - Cryptochironomus fulvus
    - Cryptotendipes sp.
    - Dicrotendipes modestus
    - Endochironomus grp.
    - Glyptotendipes lobiferous
    - Micropsectra sp.
    - Microtendipes sp.
    - Parachironomus carinatus
    - P. monochromus
    - P. pectinatellae
    - Polypedilum convictum
    - P. halterale
    - Rheotanytarsus exiguus
    - Stenochironomus sp.
    - Tanytarsus sp.
    - Tribelos fusicornis
    - Zavrelia sp.
  - Diamesinae
    - Diamesa sp.
    - Lobodiamesa sp.
    - Pseudodiamesa sp.
  - Orthocladiinae
    - Cardiocladius obscurus
    - Corynoneura taris
    - Cricotopus bicinctus
    - Cricotopus spp.
    - Eukiefferiella coerulescens grp. sp. #1
    - E. coerulescens grp. sp. #2
    - Eukiefferiella sp.
    - Heterotrissocladius sp.
    - Orthocladius sp.
    - Parorthocladius sp.
    - Psectrocladius vernalis
    - Psectrocladius sp. #1
    - Rheocricotopus sp.
    - Thienemanniella sp.
  - Ceratopogonidae
    - Bezzia sp.
- Mollusca
  - Gastropoda
    - Physidae
      - Physa gyrina
    - Lymnaeidae
      - Lymnea humilis
    - Planorbidae
      - Gyraulus parvus
      - Helisoma trivolvis
    - Ancylidae
      - Ferrissia sp.
  - Pelecypoda
    - Sphaeriidae
      - Pisidium sp.
      - Sphaerium striatinum
      - S. transversum
    - Unionidae
      - Alasmidonta undulata
      - A. varicosa
      - Anodonta cataracta
      - Elliptio complanatus
      - Lampsilis cariosa
      - Lasmigonia subviridis

TABLE 2.2-30

PERCENT OF TOTAL AND TOTAL DAMP WEIGHT OF MACROINVERTEBRATES, 1975[a]

	Mar	Jun	Oct
SSES I			
Oligochaeta	46.2	23.8	4.4
Heptageniidae	2.9	21.9	10.8
Hydropsychidae	30.9	12.9	61.5
Chironomidae	8.6	19.2	<1.0
Other	11.4	22.2	23.3
Total damp wt. (kg/ha)	8.3	15.3	3.9
SSES II			
Oligochaeta	0.0	27.9	1.5
Heptageniidae	1.4	44.2	15.9
Hydropsychidae	79.5	8.0	46.6
Chironomidae	16.1	8.5	<1.0
Other	3.0	11.4	36.0
Total damp wt. (kg/ha)	6.3	4.3	19.5
Bell Bend I			
Oligochaeta	1.3	11.4	94.7
Heptageniidae	2.1	27.0	<1.0
Hydropsychidae	71.2	2.3	1.6
Chironomidae	12.2	30.0	<1.0
Other	13.2	29.3	3.7
Total damp wt. (kg/ha)	3.8	21.1	43.1

[a]Samples were collected at three sites on the Susquehanna River (1 kg/ha = 2.20 lbs/2.47 a).

TABLE 2.2-31

SPECIES OF LARVAL FISH, 1972-75[a]

Cyprinidae - Minnows and Carps
- Cyprinus carpio - carp
- Notropis amoenus - comely shiner
- N. hudsonius - spottail shiner
- N. spilopterus - spotfin shiner
- Pimephales notatus - bluntnose minnow
- Rhinichthys cataractae - longnose dace
- Semotilus corporalis - fallfish
- Unidentified Cyprinidae - unidentified minnows

Catostomidae - Suckers
- Carpiodes cyprinus - quillback
- Catostomus commersoni - white sucker
- Hypentelium nigricans - northern hog sucker
- Moxostoma macrolepidotum - shorthead redhorse

Ictaluridae - Freshwater Catfishes
- Ictalurus catus - white catfish
- I. natalis - yellow bullhead
- I. nebulosus - brown bullhead
- I. punctatus - channel catfish

Centrarchidae - Sunfishes
- Ambloplites rupestris - rock bass
- Lepomis gibbosus - pumpkinseed
- L. macrochirus - bluegill
- Micropterus dolomieui - smallmouth bass
- M. salmoides - largemouth bass
- Pomoxis annularis - white crappie
- P. nigromaculatus - black crappie

Percidae - Perches
- Etheostoma olmstedi - tessellated darter
- Perca flavescens - yellow perch
- Stizostedion vitreum - walleye

[a]Larvae were collected near the Susquehanna SES, 1972-75. Nomenclature according to Bailey et al. (Ref. 2.2-59).

TABLE 2.2-32

TOTAL NUMBERS OF PROLARVAL (PRO) AND POSTLARVAL (POST) FISHES[a]

Species	1973				1974						1975		Total	
	Fixed-net		Push-net		Fixed-net		Push-net		Pump		Pump			
	pro	post	pro	post	pro	post	pro	post	pro	post	pro	post	pro	post
Carp	279	37	3,206	432	90	64	333	773	268	77	69	0	4,245	1,383
Minnows	23	39	449	1,651	415	211	4,632	3,248	603	3	415	14	6,537	5,166
Quillback	4,576	213	5,925	1,627	1,135	108	3,972	766	1,327	55	418	29	17,353	2,798
Other suckers	28	97	186	1,406	107	102	847	857	16	31	13	8	1,197	2,501
Catfishes	0	2	0	32	0	8	0	18	0	1	0	6	0	67
Sunfishes	0	2	15	140	12	51	61	584	1	7	0	3	89	787
Perches	140	0	650	102	105	32	605	164	62	6	212	45	1,774	349
Total	5,046	390	10,431	5,390	1,864	576	10,450	6,410	2,277	180	1,127	105	31,195	13,051

[a]Larvae were collected in 287 fixed- and push-net samples in 1973; 276 fixed-net, 275 push-net, and 343 pump samples in 1974; and 132 pump samples in 1975 near the Susquehanna SES.

TABLE 2.2-33

MEAN DENSITY OF LARVAL FISHES/10 M^3[a]

Species	May				Jun				Jul				Aug			
	Day		Night		Day		Night		Day		Night		Day		Night	
	sur	bot	sur	bot	sur	bot	sur	bot	sur	bot	sur	bot	sur	bot	sur	bot
Carp																
prolarva	0	0	0	0	1.4	0.5	2.1	0.5	0.1	0	0	0	0	0	0	0
postlarva	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spottail shiner																
prolarva	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
postlarva	0	0	0	0	0	0	0	0.3	0	0	0	0	0	0	0	0
Spotfin shiner																
prolarva	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
postlarva	0	0	0	0	0	0.1	0.1	0	0	0.1	0.3	0.1	0	0	0.3	0
Unidentified minnows																
prolarva	0	0.2	2.7	1.1	1.2	6.3	6.6	9.8	0	0.3	2.6	0.4	0	0	0.1	0
postlarva	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0
Quillback																
prolarva	0.2	0.2	4.4	0.2	0.1	0.5	24.1	0.8	0	0	0	0	0	0	0	0
postlarva	0	0	0	0	0	0.1	1.8	0.1	0	0	0	0	0	0	0	0
White sucker																
prolarva	0.2	0.5	1.1	0.2	0	0	0	0	0	0	0	0	0	0	0	0
postlarva	0	0	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0
Shorthead redhorse																
prolarva	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0
postlarva	0	0	0	0	0	0	0.1	0.1	0	0	0	0	0	0	0	0
Catfishes																
prolarva	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
postlarva	0	0	0	0	0	0	0	0.1	0	0	0	0.7	0	0	0	0
Sunfishes																
prolarva	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
postlarva	0	0	0	0	0	0.1	0.1	0	0	0	0	0	0	0	0	0
Tessellated darter																
prolarva	0	0.2	2.7	0.2	0	0.5	9.3[b]	2.3	0	0	0.4	0.9	0	0	0	0
postlarva	0	0	0	0	0.1	0	0.1	0	0	0.4	0.7	4.4	0	0	0	0
Unidentifiable	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0

[a]Larvae were collected in surface (sur) and bottom (bot) pump samples taken weekly (Jun) and biweekly (May, Jul, and Aug) at SSES-A, 1975 (10 m^3 = 353 ft^3).

[b]1 yellow perch was taken.

TABLE 2.2-34

PERCENT TOTAL AND MEAN DENSITY OF LARVAL FISHES/10 M^3[a]

Species	1974				1975			% Total
	28, 29 May	12, 13 Jun	10, 11 Jul	13, 14 Aug	10, 11 May	20, 21 May	5, 6 Jun	
Carp	1.2	2.5	0	0	0	0	1.9	7.4
Minnows	2.1	3.8	0.3	0.1	0	1.9	13.7	39.8
Quillback	5.5	8.1	tr	0	0	2.6	9.6	40.1
White sucker	tr	0	0	0	0.2	2.4	tr	6.0
Shorthead redhorse	0.1	0.3	0	0	0	tr	0.4	1.1
Catfishes	0	0	0	tr	0	0	0	<0.1
Sunfishes	0	0.1	tr	0	0	0	0.1	0.3
Tessellated darter	0.2	0.5	tr	0	0	0.6	1.3	5.0
Yellow perch & walleye	tr	0	0	0	tr	tr	tr	0.1
Unidentified	0.1	tr	tr	0	0	tr	tr	0.2
Total	9.2	15.4	0.3	0.1	0.2	7.6	27.1	

[a]Larvae were collected in surface and bottom (combined) pump samples collected at 3-h intervals for a 24-h period at SSES (1974) and SSES-A (1975) near the Susquehanna SES (tr = <0.05 fish/m^3, 10 m^3 = 353 ft^3).

TABLE 2.2-35

PERCENT TOTAL AND MEAN DENSITY OF LARVAL FISHES/10 M^3 IN 275 PUSH-NET SAMPLES[a]

Species	Day			Night			% Total
	West Shore	Channel	East Shore	West Shore	Channel	East Shore	
Carp	0.4	0.3	0.2	2.6	0.8	2.3	6.6
Minnows	1.1	0.3	2.5	11.9	2.0	26.9	46.7
Quillback	0.1	0.2	0.1	13.9	5.4	8.8	28.1
White sucker	tr	tr	tr	4.3	0.7	1.8	6.7
Shorthead redhorse	tr	tr	tr	2.1	0.6	0.7	3.4
Catfishes	0	0	tr	tr	tr	tr	0.1
Sunfishes	0.1	0.1	1.9	0.2	0.3	1.0	3.8
Tessellated darter	tr	0.1	tr	2.9	0.6	0.8	4.3
Yellow perch & walleye	tr	tr	tr	0.1	tr	tr	0.2
Unidentified	0	0	tr	tr	0.1	tr	0.1
Total	1.7	1.0	4.8	38.1	10.5	42.4	

[a]Larvae were collected at 3 SSES sites during the day (0800-1000) and at night (2300-0100), 1974 (tr = <0.05 fish/10 m^3, 10 m^3 = 353 ft^3).

TABLE 2.2-36

PERCENT TOTAL AND MEAN DENSITY OF LARVAL FISHES/10 M^3 IN 276 FIXED-NET SAMPLES[a]

Species	Day			Night			% Total
	West Shore	Channel	East Shore	West Shore	Channel	East Shore	
Carp	0.2	0.4	0.3	0.3	0.5	1.2	6.3
Minnows	0.5	0.3	0.8	2.5	0.9	8.6	25.6
Quillback	0.2	0.3	0.1	10.9	4.8	6.8	50.9
White sucker	0.1	0.1	0	0.5	0.2	1.7	4.6
Northern hog sucker	0	0	0	tr	0	0	<0.1
Shorthead redhorse	tr	tr	0	0.8	0.4	0.6	3.9
Catfishes	0	0	0	0.1	tr	tr	0.3
Sunfishes	tr	0	0.2	tr	tr	1.2	2.6
Tessellated darter	tr	0.1	0	1.0	0.6	0.7	5.4
Yellow perch & walleye	0	0	0	0.1	tr	0	0.2
Unidentified	tr	0	0	0	0	0	<0.1
Total	1.0	1.3	1.5	16.0	7.5	20.8	

[a]Larvae were collected at 3 SSES sites during the day (0800-1000) and at night (2300-0100), 1974 (tr = <0.05 fish/10 m^3, 10 m^3 = 353 ft^3).

TABLE 2.2-37

SPECIES OF FISH CAPTURED, 1971-75[a]

Stations	Falls	Nanticoke	SSES	Bell Bend	Nescopeck	Bloomsburg-Danville	Other
Species							
Amiidae - Bowfins							
Amia calva - bowfin	X						
Anguillidae - Freshwater Eels							
Anguilla rostrata - American eel			X	X			
Salmonidae - Trouts							
Coregonus artedii - cisco							X[b]
Salmo gairdneri - rainbow trout	X	X					
S. trutta - brown trout			X	X	X		
Salvelinus fontinalis - brook trout							X[c]
Esocidae - Pikes							
Esox lucius - northern pike			X	X			
E. masquinongy - muskellunge	X	X	X	X		X	
E. niger - chain pickerel	X	X	X	X	X	X	
Cyprinidae - Minnows and Carps							
Campostoma anomalum - stoneroller			X	X			
Cyprinus carpio - carp	X	X	X	X	X	X	
Exoglossum maxillingua - cutlips minnow			X	X			
Nocomis micropogon - river chub					X		
Notemigonus crysoleucas - golden shiner	X	X	X	X		X	
Notropis amoenus - comely shiner	X		X	X	X	X	
N. cornutus - common shiner	X		X	X	X	X	
N. hudsonius - spottail shiner	X	X	X	X	X	X	
N. procne - swallowtail shiner	X		X	X	X	X	
N. rubellus - rosyface shiner			X	X	X		
N. spilopterus - spotfin shiner	X	X	X	X	X	X	
Notropis spp. - shiner spp.			X	X			
Pimephales notatus - bluntnose minnow	X		X	X	X	X	
Rhinichthys atratulus - blacknose dace			X	X			
R. cataractae - longnose dace			X	X			
Semotilus atromaculatus - creek chub			X	X			
S. corporalis - fallfish	X		X	X	X	X	
Catostomidae - Suckers							
Carpiodes cyprinus - quillback	X	X	X	X	X	X	
Catostomus commersonii - white sucker	X	X	X	X	X	X	
Hypentelium nigricans - northern hog sucker	X		X	X	X	X	
Moxostoma macrolepidotum - shorthead redhorse	X	X	X	X	X	X	
Ictaluridae - Freshwater Catfishes							
Ictalurus catus - white catfish	X	X	X	X	X		
I. natalis - yellow bullhead	X	X	X	X	X		
I. nebulosus - brown bullhead	X	X	X	X	X		
I. punctatus - channel catfish	X	X	X	X	X		
Noturus insignis - margined madtom	X						
Cyprinodontidae - Banded Killifishes							
Fundulus diaphanus - banded killifish				X			
Centrarchidae - Sunfishes							
Ambloplites rupestris - rock bass	X	X	X	X	X	X	
Lepomis auritus - redbreast sunfish			X	X	X	X	
L. cyanellus - green sunfish	X	X	X	X		X	
L. gibbosus - pumpkinseed	X	X	X	X	X	X	
L. macrochirus - bluegill	X	X	X	X	X	X	
Micropterus dolomieui - smallmouth bass	X	X	X	X	X	X	
M. salmoides - largemouth bass	X	X	X	X	X	X	
Pomoxis annularis - white crappie	X	X	X	X	X	X	
P. nigromaculatus - black crappie	X	X	X	X	X	X	
Lepomis spp. - sunfish spp.	X		X	X	X		
Percidae - Perches							
Etheostoma olmstedi - tessellated darter	X		X	X	X	X	
Perca flavescens - yellow perch	X	X	X	X	X		
Percina peltata - shield darter							X[d]
Stizostedion vitreum - walleye	X	X	X	X	X	X	
Cottidae - Sculpins							
Cottus bairdi - mottled sculpin							X[e]

[a] Nomenclature according to Bailey et al. (Ref. 2.2-59).
[b] Two, one collected 6.4 km (4.0 mi) downstream from Nanticoke and another taken 3.1 km (2.0 mi) below the station discharge.
[c] One collectedbetween Shickshinny and Gould Island.
[d] Two, one collected near Falls and another taken on the west shore of Duck Island.
[e] Three, one collected in Shickshinny Creek, another at its mouth, and one in Little Wapwallopen Creek.

TABLE 2.2-38

NUMBER AND SPECIES COMPOSITION (%) OF FISH CAPTURED AT SIX STATIONS[a]

Station	Falls		Nanticoke		SSES		Bell Bend		Nescopeck		Bloomsburg-Danville		Total	Total
Date	1972 & 1973		1972 & 1973		1971-75		1971-75		1971-73		1974			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Species														
Bowfin	1	<0.1	0	0	0	0	0	0	0	0	0	0	1	<0.1
American eel	0	0	0	0	4	<0.1	3	<0.1	0	0	0	0	7	<0.1
Rainbow trout	1	<0.1	1	<0.1	0	0	0	0	0	0	0	0	2	<0.1
Brown trout	0	0	0	0	3	<0.1	20	<0.1	1	<0.1	0	0	24	<0.1
Northern pike	0	0	0	0	4	<0.1	4	<0.1	0	0	0	0	8	<0.1
Muskellunge	11	0.2	1	<0.1	38	0.2	34	0.2	0	0	8	0.7	92	0.2
Chain pickerel	8	0.1	1	<0.1	58	0.3	154	0.7	2	<0.1	3	0.3	226	0.4
Stoneroller	0	0	0	0	2	<0.1	20	<0.1	0	0	0	0	22	<0.1
Carp	524	9.1	291	15.0	793	3.5	836	3.9	628	13.2	180	16.2	3,252	5.7
Cutlips minnow	0	0	0	0	2	<0.1	7	<0.1	0	0	0	0	9	<0.1
River chub	0	0	0	0	0	0	1	<0.1	1	<0.1	0	0	2	<0.1
Golden shiner	9	0.2	1	<0.1	26	0.1	7	<0.1	0	0	2	0.2	45	<0.1
Comely shiner	6	0.1	0	0	321	1.4	328	1.5	22	0.5	15	1.4	692	1.2
Common shiner	2	<0.1	0	0	8	<0.1	20	<0.1	1	<0.1	2	0.2	33	<0.1
Spottail shiner	5	<0.1	6	0.3	1,453	6.5	1,103	5.2	229	4.8	17	1.5	2,813	4.9
Swallowtail shiner	4	<0.1	0	0	259	1.1	249	1.2	18	0.4	52	4.7	582	1.0
Rosyface shiner	0	0	0	0	2	<0.1	9	<0.1	1	<0.1	0	0	12	<0.1
Spotfin shiner	112	1.9	152	7.9	3,438	15.3	4,401	20.6	258	5.4	109	9.8	8,470	14.7
Shiner spp.	0	0	0	0	27	0.1	32	0.1	0	0	0	0	59	0.1
Bluntnose minnow	4	<0.1	0	0	1,285	5.7	1,341	6.3	79	1.7	101	9.1	2,810	4.9
Blacknose dace	0	0	0	0	1	<0.1	4	<0.1	0	0	0	0	5	<0.1
Longnose dace	0	0	0	0	1	<0.1	4	<0.1	0	0	0	0	5	<0.1
Creek chub	0	0	0	0	35	0.2	8	<0.1	0	0	0	0	43	<0.1
Fallfish	110	1.9	0	0	142	0.6	116	0.5	16	0.3	9	0.8	393	0.7
Quillback	453	7.9	269	13.9	1,121	5.0	1,743	8.2	309	6.5	103	9.3	3,998	7.0
White sucker	1,255	21.8	943	48.8	3,159	14.0	5,124	24.0	1,632	34.2	189	17.1	12,302	21.4
Northern hog sucker	779	13.5	0	0	387	1.7	191	0.9	265	5.6	150	13.5	1,772	3.1
Shorthead redhorse	1,003	17.4	15	0.8	1,025	4.6	994	4.7	789	16.5	10	0.9	3,836	6.7
White catfish	9	0.2	43	2.2	79	0.4	45	0.2	15	0.3	0	0	191	0.3
Yellow bullhead	8	0.1	2	0.1	38	0.2	9	<0.1	4	<0.1	0	0	61	0.1
Brown bullhead	4	<0.1	42	2.2	786	3.5	232	1.1	91	1.9	0	0	1,155	2.0
Channel catfish	10	0.2	29	1.5	100	0.4	42	0.2	30	0.6	0	0	211	0.4
Margined madtom	1	<0.1	0	0	0	0	0	0	0	0	0	0	1	<0.1
Banded killifish	0	0	0	0	0	0	1	<0.1	0	0	0	0	1	<0.1
Rock bass	168	2.9	12	0.6	387	1.7	539	2.5	79	1.7	2	0.2	1,187	2.1
Redbreast sunfish	0	0	0	0	14	<0.1	7	<0.1	1	<0.1	2	0.2	24	<0.1
Green sunfish	3	<0.1	1	<0.1	20	<0.1	5	<0.1	0	0	8	0.7	37	<0.1
Pumpkinseed	77	1.3	1	<0.1	226	1.0	222	1.0	2	<0.1	1	<0.1	529	0.9
Bluegill	288	5.0	17	0.9	2,315	10.3	770	3.6	76	1.6	39	3.5	3,505	6.1
Sunfish spp.	2	<0.1	0	0	92	0.4	36	0.2	1	<0.1	0	0	131	0.2
Smallmouth bass	720	12.5	27	1.4	868	3.9	1,091	5.1	40	0.8	48	4.3	2,794	4.9
Largemouth bass	10	0.2	4	0.2	317	1.4	275	1.3	4	<0.1	8	0.7	618	1.1
White crappie	3	<0.1	9	0.5	1,658	7.4	220	1.0	2	<0.1	20	1.8	1,912	3.3
Black crappie	42	0.7	18	0.9	1,209	5.4	364	1.7	7	0.1	11	1.0	1,651	2.9
Tessellated darter	51	0.9	0	0	233	1.0	435	2.0	129	2.7	15	1.4	863	1.5
Yellow perch	7	0.1	4	0.2	166	0.7	68	0.3	3	<0.1	0	0	248	0.4
Walleye	79	1.4	45	2.3	425	1.9	255	1.2	33	0.7	2	0.2	839	1.5
Unidentified	0	0	0	0	0	0	0	0	0	0	2	0.2	2	<0.1
Total	5,769	100.7	1,934	100.3	22,527	101.0	21,369	101.0	4,768	100.7	1,108	100.0	57,475	101.6

[a]Captures by all gear (electrofisher, seine, trapnets, setlines) were combined at each station.

SUSQUEHANNA SES-ER-OL

TABLE 2.2-39

TOTAL NUMBERS OF FISHES TAKEN AT FALLS, 1973

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Bowfin	0	0	0	1	0	0	0	0	0	0	0		1
Rainbow trout	0	0	0	0	0	0	1	0	0	0	0		1
Muskellunge	2	0	3	0	0	0	1	0	0	0	0		6
Chain pickerel	0	0	0	1	0	3	0	0	3	0	0		7
Carp	91	0	19	28	21	27	51	18	155	33	1		444
Golden shiner	0	0	1	0	0	1	6	0	0	0	1		9
Common shiner	0	0	0	0	0	0	2	0	0	0	0		2
Spottail shiner	0	0	0	0	0	0	1	0	0	0	0		1
Swallowtail shiner	0	0	0	0	0	4	0	0	0	0	0		4
Spotfin shiner	0	0	0	0	0	50	47	2	9	0	1		109
Bluntnose minnow	0	0	0	0	0	4	0	0	0	0	0		4
Fallfish	5	0	2	36	18	11	2	2	1	2	3		82
Quillback	0	0	5	45	26	44	54	70	123	41	1		409
White sucker	32	3	48	133	177	168	81	58	277	125	77		1,179
Norther hog sucker	1	0	5	113	134	41	38	48	152	60	6		598
Shorthead redhorse	0	0	1	38	8	61	162	131	344	137	53		935
White catfish	0	0	0	0	0	0	1	4	3	1	0		9
Yellow bullhead	0	0	0	0	0	3	0	1	2	2	0		8
Brown bullhead	1	0	0	0	1	0	0	0	1	0	1		4
Channel catfish	0	0	0	0	0	6	1	2	1	0	0		10
Margined madtom	0	0	0	0	0	0	0	0	0	0	1		1
Rock bass	0	0	0	3	38	24	25	6	24	11	6		137
Green sunfish	0	0	0	0	0	0	0	2	0	0	0		2
Pumpkinseed	0	0	0	0	0	8	1	7	14	16	2		48
Bluegill	1	0	1	0	2	13	24	31	53	88	14		227
Smallmouth bass	0	0	4	72	211	34	54	30	59	85	9		558
Largemouth bass	0	0	2	2	0	1	0	0	1	0	0		6
White crappie	0	0	0	0	0	0	1	0	1	1	0		3
Black crappie	0	0	0	15	1	4	4	3	10	2	1		40
Sunfish cross	0	0	0	0	0	1	1	0	0	0	0		2
Tessellated darter	0	0	0	50	0	0	0	0	0	0	0		50
Yellow perch	0	0	0	1	3	0	0	1	0	0	0		5
Walleye	4	0	2	5	6	9	3	2	6	6	2		45
Total	137	3	93	543	646	517	561	418	1,239	610	179		4,946

No sample — adverse river conditions

SUSQUEHANNA SES-ER-OL

TABLE 2.2-40

TOTAL NUMBERS OF FISHES TAKEN AT NANTICOKE, 1973

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Rainbow trout	0	0	0	0	0	0	1	0	0	0	0		1
Muskellunge	0	0	0	0	0	0	0	0	0	1	0		1
Chain pickerel	0	0	0	0	0	1	0	0	0	0	0		1
Carp	18	2	27	6	12	47	18	23	32	16	12		213
Golden shiner	1	0	0	0	0	0	0	0	0	0	0		1
Spottail shiner	0	3	0	0	0	0	1	0	0	2	0		6
Spotfin shiner	0	0	0	0	0	1	115	20	4	4	0		144
Quillback	0	0	0	8	26	40	10	90	40	23	2		239
White sucker	48	9	69	160	105	68	49	58	115	72	103		856
Shorthead redhorse	3	0	0	2	0	0	0	4	0	3	0		12
White catfish	0	1	0	0	0	4	15	10	6	5	1		42
Yellow bullhead	0	0	0	0	0	1	0	1	0	0	0		2
Brown bullhead	0	0	0	0	0	14	5	10	8	5	0		42
Channel catfish	0	0	0	0	0	8	4	6	4	1	6		29
Rock bass	0	1	2	0	0	2	0	2	1	3	1		12
Green sunfish	0	0	0	0	0	1	0	0	0	0	0		1
Bluegill	1	0	0	0	0	0	0	1	0	7	0		9
Smallmouth bass	1	2	2	1	0	2	3	2	0	3	2		18
Largemouth bass	0	0	0	0	0	0	0	0	1	0	0		1
White crappie	0	0	0	0	0	3	1	0	3	0	0		7
Black crappie	0	0	0	0	0	1	4	1	2	9	0		17
Yellow perch	0	0	1	0	1	1	0	0	0	0	0		3
Walleye	4	1	3	0	1	2	1	4	4	3	3		26
Total	76	19	104	177	145	196	227	232	220	157	130		1,683

No sample — adverse river conditions

SUSQUEHANNA SES-ER-OL

TABLE 2.2-41

TOTAL NUMBERS OF FISHES TAKEN AT SSES, 1973

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
American eel	0	0	0	0	0	0	0	0	0	2	0		2
Northern pike	0	0	0	0	0	0	0	0	0	1	0		1
Muskellunge	1	0	1	3	1	0	0	0	1	1	1		9
Chain pickerel	1	0	0	1	1	0	0	0	0	0	0		3
Carp	1	0	49	21	37	13	4	19	4	10	9		167
Cutlips minnow	0	0	1	0	0	0	0	0	0	0	0		1
Comely shiner	4	0	0	0	0	0	0	0	0	0	5		9
Spottail shiner	0	0	0	0	0	0	0	0	0	8	22		30
Swallowtail shiner	0	0	0	0	0	0	0	0	0	0	6		6
Spotfin shiner	0	0	0	0	0	4	24	0	11	9	22		70
Bluntnose minnow	0	0	0	0	0	0	0	7	0	1	10		18
Fallfish	0	0	0	0	0	0	0	0	1	0	0		1
Quillback	0	3	2	23	47	17	26	32	4	17	9		180
White sucker	5	10	68	55	16	24	20	54	10	37	12		311
Northern hog sucker	0	0	0	0	2	0	0	0	0	0	1		3
Shorthead redhorse	0	12	4	51	49	2	7	3	1	11	2		142
White catfish	0	0	0	0	0	4	6	2	4	3	5		24
Yellow bullhead	0	0	0	0	0	0	0	0	0	1	0		1
Brown bullhead	0	0	0	1	0	16	22	25	19	34	48		165
Channel catfish	0	0	0	0	0	12	7	12	6	0	12		49
Rock bass	0	0	0	0	1	0	4	1	7	4	10		27
Redbreast sunfish	0	0	0	0	0	0	0	1	0	0	0		1
Green sunfish	0	0	0	0	0	0	0	1	1	0	0		2
Pumpkinseed	0	0	0	0	0	0	6	0	1	0	0		7
Bluegill	1	0	1	2	1	25	2	24	149	18	12		235
Smallmouth bass	0	0	0	1	1	3	0	1	0	1	1		8
Largemouth bass	1	0	0	1	1	1	3	4	7	3	1		22
White crappie	0	0	0	0	0	0	0	5	0	2	1		8
Black crappie	1	0	0	1	0	5	5	23	14	24	18		91
Tessellated darter	0	0	0	0	0	0	0	2	1	5	0		8
Yellow perch	0	1	0	0	6	0	0	0	0	0	0		7
Walleye	0	1	0	6	3	4	1	1	3	3	0		22
Total	15	27	126	166	166	130	137	217	244	195	207	No sample — adverse river conditions	1,630

TABLE 2.2-42

NUMBER AND SPECIES COMPOSITION (%) OF FISH CAPTURED AT SSES[a]

Date	1971		1972		1973		1974		1975		Total	Total
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Species												
American eel	0	0	1	<0.1	2	0.1	1	<0.1	0	0	4	<0.1
Brown trout	0	0	0	0	0	0	0	0	3	<0.1	3	<0.1
Northern pike	0	0	0	0	1	<0.1	0	0	3	<0.1	4	<0.1
Muskellunge	0	0	0	0	9	0.5	12	0.1	17	0.3	38	0.2
Chain pickerel	1	<0.1	0	0	3	0.2	16	0.1	38	0.6	58	0.3
Stoneroller	0	0	0	0	0	0	2	<0.1	0	0	2	<0.1
Carp	14	0.7	83	6.5	167	10.1	164	1.5	365	5.5	793	3.5
Cutlips minnow	0	0	0	0	1	<0.1	1	<0.1	0	0	2	<0.1
Golden shiner	1	<0.1	2	0.2	0	0	11	0.1	12	0.2	26	0.1
Comely shiner	0	0	6	0.5	9	0.5	302	2.8	4	<0.1	321	1.4
Common shiner	0	0	0	0	0	0	2	<0.1	6	<0.1	8	<0.1
Spottail shiner	102	4.9	20	1.6	30	1.8	1,231	11.3	70	1.1	1,453	6.5
Swallowtail shiner	4	0.2	10	0.8	11	0.7	222	2.0	12	0.2	259	1.1
Rosyface shiner	0	0	0	0	0	0	1	<0.1	1	<0.1	2	<0.1
Spotfin shiner	15	0.7	27	2.1	95	5.7	2,971	27.2	330	5.0	3,438	15.3
Shiner spp.	0	0	0	0	0	0	27	0.2	0	0	27	0.1
Bluntnose minnow	116	5.5	6	0.5	19	1.1	1,020	9.3	124	1.9	1,285	5.7
Blacknose dace	0	0	0	0	0	0	1	<0.1	0	0	1	<0.1
Longnose dace	0	0	0	0	0	0	0	0	1	<0.1	1	<0.1
Creek chub	1	<0.1	0	0	0	0	34	0.3	0	0	35	0.2
Fallfish	0	0	0	0	1	<0.1	108	1.0	33	0.5	142	0.6
Quillback	6	0.3	128	10.1	180	10.9	528	4.8	279	4.2	1,121	5.0
White sucker	175	8.4	102	8.0	311	18.8	833	7.6	1,738	26.4	3,159	14.0
Northern hog sucker	1	<0.1	3	0.2	3	0.2	168	1.5	212	3.2	387	1.7
Shorthead redhorse	2	0.1	19	1.5	142	8.6	381	3.5	481	7.3	1,025	4.6
White catfish	8	0.4	24	1.9	23	1.4	13	0.1	11	0.2	79	0.4
Yellow bullhead	17	0.8	5	0.4	1	<0.1	1	<0.1	14	0.2	38	0.2
Brown bullhead	63	3.0	304	23.9	165	10.0	115	1.1	139	2.1	786	3.5
Channel catfish	2	0.1	29	2.3	45	2.7	18	0.2	6	<0.1	100	0.4
Rock bass	117	5.6	41	3.2	27	1.6	43	0.4	159	2.4	387	1.7
Redbreast sunfish	4	0.2	0	0	1	<0.1	0	0	9	0.1	14	<0.1
Green sunfish	10	0.5	1	<0.1	2	0.1	3	<0.1	4	<0.1	20	<0.1
Pumpkinseed	87	4.2	23	1.8	8	0.5	39	0.4	69	1.0	226	1.0
Bluegill	1,127	53.8	212	16.7	235	14.2	236	2.2	505	7.7	2,315	10.3
Smallmouth bass	7	0.3	6	0.5	8	0.5	198	1.8	649	9.9	868	3.9
Largemouth bass	5	0.2	15	1.2	22	1.3	147	1.3	128	1.9	317	1.4
White crappie	11	0.5	37	2.9	8	0.5	1,309	12.0	293	4.5	1,658	7.4
Black crappie	116	5.5	105	8.3	91	5.5	555	5.1	342	5.2	1,209	5.4
Sunfish spp.	0	0	0	0	0	0	0	0	92	1.4	92	0.4
Tessellated darter	60	2.9	4	0.3	7	0.4	148	1.4	14	0.2	233	1.0
Yellow perch	19	0.9	16	1.3	8	0.5	23	0.2	100	1.5	166	0.7
Walleye	2	0.1	41	3.2	22	1.3	40	0.4	320	4.9	425	1.9
Total	2,093	100.2	1,270	100.1	1,657	100.2	10,924	100.7	6,583	100.4	22,527	101.0

[a]Captures by all gear (electrofisher, seine, trapnets, setlines) were combined for each year.

SUSQUEHANNA SES-ER-OL

TABLE 2.2-43

NUMBER AND SPECIES COMPOSITION (%) OF FISH CAPTURED AT BELL BEND[a]

Date	1971		1972		1973		1974		1975		Total	Total
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Species												
American eel	0	0	0	0	0	0	2	<0.1	1	<0.1	3	<0.1
Brown trout	0	0	1	0.1	0	0	1	<0.1	18	0.2	20	<0.1
Northern pike	0	0	0	0	0	0	0	0	4	<0.1	4	<0.1
Muskellunge	0	0	1	0.1	1	<0.1	12	0.1	20	0.2	34	0.2
Chain pickerel	0	0	1	0.1	5	0.4	92	1.1	56	0.6	154	0.7
Stoneroller	2	0.1	18	2.5	0	0	0	0	0	0	20	<0.1
Carp	21	1.1	30	4.1	95	7.0	260	3.2	430	4.7	836	3.9
Cutlips minnow	4	0.2	0	0	0	0	3	<0.1	0	0	7	<0.1
River chub	0	0	0	0	0	0	1	<0.1	0	0	1	<0.1
Golden shiner	0	0	3	0.4	0	0	3	<0.1	1	<0.1	7	<0.1
Comely shiner	7	0.4	12	1.6	4	0.3	234	2.9	71	0.8	328	1.5
Common shiner	2	0.1	13	1.8	0	0	3	<0.1	2	<0.1	20	<0.1
Spottail shiner	286	14.5	3	0.4	274	20.2	502	6.1	38	0.4	1,103	5.2
Swallowtail shiner	24	1.2	11	1.5	47	3.5	125	1.5	42	0.5	249	1.2
Rosyface shiner	0	0	1	0.1	0	0	8	<0.1	0	0	9	<0.1
Spotfin shiner	134	6.8	93	12.7	111	8.2	2,486	30.3	1,577	17.3	4,401	20.6
Shiner sp.	0	0	0	0	0	0	32	0.4	0	0	32	0.1
Bluntnose minnow	239	12.1	59	8.1	74	5.5	739	9.0	230	2.5	1,341	6.3
Blacknose dace	0	0	3	0.4	0	0	1	<0.1	0	0	4	<0.1
Longnose dace	0	0	1	0.1	0	0	0	0	3	<0.1	4	<0.1
Creek chub	0	0	0	0	0	0	7	<0.1	1	<0.1	8	<0.1
Fallfish	1	<0.1	5	0.7	17	1.3	57	0.7	36	0.4	116	0.5
Quillback	21	1.1	88	12.0	173	12.7	920	11.2	541	5.9	1,743	8.2
White sucker	777	39.5	72	9.8	290	21.4	1,139	13.9	2,846	31.2	5,124	24.0
Northern hog sucker	0	0	6	0.8	2	0.1	48	0.6	135	1.5	191	0.9
Shorthead redhorse	0	0	16	2.2	59	4.3	420	5.1	499	5.5	994	4.7
White catfish	4	0.2	16	2.2	20	1.5	2	<0.1	3	<0.1	45	0.2
Yellow bullhead	2	0.1	0	0	0	0	0	0	7	<0.1	9	<0.1
Brown bullhead	55	2.8	27	3.7	26	1.9	27	0.3	97	1.1	232	1.1
Channel catfish	0	0	9	1.2	11	0.8	3	<0.1	19	0.2	42	0.2
Banded killifish	0	0	0	0	0	0	1	<0.1	0	0	1	<0.1
Rock bass	32	1.6	21	2.9	22	1.6	102	1.2	362	4.0	539	2.5
Redbreast sunfish	0	0	1	0.1	2	0.1	0	0	4	<0.1	7	<0.1
Green sunfish	1	<0.1	0	0	0	0	1	<0.1	3	<0.1	5	<0.1
Pumpkinseed	12	0.6	14	1.9	15	1.1	61	0.7	120	1.3	222	1.0
Bluegill	173	8.8	122	16.7	50	3.7	168	2.0	257	2.8	770	3.6
Smallmouth bass	2	0.1	4	0.5	15	1.1	130	1.6	940	10.3	1,091	5.1
Largemouth bass	11	0.6	8	1.1	14	1.0	75	0.9	167	1.8	275	1.3
White crappie	0	0	3	0.4	0	0	152	1.9	65	0.7	220	1.0
Black crappie	4	0.2	31	4.2	10	0.7	67	0.8	252	2.8	364	1.7
Sunfish spp.	0	0	0	0	0	0	0	0	36	0.4	36	0.2
Tessellated darter	155	7.9	16	2.2	6	0.4	249	3.0	9	<0.1	435	2.0
Yellow perch	0	0	11	1.5	5	0.4	11	0.1	41	0.5	68	0.3
Walleye	0	0	12	1.6	9	0.7	56	0.7	178	2.0	255	1.2
Total	1,969	100.2	732	99.7	1,357	100.0	8,200	100.6	9,111	100.7	21,369	101.0

[a]Captures by all gear (electrofisher, seine, trapnets, setlines) were combined for each year.

TABLE 2.2-44

STOMACH COMPOSITION (% TOTAL VOLUME) OF FISH, 1972-1973

Species	No. Fish	Size Range (mm)	% With Food	Stomach Composition (percent total volume)				
				Plant	Invertebrate	Fish & Eggs	Detritus	Organic Material
American eel	3	771-821	33	11.5	0	88.5	0	0
Chain pickerel	13	270-482	54	0	32.9	67.1	0	0
Carp[a]	176	196-717	41	23.0	12.7	0	51.4	12.5
Golden shiner	2	84-165	50	100.0	0	0	0	0
Comely shiner	9	41-88	66	0	85.3	0	14.7	0
Spottail shiner	38	42-110	94	10.0	16.3	0	25.9	47.8
Swallowtail shiner	1	55	100	50.0	0	0	50.0	0
Rosyface shiner	4	43-93	75	0	87.0	0	0	12.5
Spotfin shiner[a]	65	29-91	62	<0.1	66.7	0	19.1	14.2
Bluntnose minnow	3	42-66	100	16.7	<0.2	0	66.7	16.7
Fallfish	31	53-280	77	3	70.6	0	19.5	6.9
Quillback[a]	124	236-495	60	1.06	16.9	0	53	28.6
White sucker[a]	182	93-717	77	4.4	28.3	2.9	21.4	43.9
Northern hog sucker	32	190-336	81	1.5	51.9	0	9.7	36.9
Shorthead redhorse	114	200-475	54	0.2	31.4	0	19.8	48.6
White catfish	1	365	100	0	6.3	93.7	0	0
Yellow bullhead	1	213	100	0	100	0	0	0
Brown bullhead[a]	52	83-368	58	19.6	40.0	3.2	27.5	14.3
Channel catfish	4	317-551	50	12.5	37.4	31.3	0	18.8
Rock bass	32	75-250	72	0.4	69.0	29.0	1.1	0.5
Redbreast sunfish	2	134-154	100	0	77.2	6.5	0	16.3
Green sunfish	2	70-180	50	0	100	0	0	0
Pumpkinseed	22	65-171	82	3.7	66.9	19.7	9.3	0.4
Bluegill[a]	127	35-231	86	2.4	77.1	0	1.0	5.6
Smallmouth bass[a]	132	56-405	73	<0.1	55.5	44.6	0	0.1
Largemouth bass	27	61-397	62	<0.1	83.2	16.7	0	0
White crappie	19	117-200	53	4.1	20.7	73.2	0	2.0
Black crappie	12	150-283	92	0	35.1	46.0	17.5	1.4
Tessellated darter	3	33-44	100	0	100.0	0	0	0
Yellow perch	32	92-202	75	0	72.7	24.4	0	2.9
Walleye[a]	112	174-631	48	0.1	28.2	70.0	0.1	0

[a] Summary of work from 1972 and 1973 combined.

TABLE 2.2-45

NUMBER OF FISH TAGGED AND PERCENTAGE RECOVERED, 1972-75

Species	No. Tagged 1972	1973	1974	1975	Total No. Tagged	Total No. Recovered	Percent Recovered
American eel	1	2	0	0	3	0	0
Brown trout	1	2	1	12	16	2	12.5
Rainbow trout	0	2	0	0	2	0	0
Northern pike	3	1	1	1	6	3	50.0
Muskellunge	8	23	19	15	65	18	27.7
Chain pickerel	4	0	1	0	5	2	40.0
Carp	19	0	0	0	19	2	10.5
Quillback	3	0	0	0	3	0	0
White sucker	2	0	0	0	2	0	0
Shorthead redhorse	10	0	0	0	10	0	0
White catfish	15	0	0	0	15	0	0
Yellow bullhead	5	0	0	0	5	1	20.0
Brown bullhead	113	0	0	0	113	7	6.2
Channel catfish	16	0	0	0	16	1	6.3
Rock bass	7	0	2	0	9	3	33.3
Smallmouth bass	14	4	1	1	20	5	25.0
Largemouth bass	24	3	7	2	36	9	25.0
White crappie	7	0	0	0	7	2	28.6
Black crappie	25	0	0	0	25	0	0
Yellow perch	2	0	0	0	2	0	0
Walleye	172	231	204	132	739	245	33.2
Total	451	268	236	163	1,118	300	26.8

TABLE 2.2-46

STATUS AND RELATIVE ABUNDANCE OF WATERFOWL[a]

Species	Summer Residents	Transients	Winter Residents
Olor columbianus - whistling swan		U	U
Branta canadensis - Canada goose		A	U
Chen caerulescens - blue goose		R	
C. hyperborea - snow goose		R	
Aix sponsa - wood duck	C	A	
Anas acuta - pintail			
A. carolinensis - green-winged teal		U	
A. discors - blue-winged teal		U	
A. platyrhynchos - mallard	U	C	C
A. rubripes - black duck		C	C
Mareca americana - American widgeon		U	R
Aythya affinis - lesser scaup		U	
A. americana - redhead		U	U
A. collaris - ring-necked duck		R	
A. marila - greater scaup		U	
A. valisineria - canvasback		R	
Bucephala albeola - bufflehead		C	
B. clangula - American goldeneye		U	U
Clangula hyemalis - old squaw		C	
Melanitta deglandi - white-winged scoter		C	
M. perspicillata - surf scoter		U	
Oidemia nigra - common scoter		U	
Mergus cucullatus - hooded merganser		U	
M. merganser - common merganser		C	C
M. serrator - red-breasted merganser		U	
Oxyura jamaicensis - ruddy duck		C	

[a]Survey made between Mocanaqua and Berwick, Pennsylvania, 1971 (A, Abundant; C, Common; U, Uncommon; R, Rarely seen). Nomenclature according to Robbins et al. (Ref. 2.2-62).

TABLE 2.2-47

WATERFOWL-DAYS, 1972[a]

Survey Date	Interval	Number of Days	Mocanaqua to Berwick		Falls to Berwick	
			Number	Waterfowl-Days	Number	Waterfowl-Days
22 Feb	1 Jan - 26 Feb	57	165	9,405	277	15,789
1 Mar[b]	27 Feb - 10 Mar	13	351	4,563	351	4,563
20 Mar[c,d]	11 Mar - 29 Mar	19	71	1,349	102	1,938
6 Apr	30 Mar - 12 Apr	14	210	2,940	385	5,390
18 Apr	13 Apr - 29 Apr	17	173	2,941	360	6,120
9 May	30 Apr - 24 May	25	4	100	6	150
7 Jun	25 May - 15 Jul	52	1	52	4	208
22 Aug	16 Jul - 31 Aug	47	1	47	14	658
9 Sep	1 Sep - 18 Sep	18	3	54	66	1,188
27 Sep[d]	19 Sep - 1 Oct	13	26	338	86	1,118
5 Oct	2 Oct - 20 Oct	19	28	532	123	2,337
3 Nov[d]	21 Oct - 9 Nov	20	0	0	31	620
16 Nov[d]	10 Nov - 1 Dec	22	6	132	120	2,640
14 Dec	2 Dec - 31 Dec	30	51	1,530	136	4,080
Total		366	1,090	23,983	2,061	46,799

[a]Calculations based on data from surveys by boat or airplane.

[b]The 1 March survey was from Mocanaqua to Berwick only.

[c]The 20 March survey was from Coxton Yards to Berwick only.

[d]Survey was taken from an airplane.

TABLE 2.2-48

LOCATIONS OF VEGETATION TRANSECTS ON THE SITE[a]

Transect No.	Transect Length (m)	No. of Plots	Location
1	439	32	Originates 117 m on a line N87°W from the west side of U.S. Highway 11, 221 m north of Pennsylvania State Police, Shickshinny Substation.
2	837	61	Originates 591 m on a line N84°W from the west side of U.S. Highway 11, 183 m north of Pennsylvania State Police, Shickshinny Substation.
3	302	22	Originates 743 m on a line N87°W from the west side of U.S. Highway 11, 488 m north of Pennsylvania State Police, Shickshinny Substation.
4	302	22	Originates 733 m on a line N86°W from the west side of U.S. Highway 11, 518 m north of Pennsylvania State Police, Shickshinny Substation.
5	535	39	Originates 924 m on a line N87°W from the west side of U.S. Highway 11, 594 m north of Pennsylvania State Police, Shickshinny Substation.
6	768	56	Originates 73 m on a line S86°W from the west side of U.S. Highway 11, 792 m north of Pennsylvania State Police, Shickshinny Substation.
7	315	23	Originates 25 m on a line S28°W from the northwest corner of the cemetery, extending S83°W paralleling county road 419.
8	521	38	Originates 142 m on a line N88°W from the west side of U.S. Highway 11, 617 m north of Pennsylvania State Police, Shickshinny Substation.
9	1056	77	Extends westerly and parallel to the Montour-Susquehanna Transmission Line from a point 48 m on a line S20°W from the second 220 KV pole west of U.S. Highway 11.
10	1372	100	Extends westerly and parallel to Township Road 419 from a point 148 m on a line, oriented by the PP&L railroad spur, which originates from the center of the intersection of the spur tract and Township Road 419.
11	741	54	Extends due north from a point on Township Road 419 which is 94 m on a line due west from the northwest corner of the PP&L fence.
12	521	38	Extends easterly from a point 229 m on a line S58°E from the southeast corner of the brick farm house (Mr. Bruce Thomas) on Township Road 436.

[a]Transects 1-8 were sampled in 1973; transects 9-13 were sampled in 1974 (1 m = 3.28 ft).

TABLE 2.2-49

TREES, SAPLINGS, AND SHRUBS OBSERVED ON THE SITE, OCTOBER 1972-DECEMBER 1974[a]

Pinaceae - Pine Family
- Picea glauca - white spruce
- P. rubens - red spruce
- Pinus rigida - pitch pine
- P. strobus - white pine
- P. sylvestris - scotch pine
- P. virginiana - Virginia pine
- Tsuga canadensis - eastern hemlock

Cupressaceae - Cypress Family
- Juniperus virginiana - eastern red cedar
- Thuja occidentalis - northern white cedar

Salicaceae - Willow Family
- Populus grandidentata - large-toothed aspen
- P. tremuloides - quaking aspen
- Salix nigra - black willow

Juglandaceae - Walnut Family
- Carya cordiformis - bitternut hickory
- C. glabra - pignut hickory
- C. ovata - shagbark hickory
- C. tomentosa - mockernut hickory
- Juglans cinerea - butternut
- J. nigra - black walnut

Betulaceae - Birch Family
- Alnus rugosa - speckled alder
- Betula lenta - sweet birch
- B. lutea - yellow birch
- B. nigra - river birch
- B. papyrifera - paper birch
- B. populifolia - gray birch
- Carpinus caroliniana - American hornbeam
- Corylus cornuta - beaked hazlenut
- Ostrya virginiana - eastern hop hornbeam

Fagaceae - Beech Family
- Castanea dentata - American chestnut
- Fagus grandifolia - American beech
- Quercus alba - white oak
- Q. borealis - red oak
- Q. palustris - pin oak
- Q. prinus - chestnut oak
- Q. velutina - black oak

Ulmaceae - Elm Family
- Celtis occidentalis - hackberry
- Ulmus americana - American elm
- U. rubra - slippery elm

Moraceae - Mulberry Family
- Morus rubra - red mulberry

Magnoliaceae - Magnolia Family
- Liriodendron tulipifera - tulip-tree

Lauraceae - Laurel Family
- Lindera benzoin - spicebush
- Sassafras albidum - sassafras

Hamamelidaceae - Witch Hazel Family
- Hamamelis virginiana - witch hazel

Platanaceae - Plane-tree Family
- Platanus occidentalis - sycamore

Rosaceae - Rose Family
- Amelanchier sp. - service berry
- Crataegus sp. - hawthorne
- Prunus avium - sweet cherry
- P. serotina - black cherry
- P. virginiana - choke cherry
- Pyrus malus - apple

Leguminosae - Pulse Family
- Gleditsia triacanthos - honey locust
- Robinia pseudoacacia - black locust

Rutaceae - Rue Family
- Zanthoxylum clava-herculis - prickly ash

Anacardiaceae - Cashew Family
- Rhus radicans - poison ivy
- R. typhina - staghorn sumac
- R. vernix - poison sumac

Aceraceae - Maple Family
- Acer rubrum - red maple
- A. saccharinum - silver maple
- A. saccharum - sugar maple
- A. spicatum - mountain maple

Tiliaceae - Linden Family
- Tilia americana - basswood

Nyssaceae - Tupelo Family
- Nyssa sylvatica - black tupelo

Cornaceae - Dogwood Family
- Cornus alternifolia - alternate-leaf dogwood
- C. florida - flowering dogwood

Ericaceae - Heath Family
- Kalmia latifolia - mountain laurel
- Rhododendron maximum - rosebay rhododendron

Oleaceae - Olive Family
- Fraxinus americana - white ash
- F. pennsylvanica - green ash

Bignoniaceae - Bignonia Family
- Catalpa sp. - catalpa

Rubiaceae - Madder Family
- Cephalanthus occidentalis - buttonbush

Caprifoliaceae - Honeysuckle Family
- Sambucus canadensis - common elder
- Viburnum acerifolium - maple-leaf viburnum
- V. dentatum - arrowwood

[a]Nomenclature according to Gleason and Cronquist (Ref. 2.2-67).

SUSQUEHANNA SES-ER-OL

TABLE 2.2-50

PERCENT RELATIVE DENSITY OF PREDOMINANT TREES IN VEGETATION TRANSECTS ON THE SITE, 1973-1974

	Timber Associations					
	Oak-Pine-Maple (7, 10)[a]	Oak-Birch-Hemlock (4, 12, 8)	Oak-Maple-Birch (3, 11, 9)	Maple-Locust-Cherry (2)	Birch-Maple-Dogwood (1, 5)	Birch-Maple-Pine (6)
Trees						
Birches	--	18.4	21.4	--	38.7	37.5
Oaks	22.1	11.5	17.0	--	--	--
Pines	16.7	--	--	--	--	27.7
Maple	23.4	--	27.3	31.9	12.3	10.3
Cherry	--	--	--	22.0	--	--
Dogwood	--	--	--	--	14.1	--
Hemlock	--	35.5	--	--	--	--
Black locust	--	--	--	17.8	--	--
Other	37.7	34.6	34.3	28.3	34.9	24.5

[a] Transect numbers in parenthesis.

TABLE 2.2-51

HERBACEOUS PLANTS COLLECTED ON THE SITE, OCTOBER 1972-DECEMBER 1974[a]

Lycopodiaceae - Clubmoss Family
- Lycopodium clavatum - staghorn clubmoss
- L. complanatum - running pine
- L. lucidulum - shining clubmoss
- L. obscurum - tree clubmoss

Ophioglossaceae - Adder's-Tongue Family
- Botrychium virginianum - rattlesnake fern

Polypodiaceae - Fern Family
- Adiantum pedatum - maidenfair fern
- Dennstaedtia punctilobula - hay-scented fern
- Dryopteris marginalis - marginal wood-fern
- Matteuccia struthiopteris - ostrich fern
- Onoclea sensibilis - sensitive fern
- Polystichum acrostichoides - Christmas fern
- Pteridium aquilinum - bracken fern

Typhaceae - Cat-tail Family
- Typha latifolia - common cat-tail

Araceae - Arum Family
- Arisaema triphyllum - jack-in-the-pulpit
- Symplocarpus foetidus - skunk cabbage

Commelinaceae - Spiderwort Family
- Commelina sp. - day-flower

Liliaceae - Lily Family
- Allium canadense - wild garlic
- A. vineale - field-garlic
- Erythronium americanum - trout-lily
- Hemerocallis fulva - day-lily
- Lilium canadense - wild yellow lily
- Maianthemum canadense - wild lily-of-the-valley
- Medeola virginiana - Indian cucumber-root
- Ornithogalum umbellatum - star of Bethlehem
- Polygonatum biflorum - Solomon's-seal
- P. canaliculatum - great Solomon's-seal
- Smilacina racemosa - false Solomon's-seal
- Trillium erectum - wake-robin
- Uvularia perfoliata - perfoliate bellwort
- Veratrum viride - false hellebore[b]

Amaryllidaceae - Amaryllis Family
- Hypoxis hirsuta - star-grass

Iridaceae - Iris Family
- Iris prismatica - slender blue flag
- Sisyrinchium sp. - blue-eyed grass

Orchidaceae - Orchid Family
- Cypripedium acaule - stemless moccasin-flower
- Goodyera pubescens - rattlesnake plantain
- Habenaria orbiculata - round-leaved orchid

Moraceae - Mulberry Family
- Cannabis sativa - hemp

Urticaceae - Nettle Family
- Boehmeria cylindrica - false nettle
- Pilea pumila - clearweed
- Urtica dioica - stinging nettle[b]

Polygonaceae - Smartweed Family
- Polygonum caespitosum - long-bristled smartweed
- P. hydropiperoides - mild water-pepper
- P. lapathifolium - pale smartweed
- P. pensylvanicum - Pennsylvania smartweed
- P. sagittatum - arrow-leaved tearthumb
- Rumex acetosella - sheep sorrel
- R. crispus - sour dock
- R. patienta - patience-dock
- Rumex sp. - dock sp.[b]
- Tovara virginiana - Virginia knotweed

Phytolaccaceae - Polkweed Family
- Phytolacca americana - pokeweed

Portulacaceae - Purslane Family
- Claytonia virginica - spring-beauty

Caryophyllaceae - Pink Family
- Cerastium arvense - field chickweed
- Dianthus armeria - deptford-pink
- Lychnis alba - white campion
- Saponaria officinalis - bouncing bet
- Silene sp. - campion

Ranunculaceae - Crowfoot Family
- Anemone canadensis - Canada anemone
- A. quinquefolia - wood anemone
- Anemonella thalictroides - rue anemone
- Coptis trifolia - goldthread
- Ranunculus acris - buttercup
- R. abortivus - kidneyleaf buttercup
- Thalictrum dioicum - early meadow rue
- T. polygamum - tall meadow rue

Berberidaceae - Barberry Family
- Podophyllum peltatum - may apple

Papaveraceae - Poppy Family
- Chelidonium majus - celandine

Fumariaceae - Fumatory Family
- Dicentra cucullaria - Dutchman's breeches
- D. eximia - wild bleeding heart

Cruciferae - Mustard Family
- Alliaria officinalis - garlic mustard
- Barberea vulgaris - winter cress
- Capsella bursa-pastoris - shepherd's purse
- Cardamine pensylvanica - Pennsylvania bitter cress
- Dentaria diphylla - toothwort
- D. laciniata - cut-leaved toothwort
- Hesperis matronalis - dame's rocket
- Nasturtium officinale - watercress
- Sisymbrium altissimum - tumbling mustard
- S. officinale - hedge mustard[b]
- Thlaspi arvense - field penny-cress

Crassulaceae - Orpine Family
- Sedum telephium - live-forever[b]

Saxifragaceae - Saxifrage Family
- Mitella diphylla - mitrewort
- Saxifraga virginiensis - early saxifrage

TABLE 2.2-51 (cont.)

Rosaceae - Rose Family
- Fragaria virginiana - strawberry
- Geum canadense - white avens
- Gillenia trifoliata - bowman's root
- Potentilla canadensis - dwarf cinquefoil
- P. recta - rough-fruited cinquefoil
- Rosa carolina - pasture rose
- Rubus sp. - blackberries

Fabaceae - Legume Family
- Apios americana - ground-nut
- Coronilla varia - crown-vetch
- Desmodium canescens - hoary tick-trefoil
- D. nudiflorum - naked-flowered tick-trefoil
- D. paniculatum - panicled tick-trefoil
- Desmodium sp. - tick-trefoil
- Lathyrus latifolius - everlasting pea
- Lotus corniculatus - birdsfoot trefoil
- Melilotus alba - white sweet clover
- Trifolium agrarium - hop-clover
- T. pratense - red clover
- T. repens - white clover
- Vicia cracca - cow vetch

Oxalidaceae - Wood-sorrel Family
- Oxalis stricta - yellow wood-sorrel

Geraniaceae - Geranium Family
- Geranium carolinianum - Carolina cranesbill
- G. maculatum - wild geranium

Balsaminaceae - Touch-me-not Family
- Impatiens biflora - spotted jewelweed
- I. pallida - pale jewelweed

Malvaceae - Mallow Family
- Abutilon theophrasti - velvet-leaf

Hypericaceae - St. John's-Wort Family
- Hypericum perforatum - common St. John's wort

Violaceae - Violet Family
- Viola blanda - sweet white violet
- V. eriocarpa - smooth yellow violet
- V. papilionacea - common blue violet
- V. pubescens -downy yellow violet
- V. striata - pale violet

Onagraceae - Evening-primrose Family
- Gaura biennis - bienniel gaura
- Oenothra biennis - common evening-primrose

Araliaceae - Ginseng Family
- Aralia nudicaulis - wild sarsaparilla
- Panax trifolium - dwarf ginseng

Umbelliferae - Parsley Family
- Cryptotaenia canadensis - honewort
- Daucus carota - wild carrot
- Osmorhiza claytoni - sweet cicely

Ericaceae - Heath Family
- Chimaphila maculata - spotted wintergreen
- Monotropa uniflora - Indian pipe
- Pyrola elliptica - wintergreen
- Vaccinium sp. - blueberry

Primulaceae - Primrose Family
- Lysimachia quadrifolia - whorled loosestrife
- Trientalis borealis - starflower

Apocynaceae - Dogbane Family
- Vinca minor - periwinkle

Asclepiadaceae - Milkweed Family
- Asclepias syriaca - common milkweed
- A. tuberosa - butterfly-weed

Convolvulaceae - Morning-glory Family
- Convolvulus arvensis - field bindweed
- C. sepium - hedge-bindweed

Hydrophyllaceae - Waterleaf Family
- Hydrophyllum virginianum - Virginia waterleaf

Verbenaceae - Vervain Family
- Verbena hastata - blue vervain

Lamiaceae - Mint Family
- Glecoma hederacea - ground-ivy
- Leonurus cardiaca - common motherwort
- Prunella vulgaris - self-heal
- Scutellaria sp. - skullcap sp.
- Stachys tenuifolia - rough hedge-nettle

Solanaceae - Nightshade Family
- Physalis subglabrata - smooth ground-cherry
- Solanum carolinese - horse-nettle
- S. dulcamara - bittersweet

Scrophulariaceae - Figwort Family
- Chelone glabra - turtlehead
- Linaria vulgaris - butter-and-eggs
- Mimulus ringens - square-stemmed monkey-flower
- Penstemon hirsutus - hairy beard-tongue
- Verbascum blattaria - moth-mullein
- Veronica anagallis-aquatica - water speedwell
- V. officinalis - common speedwell

Orobanchaceae - Broom-rape Family
- Orobanche uniflora - cancer-root

Rubiaceae - Madder Family
- Galium aparine - cleavers
- Houstonia caerulea - bluets

Caprifoliaceae - Honeysuckle Family
- Lonicera japonica - Japanese honeysuckle

Cucurbitaceae - Gourd Family
- Sicyos angulatus - bur-cucumber

Campanulaceae - Harbell Family
- Specularia perfoliata - Venus' looking-glass

Lobeliaceae - Lobelia Family
- Lobelia cardinalis - cardinal-flower
- L. siphilitica - great lobelia

TABLE 2.2-51 (cont.)

Asteraceae - Composite Family
- Achillea millefolium - common yarrow
- Ambrosia artemisiifolia - common ragweed
- Antennaria neglecta - field pussy-toes
- Anthemis cotula - mayweed
- Arctium minus - common burdock
- Aster acuminatus - whorled wood aster
- A. patens - late purple aster
- Aster spp. - aster spp.
- Bidens aristosa - tickseed sunflower
- B. comosa - leafy-bracted beggar-tick
- B. frondosa - sticktight
- Centaurea maculosa - spotted knapweed
- Chrysanthemum leucanthemum - ox-eye daisy
- Cichorium intybus - chicory
- Cirsium arvense - Canada thistle
- Erigeron annuus - daisy flea bane
- Eupatorium fistulosum - hollow Joe-pye-weed
- E. maculatum - spotted Joe-pye-weed
- E. perfoliatum - boneset
- E. rugosum - white snakeroot
- Galinsoga ciliata - galinsoga
- Helenium autumnale - sneezeweed
- Hieracium aurantiacum - King-devil
- Prenanthes alba - white lettuce
- Rudbeckia hirta - black-eyed susan
- Senecio aureus - golden ragwort
- Solidago spp. - goldenrod
- Taraxacum officinale - dandelion
- Vernonia noveboracensis - (New York) ironweed
- Xanthium strumarium - cocklebur

[a] Nomenclature according to Gleason and Cronquist (Ref. 2.2-67).

[b] Observed, not collected.

TABLE 2.2-52

REPTILES AND AMPHIBIANS COLLECTED OR OBSERVED ON THE SITE, 1972-1973

Bufonidae - Toads
Bufo americanus - American toad

Hylidae - Tree Frogs
Hyla crucifer - spring peeper

Ranidae - True Frogs or Ranids
Rana catesbeiana - bullfrog
R. clamitans - green frog
R. pipiens - leopard frog
R. sylvatica - wood frog

Cryptobranchidae - Hellbenders
Cryptobranchus alleganiensis - hellbender[b]

Salamandridae - Newts
Diemictylus viridescens - red-spotted newt

Ambystomidae - Ambystomatid Salamanders
Ambystoma maculatum - spotted salamander

Plethodontidae - Lungless Salamanders
Desmognathus fuscus - dusky salamander
Eurycea bislineata - two-lined salamander
Gyrinophilus porphyriticus - spring salamander
Plethodon cinereus - red-backed salamander

Chelydridae - Snapping Turtles
Chelydra serpentina - snapping turtle

Kinosternidae - Mud and Musk Turtles
Sternothaerus odoratus - stinkpot

Emydidae - Pond and Land Turtles
Chrysemys picta - painted turtle
Clemmys guttata - spotted turtle
C. insculpta - wood turtle
Graptemys geographica - map turtle
Terrapene carolina - box turtle

Colubridae - Colubrid Snakes
Coluber constrictor - northern black snake
Natrix sipedon - common water snake
Thamnophis sirtalis - garter snake

[a]Nomenclature according to Bishop (Ref. 2.2-68) and Conant (Ref. 2.2-69).
[b]Collected at Falls, Pennsylvania.

TABLE 2.2-53

SPECIES OF BIRDS OTHER THAN WATERFOWL OBSERVED NEAR THE SITE, 1973-1974[a]

Gaviiformes - Loons
- Gavia immer - common loon

Podicipediformes - Grebes
- Podiceps auritus - horned grebe
- Podilymbus podiceps - pied-billed grebe

Ciconiiformes - Deep-water Waders
- Ardea herodias - great blue heron
- Botaurus lentiginosus - American bittern
- Bubulcus ibis - cattle egret
- Butorides virescens - eastern green heron
- Casmerodius albus - American egret
- Florida caerulea - little blue heron
- Nycticorax nycticorax - black-crowned night heron

Falconiformes - Vultures and Diurnal Birds of Prey
- Accipiter striatus - sharp-shinned hawk
- Buteo jamaicensis - red-tailed hawk
- B. lagopus - rough-legged hawk
- B. Platypterus - broad-winged hawk
- Cathartes aura - turkey vulture
- Circus cyaneus - marsh hawk
- Falco sparverius - American kestrel
- Pandion haliaetus - osprey

Galliformes - Gallinaceous Birds
- Bonasa umbellus - ruffed grouse
- Meleagris gallopavo - turkey
- Phasianus colchicus - ring-necked pheasant

Gruiformes - Marsh Birds
- Fulica americana - American coot
- Porzana carolina - sora

Charadriiformes - Shore Birds and Gulls
- Actitis macularia - spotted sandpiper
- Capella gallinago - common snipe
- Charadrius vociferus - killdeer
- Larus argentatus - herring gull
- L. delawarensis - ring-billed gull
- L. marinus - great black-backed gull
- L. philadelphia - Bonaparte's gull
- Philohela minor - American woodcock
- Sterna hirundo - common tern
- Totanus flavipes - lesser yellow-legs
- Tringa solitaria - solitary sandpiper

Columbiformes - Pigeons and Doves
- Columba livia - rock dove
- Zenaidura macroura - mourning dove

Cuculiformes - Cuckoos
- Coccyzus americanus - yellow-billed cuckoo

Strigiformes - Nocturnal Birds of Prey
- Bubo virginianus - great-horned owl
- Otus asio - screech owl

Caprimulgiformes - Nighthawks and Whip-poor-wills
- Chordeiles minor - common nighthawk

Apodiformes - Swifts and Hummingbirds
- Archilochus colubris - ruby-throated hummingbird
- Chaetura pelagica - chimney swift

Coraciiformes - kingfishers
- Megaceryle alcyon - belted kingfisher

Piciformes - woodpeckers
- Colaptes auratus - common flicker
- Dryocopus pileatus - pileated woodpecker
- Dendrocopos villosus - hairy woodpecker
- D. pubescens - downy woodpecker

Passeriformes - Perching or Passerine Birds
- Agelaius phoeniceus - red-winged blackbird
- Bombycilla cedrorum - cedar waxwing
- Carpodacus purpureus - purple finch
- Certhia familiaris - brown creeper
- Contopus cirens - eastern wood pewee
- Corvus brachyrhyncos - common crow
- C. ossifragus - fishcrow
- Cyanocitta cristata - blue jay
- Dendroica caerulescens - black-throated blue warbler
- D. castanea - bay-breasted warbler
- D. coronata - yellow-rumped warbler
- D. dominica - yellow-throated warbler
- D. fusca - blackburnian warbler
- D. magnolia - magnolia warbler
- D. palmarum - palm warbler
- D. pensylvanica - chestnut-sided warbler
- D. petechia - yellow warbler
- D. tigrina - Cape May warbler
- Dolichonyx oryzivorus - bobolink
- Dumetella carolinensis - gray catbird
- Empidonax minimus - least flycatcher
- Euphagus carolinus - rusty blackbird
- Geothlypis trichas - yellowthroat
- Hesperiphona vespertina - evening grosbeak

TABLE 2.2-53 (cont.)

Passeriformes (cont.)

Hirundo rustica - barn swallow
Hylocichla fuscescens - veery
H. guttata - hermit thrush
H. mustelina - wood thrush
H. ustulata - Swainson's thrush
Icterus galbula - northern oriole
Iridoprocne bicolor - tree swallow
Junco hyemalis - dark-eyed junco
Melospiza melodia - song sparrow
Mimus polyglottos - mockingbird
Mniotilta varia - black and white warbler
Molothrus ater - brown-headed cowbird
Myiarchus crinitus - great crested flycatcher
Oporornis philadelphia - mourning warbler
Parus sp. - chickadee
Parus atricapillus - black-capped chickadee
P. bicolor - tufted titmouse
Passer domesticus - house sparrow
Passerella iliaca - fox sparrow
Passerina cyanea - indigo bunting
Perisoreus canadensis - gray jay
Petrochelidon fulva - cliff swallow
Pheucticus ludovicianus - rose-breasted grosbeak
Pipilo erythrophthalmus - rufous-sided towhee
Piranga olivacea - scarlet tanager
Polioptila caerulea - blue-gray gnatcatcher
Pooecethes gramineus - vesper sparrow
Progne subis - purple martin
Quiscalus quiscala - common grackle
Regulus calendula - ruby-crowned kinglet
R. satrapa - golden-crowned kinglet
Richmondena cardinalis - cardinal
Riparia riparia - bank swallow
Sayornis phoebe - eastern phoebe
Seiurus aurocapillus - ovenbird
S. noveboracensis - northern waterthrush
Setophaga ruticilla - American redstart
Sialia sialis - eastern bluebird
Sitta carolinensis - white-breasted nuthatch
Spinus tristis - American goldfinch
Spizella arborea - tree sparrow
S. passerina - chipping sparrow
S. pusilla - field sparrow
Stelgidopteryz ruficollis - rough-winged swallow
Sturnella magna - eastern meadowlark
Sturnus vulgaris - starling
Thryothorus ludovicianus - Carolina wren
Toxostoma rufum - brown thrasher
Troglodytes aedon - house wren
T. troglodytes - winter wren
Turdus migratorius - American robin
Tyrannus tyrannus - eastern kingbird
Vermivora ruficapilla - Nashville warbler
Vireo flavifrons - yellow-throated vireo
V. gilvus - warbling vireo
V. olivaceus - red-eyed vireo
Zonothrichia albicollis - white-throated sparrow
Z. leucophrys - white-crowned sparrow

[a]Nomenclature according to Robbins et al. (Ref. 2.2-62).

SUSQUEHANNA SES-ER-OL

TABLE 2.2-54

SPECIES OCCURRENCE AND FAMILY COMPOSITION OF BIRDS OBSERVED NEAR THE SITE, 1973-1974

Family and Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Species Total	Family Total	Family Percent
Ardeidae														28	0.20
Great blue heron			X	X	X	X		X	X				16		
Little blue heron					X								1		
Eastern green heron					X	X	X	X	X				10		
American bittern									X				1		
Anserinae														430	3.01
Canada goose									X	X			430		
Anatinae														223	1.56
Mallard	X		X	X	X	X	X	X	X	X			164		
Black duck											X		5		
Blue-winged teal				X					X				15		
Wood duck			X	X	X	X			X	X			33		
Duck sp.			X			X	X						6		
Cathartidae														13	0.09
Turkey vulture				X	X	X							13		
Accipitridae														49	0.34
Sharp-shinned hawk			X		X								3		
Red-tailed hawk					X	X	X	X	X	X			18		
Broad-winged hawk					X	X			X				4		
Hawk sp.	X	X	X	X	X	X	X	X	X	X	X		24		
Falconidae														23	0.16
American kestrel		X	X	X	X	X	X	X				X	23		
Tetraonidae														69	0.48
Ruffed grouse	X		X	X	X	X	X	X	X	X	X	X	69		
Phasianidae														92	0.64
Ring-necked pheasant	X	X	X	X	X	X	X	X	X	X	X	X	92		
Rallidae														2	0.01
American coot				X									2		
Charadriidae														46	0.32
Killdeer	X	X	X	X	X	X	X	X					46		
Scolopacidae														18	0.13
American woodcock			X	X	X	X				X	X		12		
Solitary sandpiper						X							1		
Lesser yellow-legs			X	X									5		
Laridae														12	0.08
Ring-billed gull				X									10		
Gull sp.				X		X							2		

TABLE 2.2-54 (cont.)

Family and Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Species Total	Family Total	Family Percent
Columbidae														633	4.43
Rock dove	X		X	X	X	X	X	X	X	X	X		342		
Mourning dove		X	X	X	X	X	X	X	X	X	X	X	291		
Cuculidae														33	0.23
Yellow-billed cuckoo					X	X	X	X	X	X			33		
Strigidae														6	0.04
Great-horned owl							X	X	X	X			6		
Trochilidae														1	0.01
Ruby-throated hummingbird						X							1		
Alcedinidae														18	0.13
Belted kingfisher			X	X	X	X	X		X	X	X		18		
Picidae														461	3.23
Common flicker			X	X	X	X	X	X	X	X	X		245		
Pileated woodpecker		X		X	X	X			X	X		X	11		
Hairy woodpecker	X	X	X	X	X	X	X	X	X	X	X	X	32		
Downy woodpecker	X	X	X	X	X	X	X	X	X	X	X	X	165		
Woodpecker sp.	X	X	X	X	X	X							8		
Tyrannidae														203	1.42
Eastern kingbird					X	X	X	X					27		
Great crested flycatcher					X	X	X	X	X				24		
Eastern phoebe		X	X	X	X	X	X	X	X				56		
Least flycatcher				X	X	X	X	X	X				26		
Eastern wood pewee									X				3		
Flycatcher sp.			X	X	X	X	X	X	X	X			67		
Hirundinidae														234	1.64
Tree swallow				X				X					20		
Bank swallow					X	X							12		
Rough-winged swallow					X								2		
Barn swallow				X	X	X	X	X	X				188		
Purple martin				X	X								9		
Swallow sp.						X							3		
Corvidae														611	4.28
Blue jay	X	X	X	X	X	X	X	X	X	X	X	X	194		
Common crow	X	X	X	X	X	X	X	X	X	X	X	X	417		
Paridae														457	3.20
Black-capped chickadee		X	X	X	X	X	X	X	X	X		X	153		
Tufted titmouse	X	X	X	X	X	X	X	X	X	X	X	X	113		
Chickadee sp.	X	X	X	X	X	X	X	X	X	X	X	X	191		
Sittidae														152	1.06
White-breasted nuthatch	X	X	X	X	X	X	X	X	X	X	X	X	152		
Certhiidae														16	0.11
Brown creeper	X		X	X	X	X			X	X		X	16		

TABLE 2.2-54 (cont.)

Family and Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Species Total	Family Total	Family Percent
Troglodytidae														123	0.86
House wren			X	X	X	X	X	X		X			102		
Winter wren									X	X	X	X	6		
Carolina wren									X	X		X	9		
Wren sp.										X	X	X	6		
Mimidae														219	1.53
Mockingbird				X	X		X			X			9		
Gray catbird				X	X	X	X	X	X	X			193		
Brown thrasher				X	X	X	X	X	X				17		
Turdidae														769	5.38
American robin			X	X	X	X	X	X	X	X			649		
Wood thrush			X	X	X	X	X	X	X	X			91		
Hermit thrush				X	X	X				X			6		
Olive-backed thrush					X	X							10		
Veery					X								1		
Thrush sp.					X	X			X		X		12		
Sylviidae														146	1.02
Blue-gray gnatcatcher					X								3		
Golden-crowned kinglet	X	X	X	X	X	X					X	X	125		
Ruby-crowned kinglet		X	X	X	X				X				18		
Bombycillidae														118	0.83
Cedar waxwing					X	X	X		X	X		X	118		
Sturnidae														1234	8.64
Starling	X	X	X	X	X	X	X	X	X	X	X		1234		
Vireonidae														51	0.36
Yellow-throated vireo					X	X	X	X	X				10		
Red-eyed vireo						X			X				9		
Warbling vireo					X	X		X	X				8		
Vireo sp.					X	X	X	X	X	X	X		24		
Parulidae														230	1.61
Black and white warbler					X								2		
Nashville warbler					X				X	X			4		
Yellow warbler				X	X	X	X	X	X	X			34		
Magnolia warbler					X								2		
Cape May warbler									X				2		
Black-throated blue warbler					X								5		
Yellow-rumped warbler				X	X		X	X		X			18		
Blackburnian warbler					X	X			X				3		
Yellow-throated warbler					X								1		
Chestnut-sided warbler					X								2		
Bay-breasted warbler					X								1		
Palm warbler									X	X			4		
Ovenbird				X	X	X							9		

TABLE 2.2-54 (cont.)

Family and Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Species Total	Family Total	Family Percent
Parulidae (cont.)															
Northern water-thrush					X	X							5		
Mourning warbler					X				X				3		
Yellowthroat					X	X	X	X	X				59		
American redstart					X	X							4		
Warbler sp.					X	X	X	X	X	X			72		
Ploceidae														12	0.08
House sparrow	X							X	X	X			12		
Icteridae														3279	22.95
Bobolink					X								4		
Meadowlark			X	X	X	X	X	X	X	X			35		
Red-winged blackbird		X	X	X	X	X	X	X		X			1133		
Northern oriole					X	X	X	X	X				59		
Rusty blackbird			X	X	X	X	X	X	X	X			552		
Purple grackle			X	X	X	X	X		X	X			1378		
Cowbird			X	X	X	X	X			X			64		
Blackbird sp.										X			54		
Thraupidae														24	0.17
Scarlet tanager					X	X							24		
Fringillidae														2877	20.14
Cardinal	X	X	X	X	X	X	X	X	X	X	X	X	274		
Rose-breasted grosbeak					X	X	X	X	X	X	X		71		
Indigo bunting					X	X	X	X	X				85		
Purple finch					X					X			19		
American goldfinch		X		X	X	X	X	X	X	X	X	X	492		
Rufous-sided towhee				X	X	X	X	X	X	X			56		
Vesper sparrow			X	X	X	X	X	X	X	X	X		33		
Dark-eyed junco	X	X	X	X	X				X	X	X	X	130		
Tree sparrow	X	X	X	X	X			X	X	X	X	X	467		
Chipping sparrow				X	X	X	X	X					83		
Field sparrow				X	X	X	X	X	X	X	X	X	295		
White-crowned sparrow				X	X								5		
White-throated sparrow	X	X	X	X	X	X			X	X	X	X	252		
Fox sparrow				X									5		
Song sparrow	X	X	X	X	X	X	X	X	X	X	X	X	414		
Sparrow sp.	X					X	X	X	X				196		
														1374	9.62
Unknown	X	X	X	X	X	X	X	X	X	X	X	X	1374		
Total														14286	99.99

TABLE 2.2-55

MAMMALS COLLECTED OR OBSERVED ON THE SITE, OCTOBER 1972-DECEMBER 1974[a]

Didelphidae - Opossums
- *Didelphis marsupialis* - Opossum

Talpidae - Moles
- *Condylura cristata* - star-nosed mole[b]

Soricidae - Shrews
- *Blarina brevicauda* - short-tailed shrew

Vespertilionidae - Vespertilionid Bats
- *Myotis lucifugus* - little brown bat

Leporidae - Rabbits and Hares
- *Sylvilagus floridanus* - eastern cottontail

Sciuridae - Squirrels and Relatives
- *Marmota monax* - eastern woodchuck
- *Sciurus carolinensis* - eastern gray squirrel
- *S. niger* - fox squirrel
- *Tamias striatus* - eastern chipmunk
- *Tamiasciurus hudsonicus* - red squirrel

Castoridae - Beavers
- *Castor canadensis* - beaver

Cricetidae - Cricetids
- *Microtus pennsylvanicus* - meadow vole
- *Ondatra zibethicus* - muskrat
- *Peromyscus* sp. - mouse sp.
- *Pitymys pinetorum* - pine vole

Muridae - Murids
- *Mus musculus* - house mouse
- *Rattus norvegicus* - Norway rat

Zapodidae - Jumping Mice
- *Napaeozapus insignis* - woodland jumping mouse
- *Zapus hudsonius* - meadow jumping mouse

Erethizontidae - New World Porcupines
- *Erethizon dorsatum* - porcupine

Canidae - Foxes
- *Urocyon cinereoargenteus* - gray fox
- *Vulpes fulva* - red fox

Procyonidae - Raccoons
- *Procyon lotor* - raccoon

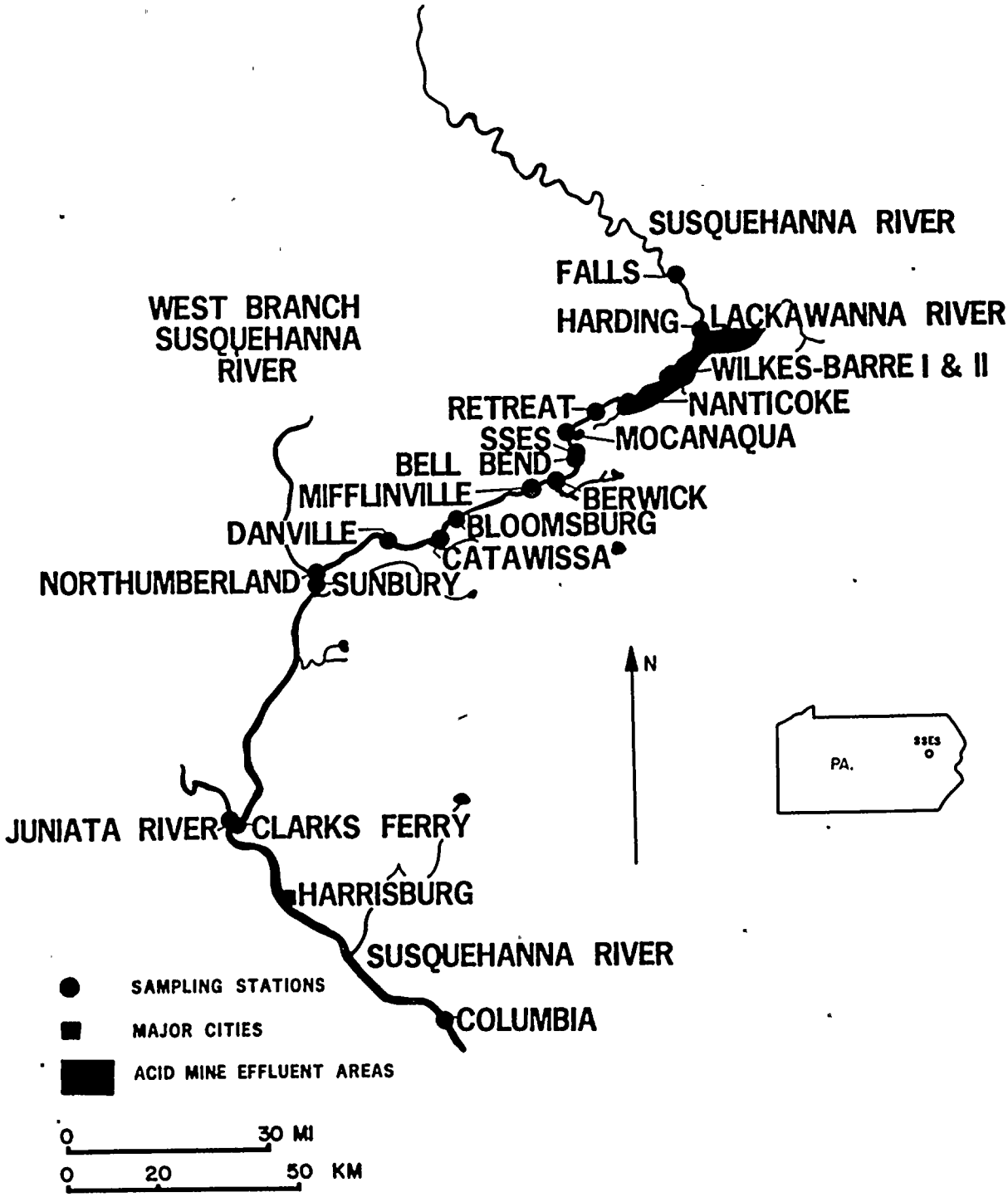
Mustelidae - Mustelids
- *Mephitis mephitis* - striped skunk
- *Mustela frenata* - long-tailed weasel[c]

Cervidae - Cervids
- *Odocoileus virginianus* - white-tailed deer

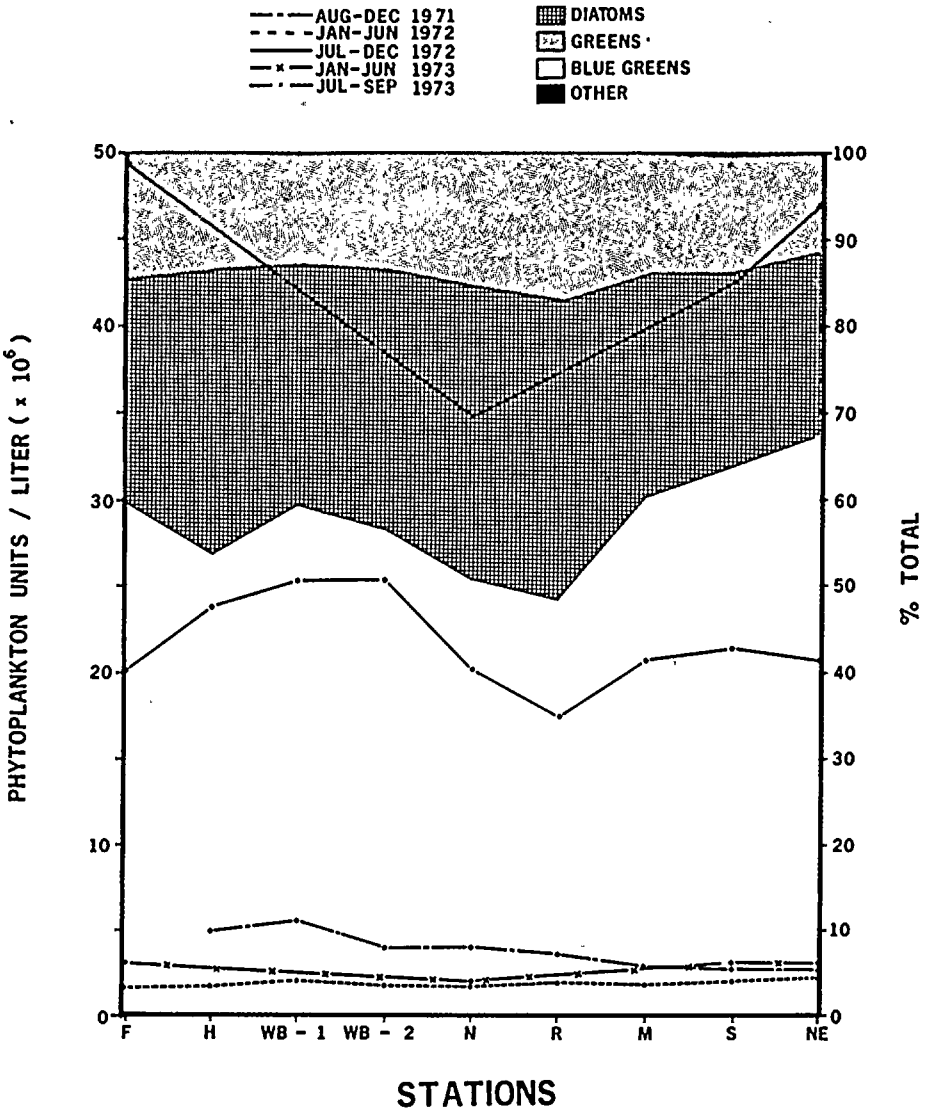
[a]Nomenclature according to Burt and Grossenheider (Ref 2.2-70).

[b]Collected in field approximately 3.5 km (2.2 mi) east of the Biological Laboratory.

[c]Collected as road kill on Route 239, Huntington Mills, Pennsylvania.

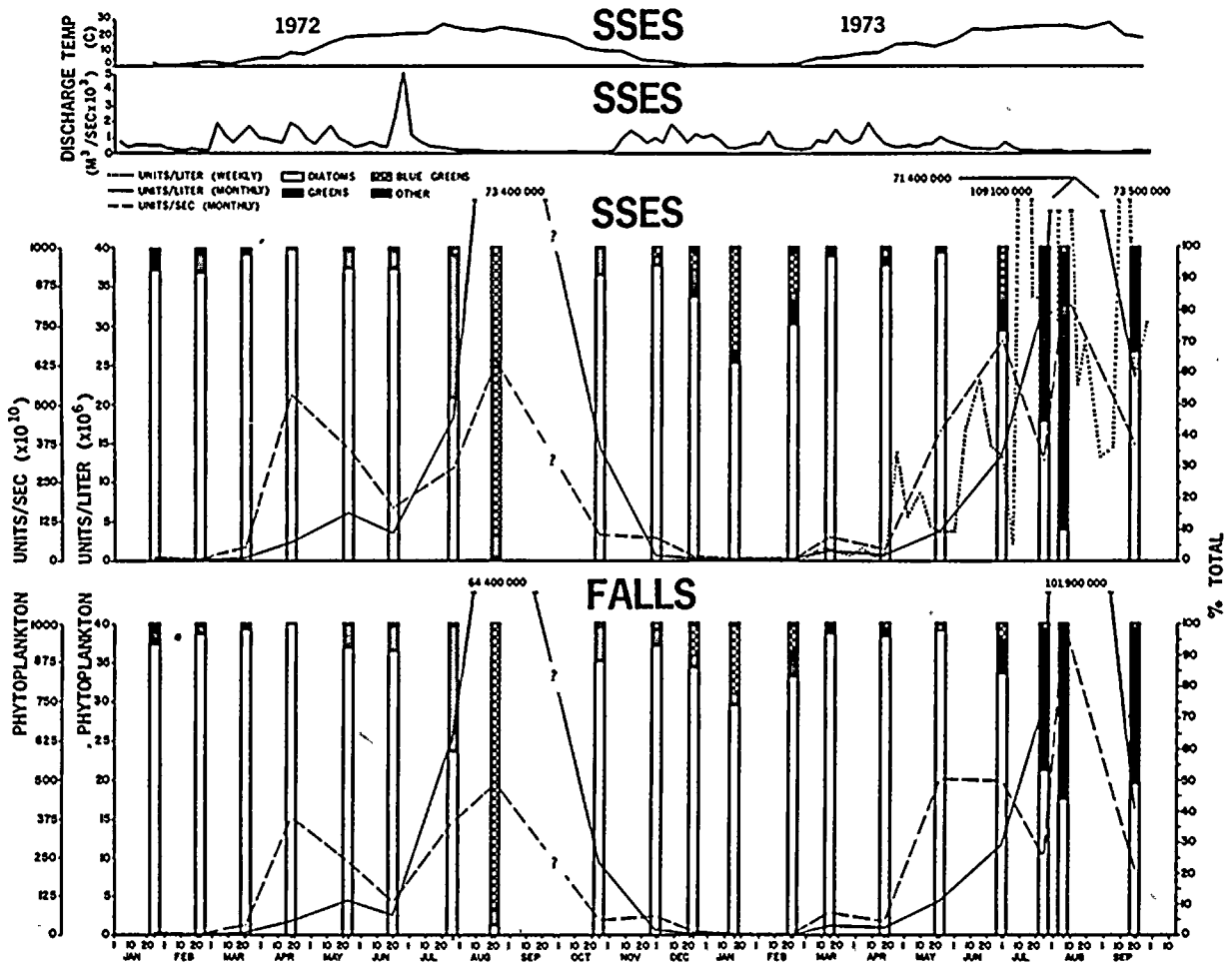


SUSQUEHANNA STEAM ELECTRIC STATION ER–OPERATING LICENSE STAGE UNITS 1 AND 2
MAP OF THE RIVER STUDY AREA
FIGURE 2.2-1.



*See text for station designations.

SUSQUEHANNA STEAM ELECTRIC STATION ER–OPERATING LICENSE STAGE UNITS 1 AND 2
MEAN PHYTOPLANKTON DENSITY FOR 5 TIME INTERVALS, AND COMPOSITION FOR JULY–DECEMBER 1972.*
FIGURE 2.2-2.

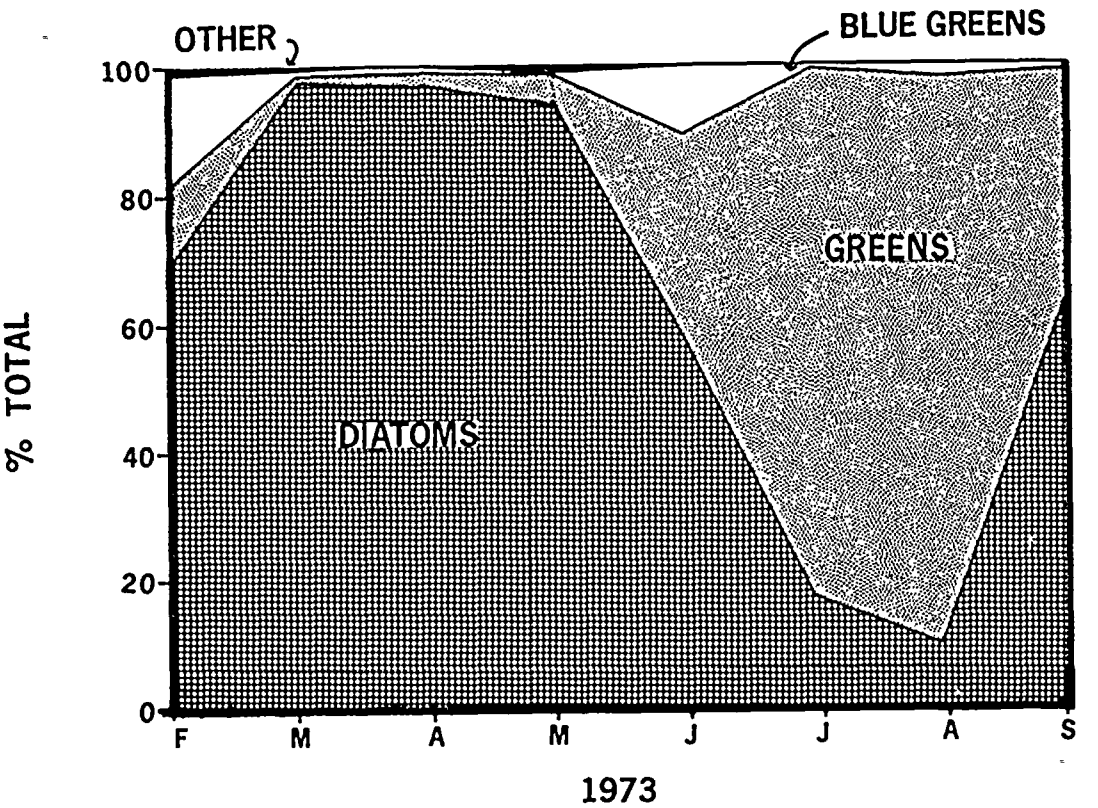


*River discharge and temperature data are from SSES.

SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

STANDING CROP DENSITY AND COMPOSITION OF THE PHYTOPLANKTON COMMUNITY, 1972–1973.*

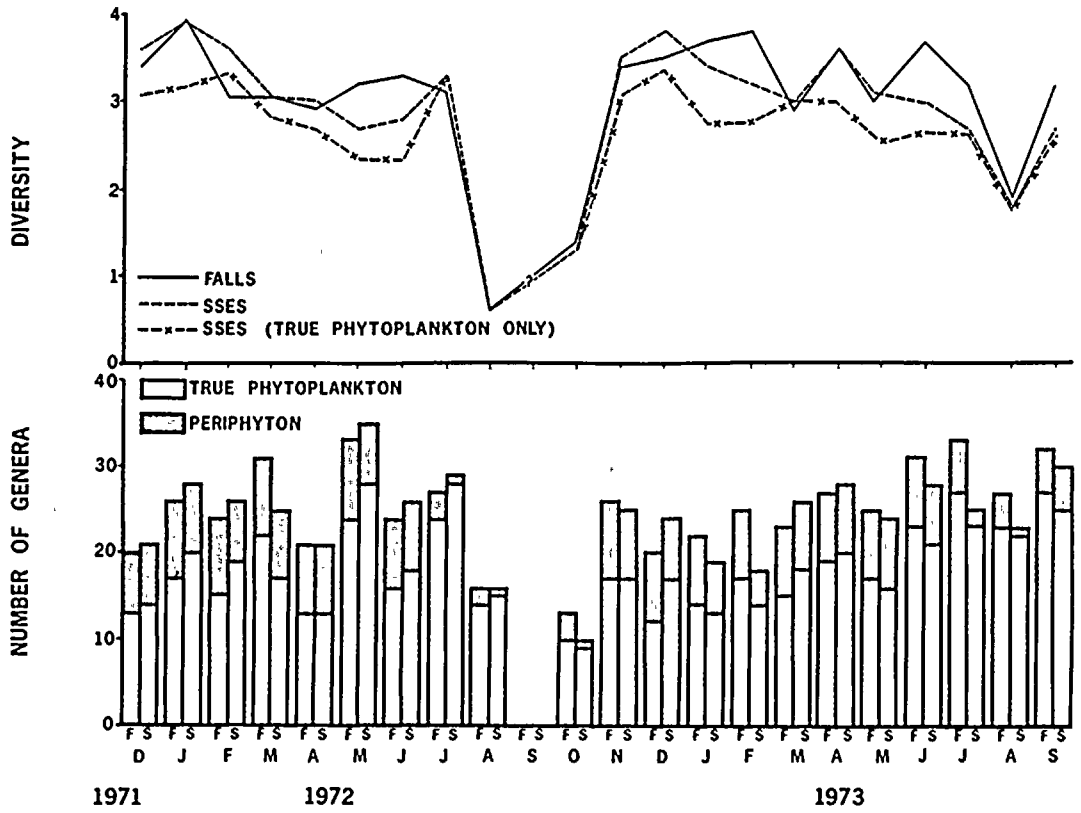
FIGURE 2.2-3.



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

COMPOSITION OF THE PHYTOPLANKTON COMMUNITY AT SSES DETERMINED FROM WEEKLY SAMPLES IN 1973.

FIGURE 2.2-4.

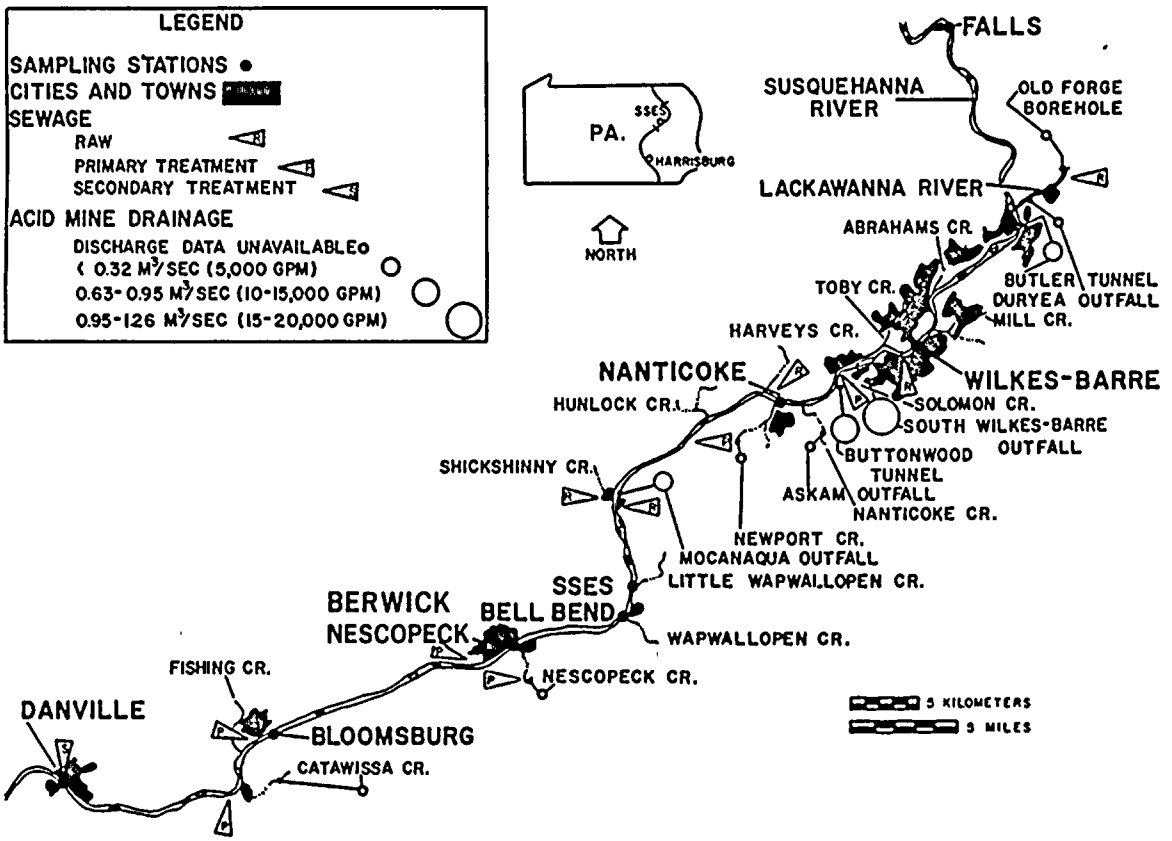


*Samples were taken monthly at Falls (F) and SSES (S), December 1971-September 1973.

SUSQUEHANNA STEAM ELECTRIC STATION
ER-OPERATING LICENSE STAGE
UNITS 1 AND 2

DIVERSITY AND NUMBER OF ALGAE GENERA IN PHYTOPLANKTON SAMPLES.*

FIGURE 2.2-5.

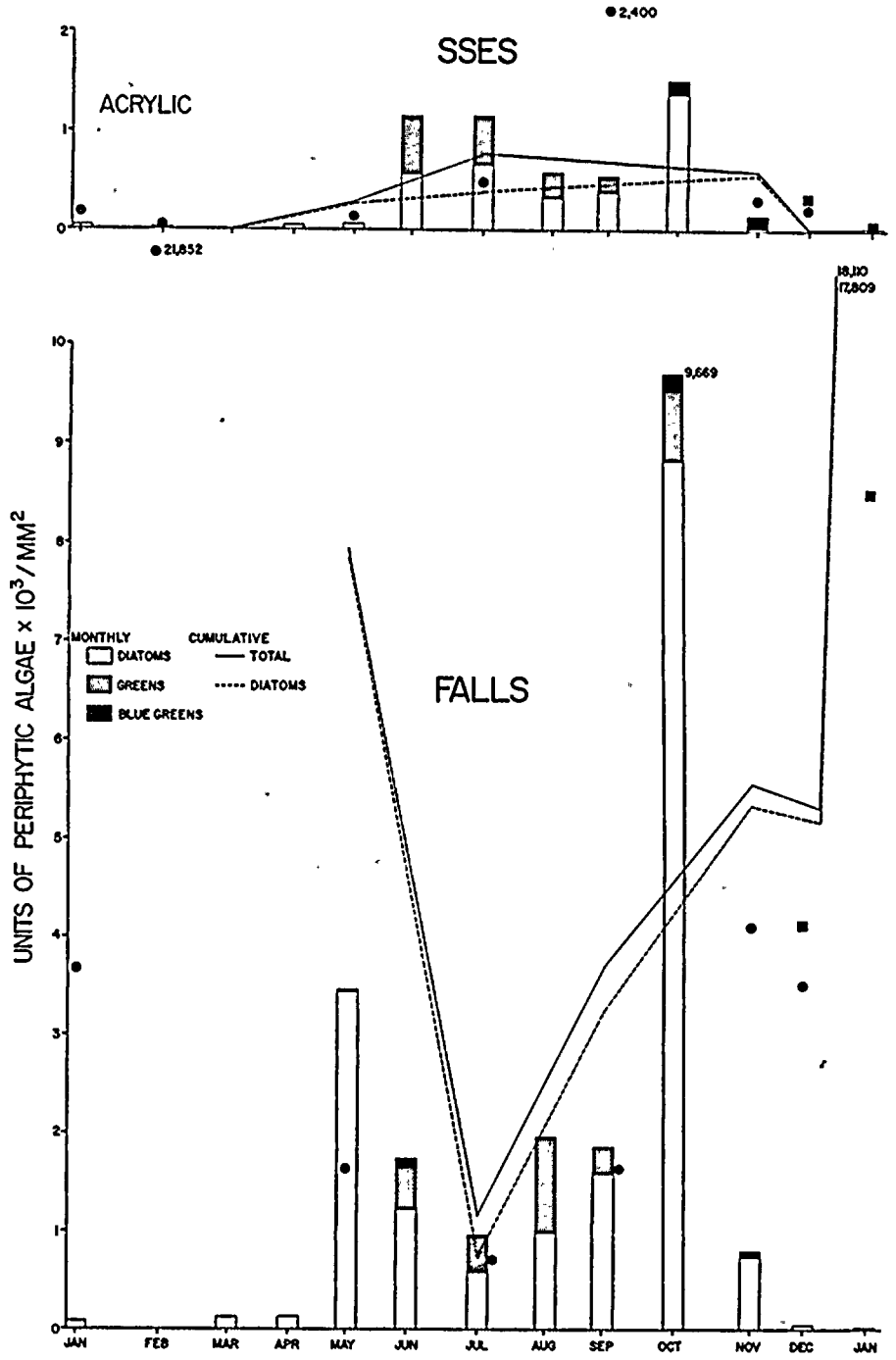


*Sewage and acid mine drainages, 1975.

SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

PERIPHYTON AND MACROINVERTEBRATE SAMPLING STATIONS.*

FIGURE 2.2-6.

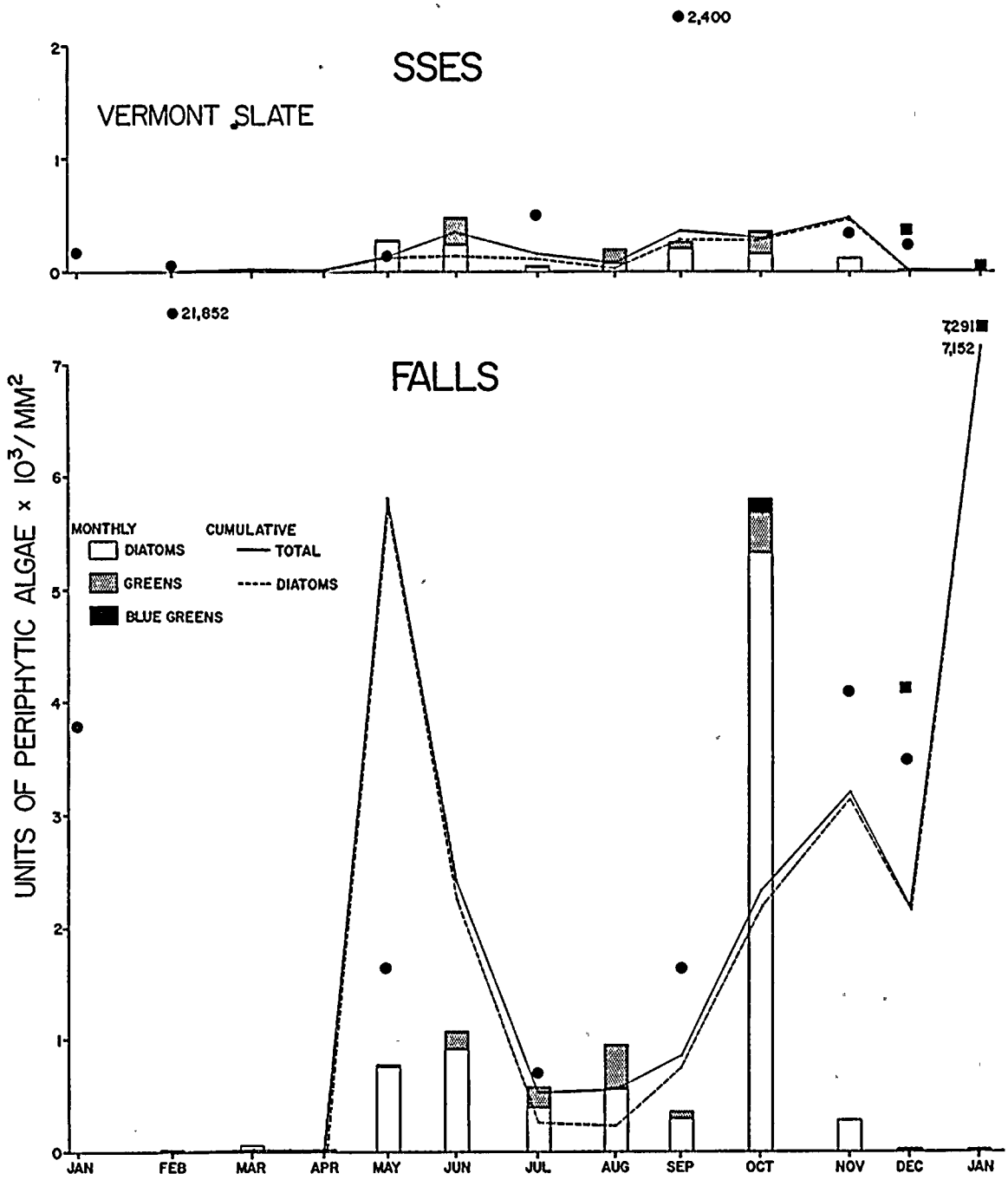


*Circles and squares denote crops on stones near shore and in the channel, respectively.

SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

ALGAE ON PLATES AT FALLS AND SSES, 1974 AND JANUARY 1975.*

FIGURE 2.2-7.

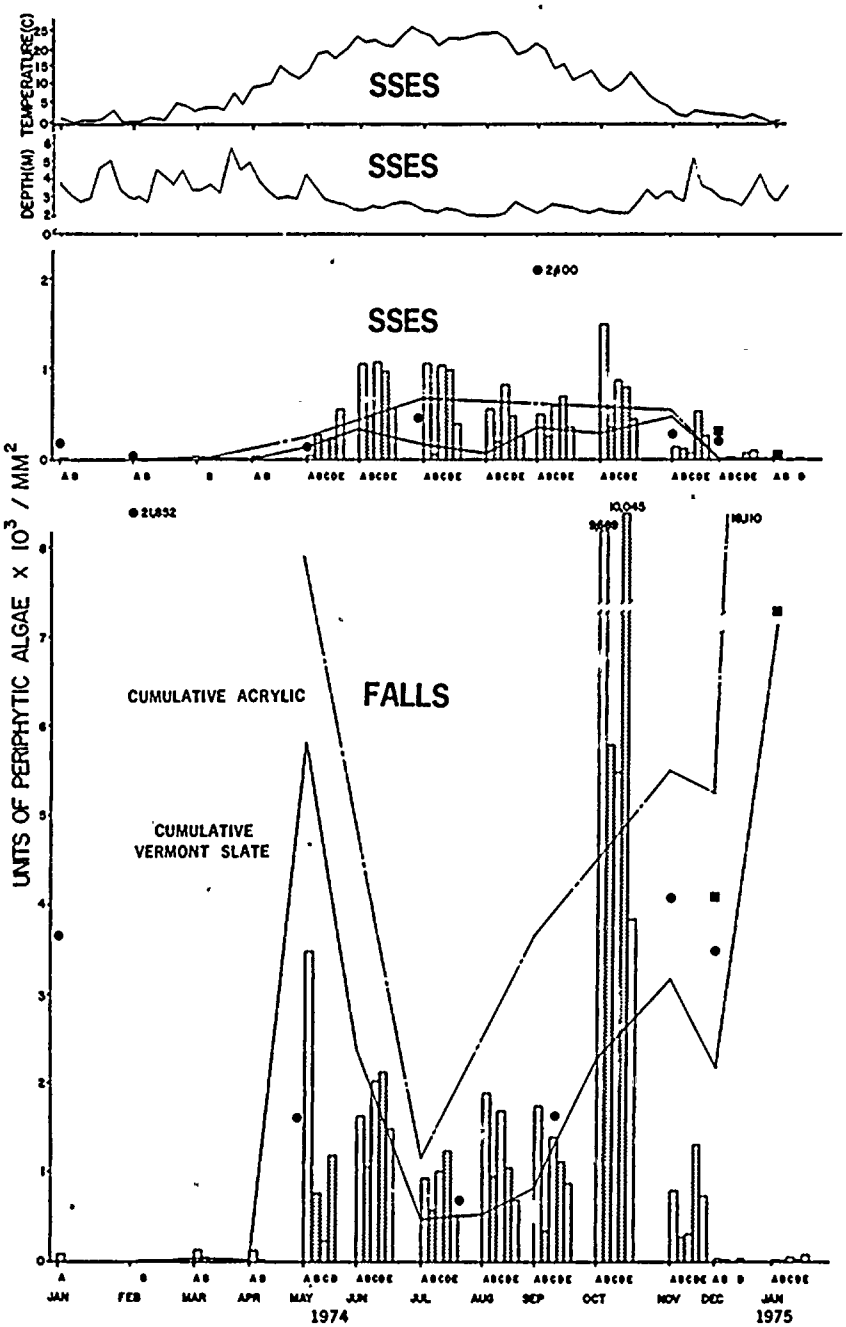


*Circles and squares denote crops on stones near shore and in the channel, respectively.

SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

STANDING CROP OF ALGAE, 1974 AND JANUARY 1975.*

FIGURE 2.2-8.

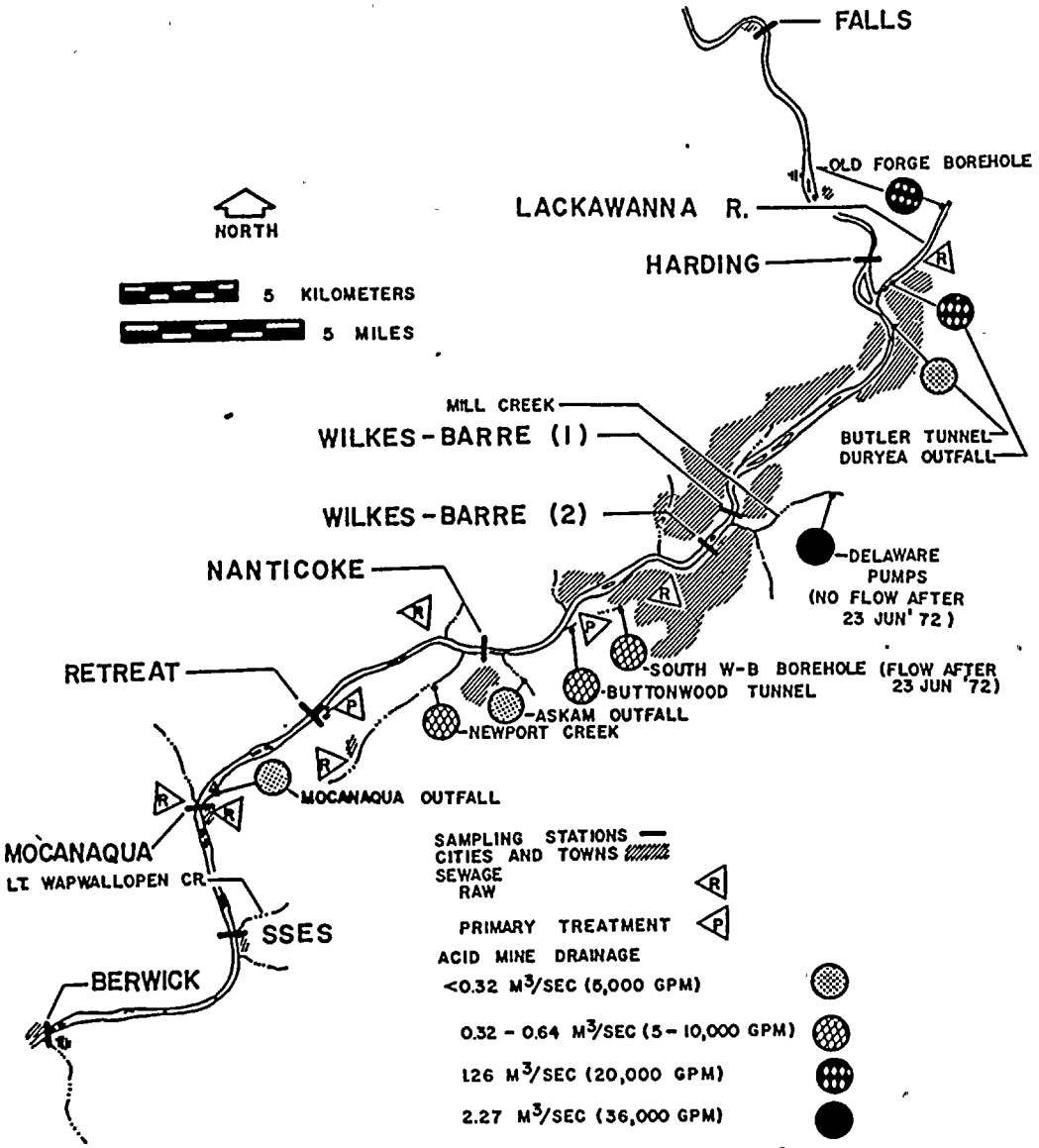


*(A, acrylic; B, Vermont slate; C, smooth glass; D, frosted glass; E, sandy slate). Depths in the channel (2-5 day periods) and water temperature (5-day means, about 20 m from shore) are for SSES. Circles and squares denote crops on stones near shore and in the channel, respectively.

SUSQUEHANNA STEAM ELECTRIC STATION
ER--OPERATING LICENSE STAGE
UNITS 1 AND 2

ALGAE ON MONTHLY PLATES, 1974 AND JANUARY 1975.*

FIGURE 2.2-9.

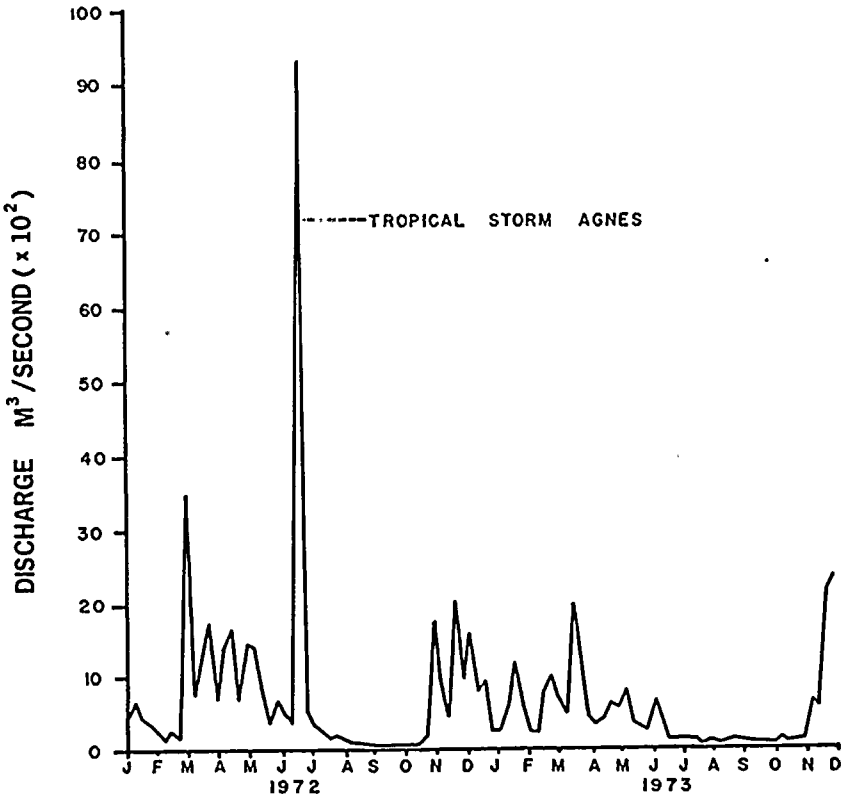


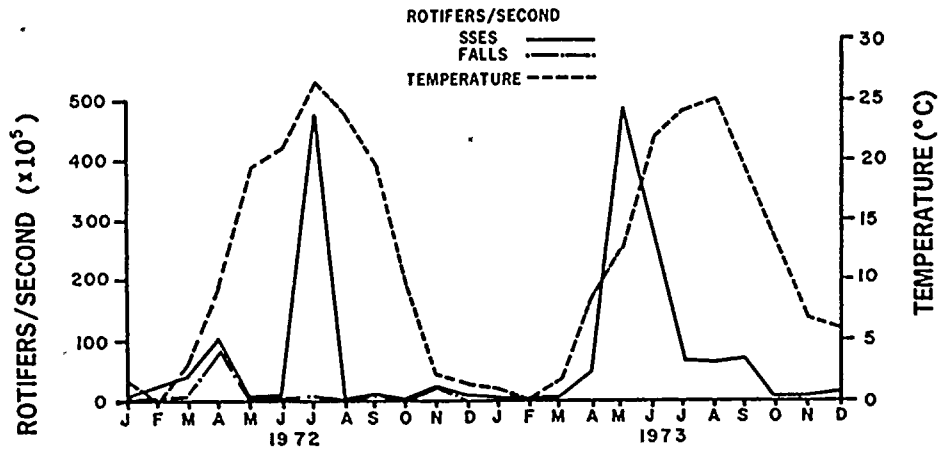
*Sewage and acid mine drainages, 1972.

SUSQUEHANNA STEAM ELECTRIC STATION
ER-OPERATING LICENSE STAGE
UNITS 1 AND 2

ZOOPLANKTON SAMPLING STATIONS.*

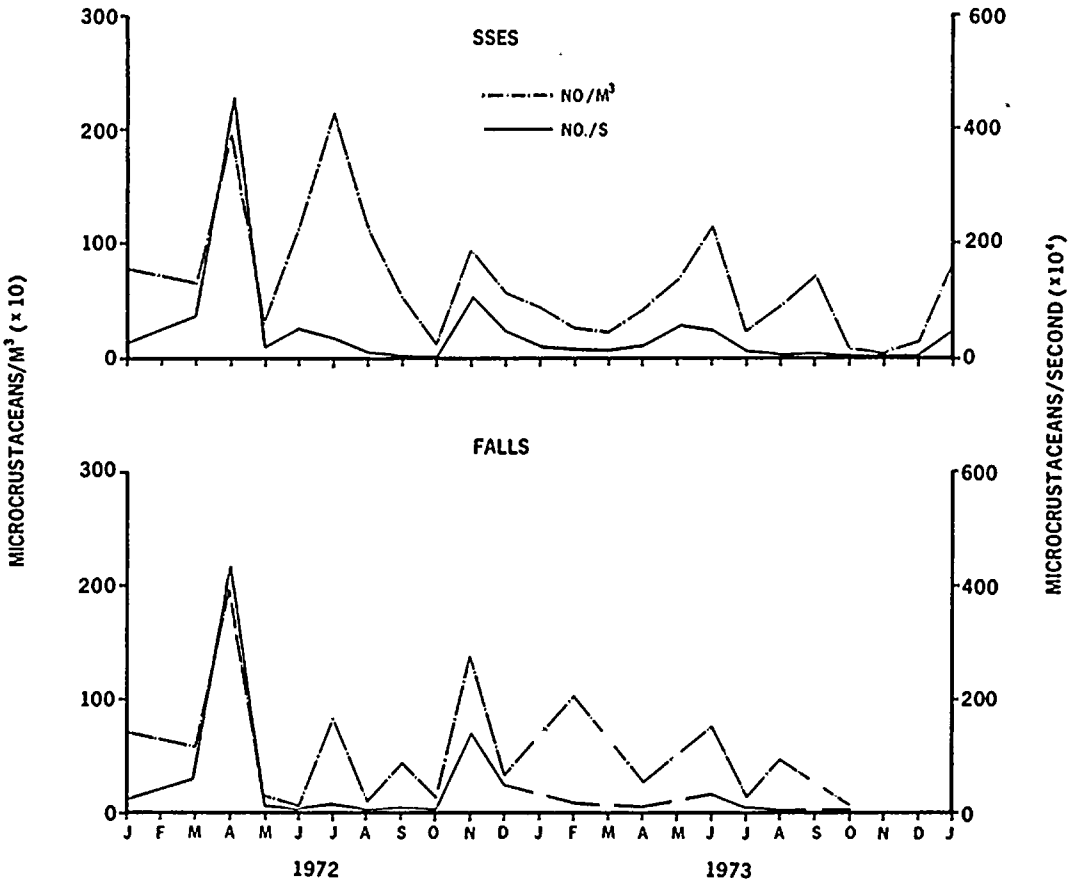
FIGURE 2.2-10.





*Water temperature and river discharge data are from SSES.

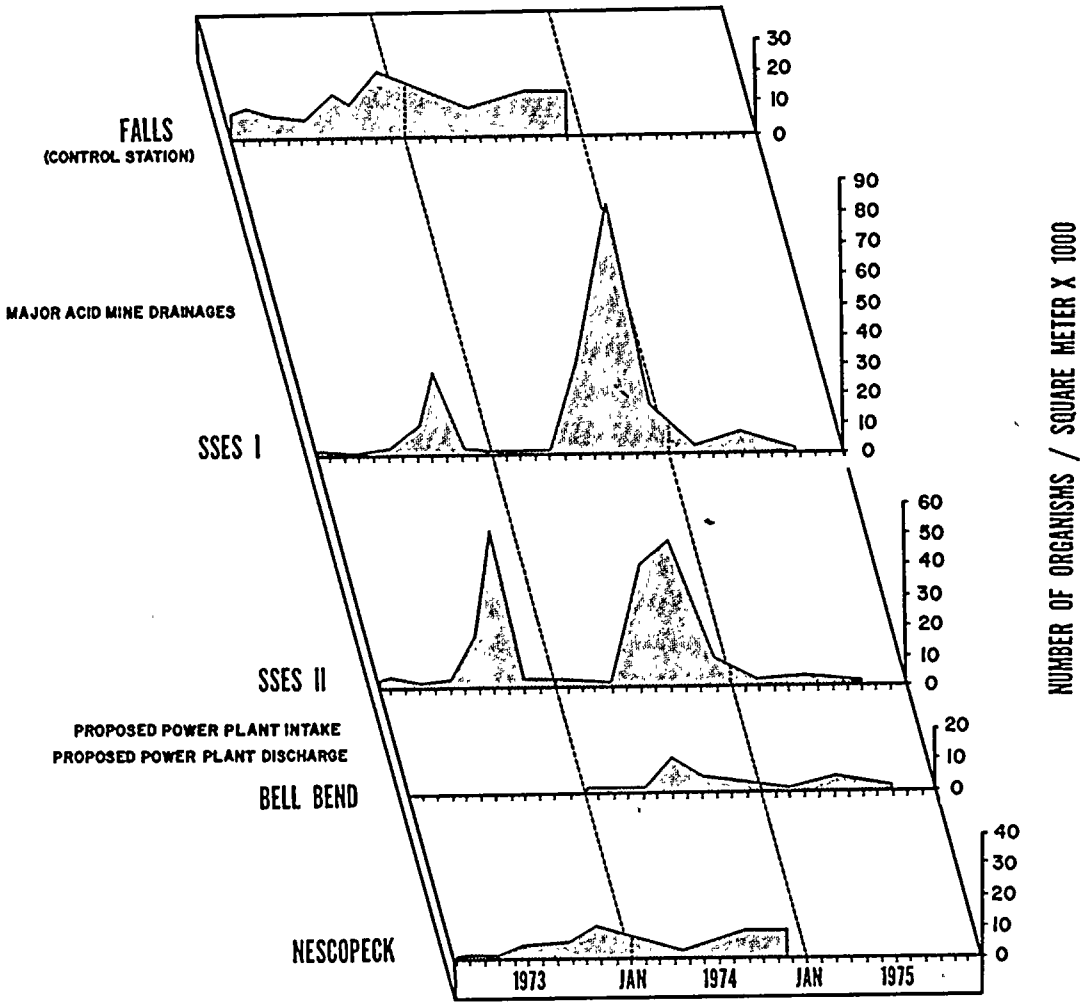
SUSQUEHANNA STEAM ELECTRIC STATION ER–OPERATING LICENSE STAGE UNITS 1 AND 2
ROTIFER STANDING CROP.*
FIGURE 2.2-11.



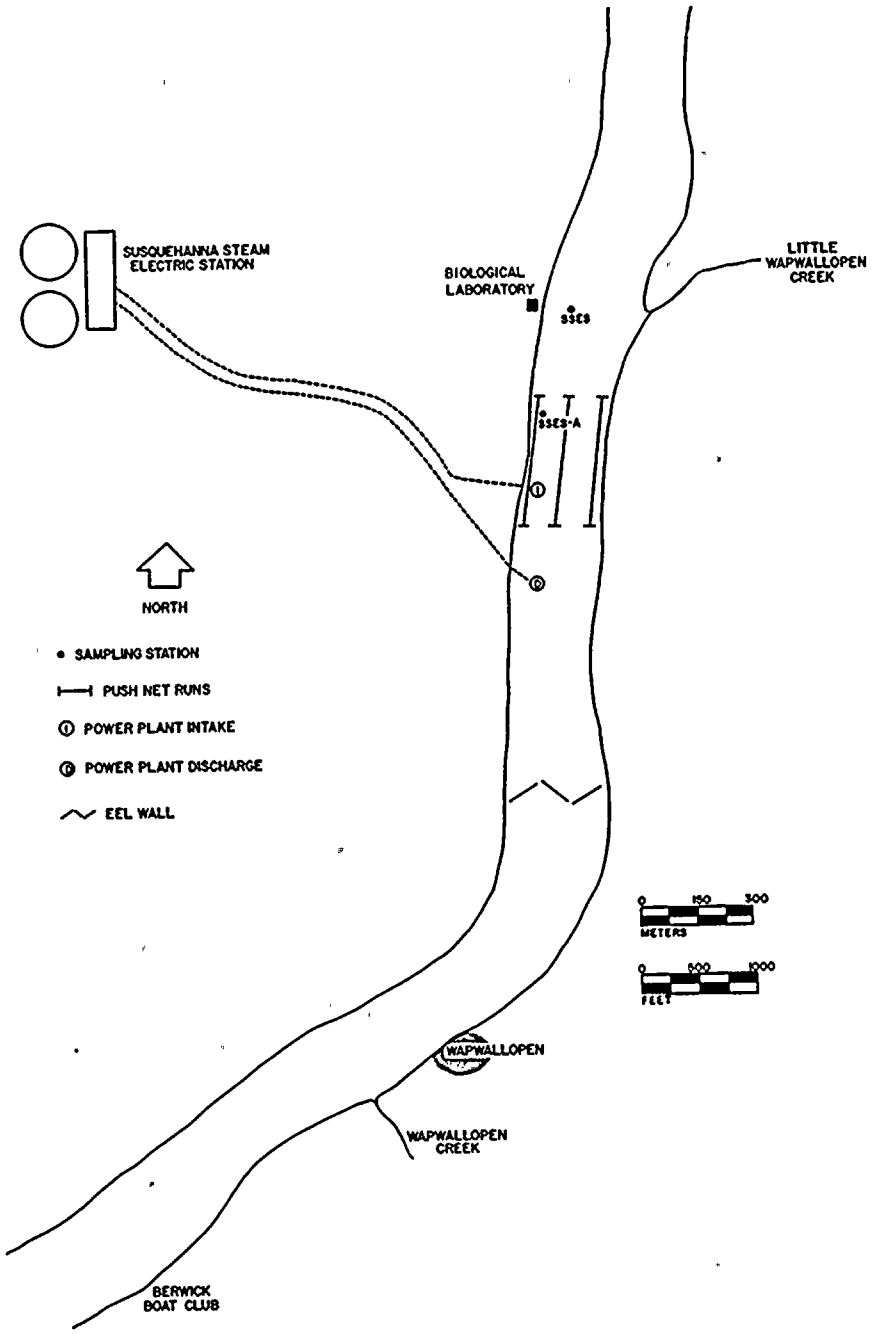
SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

DENSITY AND STANDING CROP OF MICROCRUSTACEANS.

FIGURE 2.2-12.



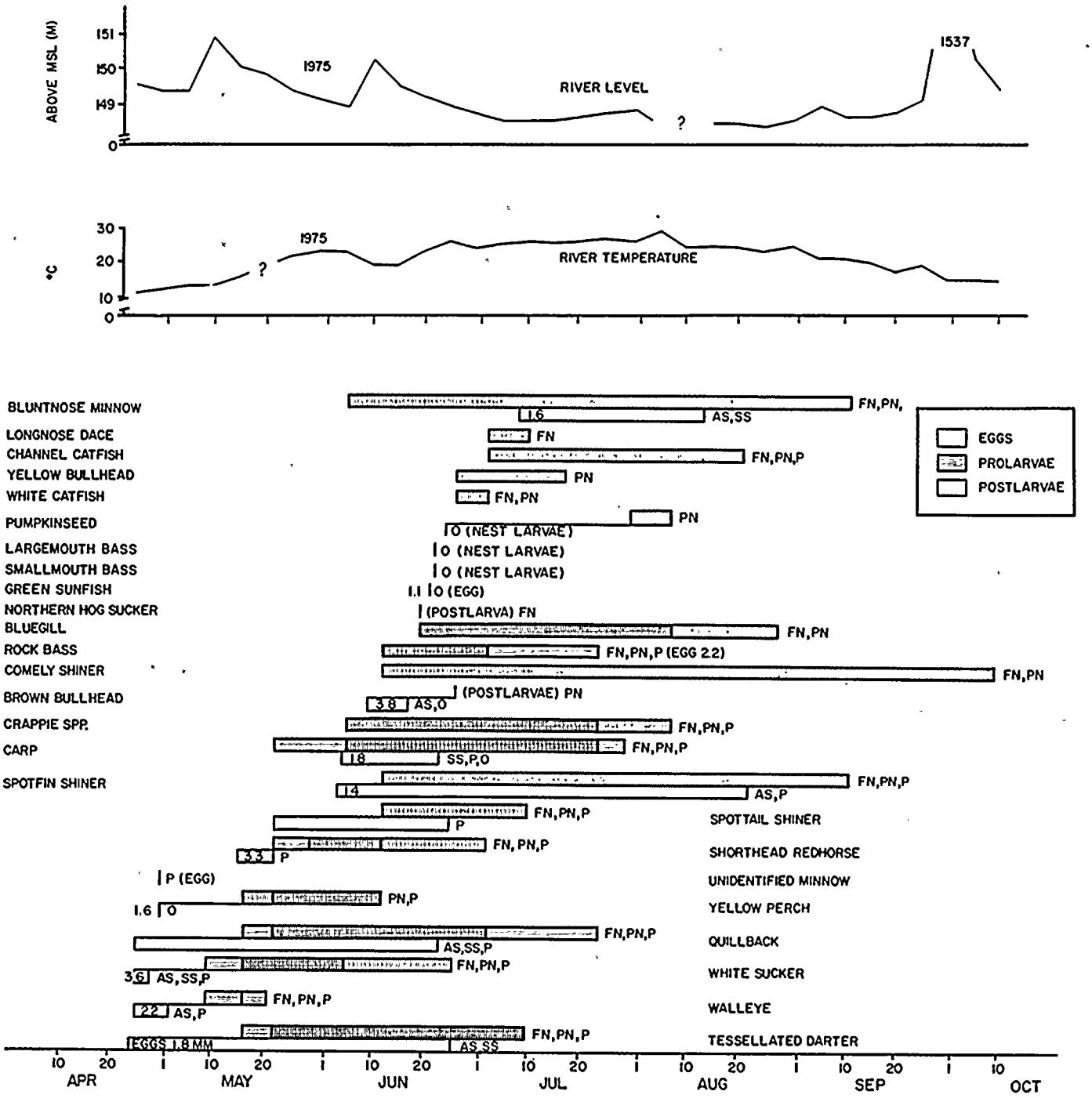
SUSQUEHANNA STEAM ELECTRIC STATION ER–OPERATING LICENSE STAGE UNITS 1 AND 2
MACROINVERTEBRATE DENSITIES, 1973–75.
FIGURE 2.2-13.



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

MONITORING STATIONS ON THE SUSQUEHANNA RIVER, 1972–75.

FIGURE 2.2-14.

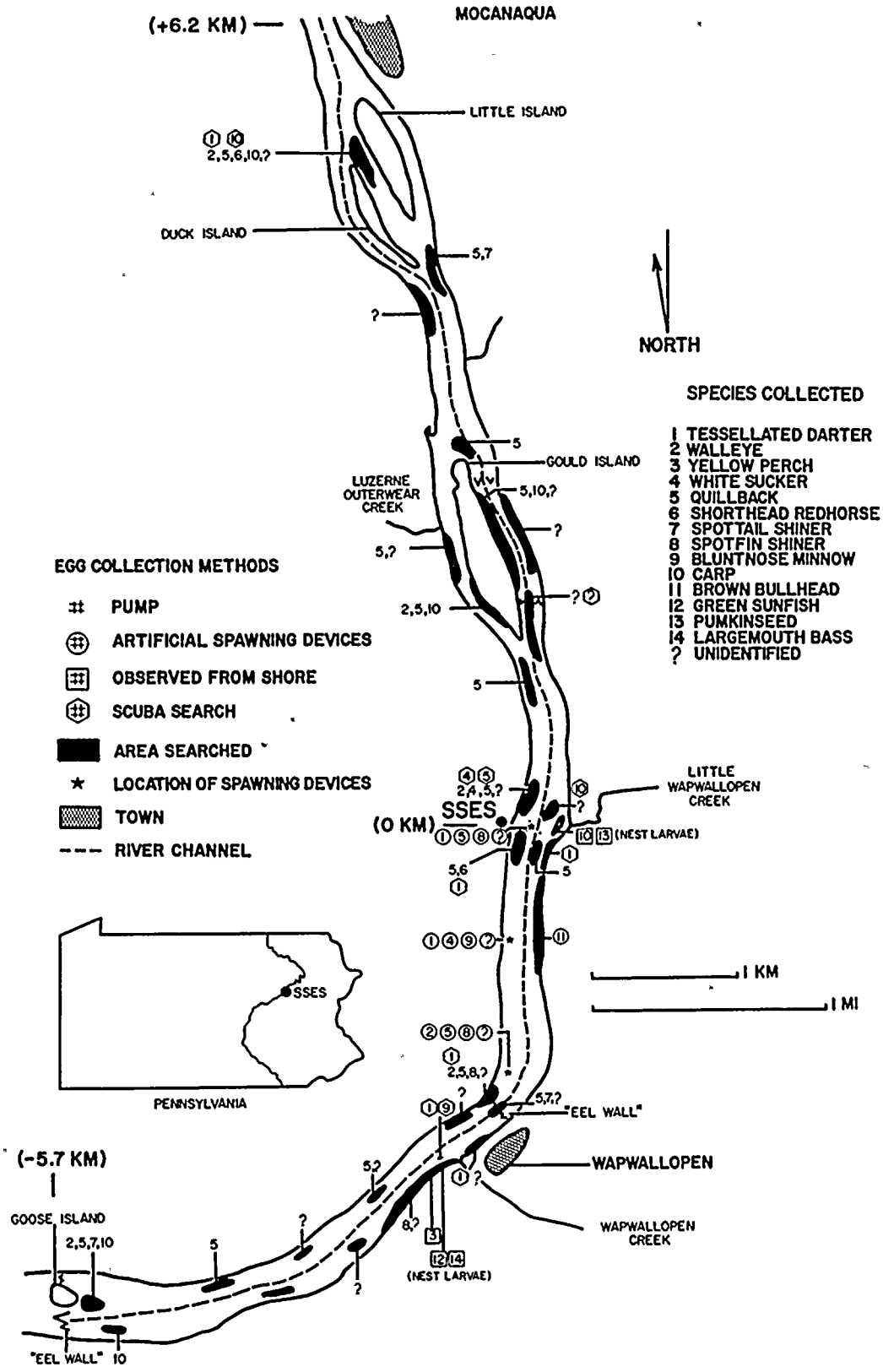


*Decimal values are mean diameters.

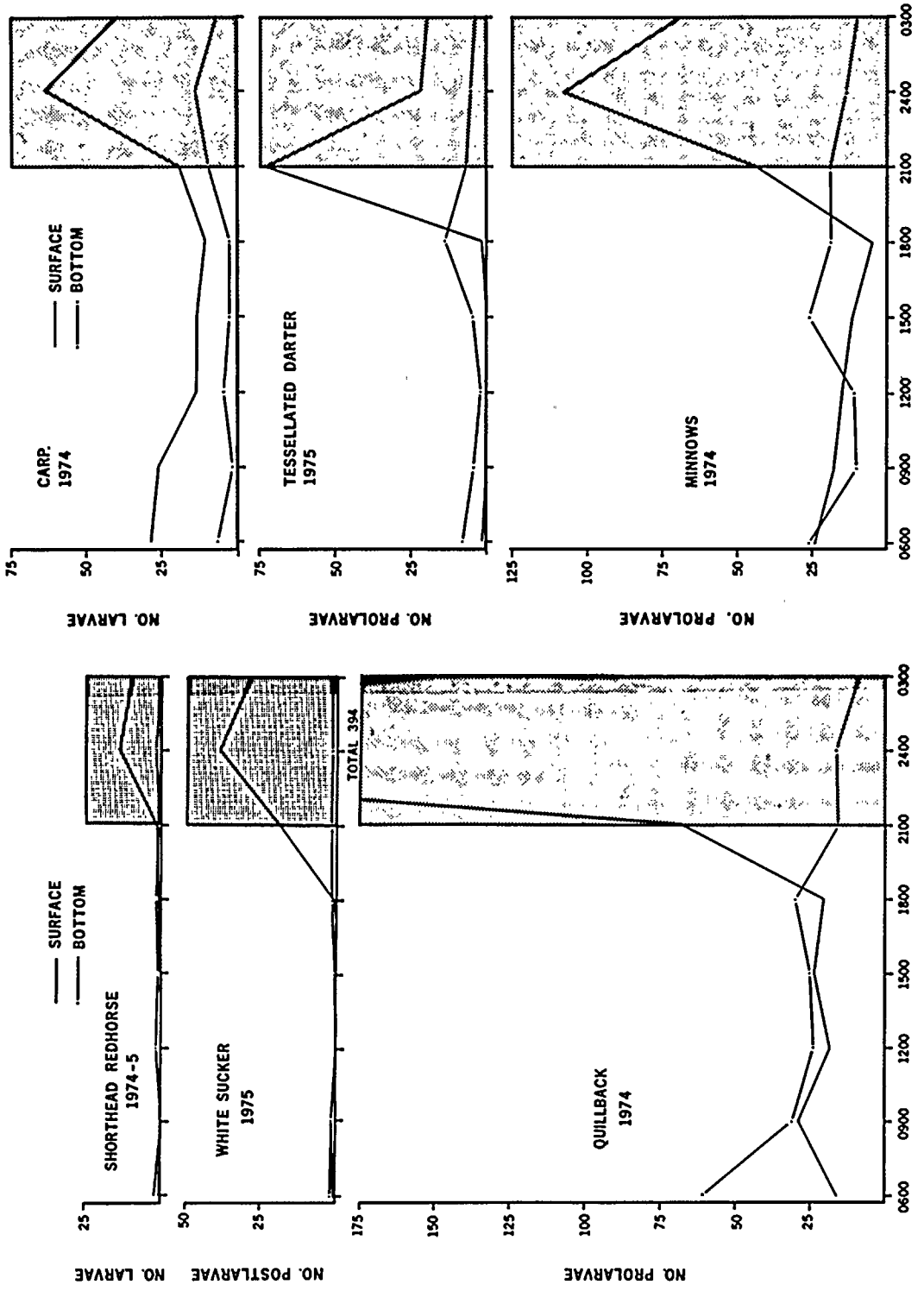
SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

OCCURRENCE OF FISH EGGS AND LARVAE, 1974–1975.*

FIGURE 2.2-15.



SUSQUEHANNA STEAM ELECTRIC STATION ER–OPERATING LICENSE STAGE UNITS 1 AND 2
AREAS WHERE FISH EGGS WERE COLLECTED, 1974–1975.
FIGURE 2.2-16.

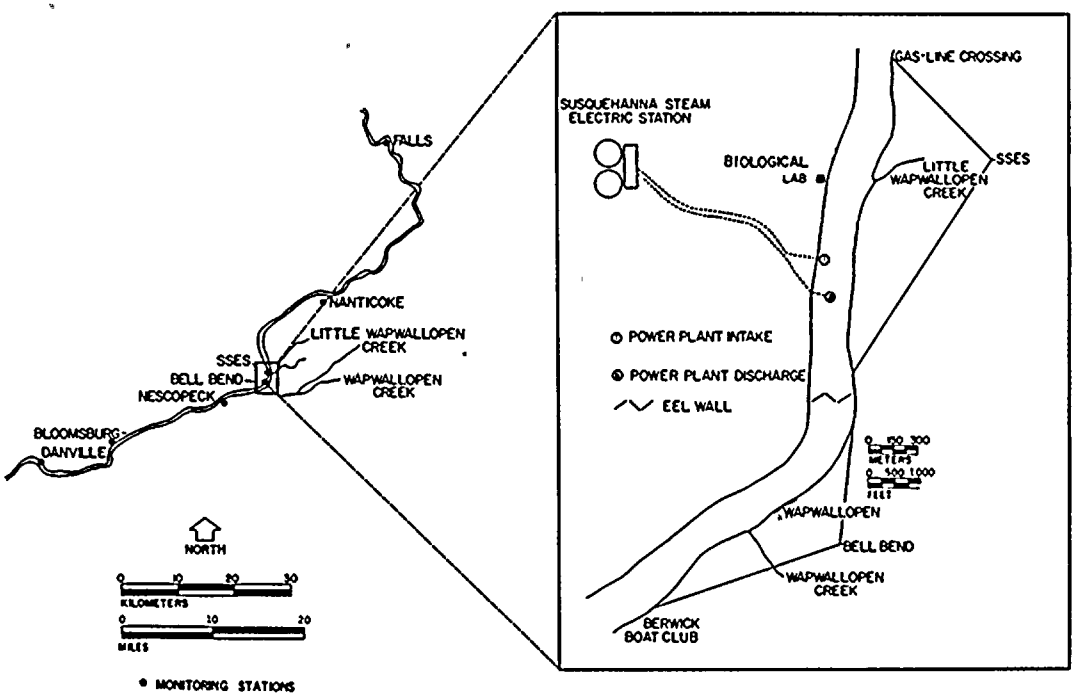


*Samples were collected by pumping at 3-h intervals in May and June (periods from sunset to end of sampling are shaded).

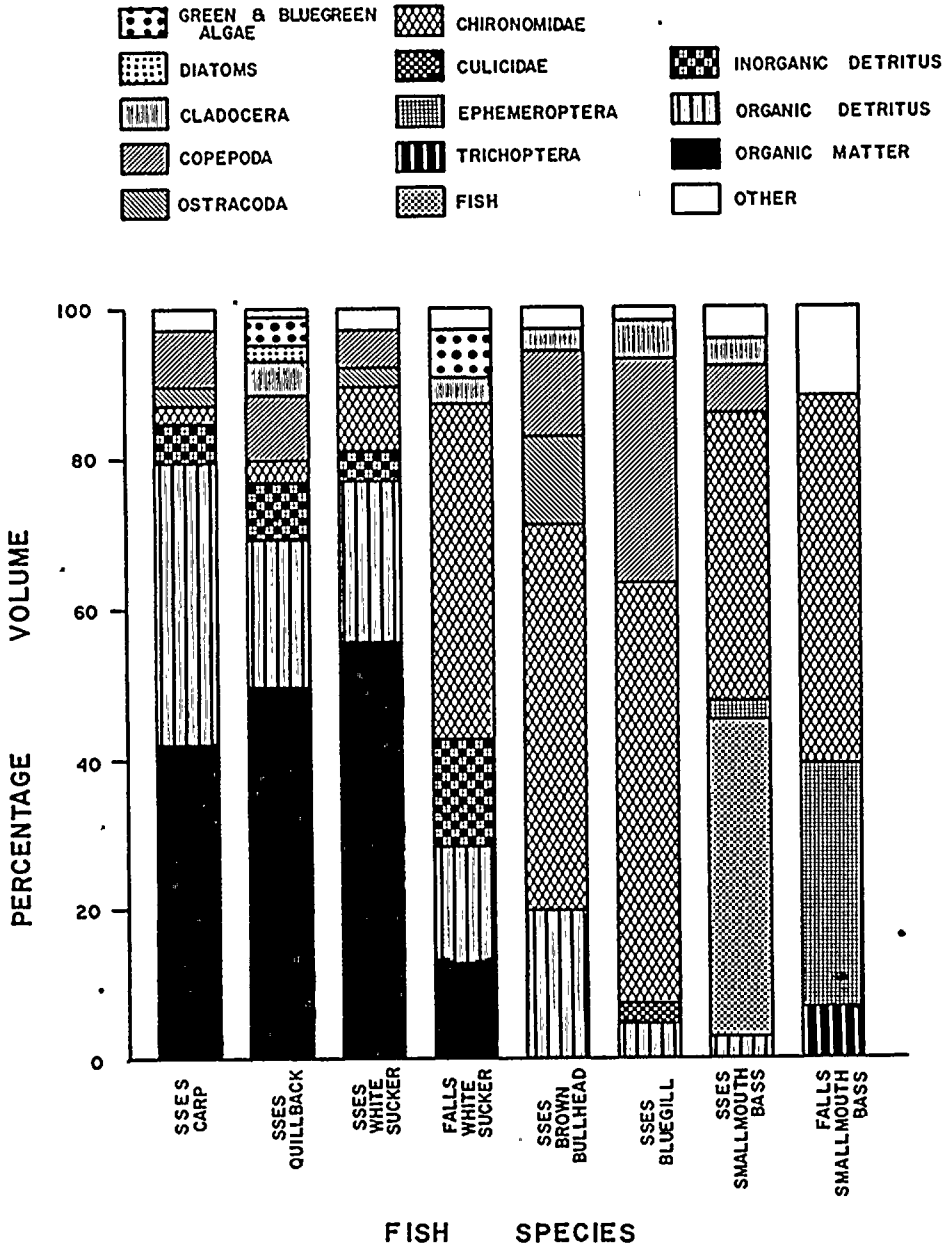
SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

MEAN NUMBERS OF DRIFTING FISH LARVAE/90.4m^3, 1974–1975.*

FIGURE 2.2-17.



SUSQUEHANNA STEAM ELECTRIC STATION ER--OPERATING LICENSE STAGE UNITS 1 AND 2
FISH MONITORING STATIONS, 1971-75.
FIGURE 2.2-18.

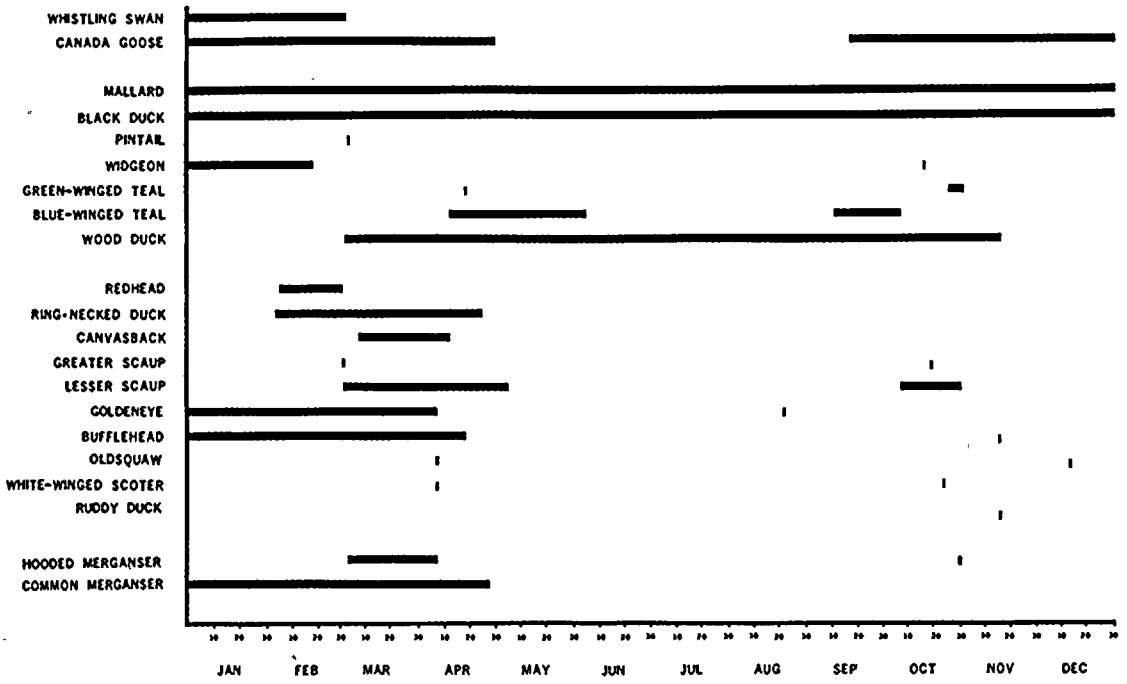


*Analysis of young-of-the-year fishes collected at SSES and Falls from 24 July through 13 August 1973.

SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

PERCENTAGE BY VOLUME OF MAJOR FOOD ITEMS IN FISH STOMACHS.*

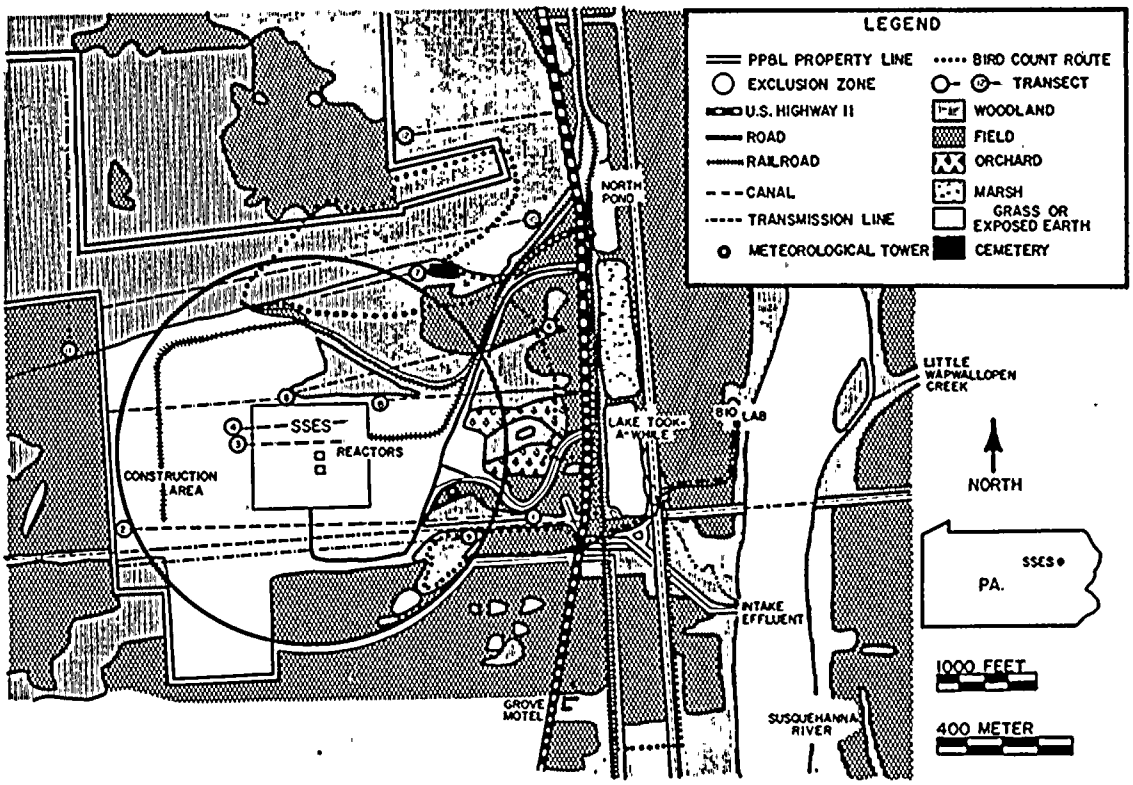
FIGURE 2.2-19.



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

OCCURRENCE OF WATERFOWL FROM FALLS TO BERWICK, 1972.

FIGURE 2.2-20.



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

VEGETATION TRANSECTS (1-12) AND BIRD-COUNT ROUTE ON THE SITE, 1974.

FIGURE 2.2-21.

2.3 METEOROLOGY

2.3.1 REGIONAL CLIMATOLOGY

2.3.1.1 General Climate

The climate of east central Pennsylvania is on the border of Köeppen's "snow forest" and temperate rainy climate (Ref. 2.3-1). There is considerable snow during the winter and relatively hot humid weather during the summer. Precipitation is distributed evenly throughout the year.

This region is repeatedly affected by interactions between warm, moist maritime tropical air masses and cool, dry continental polar air masses. The polar air masses are the dominant influence in the winter while tropical air masses predominate in the summer. Maritime polar air masses are also common in a highly modified form from the Pacific or directly from the North Atlantic. The North Atlantic air masses which are cool and humid are usually associated with approaching warm fronts and "back door" cold fronts.

The weather systems which affect east central Pennsylvania are generally of non-tropical origin. The storm tracks of less than 7% of all North Atlantic tropical cyclones enter Pennsylvania (Ref. 2.3-2). Systems which produce precipitation are divided into three groups. Cold fronts, trailing from cyclones passing to the north and occurring throughout the year, are the primary source of summer precipitation in the region. A second type of disturbance that produces precipitation in this area is the coastal low, originating in the Gulf of Mexico or in the Cape Hatteras region, which moves NNE along the coast. The greatest snowfalls in east central Pennsylvania are associated with this type of system. Major cyclones originating in the Gulf of Mexico, Texas Panhandle, or the lee of the Rockies which move northeast or east frequently give the region light or moderate snowfalls and rain. Tropical cyclones occasionally affect the region but very rarely retain hurricane force so far inland. Record rainfalls are often associated with decaying tropical cyclones.

Tornadoes seldom occur in Pennsylvania and those which cause severe damage or loss of life are rare.

The monthly average winds are westerly (Ref. 2.3-3). The wind in the region is constrained by the general direction (ENE-WSW) of the ridge and valley topography. Wind speeds in the region are light to moderate with monthly averages less than 10 mph.

Average temperatures range between 72°F in the summer and 26°F in the winter with extremes of 101°F and -11°F. Relative humidity is usually greater than 50%, often greater than 85% (Ref. 2.3-3).

The Wilkes-Barre/Scranton Airport at Avoca, Pennsylvania, approximately 45 km northeast of the site, is the nearest National Weather Service Station. Based upon "STAR" summaries for the years 1971-1975, neutral stability conditions predominate at Avoca with Class C, D, and E occurring approximately 9%, 59%, and 13% of the time, respectively (Ref. 2.3-4).

The diffusion climatology of the region is generally good due to the prevalence of moderate wind speeds at most times. Occasional stagnant situations occur during the late summer and autumn when anticyclones stall over the northeastern U.S.

2.3.1.2 Regional Meteorological Conditions for Design and Operating Bases

2.3.1.2.1 Hurricanes and Tropical Storms

Hurricanes and tropical storms seldom affect the area because of the rough terrain and the distance of the region from the ocean. Recently, Tropical Storm Agnes (June 1972) resulted in the worst natural disaster to hit the region because of the excessive precipitation it produced. Record flooding was documented along the Susquehanna River. At Wilkes-Barre, 25 miles upstream from the site, the river crested on June 24 at a height of 40.91 feet, almost eight feet above the previous record. Rainfall at Avoca for the period of Tropical Storm Agnes (June 21-22) was 3.10 inches. On August 18-19, 1955 the rainfall associated with Hurricane Diane was 4.58 inches (Ref. 2.3-3).

A tabulation of North Atlantic tropical cyclones passing within 75 and 150 nautical miles of the site is presented in Table 2.3-1 (Hurricanes Within 75 and 150 Nautical Miles of the Susquehanna SES). The significance of the two distances is that a hurricane within 150 nautical miles radius may cause some heavy rain and within 75 nautical miles radius may produce heavy rain and possibly hurricane force winds in excess of 74 mph. A sustained wind in excess of 60 mph has, however, never been observed in the site region. The frequency and recurrence interval of hurricanes passing within 75 and 150 nautical miles is, respectively, 0.08 per year with an interval of 12 years, and 0.20 per year with an interval of five years (Ref. 2.3-2).

2.3.1.2.2 Tornadoes

The incidence of tornadoes in the site area is very low. Between the years 1950 and 1973 only 38 tornadoes were reported within 50 miles of the site. Tornado activity is at a maximum during the summer months with most tornadoes occurring in the late afternoon or evening. Figure 2.3-1, Tornado Occurrence and Intensity in the Susquehanna SES Region, is a histogram for the years 1953-1962 showing tornado frequency by month, hour and intensity within a 3° by 3° square which is centered on the site. The intensity categories are based on the Fujita tornado intensity classification (Ref. 2.3-5). From Figure 2.3-1 it can be seen that maximum tornado occurrence is in the summer. Diurnally, tornado frequency reaches a maximum during late afternoon, shortly after the period of greatest instability.

2.3.1.2.3 Thunderstorms

Thunderstorms in the area are usually of brief duration and concentrated in the warm months. They are responsible for most of the summertime rainfall which normally averages around 3.7 inches per month at Avoca. Based on a 19 year average at Avoca the mean number of "days with thunder heard" is 30 (Ref. 2.3-3). A monthly breakdown of the mean number of thunderstorm days that is representative of the site is shown in Table 2.3-2, Thunderstorm Days for Avoca.

2.3.1.2.4 Lightning

There is neither documentation nor direct measurement of the occurrence of lightning other than the observation of associated thunder. Local climatological data tabulated by the National Weather Service (Ref. 2.3-3) does not provide information regarding the incidence, severity, or frequency of lightning occurrences. A thunderstorm can usually be heard unless the lightning causing the thunder is more than 15 miles away; therefore, thunder incidence can presumably be used to confirm the presence of some lightning.

The number of lightning strikes per square mile per year has been established by Uman (Ref. 2.3-6). The combined results of several studies summarized by Uman indicate that the number of flashes to the ground per square mile per year is between 0.05 and 0.80 times the number of thunderstorm days per year. The mean number of days with thunderstorms probably over estimates the actual occurrence of cloud-to-ground lightning since some thunderstorms probably contain only cloud-to-cloud lightning.

Therefore, if the annual thunderstorm frequency at Avoca is used (30 days), the number of ground lightning strikes is between two and 24.

2.3.1.2.5 Hail

Hail in the site region sometimes falls from severe thunderstorms. Because hail falls in narrow swaths, only a small fraction of occurrences is recorded at regular reporting stations. The average annual number of days with hail at a point in the area is 23. The occurrence of large hail (greater than 0.75 inches diameter) averages one or two occurrences annually. According to Pautz (Ref. 2.3-7) the number of hailstorms with hail 0.75 inch or greater in a one-degree longitude-latitude square area in the vicinity of the site for the period 1955-1967 was about five. For Avoca from 1973-75 there was one hailstorm in June and one in July of 1973 and 1974. In 1975 there was also one hailstorm in August and one in October. There were no occurrences of hail recorded in 1976 at Avoca (Ref. 2.3-3).

2.3.1.2.6 Extreme Winds

Strong winds occur in Pennsylvania as a result of occasional hurricanes, thunderstorms, tornadoes and tropical storms. The following is the fastest mile of wind and its associated direction, by month, at Avoca (1955-1976) (Ref. 2.3-3).

Fastest Mile of Wind

Month	mph	Direction	Month	mph	Direction
January	47	SE	July	42	NW
February	60	W	August	50	NE
March	49	S	September	38	SW
April	47	NW	October	38	E
May	40	NW	November	45	S
June	43	W	December	47	SW

The 50-year and 100-year mean fastest mile wind speeds for the site area are 75 miles per hour and 80 miles per hour, respectively (Ref. 2.3-8). According to Pautz, there were eight windstorms 50 knots and greater for the one degree latitude-longitude square that includes the Susquehanna SES for the period 1955-1967 (Ref. 2.3-7).

2.3.1.2.7 Freezing Rain

Freezing rain can occur in the late fall, winter and early spring. During the 50 years from 1919-1969 there were four occurrences of ice accumulation of one inch. The probability of an ice storm accumulating at least one inch in any year in the Northeast region of the U.S. is 0.24 (Ref. 2.3-10). At Avoca from 1973-1976, there were 57 days with freezing rain; 21 in January and 18 in February. There were nine occurrences each in March and December during that period. The duration of these phenomenon never exceeded 12 hours and was usually less than three hours (Ref. 2.3-11).

2.3.1.2.8 Duststorms

Because the soil in Pennsylvania is usually moist all year the likelihood of a duststorm is small (Ref. 2.3-12). There were no recorded duststorms for the period 1972-1976 at Avoca (Ref. 2.3-11).

2.3.1.2.9 High Air Pollution Potential

The meteorological conditions that are generally conducive to high air pollution potential are light winds, stable boundary layers and near surface-based inversions. Holzworth (Ref. 2.3-13) studied the episodic occurrence of several limited dispersion conditions at each of 62 upper air stations in the United States. He considered episode durations of at least two days and at least five days. Twelve different limited dispersion conditions were used to define each episode. Each condition was defined by a different combination of mixing height and wind speed. Intermediate limiting conditions of mixing heights less than or equal to 1500 m and wind speeds 4.0 m/sec or less with no significant precipitation during episodes lasting at least 2 days are of interest because such criteria have been used as criteria by the National Pollution Potential Forecasting Program (Ref. 2.3-13). The approximate number of episode-days at the site area is 25 in five years. This is much less than in the western half of the country and less than most of the East. Table 2.3-3, Total Number of Episode Days in Five Years, presents a summary of the data at stations presented by Holzworth which are closest to the site.

2.3.2 LOCAL METEOROLOGY

2.3.2.1 Normal and Extreme Values of Meteorological Parameters

2.3.2.1.1 Wind

The following data sources were used as the basis of this section: long-term data from the station at the Wilkes-Barre/Scranton Airport at Avoca (Ref. 2.3-3) and four years of data (1973-1976) collected at the 31.5 and 300-foot levels of the meteorological tower located at the Susquehanna SES.

The Avoca station is located about 30 miles northeast of the Susquehanna SES. It is reasonably representative of the site due to its close proximity and similar topography.

Table 2.3-4, Long-Term Average Wind Speed and Prevailing Direction at Avoca, is a summary of long-term wind data (Ref. 2.3-3). It shows the annual average speed is 8.4 miles per hour and the prevailing direction is southwest. The monthly average wind speeds are greatest in the spring (9.6 mph in April) and lowest in the late summer (7.2 mph in August). The prevailing wind direction is SW or WSW for every month except March when it is NW. Table 2.3-5, Average Wind Speed and Prevailing Direction at the Susquehanna SES, is a similar summary for the on-site data.

Lower level data from the Susquehanna SES for the four-year period shows an average wind speed of 4.45 mph. The prevalent direction over the four years was the WSW closely followed by W. The ENE direction presents a secondary maximum in frequency of occurrence.

Tables 2.3-6 through 2.3-14, Wind Direction Persistence-Susquehanna SES, provide wind persistence data for the Susquehanna SES on an annual basis, at the lower level, for each stability class, all classes combined and all stable classes.

The joint frequencies of on-site wind speed, direction and stability for both levels for the four-year period are found in Tables 2.3-15 through 2.3-32, Joint Wind Frequency Distribution by Stability Class. Monthly and annual joint frequencies are found in a separate report entitled, "1973-1976 Meteorological Summary."

2.3.2.1.2 Temperature and Atmospheric Water Vapor

Table 2.3-33, Long-Term Temperature, presents the long-term monthly average and extreme temperatures for Avoca. July is the warmest month with a long-term average maximum temperature of 83.0°F, an average minimum temperature of 61.3°F and a mean of 72.2°F. The coolest month is January, having an average temperature range of 33.5°F to 18.4°F and a mean temperature of 26.0°F. The average annual diurnal variation is 19.1°F.

East-central Pennsylvania experiences the temperature extremes associated with mid-latitude traveling low pressure disturbances. The temperature extremes at Avoca were 101°F in July of 1966 and -11°F in February, 1961. Average Avoca dewpoint and relative humidity data are contained in Table 2.3-34, Mean Monthly Temperature, Dew Point Temperature and Relative Humidity.

At the Susquehanna SES during the period 1973-1976 dry bulb temperatures ranged from a high of 94°F to a low of -6°F. The average temperature was 49°F. July had the highest average temperature with 69°F while January had the lowest with 28°F. The average wet bulb temperature was 44°F with the months of July and August averaging 64°F. The average relative humidity was 70% with the month of August averaging 82%. A monthly summary of temperature and moisture data for the site is presented in Table 2.3-35, Temperature and Moisture Data for the Susquehanna SES. The hourly variation in dry-bulb and wet-bulb temperature and relative humidity by month and annually for the site is presented in Tables 2.3-36 through 2.3-48, Statistics and Diurnal Variation of Meteorological Parameters Susquehanna SES.

2.3.2.1.3 Precipitation

The Susquehanna SES has a moderately moist climate averaging nearly 35 inches of rainfall per year spread quite evenly over all months of the year. There is a slight maximum during the summer when there is a greater effect of tropical air masses and thunderstorms. The average monthly and maximum 24-hour precipitation for Avoca are given in Table 2.3-49, Precipitation Data for Avoca. The greatest 24-hour rainfall reported at Avoca was 5.09 inches on September 29-30, 1924. The greatest 24-hour snowfall, 20.5 inches, occurred with the Thanksgiving Day storm of November 24-25, 1971, but the greatest snowfall of record was 21.1 inches over a 29-hour period on January 12-13, 1964 (Ref. 2.3-3).

Table 2.3-50, Expected Rainfall by Duration and Recurrence Interval for the Vicinity of the Susquehanna SES, presents the expected rainfall by duration and recurrence intervals for the

area around the site as compiled by the National Weather Service (Ref. 2.3-13). The probable maximum precipitation for various rainfall durations in east central Pennsylvania by area sizes are presented in Table 2.3-51, Probable Maximum Precipitation for Varying Rainfall Durations and Areas for Vicinity of Susquehanna SES. Assuming 10 square miles is most representative of the station site, the probable maximum rainfall ranges from 25.5 inches in six hours to 36.5 inches in 72 hours (Ref. 2.3-14). The rainfall rate distribution curves are presented for Scranton in Figure 2.3-2, Rainfall Intensity Duration Frequency Curves. The 100-year return period rainfall rate is 2.5 inches for a one-hour period.

Table 2.3-52, Precipitation Data for the Susquehanna SES, presents the summary of on-site precipitation data for the four-year period. The site averaged a total of 47.83 inches annually with the greatest occurring in September (7.54 inches) and the minimum in December (2.21 inches). Data on rainfall rate distribution frequencies and duration of precipitation for the Susquehanna SES by month and for the four-year period are presented in Tables 2.3-53 through 2.3-65, Frequency Distribution of Precipitation for Susquehanna SES. Precipitation wind roses are presented by month and for the total period in Tables 2.3-66 through 2.3-78, Precipitation Wind Rose for the Susquehanna SES.

2.3.2.1.4 Fog and Smog

At Avoca between 1973 and 1976 an average of 86 days of haze and smoke were reported. Most of the days were in the summer months. Over the same period, fog occurred on 250 days. Fog was usually observed with rain or snow and most often in the early fall months. The average number of days with heavy fog for the period was 21. Table 2.3-79, Heavy Fog (Visibility 1/4 mile or Less) at Avoca, presents the heavy fog occurrences at Avoca for recent years. No on-site data on fog or haze are available.

2.3.2.1.5 Stability

Atmospheric stability at Avoca, based on STAR data for the period 1971-1975, is in the Pasquill D category over 58% of the year. Another 24% is classified as E and F. From the spring to early summer the frequency of D stability decreases while A, B and C stabilities are more frequent. The distribution then shifts back to maximum occurrence of D stability in December of 76% (Ref. 2.3-4).

Tables 2.3-80 to 2.3-87, Joint Frequency (%) of Wind Direction, Wind Speed and Stability for Avoca, are annual stability

summaries by wind speed and direction from Avoca data for the years 1971 through 1975 (Ref. 2.3-4). The analytical technique for classifying stability is based upon three hourly observations and is dependent primarily upon net solar radiation and wind speed. For the entire period, neutral and slightly stable conditions occur most often. The on-site stability summaries by wind speed and direction are presented in Tables 2.3-15 through 2.3-32.

Studies by Holzworth (Ref. 2.3-15) indicate that for Northeastern Pennsylvania unstable conditions (A, B, C) occur 16-25% of the time while neutral (D) conditions prevail 46-55% of the time and stable conditions (E, F, G) occur 26-35% of the time. For the four-year period 1973-1976 the on-site data showed the following stability frequencies: Pasquill class A-16%, B-7.6%, C-4.2%, D-30.8%, E-26.2%, F-10.5%, G-4.5%. This indicates that the site is prone toward stable conditions (41.2%) rather than neutral conditions (30.8%).

In Table 2.3-88, Regional Mixing Heights, representative mixing heights on a seasonal and diurnal basis are presented. The information was obtained by averaging mixing height data from Albany, New York City, Pittsburgh and Washington, D.C. (Ref. 2.3-12).

2.3.2.1.6 Comparison of On-Site Data and Weather Service Data

In previous analyses, prior to the availability of on-site data, data from the National Weather Service stations at Avoca and Harrisburg had been used. Table 2.3-89, Mean Monthly Wind Speed, Dry-Bulb and Wet-Bulb Temperature Values for Harrisburg, Pa., presents the monthly and annual average wind speed, dry bulb, and wet bulb temperatures for Harrisburg for the period 1973-1975. Table 2.3-90, Mean Monthly Wind Speed, Dry-Bulb and Wet-Bulb Temperature Values for the Susquehanna SES, presents the identical data for the Susquehanna SES between 1973-1976. From these data and those discussed previously it is apparent that the Susquehanna SES, compared to both Harrisburg and Avoca, has the lowest wind speeds, the lowest dry bulb and wet bulb temperatures, and is less prone to extremes, greatest precipitation. It also is apparently more prone to stable conditions, as determined by the delta-temperature method, than either Harrisburg or Avoca, where stability is determined by the Pasquill-Turner method. It is felt that the four years of on-site data are representative of long-term conditions to be expected.

2.3.2.2 Potential Influence of the Station and its Facilities on Local Meteorology

The expected characteristics and effects of water vapor plumes entering the atmosphere arising from the operation of two natural draft cooling towers have been evaluated and are discussed in Subsection 5.1.4.

The characteristics and effects associated with cooling tower operation were determined in terms of:

(a) Monthly and annual frequency distributions of plume length with respect to distance and direction out to 20,000 ft.

(b) Monthly and annual frequency distributions of ground level plumes (fogging) with respect to distance and direction.

(c) Monthly and annual frequency distributions of ground level plumes accompanied by subfreezing temperatures (icing) by distance and direction.

(d) Monthly and annual frequency distribution of increases in relative humidity and temperature with respect to distance and direction.

Simulations were obtained from a computerized diffusion model that simulates vapor plume length and the occurrence of ground level fogging or icing. The Gaussian plume theory distribution is assumed with buoyancy approximated by a dry plume rise equation. The computer program utilizes cooling tower performance data and on-site meteorological observations for 1976 (ambient temperature, dew point, wet bulb temperature, wind velocity and atmospheric stability which is presented in joint frequency form in Subsection 5.1.4), to determine the downwind dispersion of water vapor at plume centerline and ground level.

Further details of this analysis and a depiction of the surrounding topography are provided in Subsection 5.1.4.

2.3.3 REFERENCES

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TABLE 2.3-1

HURRICANES WITHIN 75 AND 150 NAUTICAL MILES OF THE SUSQUEHANNA SES

(Period of Record: 1871 to 1969)

Time Period	Tracks Within 75 NM*	Tracks Within 150 NM*	Total North Atlantic Storms
Prior to 1900	8	18	
After 1900	0	2	
1871 to 1969	8	20	489
Occurrence by Month			
June	0	1	
July	0	0	
August	2	3	
September	4	10	
October	2	6	
Totals	8	20	

*NM represents nautical miles; 1 NM = 1.151 statute miles

Ref. 2.3-2

TABLE 2.3-2

THUNDERSTORM DAYS FOR AVOCA

(Period of Record: 1956 to 1974)

Month	Thunderstorm Days (to the nearest whole day)
January	*
February	*
March	1
April	2
May	4
June	6
July	8
August	5
September	3
October	1
November	*
December	*
Annual Average	30

*Less than one-half.

Ref. 2.3-3

TABLE 2.3-3

TOTAL NUMBER OF EPISODE DAYS IN FIVE YEARS

Station	Episodes	Episode-days	Season of Greatest # of Episode Days
Pittsburgh, Pa.	16	39	Autumn
New York, N.Y.	4	9	Autumn
Albany, N.Y.	7	23	Autumn

Criteria: Mixing heights < 150 meters, wind speeds < 4.0 m/s, no significant precipitation, episode lasting at least two days.

Ref. 2.3-12

TABLE 2.3-4

LONG-TERM AVERAGE WIND SPEED AND PREVAILING DIRECTION AT AVOCA

(Period of Record: 1956-1974)

Month	Average Speed (mph)	Prevailing Direction
January	8.9	SW
February	9.3	SW
March	9.3	NW
April	9.6	SW
May	8.8	WSW
June	7.9	SW
July	7.4	WSW
August	7.2	SW
September	7.4	SW
October	7.9	WSW
November	8.7	WSW
December	8.9	SW
Annual	8.4	SW

Ref. 2.3-3

TABLE 2.3-5

AVERAGE WIND SPEED AND PREVAILING DIRECTION AT THE SUSQUEHANNA SES

(Period of Record: 1973-1976)

Month	Average Speed (mph)	Prevailing Direction
January	5.1	WSW
February	4.5	SSW
March	6.0	W
April	6.3	W
May	4.5	W and E
June	3.8	WSW
July	3.4	WSW
August	3.1	ENE
September	3.6	ENE
October	4.3	E
November	4.7	W
December	4.7	W
Annual	4.5	WSW

TABLE 2.3-6

WIND DIRECTION PERSISTENCE - SUSQUEHANNA SES

PASQUILL - A

(PERIOD OF RECORD: 1973-1976)

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	33	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NE	34	12	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ENE	17	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E	19	2	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	10	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	11	5	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSE	12	6	2	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	46	12	8	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSW	49	15	11	4	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SW	80	26	10	9	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WSW	123	55	20	13	4	4	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
W	102	69	29	17	10	3	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNW	33	16	8	4	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NW	17	6	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NNW	16	9	2	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N	16	5	7	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AVERAGE WIND SPEED (M/SEC)

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	2.64	3.15	2.56	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE	2.38	2.58	2.87	3.09	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ENE	2.41	2.86	2.88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
E	2.51	1.85	3.62	0.	0.	3.44	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ESE	2.29	2.65	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE	1.60	2.29	0.	2.09	2.98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SSE	2.28	2.02	3.26	1.80	2.23	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S	2.73	2.94	3.44	4.88	3.75	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SSW	2.86	2.71	3.84	4.02	5.01	0.	6.76	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SW	2.37	2.65	2.58	2.89	3.29	2.00	3.64	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WSW	2.94	2.97	3.20	3.12	3.94	4.22	2.31	0.	2.45	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W	3.51	3.61	3.87	4.34	3.63	5.20	3.68	6.33	3.04	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WNW	4.33	4.83	4.80	5.43	4.81	0.	0.	4.99	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NW	3.23	4.59	4.38	5.62	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NNW	3.59	4.37	2.53	4.68	6.45	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N	3.28	3.64	3.26	3.12	3.66	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

*TOTAL NO. OF OBSERVATIONS = 35064

TABLE 2.3-7

WIND DIRECTION PERSISTENCE - SUSQUEHANNA SES

PASQUILL - B

(PERIOD OF RECORD: 1973-1976)

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	12	4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NE	14	6	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ENE	7	4	4	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E	12	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	8	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSE	7	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	21	5	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSW	20	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SW	21	3	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WSW	33	8	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
W	36	12	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNW	11	5	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NW	15	5	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NNW	14	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N	8	3	3	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AVERAGE WIND SPEED (M/SEC)

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	2.51	2.81	1.30	3.58	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE	2.72	2.20	2.19	3.54	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ENE	1.65	2.34	3.29	0.	0.	3.28	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
E	2.69	1.16	0.	2.06	0.	6.58	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ESE	2.05	2.50	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE	1.68	2.17	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SSE	2.06	1.16	1.48	1.74	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S	2.47	2.91	1.97	3.59	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SSW	2.82	7.00	0.	6.52	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SW	3.27	3.66	4.70	6.69	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WSW	3.47	3.64	1.78	5.78	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W	4.53	5.09	3.62	2.27	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WNW	3.90	4.70	4.43	5.96	0.	5.14	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NW	3.70	2.63	4.25	1.79	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NNW	3.23	3.14	3.23	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N	2.89	2.55	3.35	2.40	0.	3.61	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

TOTAL NO. OF OBSERVATIONS = 35064

TABLE 2.3-8

WIND DIRECTION PERSISTENCE - SUSQUEHANNA SES

PASQUILL - C

(PERIOD OF RECORD: 1973-1976)

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NE	7	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ENE	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E	5	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSE	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	14	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSW	10	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SW	13	5	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WSW	15	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
W	11	3	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNW	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NW	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NNW	7	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N	10	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AVERAGE WIND SPEED (M/SEC)

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	2.05	2.49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE	2.62	0.	3.81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ENE	3.38	2.44	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
E	3.05	7.30	0.	0.	4.93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ESE	2.23	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE	1.54	1.03	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SSE	1.39	1.48	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S	3.75	3.83	0.	0.	5.95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SSW	3.63	0.	2.75	0.	0.	0.	0.	4.63	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SW	3.35	5.17	0.	3.67	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WSW	3.75	4.05	4.02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W	4.09	4.89	1.60	5.59	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WNW	2.23	5.45	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NW	3.46	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NNW	3.45	1.85	4.69	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N	3.14	4.26	3.11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

TOTAL NO. OF OBSERVATIONS = 35064

TABLE 2.3-9

WIND DIRECTION PERSISTENCE - SUSQUEHANNA SES

PASQUILL - D

(PERIOD OF RECORD: 1973-1976)

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	79	25	4	3	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NE	90	27	17	4	2	2	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ENE	60	17	5	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E	53	10	6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	33	10	6	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	24	4	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSE	33	16	4	1	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	62	24	7	7	4	4	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSW	74	30	4	2	0	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SW	101	32	8	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WSW	134	60	23	9	7	2	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
W	102	41	26	21	13	2	1	1	2	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
WNW	68	26	15	8	3	4	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NW	63	29	7	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NNW	45	21	5	3	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
N	47	22	6	1	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AVERAGE WIND SPEED (M/SEC)

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	1.98	2.77	2.37	3.15	4.38	0.	2.81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE	1.98	2.32	2.13	2.65	2.66	3.45	0.	2.73	2.32	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ENE	2.10	2.33	1.62	2.66	0.	4.00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
E	1.79	1.82	2.28	2.52	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ESE	1.55	2.30	1.81	0.	2.89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE	1.81	1.48	0.	3.75	2.27	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SSE	1.48	1.98	2.62	1.98	1.85	0.	0.	2.67	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S	2.10	2.40	2.57	1.89	2.68	2.39	3.03	0.	3.79	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SSW	2.05	1.75	1.22	5.27	0.	2.43	0.	4.54	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SW	1.79	2.37	1.77	1.15	0.	2.35	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WSW	2.49	2.73	3.03	2.92	2.82	2.17	4.08	3.75	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W	3.19	3.56	3.96	4.20	3.11	4.58	5.59	5.50	4.71	0.	0.	4.25	0.	3.29	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WNW	3.71	3.60	4.01	3.87	5.39	5.41	4.64	0.	5.20	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NW	3.06	3.05	3.83	3.66	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NNW	2.77	2.92	3.93	3.40	6.47	0.	0.	0.	0.	0.	0.	0.	0.	0.	4.73	0.	0.	0.	0.	0.	0.	0.	0.	0.
N	2.33	3.22	2.87	1.98	3.84	0.	0.	6.83	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

TOTAL NO. OF OBSERVATIONS = 35064

TABLE 2.3-10

WIND DIRECTION PERSISTENCE - SUSQUEHANNA SES

PASQUILL - E

(PERIOD OF RECORD: 1973-1976)

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	47	20	4	2	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NE	98	21	4	4	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
ENE	103	31	21	7	0	0	2	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
E	89	33	8	11	4	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	38	5	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	23	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSE	19	9	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	34	13	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSW	44	8	8	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SW	61	28	10	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WSW	64	33	12	10	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
W	61	22	11	2	1	2	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
WNW	32	10	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NW	22	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NNW	25	2	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N	37	19	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AVERAGE WIND SPEED (M/SEC)

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	1.55	1.56	2.39	1.59	2.13	1.95	0.	1.70	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE	1.47	1.39	1.62	2.26	1.57	0.	0.	0.	0.	0.	0.	0.	1.89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ENE	1.34	1.03	1.46	1.12	0.	0.	.81	0.	1.02	0.	0.	0.	0.	.98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
E	1.11	1.12	1.30	1.00	1.12	3.47	0.	1.04	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ESE	1.13	.83	1.52	1.45	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE	1.77	.91	.89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SSE	1.72	2.05	2.97	1.86	2.38	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S	1.58	1.63	2.37	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SSW	1.28	1.40	1.52	1.11	2.21	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SW	1.47	1.35	1.70	1.31	0.	2.09	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WSW	1.93	2.29	2.47	2.37	2.71	2.69	3.65	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W	2.59	2.57	3.59	3.59	3.40	2.50	0.	5.62	0.	0.	0.	0.	0.	5.11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WNW	2.22	2.06	2.76	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NW	2.37	1.80	2.74	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NNW	1.59	2.66	2.34	3.03	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N	1.72	1.49	1.62	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

TOTAL NO. OF OBSERVATIONS = 35064

TABLE 2.3-11

WIND DIRECTION PERSISTENCE - SUSQUEHANNA SES

PASQUILL - F

(PERIOD OF RECORD: 1973-1976)

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	14	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NE	36	5	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ENE	89	28	13	11	7	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
E	85	31	14	4	6	5	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	20	4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSE	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSW	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SW	6	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WSW	5	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
W	9	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNW	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NW	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NNW	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N	12	5	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AVERAGE WIND SPEED (M/SEC)

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	.88	.97	1.01	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE	.91	.72	.54	.98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ENE	.97	1.13	1.20	1.40	1.05	1.97	1.56	0.	0.	0.	0.	1.34	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
E	1.06	1.25	1.00	1.24	1.17	1.25	.80	.92	1.62	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ESE	.92	1.18	1.13	.93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SSE	.71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S	.86	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SSW	1.38	.70	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SW	1.12	.53	0.	0.	0.	2.01	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WSW	1.98	.69	.93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W	.87	.64	.76	.84	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WNW	.79	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NW	.85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NNW	.95	.89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N	1.14	1.53	.89	1.14	1.36	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

TOTAL NO. OF OBSERVATIONS = 35064

TABLE 2.3-12

WIND DIRECTION PERSISTENCE - SUSQUEHANNA SES

PASQUILL - G

(PERIOD OF RECORD: 1973-1976)

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NE	28	9	3	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ENE	50	18	12	1	4	1	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E	36	20	13	7	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	9	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSE	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSW	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SW	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WSW	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
W	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNW	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NNW	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N	6	3	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AVERAGE WIND SPEED (M/SEC)

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	.98	1.07	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE	1.04	1.05	1.15	.73	0.	0.	1.01	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ENE	1.03	1.02	1.22	1.47	1.33	1.67	1.55	1.76	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
E	1.02	1.01	1.22	1.23	0.	2.56	1.23	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ESE	.99	.81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE	.69	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SSE	0.	.63	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SSW	.69	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SW	.94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WSW	.76	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W	1.08	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WNW	.85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NW	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NNW	.92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N	1.47	.95	0.	1.48	1.40	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

TOTAL NO. OF OBSERVATIONS = 35064

TABLE 2.3-13

WIND DIRECTION PERSISTENCE - SUSQUEHANNA SES

PASQUILL - ALL CLASSES

(PERIOD OF RECORD: 1973-1976)

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	211	81	26	15	4	3	3	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
NE	315	107	60	22	11	7	4	1	3	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
ENE	328	128	79	34	15	9	9	4	5	1	1	0	2	2	0	0	0	0	0	0	0	0	0	0
E	271	99	63	35	21	17	9	9	4	2	2	0	1	0	0	0	0	0	0	0	0	0	0	0
ESE	140	44	15	9	3	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	90	17	7	4	1	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSE	90	38	13	11	7	0	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
S	158	66	29	14	14	8	3	5	1	4	1	1	0	1	1	0	0	0	0	1	0	0	0	0
SSW	184	87	33	11	9	7	3	1	3	2	2	0	0	1	0	0	0	0	0	0	0	0	0	0
SW	305	114	54	20	14	12	7	1	2	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
WSW	373	166	93	56	23	13	16	3	7	1	1	1	2	0	1	0	1	0	0	0	0	0	0	0
W	309	129	93	63	24	25	20	9	5	4	4	2	0	2	0	0	1	0	0	0	1	0	0	0
WNW	163	65	34	14	11	7	8	2	3	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
NW	128	58	20	8	4	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NNW	123	46	21	13	10	0	2	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0
N	155	68	30	16	8	5	2	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0

AVERAGE WIND SPEED (M/SEC)

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	1.77	1.99	2.29	2.31	3.79	3.05	2.06	1.48	0.	0.	0.	4.45	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE	1.54	1.80	2.01	2.25	1.99	2.34	1.80	2.73	2.74	0.	4.11	0.	1.89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ENE	1.40	1.34	1.54	1.43	1.18	2.13	1.50	1.05	1.48	1.01	1.61	0.	1.44	1.08	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
E	1.37	1.21	1.28	1.17	1.32	1.47	1.94	2.06	1.27	2.72	3.15	0.	1.49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ESE	1.43	1.56	1.37	1.57	2.61	1.26	0.	0.	2.90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE	1.63	1.55	1.88	3.20	1.67	1.85	0.	0.	2.67	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SSE	1.63	1.68	1.84	2.00	2.06	0.	1.46	2.67	2.68	3.95	0.	0.	1.95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S	1.71	2.13	2.64	2.27	2.74	2.10	2.61	2.91	6.24	3.32	4.65	3.99	0.	5.26	4.06	0.	0.	0.	0.	4.89	0.	0.	0.	0.
SSW	1.93	2.11	2.51	2.45	3.18	4.02	1.91	4.54	5.16	4.05	4.09	0.	0.	4.94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SW	1.91	1.99	1.94	2.26	2.48	3.23	1.72	3.41	2.22	8.48	0.	0.	0.	0.	5.11	0.	0.	0.	0.	0.	0.	0.	0.	0.
WSW	2.43	2.47	2.77	2.88	3.19	3.21	3.68	3.76	3.29	4.03	3.36	2.35	2.81	0.	0.	0.	3.69	0.	0.	0.	0.	0.	0.	0.
W	2.7	3.06	3.45	3.65	3.84	3.57	3.78	4.97	4.94	5.18	4.50	5.23	0.	4.20	0.	0.	4.44	0.	0.	0.	5.58	0.	0.	0.
WNW	2.9	3.51	3.67	3.97	4.34	5.51	4.59	5.10	5.20	0.	0.	0.	0.	5.78	5.45	0.	0.	0.	0.	0.	0.	0.	0.	0.
NW	2.70	3.08	3.51	4.07	3.05	0.	0.	0.	3.77	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NNW	2.41	3.07	3.22	3.41	3.93	0.	2.62	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.86	4.72	0.	.24	0.	0.	0.	0.
N	1.97	2.28	2.82	2.38	2.60	2.42	1.73	1.28	4.24	0.	4.21	0.	0.	0.	0.	6.24	0.	0.	0.	0.	0.	0.	0.	0.

TOTAL NO. OF OBSERVATIONS = 35064

TABLE 2.3-14

WIND DIRECTION PERSISTENCE - SUSQUEHANNA SES

PASQUILL - ALL STABLE

(PERIOD OF RECORD: 1973-1976)

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	77	29	7	4	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NE	183	46	17	7	4	2	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
ENE	235	94	54	21	15	6	10	2	6	0	1	0	2	2	0	0	0	0	0	0	0	0	0	0
E	177	78	46	30	17	14	7	6	4	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0
ESE	74	16	5	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	35	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSE	26	13	4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	44	12	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSW	48	13	9	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SW	80	31	11	5	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WSW	81	39	17	16	3	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
W	86	29	12	2	1	2	2	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
WNW	49	12	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NW	38	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NNW	41	6	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N	63	30	8	1	2	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AVERAGE WIND SPEED (M/SEC)

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	1.26	1.45	2.03	1.60	0.	2.02	0.	1.70	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE	1.26	1.17	1.48	1.69	1.44	1.06	.99	0.	0.	0.	0.	0.	1.89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ENE	1.13	1.04	1.21	1.10	1.12	1.06	1.43	.99	1.40	0.	1.61	0.	1.44	1.08	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
E	1.05	1.06	1.03	1.08	1.21	1.33	1.26	1.07	1.99	1.28	0.	0.	1.49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ESE	1.06	.89	1.52	1.17	.92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE	1.57	.90	.89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SSE	1.55	2.02	1.63	1.86	2.38	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S	1.39	1.73	1.46	2.94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SSW	1.22	1.23	1.61	1.11	2.21	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SW	1.46	1.35	1.63	1.48	0.	2.09	.92	2.03	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WSW	1.93	2.10	2.27	2.33	2.71	3.20	3.65	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W	2.22	2.38	3.53	3.59	3.40	2.50	.77	5.62	0.	0.	0.	0.	0.	5.11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WNW	1.80	2.06	2.81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NW	1.94	1.80	2.74	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NNW	1.57	1.45	2.34	3.03	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N	1.53	1.47	1.73	1.31	1.36	1.19	0.	1.28	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

TOTAL NO. OF OBSERVATIONS = 35064

TABLE 2.3-15

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS
LOWER WIND JANUARY 1, 1973 THROUGH DECEMBER 31, 1976
SUSQUEHANNA SES
STABILITY CLASS: PASQUILL A

WIND SECTOR	WIND SPEED CATEGORIES (METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	28	90	64	1	0	0	183	2.59
	.54	1.72	1.23	.02	0.00	0.00	3.51	
	.09	.28	.20	.00	0.00	0.00	.57	
NE	39	141	60	2	0	0	242	2.42
	.75	2.70	1.15	.04	0.00	0.00	4.64	
	.12	.44	.19	.01	0.00	0.00	.76	
ENE	37	86	24	2	0	0	149	2.27
	.71	1.65	.46	.04	0.00	0.00	2.85	
	.12	.27	.08	.01	0.00	0.00	.47	
E	46	72	28	1	0	0	147	2.18
	.88	1.38	.54	.02	0.00	0.00	2.82	
	.14	.23	.09	.00	0.00	0.00	.46	
ESE	43	43	9	1	0	0	96	1.93
	.82	.82	.17	.02	0.00	0.00	1.84	
	.13	.13	.03	.00	0.00	0.00	.30	
SE	49	55	9	0	0	0	113	1.83
	.94	1.05	.17	0.00	0.00	0.00	2.16	
	.15	.17	.03	0.00	0.00	0.00	.35	
SSE	62	85	11	2	0	0	160	1.88
	1.19	1.63	.21	.04	0.00	0.00	3.07	
	.19	.27	.03	.01	0.00	0.00	.50	
S	81	131	79	32	1	0	324	2.71
	1.55	2.51	1.51	.61	.02	0.00	6.21	
	.25	.41	.25	.10	.00	0.00	1.02	
SSW	95	182	90	52	2	1	422	2.85
	1.82	3.49	1.72	1.00	.04	.02	8.08	
	.30	.57	.28	.16	.01	.00	1.32	
SW	136	351	106	24	2	0	619	2.38
	2.61	6.72	2.03	.46	.04	0.00	11.86	
	.43	1.10	.33	.08	.01	0.00	1.94	
WSW	116	473	313	65	2	0	969	2.90
	2.22	9.06	6.00	1.25	.04	0.00	18.56	
	.36	1.48	.98	.20	.01	0.00	3.04	
W	75	326	414	172	4	1	992	3.61
	1.44	6.25	7.93	3.30	.08	.02	19.00	
	.24	1.02	1.30	.54	.01	.00	3.11	
WNW	17	57	136	93	6	0	309	4.26
	.33	1.09	2.61	1.78	.11	0.00	5.92	
	.05	.18	.43	.29	.02	0.00	.97	
NW	13	49	52	32	0	0	146	3.65
	.25	.94	1.00	.61	0.00	0.00	2.80	
	.04	.15	.16	.10	0.00	0.00	.46	
NNW	13	57	60	36	0	0	166	3.66
	.25	1.09	1.15	.69	0.00	0.00	3.18	
	.04	.18	.19	.11	0.00	0.00	.52	
N	14	70	87	6	0	0	177	3.07
	.27	1.34	1.67	.11	0.00	0.00	3.39	
	.04	.22	.27	.02	0.00	0.00	.55	
CALM	6						6	CALM
	.11						.11	
	.02						.02	
TOTAL	870	2268	1542	521	17	2	5220	2.94
	16.67	43.45	29.54	9.98	.33	.04	100.00	
	2.73	7.11	4.83	1.63	.05	.01	16.36	

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES THIS CLASS
XXX PERCENT OCCURRENCES ALL CLASSES

SUSQUEHANNA SES-ER-OL

TABLE 2.3-16

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS
LOWER WIND JANUARY 1, 1973 THROUGH DECEMBER 31, 1976
SUSQUEHANNA SES
STABILITY CLASS: PASQUILL B

WIND SECTOR	WIND SPEED CATEGORIES (METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	48	44	29	2	0	0	123	2.19
	2.05	1.88	1.24	.09	0.00	0.00	5.27	
	.15	.14	.09	.01	0.00	0.00	.39	
NE	35	58	35	1	0	0	129	2.30
	1.50	2.48	1.50	.04	0.00	0.00	5.52	
	.11	.18	.11	.00	0.00	0.00	.40	
ENE	28	62	18	2	0	0	110	2.26
	1.20	2.65	.77	.09	0.00	0.00	4.71	
	.09	.19	.06	.01	0.00	0.00	.34	
E	31	41	9	7	1	0	89	2.38
	1.33	1.76	.39	.30	.04	0.00	3.81	
	.10	.13	.03	.02	.00	0.00	.28	
ESE	31	32	10	0	0	0	73	1.95
	1.33	1.37	.43	0.00	0.00	0.00	3.12	
	.10	.10	.03	0.00	0.00	0.00	.23	
SE	26	31	4	0	0	0	61	1.85
	1.11	1.33	.17	0.00	0.00	0.00	2.61	
	.08	.10	.01	0.00	0.00	0.00	.19	
SSE	40	31	7	0	0	0	78	1.73
	1.71	1.33	.30	0.00	0.00	0.00	3.34	
	.13	.10	.02	0.00	0.00	0.00	.24	
S	59	74	32	9	0	0	174	2.33
	2.53	3.17	1.37	.39	0.00	0.00	7.45	
	.18	.23	.10	.03	0.00	0.00	.55	
SSW	74	59	35	17	5	1	191	2.63
	3.17	2.53	1.50	.73	.21	.04	8.18	
	.23	.18	.11	.05	.02	.00	.60	
SW	69	80	53	14	9	0	225	2.82
	2.95	3.42	2.27	.60	.39	0.00	9.63	
	.22	.25	.17	.04	.03	0.00	.71	
WSW	33	126	105	26	0	0	290	3.05
	1.41	5.39	4.49	1.11	0.00	0.00	12.41	
	.10	.39	.33	.08	0.00	0.00	.91	
W	36	94	117	70	1	0	318	3.67
	1.54	4.02	5.01	3.00	.04	0.00	13.61	
	.11	.29	.37	.22	.00	0.00	1.00	
WNW	9	40	48	35	0	0	132	3.83
	.39	1.71	2.05	1.50	0.00	0.00	5.65	
	.03	.13	.15	.11	0.00	0.00	.41	
NW	16	44	44	5	0	0	109	2.82
	.68	1.88	1.88	.21	0.00	0.00	4.67	
	.05	.14	.14	.02	0.00	0.00	.34	
NNW	22	39	43	7	0	0	111	2.84
	.94	1.67	1.84	.30	0.00	0.00	4.75	
	.07	.12	.13	.02	0.00	0.00	.35	
N	24	43	44	3	0	0	114	2.74
	1.03	1.84	1.88	.13	0.00	0.00	4.88	
	.08	.13	.14	.01	0.00	0.00	.36	
CALM	9						9	CALM
	.39						.39	
	.03						.03	
TOTAL	590	898	633	198	16	1	2336	2.76
	25.26	38.44	27.10	8.48	.68	.04	100.00	
	1.85	2.81	1.98	.62	.05	.00	7.32	

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES THIS CLASS
XXX PERCENT OCCURRENCES ALL CLASSES

TABLE 2.3-17

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS
LOWER WIND JANUARY 1, 1973 THROUGH DECEMBER 31, 1976
SUSQUEHANNA SES
STABILITY CLASS: PASQUILL C

WIND SECTOR	WIND SPEED CATEGORIES (METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	44	73	31	7	0	0	155	2.36
	1.60	2.66	1.13	.26	0.00	0.00	5.65	
	.14	.23	.10	.02	0.00	0.00	.49	
NE	51	88	43	0	0	0	182	2.28
	1.86	3.21	1.57	0.00	0.00	0.00	6.63	
	.16	.28	.13	0.00	0.00	0.00	.57	
ENE	35	58	23	2	0	0	118	2.23
	1.28	2.11	.84	.07	0.00	0.00	4.30	
	.11	.18	.07	.01	0.00	0.00	.37	
E	52	45	25	8	1	0	131	2.39
	1.89	1.64	.91	.29	.04	0.00	4.77	
	.16	.14	.08	.03	.00	0.00	.41	
ESE	38	39	7	0	0	0	84	1.79
	1.38	1.42	.26	0.00	0.00	0.00	3.06	
	.12	.12	.02	0.00	0.00	0.00	.26	
SE	29	24	1	1	0	0	55	1.65
	1.06	.87	.04	.04	0.00	0.00	2.00	
	.09	.08	.00	.00	0.00	0.00	.17	
SSE	49	30	8	1	0	0	88	1.72
	1.79	1.09	.29	.04	0.00	0.00	3.21	
	.15	.09	.03	.00	0.00	0.00	.28	
S	71	76	41	26	1	0	215	2.62
	2.59	2.77	1.49	.95	.04	0.00	7.83	
	.22	.24	.13	.08	.00	0.00	.67	
SSW	70	68	51	31	0	0	220	2.80
	2.55	2.48	1.86	1.13	0.00	0.00	8.01	
	.22	.21	.16	.10	0.00	0.00	.69	
SW	85	111	44	18	5	0	263	2.51
	3.10	4.04	1.60	.66	.18	0.00	9.58	
	.27	.35	.14	.06	.02	0.00	.82	
WSW	55	127	122	30	0	0	334	2.94
	2.00	4.63	4.44	1.09	0.00	0.00	12.17	
	.17	.40	.38	.09	0.00	0.00	1.05	
W	47	98	131	57	1	0	334	3.47
	1.71	3.57	4.77	2.08	.04	0.00	12.17	
	.15	.31	.41	.18	.00	0.00	1.05	
WNW	34	48	62	14	1	0	159	3.06
	1.24	1.75	2.26	.51	.04	0.00	5.79	
	.11	.15	.19	.04	.00	0.00	.50	
NW	26	40	27	5	0	0	98	2.57
	.95	1.46	.98	.18	0.00	0.00	3.57	
	.08	.13	.08	.02	0.00	0.00	.31	
NNW	26	55	53	12	0	0	146	2.94
	.95	2.00	1.93	.44	0.00	0.00	5.32	
	.08	.17	.17	.04	0.00	0.00	.46	
N	37	55	41	15	1	0	149	2.79
	1.35	2.00	1.49	.55	.04	0.00	5.43	
	.12	.17	.13	.05	.00	0.00	.47	
CALM	14						14	CALM
	.51						.51	
	.04						.04	
TOTAL	763	1035	710	227	10	0	2745	2.66
	27.80	37.70	25.87	8.27	.36	0.00	100.00	
	2.39	3.24	2.23	.71	.03	0.00	8.60	

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES THIS CLASS
XXX PERCENT OCCURRENCES ALL CLASSES

TABLE 2.3-18

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS
LOWER WIND JANUARY 1, 1973 THROUGH DECEMBER 31, 1976
SUSQUEHANNA SES
STABILITY CLASS: PASQUILL D

WIND SECTOR	WIND SPEED CATEGORIES (METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	255	208	92	8	0	0	563	1.98
	2.68	2.19	.97	.08	0.00	0.00	5.92	
	.80	.65	.29	.03	0.00	0.00	1.76	
NE	303	303	105	3	0	0	714	1.92
	3.18	3.18	1.10	.03	0.00	0.00	7.50	
	.95	.95	.33	.01	0.00	0.00	2.24	
ENE	275	193	71	7	0	0	546	1.83
	2.89	2.03	.75	.07	0.00	0.00	5.74	
	.86	.60	.22	.02	0.00	0.00	1.71	
E	263	140	36	6	0	0	445	1.61
	2.76	1.47	.38	.06	0.00	0.00	4.68	
	.82	.44	.11	.02	0.00	0.00	1.39	
ESE	213	100	27	1	0	0	341	1.52
	2.24	1.05	.28	.01	0.00	0.00	3.58	
	.67	.31	.08	.00	0.00	0.00	1.07	
SE	166	93	15	5	0	0	279	1.51
	1.74	.98	.16	.05	0.00	0.00	2.93	
	.52	.29	.05	.02	0.00	0.00	.87	
SSE	219	134	20	2	0	0	375	1.54
	2.30	1.41	.21	.02	0.00	0.00	3.94	
	.69	.42	.06	.01	0.00	0.00	1.18	
S	302	219	75	10	1	0	607	1.86
	3.17	2.30	.79	.11	.01	0.00	6.38	
	.95	.69	.24	.03	.00	0.00	1.90	
SSW	342	215	37	12	0	0	606	1.65
	3.59	2.26	.39	.13	0.00	0.00	6.37	
	1.07	.67	.12	.04	0.00	0.00	1.90	
SW	427	317	45	6	0	0	795	1.65
	4.49	3.33	.47	.06	0.00	0.00	8.35	
	1.34	.99	.14	.02	0.00	0.00	2.49	
WSW	332	464	251	32	0	0	1079	2.35
	3.49	4.88	2.64	.34	0.00	0.00	11.34	
	1.04	1.45	.79	.10	0.00	0.00	3.38	
W	229	328	370	190	3	0	1120	3.21
	2.41	3.45	3.89	2.00	.03	0.00	11.77	
	.72	1.03	1.16	.60	.01	0.00	3.51	
WNW	125	194	211	129	4	0	663	3.35
	1.31	2.04	2.22	1.36	.04	0.00	6.97	
	.39	.61	.66	.40	.01	0.00	2.08	
NW	110	164	167	38	0	0	479	2.85
	1.16	1.72	1.75	.40	0.00	0.00	5.03	
	.34	.51	.52	.12	0.00	0.00	1.50	
NNW	117	130	112	30	0	0	389	2.61
	1.23	1.37	1.18	.32	0.00	0.00	4.09	
	.37	.41	.35	.09	0.00	0.00	1.22	
N	172	165	92	15	0	0	444	2.20
	1.81	1.73	.97	.16	0.00	0.00	4.67	
	.54	.52	.29	.05	0.00	0.00	1.39	
CALM	71						71	CALM
	.75						.75	
	.22						.22	
TOTAL	3921	3367	1726	494	8	0	9516	2.19
	41.20	35.38	18.14	5.19	.08	0.00	100.00	
	12.29	10.55	5.41	1.55	.03	0.00	29.82	

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES THIS CLASS
XXX PERCENT OCCURRENCES ALL CLASSES

TABLE 2.3-19

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS
LOWER WIND JANUARY 1, 1973 THROUGH DECEMBER 31, 1976
SUSQUEHANNA SES
STABILITY CLASS: PASQUILL E

WIND SECTOR	WIND SPEED CATEGORIES (METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	347	134	7	0	0	0	488	1.26
	4.76	1.84	.10	0.00	0.00	0.00	6.69	
	1.09	.42	.02	0.00	0.00	0.00	1.53	
NE	487	162	25	0	0	0	674	1.28
	6.68	2.22	.34	0.00	0.00	0.00	9.24	
	1.53	.51	.08	0.00	0.00	0.00	2.11	
ENE	711	112	11	2	0	0	836	1.10
	9.75	1.54	.15	.03	0.00	0.00	11.46	
	2.23	.35	.03	.01	0.00	0.00	2.62	
E	680	97	10	0	0	0	787	1.06
	9.32	1.33	.14	0.00	0.00	0.00	10.79	
	2.13	.30	.03	0.00	0.00	0.00	2.47	
ESE	313	42	4	0	0	0	359	1.02
	4.29	.58	.05	0.00	0.00	0.00	4.92	
	.98	.13	.01	0.00	0.00	0.00	1.13	
SE	177	36	3	0	0	0	216	1.07
	2.43	.49	.04	0.00	0.00	0.00	2.96	
	.55	.11	.01	0.00	0.00	0.00	.68	
SSE	158	43	5	1	0	0	207	1.22
	2.17	.59	.07	.01	0.00	0.00	2.84	
	.50	.13	.02	.00	0.00	0.00	.65	
S	229	88	7	2	0	0	326	1.28
	3.14	1.21	.10	.03	0.00	0.00	4.47	
	.72	.28	.02	.01	0.00	0.00	1.02	
SSW	307	78	10	0	0	0	395	1.18
	4.21	1.07	.14	0.00	0.00	0.00	5.42	
	.96	.24	.03	0.00	0.00	0.00	1.24	
SW	397	153	1	1	0	0	552	1.26
	5.44	2.10	.01	.01	0.00	0.00	7.57	
	1.24	.48	.00	.00	0.00	0.00	1.73	
WSW	294	301	54	10	0	0	659	1.82
	4.03	4.13	.74	.14	0.00	0.00	9.03	
	.92	.94	.17	.03	0.00	0.00	2.07	
W	290	167	68	21	0	0	546	1.85
	3.98	2.29	.93	.29	0.00	0.00	7.49	
	.91	.52	.21	.07	0.00	0.00	1.71	
WNW	202	61	24	3	0	0	290	1.44
	2.77	.84	.33	.04	0.00	0.00	3.98	
	.63	.19	.08	.01	0.00	0.00	.91	
NW	147	49	16	1	0	0	213	1.38
	2.02	.67	.22	.01	0.00	0.00	2.92	
	.46	.15	.05	.00	0.00	0.00	.67	
NNW	167	60	17	1	0	0	245	1.40
	2.29	.82	.23	.01	0.00	0.00	3.36	
	.52	.19	.05	.00	0.00	0.00	.77	
N	300	76	16	1	0	0	393	1.24
	4.11	1.04	.22	.01	0.00	0.00	5.39	
	.94	.24	.05	.00	0.00	0.00	1.23	
CALM	108						108	CALM
	1.48						1.48	
	.34						.34	
TOTAL	5314	1659	278	43	0	0	7294	1.29
	72.85	22.74	3.81	.59	0.00	0.00	100.00	
	16.65	5.20	.87	.13	0.00	0.00	22.86	

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES THIS CLASS
XXX PERCENT OCCURRENCES ALL CLASSES

TABLE 2.3-20

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS
LOWER WIND JANUARY 1, 1973 THROUGH DECEMBER 31, 1976
SUSQUEHANNA SES
STABILITY CLASS: PASQUILL F

WIND SECTOR	WIND SPEED CATEGORIES (METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	200	9	0	0	0	0	209	.84
	5.74	.26	0.00	0.00	0.00	0.00	6.00	
	.63	.03	0.00	0.00	0.00	0.00	.65	
NE	343	20	0	0	0	0	363	.86
	9.84	.57	0.00	0.00	0.00	0.00	10.41	
	1.07	.06	0.00	0.00	0.00	0.00	1.14	
ENE	721	103	0	0	0	0	824	1.02
	20.68	2.95	0.00	0.00	0.00	0.00	23.64	
	2.26	.32	0.00	0.00	0.00	0.00	2.58	
E	702	103	3	0	0	0	808	1.06
	20.14	2.95	.09	0.00	0.00	0.00	23.18	
	2.20	.32	.01	0.00	0.00	0.00	2.53	
ESE	185	12	1	0	0	0	198	.90
	5.31	.34	.03	0.00	0.00	0.00	5.68	
	.58	.04	.00	0.00	0.00	0.00	.62	
SE	51	1	0	0	0	0	52	.65
	1.46	.03	0.00	0.00	0.00	0.00	1.49	
	.16	.00	0.00	0.00	0.00	0.00	.16	
SSE	53	2	0	0	0	0	55	.85
	1.52	.06	0.00	0.00	0.00	0.00	1.58	
	.17	.01	0.00	0.00	0.00	0.00	.17	
S	78	1	0	0	0	0	79	.76
	2.24	.03	0.00	0.00	0.00	0.00	2.27	
	.24	.00	0.00	0.00	0.00	0.00	.25	
SSW	49	4	0	0	0	0	53	.85
	1.41	.11	0.00	0.00	0.00	0.00	1.52	
	.15	.01	0.00	0.00	0.00	0.00	.17	
SW	79	15	0	0	0	0	94	.98
	2.27	.43	0.00	0.00	0.00	0.00	2.70	
	.25	.05	0.00	0.00	0.00	0.00	.29	
WSW	70	17	3	1	0	0	91	1.21
	2.01	.49	.09	.03	0.00	0.00	2.61	
	.22	.05	.01	.00	0.00	0.00	.29	
W	101	5	0	0	0	0	106	.89
	2.90	.14	0.00	0.00	0.00	0.00	3.04	
	.32	.02	0.00	0.00	0.00	0.00	.33	
WNW	88	3	0	0	0	0	91	.80
	2.52	.09	0.00	0.00	0.00	0.00	2.61	
	.28	.01	0.00	0.00	0.00	0.00	.29	
NW	101	2	0	0	0	0	103	.78
	2.90	.06	0.00	0.00	0.00	0.00	2.95	
	.32	.01	0.00	0.00	0.00	0.00	.32	
NNW	90	2	0	0	0	0	92	.82
	2.58	.06	0.00	0.00	0.00	0.00	2.64	
	.28	.01	0.00	0.00	0.00	0.00	.29	
N	153	16	2	0	0	0	171	.99
	4.39	.46	.06	0.00	0.00	0.00	4.91	
	.48	.05	.01	0.00	0.00	0.00	.54	
CALM	97						97	CALM
	2.78						2.78	
	.30						.30	
TOTAL	3161	315	9	1	0	0	3486	.93
	90.68	9.04	.26	.03	0.00	0.00	100.00	
	9.91	.99	.03	.00	0.00	0.00	10.92	

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES THIS CLASS
XXX PERCENT OCCURRENCES ALL CLASSES

TABLE 2.3-21

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS
LOWER WIND JANUARY 1, 1973 THROUGH DECEMBER 31, 1976
SUSQUEHANNA SES
STABILITY CLASS: PASQUILL G

WIND SECTOR	WIND SPEED CATEGORIES (METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	55 4.19 .17	2 .15 .01	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	57 4.34 .18	.93
NE	200 15.23 .63	15 1.14 .05	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	215 16.37 .67	.96
ENE	341 25.97 1.07	56 4.27 .18	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	397 30.24 1.24	1.12
E	293 22.32 .92	31 2.36 .10	7 .53 .02	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	331 25.21 1.04	1.11
ESE	65 4.95 .20	1 .08 .00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	66 5.03 .21	.86
SE	19 1.45 .06	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	19 1.45 .06	.68
SSE	20 1.52 .06	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	20 1.52 .06	.72
S	11 .84 .03	1 .08 .00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	12 .91 .04	.89
SSW	9 .69 .03	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	9 .69 .03	.73
SW	11 .84 .03	1 .08 .00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	12 .91 .04	.88
WSW	9 .69 .03	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	9 .69 .03	.77
W	17 1.29 .05	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	17 1.29 .05	.83
WNW	18 1.37 .06	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	18 1.37 .06	.73
NW	14 1.07 .04	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	14 1.07 .04	.73
NNW	26 1.98 .08	1 .08 .00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	27 2.06 .08	.83
N	57 4.34 .18	13 .99 .04	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	70 5.33 .22	1.12
CALM	20 1.52 .06						20 1.52 .06	CALM
TOTAL	1185 90.25 3.71	121 9.22 .38	7 .53 .02	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	1313 100.00 4.11	1.01

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES THIS CLASS
XXX PERCENT OCCURRENCES ALL CLASSES

TABLE 2.3-22

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS
LOWER WIND JANUARY 1, 1973 THROUGH DECEMBER 31, 1976
SUSQUEHANNA SES
ALL CLASSES

WIND SECTOR	WIND SPEED CATEGORIES (METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	977 3.06	560 1.75	223 .70	18 .06	0 0.00	0 0.00	1778 5.57	1.72
NE	1458 4.57	787 2.47	268 .84	6 .02	0 0.00	0 0.00	2519 7.89	1.61
ENE	2148 6.73	670 2.10	147 .46	15 .05	0 0.00	0 0.00	2980 9.34	1.36
E	2067 6.48	529 1.66	118 .37	22 .07	2 .01	0 0.00	2738 8.58	1.32
ESE	888 2.78	269 .84	58 .18	2 .01	0 0.00	0 0.00	1217 3.81	1.31
SE	517 1.62	240 .75	32 .10	6 .02	0 0.00	0 0.00	795 2.49	1.39
SSE	601 1.88	325 1.02	51 .16	6 .02	0 0.00	0 0.00	983 3.08	1.50
S	831 2.60	590 1.85	234 .73	79 .25	3 .01	0 0.00	1737 5.44	1.99
SSW	946 2.96	606 1.90	223 .70	112 .35	7 .02	2 .01	1896 5.94	2.03
SW	1204 3.77	1028 3.22	249 .78	63 .20	16 .05	0 0.00	2560 8.02	1.91
WSW	909 2.85	1508 4.73	848 2.66	164 .51	2 .01	0 0.00	3431 10.75	2.49
W	795 2.49	1018 3.19	1100 3.45	510 1.60	9 .03	1 .00	3433 10.76	3.09
WNW	493 1.54	403 1.26	481 1.51	274 .86	11 .03	0 0.00	1662 5.21	3.03
NW	427 1.34	348 1.09	306 .96	81 .25	0 0.00	0 0.00	1162 3.64	2.44
NNW	461 1.44	344 1.08	285 .89	86 .27	0 0.00	0 0.00	1176 3.69	2.39
N	757 2.37	438 1.37	282 .88	40 .13	1 .00	0 0.00	1518 4.76	1.97
CALM	325 1.02						325 1.02	CALM
TOTAL	15804 49.53	9663 30.28	4905 15.37	1484 4.65	51 .16	3 .01	31910 100.00	2.00

NUMBER OF VALID OBSERVATIONS 31910 91.01 PCT.
NUMBER OF INVALID OBSERVATIONS 3154 8.99 PCT.
TOTAL NUMBER OF OBSERVATIONS 35064 100.00 PCT.

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES

TABLE 2.3-23

JOINT WIND FREQUENCY DISTRIBUTION
LOWER WIND JANUARY 1, 1973 THROUGH DECEMBER 31, 1976
SUSQUEHANNA SES
ALL WINDS

WIND SECTOR	WIND SPEED CATEGORIES (METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	997 3.05	570 1.74	223 .68	18 .06	0 0.00	0 0.00	1808 5.53	1.72
NE	1531 4.69	802 2.45	273 .84	6 .02	0 0.00	0 0.00	2612 7.99	1.60
ENE	2233 6.83	679 2.08	148 .45	15 .05	0 0.00	0 0.00	3075 9.41	1.35
E	2089 6.39	533 1.63	118 .36	22 .07	2 .01	0 0.00	2764 8.46	1.32
ESE	899 2.75	270 .83	58 .18	2 .01	0 0.00	0 0.00	1229 3.76	1.31
SE	534 1.63	247 .76	32 .10	6 .02	0 0.00	0 0.00	819 2.51	1.39
SSE	635 1.94	336 1.03	52 .16	6 .02	0 0.00	0 0.00	1029 3.15	1.49
S	846 2.59	592 1.81	234 .72	79 .24	3 .01	0 0.00	1754 5.37	1.99
SSW	970 2.97	613 1.88	223 .68	112 .34	7 .02	2 .01	1927 5.90	2.01
SW	1234 3.78	1057 3.23	249 .76	63 .19	16 .05	0 0.00	2619 8.01	1.90
WSW	942 2.88	1552 4.75	862 2.64	166 .51	2 .01	0 0.00	3524 10.78	2.48
W	835 2.56	1029 3.15	1107 3.39	512 1.57	9 .03	1 .00	3493 10.69	3.07
WNW	525 1.61	415 1.27	494 1.51	275 .84	11 .03	0 0.00	1720 5.26	2.99
NW	445 1.36	356 1.09	316 .97	82 .25	0 0.00	0 0.00	1199 3.67	2.43
NNW	489 1.50	355 1.09	290 .89	87 .27	0 0.00	0 0.00	1221 3.74	2.36
N	775 2.37	449 1.37	289 .88	40 .12	1 .00	0 0.00	1554 4.76	1.96
CALM	330 1.01						330 1.01	CALM
TOTAL	16309 49.91	9855 30.16	4968 15.20	1491 4.56	51 .16	3 .01	32677 100.00	1.99

NUMBER OF VALID OBSERVATIONS 32677 93.19 PCT.
NUMBER OF INVALID OBSERVATIONS 2387 6.81 PCT.
TOTAL NUMBER OF OBSERVATIONS 35064 100.00 PCT.

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES

TABLE 2.3-24

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS
UPPER WIND JANUARY 1, 1973 THROUGH DECEMBER 31, 1976
SUSQUEHANNA SES
STABILITY CLASS: PASQUILL A

WIND SECTOR	WIND SPEED CATEGORIES (METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	19	81	64	35	3	0	202	3.41
	.37	1.58	1.25	.68	.06	0.00	3.93	
	.06	.26	.21	.11	.01	0.00	.66	
NE	19	48	26	2	0	0	95	2.57
	.37	.93	.51	.04	0.00	0.00	1.85	
	.06	.16	.08	.01	0.00	0.00	.31	
ENE	15	29	18	2	0	0	64	2.52
	.29	.56	.35	.04	0.00	0.00	1.25	
	.05	.09	.06	.01	0.00	0.00	.21	
E	10	15	23	20	0	0	68	3.81
	.19	.29	.45	.39	0.00	0.00	1.32	
	.03	.05	.07	.07	0.00	0.00	.22	
ESE	13	23	28	21	2	0	87	3.64
	.25	.45	.54	.41	.04	0.00	1.69	
	.04	.07	.09	.07	.01	0.00	.28	
SE	14	37	41	31	2	0	125	3.83
	.27	.72	.80	.60	.04	0.00	2.43	
	.05	.12	.13	.10	.01	0.00	.41	
SSE	22	36	35	49	13	0	155	4.29
	.43	.70	.68	.95	.25	0.00	3.02	
	.07	.12	.11	.16	.04	0.00	.50	
S	34	78	89	107	36	0	344	4.49
	.66	1.52	1.73	2.08	.70	0.00	6.70	
	.11	.25	.29	.35	.12	0.00	1.12	
SSW	27	196	222	126	33	1	605	4.04
	.53	3.81	4.32	2.45	.64	.02	11.78	
	.09	.64	.72	.41	.11	.00	1.97	
SW	41	237	484	348	82	15	1207	4.58
	.80	4.61	9.42	6.77	1.60	.29	23.49	
	.13	.77	1.57	1.13	.27	.05	3.92	
WSW	15	103	242	319	76	10	765	5.22
	.29	2.00	4.71	6.21	1.48	.19	14.89	
	.05	.33	.79	1.04	.25	.03	2.49	
W	12	28	116	257	63	9	485	5.81
	.23	.54	2.26	5.00	1.23	.18	9.44	
	.04	.09	.38	.84	.20	.03	1.58	
WNW	7	19	61	155	26	4	272	5.75
	.14	.37	1.19	3.02	.51	.08	5.29	
	.02	.06	.20	.50	.08	.01	.88	
NW	5	14	56	123	5	0	203	5.32
	.10	.27	1.09	2.39	.10	0.00	3.95	
	.02	.05	.18	.40	.02	0.00	.66	
NNW	13	22	78	89	2	0	204	4.61
	.25	.43	1.52	1.73	.04	0.00	3.97	
	.04	.07	.25	.29	.01	0.00	.66	
N	13	98	99	35	3	0	248	3.49
	.25	1.91	1.93	.68	.06	0.00	4.83	
	.04	.32	.32	.11	.01	0.00	.81	
CALM	9						9	CALM
	.18						.18	
	.03						.03	
TOTAL	288	1064	1682	1719	346	39	5138	4.59
	5.61	20.71	32.74	33.46	6.73	.76	100.00	
	.94	3.46	5.47	5.59	1.12	.13	16.70	

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES THIS CLASS
XXX PERCENT OCCURRENCES ALL CLASSES

TABLE 2.3-25

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS
UPPER WIND JANUARY 1, 1973 THROUGH DECEMBER 31, 1976
SUSQUEHANNA SES
STABILITY CLASS: PASQUILL B

WIND SECTOR	WIND SPEED CATEGORIES (METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	14	28	68	44	2	0	156	4.10
	.60	1.20	2.93	1.89	.09	0.00	6.71	
	.05	.09	.22	.14	.01	0.00	.51	
NE	6	21	20	6	3	0	56	3.32
	.26	.90	.86	.26	.13	0.00	2.41	
	.02	.07	.07	.02	.01	0.00	.18	
ENE	9	17	21	10	0	0	57	3.46
	.39	.73	.90	.43	0.00	0.00	2.45	
	.03	.06	.07	.03	0.00	0.00	.19	
E	8	16	20	20	0	0	64	3.76
	.34	.69	.86	.86	0.00	0.00	2.75	
	.03	.05	.07	.07	0.00	0.00	.21	
ESE	3	10	27	16	2	0	58	4.19
	.13	.43	1.16	.69	.09	0.00	2.50	
	.01	.03	.09	.05	.01	0.00	.19	
SE	7	17	39	15	3	0	81	3.97
	.30	.73	1.68	.65	.13	0.00	3.49	
	.02	.06	.13	.05	.01	0.00	.26	
SSE	8	14	45	13	4	0	84	4.00
	.34	.60	1.94	.56	.17	0.00	3.61	
	.03	.05	.15	.04	.01	0.00	.27	
S	14	23	36	43	9	0	125	4.42
	.60	.99	1.55	1.85	.39	0.00	5.38	
	.05	.07	.12	.14	.03	0.00	.41	
SSW	20	53	39	39	5	0	156	3.70
	.86	2.28	1.68	1.68	.22	0.00	6.71	
	.07	.17	.13	.13	.02	0.00	.51	
SW	26	55	120	90	20	4	315	4.44
	1.12	2.37	5.16	3.87	.86	.17	13.55	
	.08	.18	.39	.29	.07	.01	1.02	
WSW	3	25	96	128	46	15	313	5.78
	.13	1.08	4.13	5.51	1.98	.65	13.47	
	.01	.08	.31	.42	.15	.05	1.02	
W	1	16	63	148	24	8	260	5.86
	.04	.69	2.71	6.37	1.03	.34	11.19	
	.00	.05	.20	.48	.08	.03	.85	
WNW	4	7	50	79	13	0	153	5.41
	.17	.30	2.15	3.40	.56	0.00	6.58	
	.01	.02	.16	.26	.04	0.00	.50	
NW	7	17	45	83	3	0	155	4.95
	.30	.73	1.94	3.57	.13	0.00	6.67	
	.02	.06	.15	.27	.01	0.00	.50	
NNW	14	25	46	40	1	0	126	4.12
	.60	1.08	1.98	1.72	.04	0.00	5.42	
	.05	.08	.15	.13	.00	0.00	.41	
N	8	55	55	43	2	0	163	3.85
	.34	2.37	2.37	1.85	.09	0.00	7.01	
	.03	.18	.18	.14	.01	0.00	.53	
CALM	2						2	CALM
	.09						.09	
	.01						.01	
TOTAL	154	399	790	817	137	27	2324	4.63
	6.63	17.17	33.99	35.15	5.90	1.16	100.00	
	.50	1.30	2.57	2.66	.45	.09	7.56	

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES THIS CLASS
XXX PERCENT OCCURRENCES ALL CLASSES

TABLE 2.3-26

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS
UPPER WIND JANUARY 1, 1973 THROUGH DECEMBER 31, 1976
SUSQUEHANNA SES
STABILITY CLASS: PASQUILL C

WIND SECTOR	WIND SPEED CATEGORIES (METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	16	48	96	54	10	0	224	4.16
	.58	1.75	3.50	1.97	.37	0.00	8.18	
	.05	.16	.31	.18	.03	0.00	.73	
NE	16	26	37	14	5	2	100	3.67
	.58	.95	1.35	.51	.18	.07	3.65	
	.05	.08	.12	.05	.02	.01	.33	
ENE	7	20	29	24	2	0	82	3.89
	.26	.73	1.06	.88	.07	0.00	2.99	
	.02	.07	.09	.08	.01	0.00	.27	
E	14	19	37	17	2	0	89	3.76
	.51	.69	1.35	.62	.07	0.00	3.25	
	.05	.06	.12	.06	.01	0.00	.29	
ESE	5	25	25	20	2	0	77	3.96
	.18	.91	.91	.73	.07	0.00	2.81	
	.02	.08	.08	.07	.01	0.00	.25	
SE	5	21	39	30	0	0	95	4.19
	.18	.77	1.42	1.10	0.00	0.00	3.47	
	.02	.07	.13	.10	0.00	0.00	.31	
SSE	12	21	33	18	5	0	89	3.95
	.44	.77	1.20	.66	.18	0.00	3.25	
	.04	.07	.11	.06	.02	0.00	.29	
S	17	30	34	66	11	0	158	4.57
	.62	1.10	1.24	2.41	.40	0.00	5.77	
	.06	.10	.11	.21	.04	0.00	.51	
SSW	24	52	50	38	5	0	169	3.68
	.88	1.90	1.83	1.39	.18	0.00	6.17	
	.08	.17	.16	.12	.02	0.00	.55	
SW	33	78	119	87	29	14	360	4.54
	1.20	2.85	4.34	3.18	1.06	.51	13.14	
	.11	.25	.39	.28	.09	.05	1.17	
WSW	14	46	81	157	62	8	368	5.52
	.51	1.68	2.96	5.73	2.26	.29	13.44	
	.05	.15	.26	.51	.20	.03	1.20	
W	5	6	62	128	31	7	239	5.99
	.18	.22	2.26	4.67	1.13	.26	8.73	
	.02	.02	.20	.42	.10	.02	.78	
WNW	4	10	45	82	13	2	156	5.42
	.15	.37	1.64	2.99	.47	.07	5.70	
	.01	.03	.15	.27	.04	.01	.51	
NW	5	14	62	74	5	1	161	4.88
	.18	.51	2.26	2.70	.18	.04	5.88	
	.02	.05	.20	.24	.02	.00	.52	
NNW	25	32	55	50	1	0	163	3.98
	.91	1.17	2.01	1.83	.04	0.00	5.95	
	.08	.10	.18	.16	.00	0.00	.53	
N	21	55	80	46	4	0	206	3.85
	.77	2.01	2.92	1.68	.15	0.00	7.52	
	.07	.18	.26	.15	.01	0.00	.67	
CALM	3						3	CALM
	.11						.11	
	.01						.01	
TOTAL	226	503	884	905	187	34	2739	4.57
	8.25	18.36	32.27	33.04	6.83	1.24	100.00	
	.73	1.64	2.87	2.94	.61	.11	8.90	

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES THIS CLASS
XXX PERCENT OCCURRENCES ALL CLASSES

TABLE 2.3-27

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS
UPPER WIND JANUARY 1, 1973 THROUGH DECEMBER 31, 1976
SUSQUEHANNA SES
STABILITY CLASS: PASQUILL D

WIND SECTOR	WIND SPEED CATEGORIES (METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	129	187	204	91	6	0	617	3.19
	1.42	2.06	2.25	1.00	.07	0.00	6.79	
	.42	.61	.66	.30	.02	0.00	2.01	
NE	80	140	179	71	7	0	477	3.28
	.88	1.54	1.97	.78	.08	0.00	5.25	
	.26	.46	.58	.23	.02	0.00	1.55	
ENE	55	77	93	30	0	0	255	3.09
	.61	.85	1.02	.33	0.00	0.00	2.81	
	.18	.25	.30	.10	0.00	0.00	.83	
E	38	69	130	40	6	0	283	3.58
	.42	.76	1.43	.44	.07	0.00	3.12	
	.12	.22	.42	.13	.02	0.00	.92	
ESE	36	86	100	67	10	0	299	3.76
	.40	.95	1.10	.74	.11	0.00	3.29	
	.12	.28	.33	.22	.03	0.00	.97	
SE	49	89	130	67	17	1	353	3.78
	.54	.98	1.43	.74	.19	.01	3.89	
	.16	.29	.42	.22	.06	.00	1.15	
SSE	59	86	151	77	10	1	384	3.74
	.65	.95	1.66	.85	.11	.01	4.23	
	.19	.28	.49	.25	.03	.00	1.25	
S	83	114	174	172	39	6	588	4.22
	.91	1.25	1.92	1.89	.43	.07	6.47	
	.27	.37	.57	.56	.13	.02	1.91	
SSW	105	221	188	124	31	3	672	3.58
	1.16	2.43	2.07	1.37	.34	.03	7.40	
	.34	.72	.61	.40	.10	.01	2.18	
SW	125	317	403	322	58	9	1234	4.07
	1.38	3.49	4.44	3.54	.64	.10	13.58	
	.41	1.03	1.31	1.05	.19	.03	4.01	
WSW	55	168	289	317	105	7	941	4.86
	.61	1.85	3.18	3.49	1.16	.08	10.36	
	.18	.55	.94	1.03	.34	.02	3.06	
W	45	89	232	424	106	9	905	5.34
	.50	.98	2.55	4.67	1.17	.10	9.96	
	.15	.29	.75	1.38	.34	.03	2.94	
WNW	31	41	163	299	65	0	599	5.35
	.34	.45	1.79	3.29	.72	0.00	6.59	
	.10	.13	.53	.97	.21	0.00	1.95	
NW	35	43	153	214	14	0	459	4.76
	.39	.47	1.68	2.36	.15	0.00	5.05	
	.11	.14	.50	.70	.05	0.00	1.49	
NNW	71	88	133	104	5	0	401	3.71
	.78	.97	1.46	1.14	.06	0.00	4.41	
	.23	.29	.43	.34	.02	0.00	1.30	
N	110	210	168	90	7	0	585	3.20
	1.21	2.31	1.85	.99	.08	0.00	6.44	
	.36	.68	.55	.29	.02	0.00	1.90	
CALM	32						32	CALM
	.35						.35	
	.10						.10	
TOTAL	1138	2025	2890	2509	486	36	9084	4.11
	12.53	22.29	31.81	27.62	5.35	.40	100.00	
	3.70	6.58	9.40	8.16	1.58	.12	29.53	

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES THIS CLASS
XXX PERCENT OCCURRENCES ALL CLASSES

SUSQUEHANNA SES-ER-OL

TABLE 2.3-28

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS

UPPER WIND JANUARY 1, 1973 THROUGH DECEMBER 31, 1976

SUSQUEHANNA SES

STABILITY CLASS: PASQUILL E

WIND SECTOR	WIND SPEED CATEGORIES (METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	207	298	119	13	0	0	637	2.18
	2.98	4.30	1.72	.19	0.00	0.00	9.18	
	.67	.97	.39	.04	0.00	0.00	2.07	
NE	180	194	91	4	0	0	469	2.04
	2.59	2.80	1.31	.06	0.00	0.00	6.76	
	.59	.63	.30	.01	0.00	0.00	1.52	
ENE	92	107	68	14	0	0	281	2.36
	1.33	1.54	.98	.20	0.00	0.00	4.05	
	.30	.35	.22	.05	0.00	0.00	.91	
E	89	81	46	11	2	0	229	2.30
	1.28	1.17	.66	.16	.03	0.00	3.30	
	.29	.26	.15	.04	.01	0.00	.74	
ESE	68	64	43	16	0	0	191	2.46
	.98	.92	.62	.23	0.00	0.00	2.75	
	.22	.21	.14	.05	0.00	0.00	.62	
SE	82	75	66	13	1	0	237	2.49
	1.18	1.08	.95	.19	.01	0.00	3.42	
	.27	.24	.21	.04	.00	0.00	.77	
SSE	95	78	85	26	2	0	286	2.73
	1.37	1.12	1.23	.37	.03	0.00	4.12	
	.31	.25	.28	.08	.01	0.00	.93	
S	136	134	126	64	5	2	467	2.99
	1.96	1.93	1.82	.92	.07	.03	6.73	
	.44	.44	.41	.21	.02	.01	1.52	
SSW	147	203	162	86	14	0	612	3.08
	2.12	2.93	2.33	1.24	.20	0.00	8.82	
	.48	.66	.53	.28	.05	0.00	1.99	
SW	158	305	328	123	11	1	926	3.23
	2.28	4.40	4.73	1.77	.16	.01	13.35	
	.51	.99	1.07	.40	.04	.00	3.01	
WSW	94	170	242	250	30	0	786	4.12
	1.35	2.45	3.49	3.60	.43	0.00	11.33	
	.31	.55	.79	.81	.10	0.00	2.56	
W	70	88	148	139	26	0	471	4.12
	1.01	1.27	2.13	2.00	.37	0.00	6.79	
	.23	.29	.48	.45	.08	0.00	1.53	
WNW	39	48	74	45	5	0	211	3.64
	.56	.69	1.07	.65	.07	0.00	3.04	
	.13	.16	.24	.15	.02	0.00	.69	
NW	45	38	46	15	0	0	144	2.77
	.65	.55	.66	.22	0.00	0.00	2.08	
	.15	.12	.15	.05	0.00	0.00	.47	
NNW	93	103	96	18	0	0	310	2.63
	1.34	1.48	1.38	.26	0.00	0.00	4.47	
	.30	.33	.31	.06	0.00	0.00	1.01	
N	188	281	123	22	0	0	614	2.29
	2.71	4.05	1.77	.32	0.00	0.00	8.85	
	.61	.91	.40	.07	0.00	0.00	2.00	
CALM	67						67	CALM
	.97						.97	
	.22						.22	
TOTAL	1850	2267	1863	859	96	3	6938	2.91
	26.66	32.68	26.85	12.38	1.38	.04	100.00	
	6.01	7.37	6.06	2.79	.31	.01	22.56	

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES THIS CLASS
XXX PERCENT OCCURRENCES ALL CLASSES

TABLE 2.3-29

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS
UPPER WIND JANUARY 1, 1973 THROUGH DECEMBER 31, 1976
SUSQUEHANNA SES
STABILITY CLASS: PASQUILL F

WIND SECTOR	WIND SPEED CATEGORIES (METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	148	215	32	1	1	0	397	1.88
	4.48	6.51	.97	.03	.03	0.00	12.02	
	.48	.70	.10	.00	.00	0.00	1.29	
NE	137	135	16	0	0	0	288	1.69
	4.15	4.09	.48	0.00	0.00	0.00	8.72	
	.45	.44	.05	0.00	0.00	0.00	.94	
ENE	108	58	7	1	0	0	174	1.50
	3.27	1.76	.21	.03	0.00	0.00	5.27	
	.35	.19	.02	.00	0.00	0.00	.57	
E	116	37	1	0	0	0	154	1.23
	3.51	1.12	.03	0.00	0.00	0.00	4.66	
	.38	.12	.00	0.00	0.00	0.00	.50	
ESE	83	14	3	0	0	0	100	1.21
	2.51	.42	.09	0.00	0.00	0.00	3.03	
	.27	.05	.01	0.00	0.00	0.00	.33	
SE	86	32	8	1	0	0	127	1.44
	2.60	.97	.24	.03	0.00	0.00	3.85	
	.28	.10	.03	.00	0.00	0.00	.41	
SSE	86	37	14	3	0	0	140	1.68
	2.60	1.12	.42	.09	0.00	0.00	4.24	
	.28	.12	.05	.01	0.00	0.00	.46	
S	91	74	40	2	0	0	207	2.08
	2.76	2.24	1.21	.06	0.00	0.00	6.27	
	.30	.24	.13	.01	0.00	0.00	.67	
SSW	112	136	43	4	0	0	295	2.05
	3.39	4.12	1.30	.12	0.00	0.00	8.93	
	.36	.44	.14	.01	0.00	0.00	.96	
SW	84	200	55	8	0	0	347	2.27
	2.54	6.06	1.67	.24	0.00	0.00	10.51	
	.27	.65	.18	.03	0.00	0.00	1.13	
WSW	48	105	54	8	1	0	216	2.58
	1.45	3.18	1.64	.24	.03	0.00	6.54	
	.16	.34	.18	.03	.00	0.00	.70	
W	27	34	33	13	2	0	109	3.04
	.82	1.03	1.00	.39	.06	0.00	3.30	
	.09	.11	.11	.04	.01	0.00	.35	
WNW	20	14	11	4	0	0	49	2.35
	.61	.42	.33	.12	0.00	0.00	1.48	
	.07	.05	.04	.01	0.00	0.00	.16	
NW	30	19	14	1	0	0	64	2.03
	.91	.58	.42	.03	0.00	0.00	1.94	
	.10	.06	.05	.00	0.00	0.00	.21	
NNW	53	52	36	1	0	0	142	2.15
	1.61	1.57	1.09	.03	0.00	0.00	4.30	
	.17	.17	.12	.00	0.00	0.00	.46	
N	128	228	91	0	0	0	447	2.18
	3.88	6.90	2.76	0.00	0.00	0.00	13.54	
	.42	.74	.30	0.00	0.00	0.00	1.45	
CALM	46						46	CALM
	1.39						1.39	
	.15						.15	
TOTAL	1403	1390	458	47	4	0	3302	1.96
	42.49	42.10	13.87	1.42	.12	0.00	100.00	
	4.56	4.52	1.49	.15	.01	0.00	10.73	

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES THIS CLASS
XXX PERCENT OCCURRENCES ALL CLASSES

TABLE 2.3-30

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS
UPPER WIND JANUARY 1, 1973 THROUGH DECEMBER 31, 1976
SUSQUEHANNA SES
STABILITY CLASS: PASQUILL G

WIND SECTOR	WIND SPEED CATEGORIES (METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	37	78	14	0	0	0	129	2.05
	3.00	6.32	1.13	0.00	0.00	0.00	10.45	
	.12	.25	.05	0.00	0.00	0.00	.42	
NE	66	86	6	1	0	0	159	1.69
	5.34	6.96	.49	.08	0.00	0.00	12.87	
	.21	.28	.02	.00	0.00	0.00	.52	
ENE	44	37	6	0	0	0	87	1.72
	3.56	3.00	.49	0.00	0.00	0.00	7.04	
	.14	.12	.02	0.00	0.00	0.00	.28	
E	51	20	0	0	0	0	71	1.33
	4.13	1.62	0.00	0.00	0.00	0.00	5.75	
	.17	.07	0.00	0.00	0.00	0.00	.23	
ESE	39	13	4	0	0	0	56	1.41
	3.16	1.05	.32	0.00	0.00	0.00	4.53	
	.13	.04	.01	0.00	0.00	0.00	.18	
SE	36	17	5	0	0	0	58	1.53
	2.91	1.38	.40	0.00	0.00	0.00	4.70	
	.12	.06	.02	0.00	0.00	0.00	.19	
SSE	51	27	3	0	0	0	81	1.47
	4.13	2.19	.24	0.00	0.00	0.00	6.56	
	.17	.09	.01	0.00	0.00	0.00	.26	
S	64	58	10	2	0	0	134	1.86
	5.18	4.70	.81	.16	0.00	0.00	10.85	
	.21	.19	.03	.01	0.00	0.00	.44	
SSW	37	56	22	4	1	0	120	2.26
	3.00	4.53	1.78	.32	.08	0.00	9.72	
	.12	.18	.07	.01	.00	0.00	.39	
SW	33	60	17	1	0	0	111	2.15
	2.67	4.86	1.38	.08	0.00	0.00	8.99	
	.11	.20	.06	.00	0.00	0.00	.36	
WSW	15	16	14	2	0	0	47	2.50
	1.21	1.30	1.13	.16	0.00	0.00	3.81	
	.05	.05	.05	.01	0.00	0.00	.15	
W	5	6	2	2	0	0	15	2.47
	.40	.49	.16	.16	0.00	0.00	1.21	
	.02	.02	.01	.01	0.00	0.00	.05	
WNW	7	1	3	0	0	0	11	1.95
	.57	.08	.24	0.00	0.00	0.00	.89	
	.02	.00	.01	0.00	0.00	0.00	.04	
NW	7	4	2	0	0	0	13	1.76
	.57	.32	.16	0.00	0.00	0.00	1.05	
	.02	.01	.01	0.00	0.00	0.00	.04	
NNW	15	12	7	1	0	0	35	2.05
	1.21	.97	.57	.08	0.00	0.00	2.83	
	.05	.04	.02	.00	0.00	0.00	.11	
N	30	45	16	1	0	0	92	2.20
	2.43	3.64	1.30	.08	0.00	0.00	7.45	
	.10	.15	.05	.00	0.00	0.00	.30	
CALM	16						16	CALM
	1.30						1.30	
	.05						.05	
TOTAL	553	536	131	14	1	0	1235	1.86
	44.78	43.40	10.61	1.13	.08	0.00	100.00	
	1.80	1.74	.43	.05	.00	0.00	4.01	

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES THIS CLASS
XXX PERCENT OCCURRENCES ALL CLASSES

TABLE 2.3-31

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS
UPPER WIND JANUARY 1, 1973 THROUGH DECEMBER 31, 1976
SUSQUEHANNA SES
ALL CLASSES

WIND SECTOR	WIND SPEED CATEGORIES (METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	570 1.85	935 3.04	597 1.94	238 .77	22 .07	0 0.00	2362 7.68	2.81
NE	504 1.64	650 2.11	375 1.22	98 .32	15 .05	2 .01	1644 5.34	2.48
ENE	330 1.07	345 1.12	242 .79	81 .26	2 .01	0 0.00	1000 3.25	2.54
E	326 1.06	257 .84	257 .84	108 .35	10 .03	0 0.00	958 3.11	2.78
ESE	247 .80	235 .76	230 .75	140 .46	16 .05	0 0.00	868 2.82	3.06
SE	279 .91	288 .94	328 1.07	157 .51	23 .07	1 .00	1076 3.50	3.15
SSE	333 1.08	299 .97	366 1.19	186 .60	34 .11	1 .00	1219 3.96	3.22
S	439 1.43	511 1.66	509 1.65	456 1.48	100 .33	8 .03	2023 6.58	3.65
SSW	472 1.53	917 2.98	726 2.36	421 1.37	89 .29	4 .01	2629 8.55	3.35
SW	500 1.63	1252 4.07	1526 4.96	979 3.18	200 .65	43 .14	4500 14.63	3.91
WSW	244 .79	633 2.06	1018 3.31	1181 3.84	320 1.04	40 .13	3436 11.17	4.75
W	165 .54	267 .87	656 2.13	1111 3.61	252 .82	33 .11	2484 8.08	5.20
WNW	112 .36	140 .46	407 1.32	664 2.16	122 .40	6 .02	1451 4.72	5.07
NW	134 .44	149 .48	378 1.23	510 1.66	27 .09	1 .00	1199 3.90	4.48
NNW	284 .92	334 1.09	451 1.47	303 .99	9 .03	0 0.00	1381 4.49	3.47
N	498 1.62	972 3.16	632 2.05	237 .77	16 .05	0 0.00	2355 7.66	2.86
CALM	175 .57						175 .57	CALM
TOTAL	5612 18.24	8184 26.61	8698 28.28	6870 22.33	1257 4.09	139 .45	30760 100.00	3.68

NUMBER OF VALID OBSERVATIONS 30760 87.73 PCT.
NUMBER OF INVALID OBSERVATIONS 4304 12.27 PCT.
TOTAL NUMBER OF OBSERVATIONS 35064 100.00 PCT.

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES

TABLE 2.3-32

JOINT WIND FREQUENCY DISTRIBUTION
UPPER WIND JANUARY 1, 1973 THROUGH DECEMBER 31, 1976
SUSQUEHANNA SES
ALL WINDS

WIND SECTOR	WIND SPEED CATEGORIES (METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	613 1.87	996 3.04	660 2.02	256 .78	23 .07	0 0.00	2548 7.79	2.81
NE	538 1.64	693 2.12	392 1.20	102 .31	15 .05	2 .01	1742 5.33	2.46
ENE	371 1.13	367 1.12	250 .76	88 .27	2 .01	0 0.00	1078 3.30	2.51
E	351 1.07	282 .86	263 .80	109 .33	10 .03	0 0.00	1015 3.10	2.73
ESE	268 .82	252 .77	245 .75	150 .46	18 .06	0 0.00	933 2.85	3.06
SE	296 .90	308 .94	345 1.05	166 .51	23 .07	2 .01	1140 3.49	3.15
SSE	356 1.09	321 .98	388 1.19	203 .62	35 .11	1 .00	1304 3.99	3.22
S	471 1.44	547 1.67	556 1.70	470 1.44	104 .32	8 .02	2156 6.59	3.62
SSW	502 1.53	990 3.03	764 2.34	428 1.31	91 .28	4 .01	2779 8.50	3.31
SW	532 1.63	1327 4.06	1608 4.92	1031 3.15	207 .63	45 .14	4750 14.52	3.90
WSW	260 .79	686 2.10	1077 3.29	1239 3.79	337 1.03	47 .14	3646 11.15	4.74
W	176 .54	301 .92	698 2.13	1149 3.51	267 .82	34 .10	2625 8.03	5.16
WNW	119 .36	149 .46	440 1.35	682 2.08	124 .38	6 .02	1520 4.65	5.03
NW	150 .46	167 .51	409 1.25	541 1.65	29 .09	1 .00	1297 3.97	4.43
NNW	295 .90	375 1.15	472 1.44	318 .97	9 .03	0 0.00	1469 4.49	3.45
N	529 1.62	1034 3.16	686 2.10	262 .80	18 .06	0 0.00	2529 7.73	2.89
CALM	179 .55						179 .55	CALM
TOTAL	6006 18.36	8795 26.89	9253 28.29	7194 21.99	1312 4.01	150 .46	32710 100.00	3.66

NUMBER OF VALID OBSERVATIONS 32710 93.29 PCT.
NUMBER OF INVALID OBSERVATIONS 2354 6.71 PCT.
TOTAL NUMBER OF OBSERVATIONS 35064 100.00 PCT.

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES

TABLE 2.3-33

LONG-TERM TEMPERATURE (^{o}F) AT AVOCA

(Period of Record: 1956-1974)

Month	Averages			Extreme	
	Daily Max	Daily Min	Mean	Highest	Lowest
January	33.5	18.4	26.0	67	-10
February	35.3	19.3	27.3	68	-11
March	44.7	27.2	36.0	83	- 4
April	58.9	38.0	48.5	92	15
May	70.0	47.8	58.9	93	27
June	79.0	56.8	67.9	97	34
July	83.0	61.3	72.2	101	45
August	80.7	59.2	70.0	94	42
September	73.6	52.1	62.9	95	30
October	63.0	42.2	52.6	84	19
November	48.8	32.8	40.8	77	9
December	36.1	22.0	29.1	65	- 7
Annual	58.9	39.8	49.4	101	-11

Ref. 2.3-3

TABLE 2.3-34

MEAN MONTHLY TEMPERATURE, DEW POINT*

TEMPERATURE, AND RELATIVE HUMIDITY AT AVOCA

(Period of Record: 1956-1974)

Month	Temperature °F	Dew Point °F	RH (%)
January	26	18	70
February	27	18	69
March	36	26	67
April	49	37	62
May	59	47	64
June	68	58	70
July	72	62	70
August	70	61	73
September	63	55	76
October	53	44	72
November	41	33	72
December	29	21	73
Annual	49	40	70

*Dew point temperatures computed from temperature and relative humidity measurements.

Ref. 2.3-3

TABLE 2.3-35

TEMPERATURE AND MOISTURE DATA

FOR THE SUSQUEHANNA SES

(Period of Record: 1973-1976)

Month	Dry Bulb (°C) Average	Dry Bulb (°C) Max	Dry Bulb (°C) Min	Average Wet Bulb (°C)	RH (%)
January	-2.1	18.5	-20.9	-3.6	66
February	-1.4	18.7	-18.5	-3.4	61
March	3.6	22.2	-11.2	1.1	62
April	8.8	32.5	- 6.1	5.2	60
May	13.8	30.6	- 1.9	10.6	70
June	18.8	31.9	5.6	16.1	75
July	20.3	31.7	7.8	17.7	79
August	20.0	34.3	4.8	17.7	82
September	15.0	31.8	- 0.8	12.9	81
October	9.9	27.8	- 6.4	7.6	72
November	4.9	23.1	-14.0	2.6	67
December	- 0.9	17.8	-19.0	-2.6	66
Annual	9.3	34.3	-20.9	6.9	70

TABLE 2.3-36

STATISTICS AND DIURNAL VARIATION OF METEOROLOGICAL PARAMETERS FOR THE SUSQUEHANNA SES

(DATA PERIOD: JANUARY 1973 - 1976)

METEOROLOGICAL PARAMETERS (HEIGHTS IN METERS)

	REL HUMID	WET BULB	DRY BULB
	9.61	9.61	9.61
HOUR	PCT	DEG C	DEG C
1	67.9	-4.2	-2.8
2	68.5	-4.4	-3.1
3	68.8	-4.5	-3.2
4	68.9	-4.7	-3.4
5	68.7	-4.8	-3.6
6	68.4	-5.1	-3.8
7	68.8	-5.3	-4.1
8	69.2	-5.4	-4.2
9	69.6	-5.1	-4.0
10	68.8	-4.3	-3.0
11	66.3	-3.5	-2.0
12	63.6	-2.8	-1.1
13	61.7	-2.3	-.4
14	60.6	-1.9	.1
15	60.0	-1.6	.5
16	59.6	-1.6	.6
17	60.1	-1.9	.2
18	61.7	-2.3	-.4
19	63.6	-2.7	-1.0
20	64.8	-3.1	-1.5
21	65.5	-3.4	-1.9
22	65.7	-3.8	-2.2
23	65.9	-4.0	-2.6
24	66.6	-4.3	-2.9
ABSOLUTE MAX	98.5	16.4	18.5
AVG DAILY MAX	78.3	-.2	1.9
MEAN	65.6	-3.6	-2.1
CLIMATIC MEAN	65.1	-3.7	-2.2
AVG DAILY MIN	52.0	-7.3	-6.2
ABSOLUTE MIN	3.2	-21.6	-20.9
STANDARD DEV	17.9	6.0	6.2
VALID OBS	2975	2975	2975
INVALID OBS	1	1	1
TOTAL OBS	2976	2976	2976
DATA RECOVERY	100.0	100.0	100.0

TABLE 2.3-37

STATISTICS AND DIURNAL VARIATION OF METEOROLOGICAL PARAMETERS FOR THE SUSQUEHANNA SES

(DATA PERIOD: FEBRUARY 1973 - 1976)

METEOROLOGICAL PARAMETERS (HEIGHTS IN METERS)

HOUR	REL HUMID	WET BULB	DRY BULB
	9.61	9.61	9.61
	PCT	DEG C	DEG C
1	64.8	-4.4	-2.9
2	65.2	-4.6	-3.1
3	65.4	-4.9	-3.4
4	66.3	-5.1	-3.7
5	66.5	-5.4	-4.0
6	66.8	-5.5	-4.2
7	66.8	-5.7	-4.4
8	67.4	-5.6	-4.4
9	67.3	-5.0	-3.6
10	64.0	-4.0	-2.4
11	60.0	-3.0	-1.0
12	57.4	-2.2	.2
13	54.7	-1.7	1.0
14	53.2	-1.2	1.7
15	53.1	-.9	2.1
16	52.6	-.8	2.2
17	53.0	-.9	2.0
18	54.4	-1.4	1.4
19	56.7	-2.0	.5
20	59.2	-2.5	-.3
21	61.2	-2.9	-.9
22	62.8	-3.2	-1.4
23	64.1	-3.6	-1.9
24	65.1	-3.9	-2.4
ABSOLUTE MAX	100.0	14.2	18.7
AVG DAILY MAX	76.9	.3	3.2
MEAN	61.2	-3.4	-1.4
CLIMATIC MEAN	61.5	-3.6	-1.5
AVG DAILY MIN	46.0	-7.4	-6.2
ABSOLUTE MIN	13.7	-18.9	-18.5
STANDARD DEV	17.0	5.9	6.5
VALID OBS	2712	2712	2712
INVALID OBS	0	0	0
TOTAL OBS	2712	2712	2712
DATA RECOVERY	100.0	100.0	100.0

TABLE 2.3-38

STATISTICS AND DIURNAL VARIATION OF METEOROLOGICAL PARAMETERS FOR THE SUSQUEHANNA SES

(DATA PERIOD: MARCH 1973 - 1976)

METEOROLOGICAL PARAMETERS (HEIGHTS IN METERS)

	REL HUMID	WET BULB	DRY BULB
	9.61	9.61	9.61
HOUR	PCT	DEG C	DEG C
1	66.1	-.1	1.9
2	66.7	-.3	1.6
3	67.4	-.5	1.3
4	67.9	-.7	1.1
5	68.3	-.9	.9
6	68.6	-1.0	.7
7	69.2	-1.0	.6
8	69.3	-.7	.9
9	66.9	-.1	1.8
10	63.4	.8	3.0
11	60.5	1.5	4.1
12	57.8	2.2	5.2
13	55.9	2.7	6.0
14	54.7	3.1	6.6
15	54.2	3.5	7.2
16	54.3	3.6	7.3
17	54.0	3.5	7.2
18	54.8	3.1	6.6
19	56.7	2.5	5.8
20	59.1	1.9	4.8
21	60.9	1.4	4.0
22	62.3	.9	3.3
23	63.9	.5	2.8
24	65.1	.2	2.3
ABSOLUTE MAX	100.0	20.8	22.2
AVG DAILY MAX	77.7	4.6	8.3
MEAN	62.0	1.1	3.6
CLIMATIC MEAN	62.3	1.0	3.6
AVG DAILY MIN	47.0	-2.6	-1.0
ABSOLUTE MIN	18.8	-12.2	-11.2
STANDARD DEV	18.1	5.2	5.8
VALID OBS	2925	2925	2925
INVALID OBS	51	51	51
TOTAL OBS	2976	2976	2976
DATA RECOVERY	98.3	98.3	98.3

TABLE 2.3-39

STATISTICS AND DIURNAL VARIATION OF METEOROLOGICAL PARAMETERS FOR THE SUSQUEHANNA SES

(DATA PERIOD: APRIL 1973 - 1976)

METEOROLOGICAL PARAMETERS (HEIGHTS IN METERS)

HOUR	REL HUMID	WET BULB	DRY BULB
	9.61	9.61	9.61
	PCT	DEG C	DEG C
1	66.7	3.7	6.1
2	68.1	3.3	5.6
3	69.5	3.0	5.1
4	70.8	2.7	4.7
5	71.9	2.4	4.2
6	72.8	2.2	4.0
7	72.5	2.5	4.4
8	69.6	3.6	5.8
9	63.9	4.7	7.5
10	58.7	5.4	9.0
11	55.6	6.2	10.3
12	52.9	6.7	11.3
13	51.4	7.2	12.1
14	49.9	7.6	12.7
15	49.4	7.8	13.1
16	49.0	7.9	13.3
17	49.1	7.8	13.2
18	49.5	7.5	12.7
19	50.9	7.0	11.8
20	53.9	6.4	10.7
21	56.8	5.8	9.6
22	59.8	5.2	8.5
23	62.2	4.7	7.7
24	64.7	4.2	6.9
ABSOLUTE MAX	97.9	20.0	32.5
AVG DAILY MAX	77.9	8.7	14.2
MEAN	60.0	5.2	8.8
CLIMATIC MEAN	60.7	4.9	8.6
AVG DAILY MIN	43.6	1.0	2.9
ABSOLUTE MIN	10.0	-7.8	-6.1
STANDARD DEV	18.6	5.8	7.1
VALID OBS	2878	2878	2878
INVALID OBS	2	2	2
TOTAL OBS	2880	2880	2880
DATA RECOVERY	99.9	99.9	99.9

TABLE 2.3-40

STATISTICAL AND DIURNAL VARIATION OF METEOROLOGICAL PARAMETERS FOR THE SUSQUEHANNA SITE

(DATA PERIOD: MAY 1973 - 1976)

METEOROLOGICAL PARAMETERS (HEIGHTS IN METERS)

HOUR	REL HUMID	WET BULB	DRY BULB
	9.61	9.61	9.61
	PCT	DEG C	DEG C
1	76.5	9.1	11.2
2	77.6	8.7	10.6
3	78.4	8.3	10.2
4	79.4	8.1	9.8
5	80.0	7.8	9.5
6	81.1	7.7	9.3
7	81.0	8.1	9.7
8	78.4	9.1	11.0
9	73.4	10.2	12.7
10	69.3	11.0	14.1
11	65.7	11.7	15.3
12	63.3	12.2	16.2
13	60.6	12.6	17.1
14	58.9	13.0	17.8
15	57.6	13.2	18.2
16	57.5	13.2	18.2
17	58.2	13.0	17.9
18	59.5	12.7	17.4
19	61.3	12.4	16.7
20	63.7	11.8	15.7
21	67.2	11.3	14.6
22	70.7	10.7	13.5
23	73.4	10.1	12.6
24	75.2	9.7	11.9
ABSOLUTE MAX	100.0	30.6	30.6
AVG DAILY MAX	85.8	14.0	19.2
MEAN	69.5	10.6	13.8
CLIMATIC MEAN	69.0	10.3	13.7
AVG DAILY MIN	52.1	6.6	8.1
ABSOLUTE MIN	20.7	-3.3	-1.9
STANDARD DEV	18.1	5.1	5.9
VALID OBS	2964	2964	2964
INVALID OBS	12	12	12
TOTAL OBS	2976	2976	2976
DATA RECOVERY	99.6	99.6	99.6

TABLE 2.3-41

STATISTICS AND DIURNAL VARIATION OF METEOROLOGICAL PARAMETERS FOR THE SUSQUEHANNA SES

(DATA PERIOD: JUNE 1973 - 1976)

METEOROLOGICAL PARAMETERS (HEIGHTS IN METERS)

	REL HUMID	WET BULB	DRY BULB
	9.61	9.61	9.61
HOUR	PCT	DEG C	DEG C
1	85.1	14.4	15.8
2	85.9	14.0	15.4
3	86.5	13.8	15.1
4	86.8	13.5	14.8
5	87.1	13.3	14.6
6	88.0	13.4	14.6
7	87.6	14.0	15.2
8	85.4	15.0	16.4
9	80.8	15.9	18.0
10	75.4	16.7	19.5
11	70.9	17.4	20.9
12	67.7	17.8	21.8
13	64.9	18.0	22.6
14	64.0	18.2	22.9
15	63.6	18.4	23.2
16	63.2	18.4	23.3
17	63.4	18.3	23.2
18	64.8	18.0	22.6
19	67.5	17.6	21.7
20	71.3	17.0	20.5
21	76.6	16.4	19.0
22	80.4	15.7	17.9
23	83.0	15.3	17.0
24	84.0	14.8	16.4
ABSOLUTE MAX	100.0	27.2	31.9
AVG DAILY MAX	90.5	19.0	24.0
MEAN	76.4	16.1	18.8
CLIMATIC MEAN	74.7	15.8	18.9
AVG DAILY MIN	58.8	12.6	13.9
ABSOLUTE MIN	17.3	3.9	5.6
STANDARD DEV	15.8	4.0	4.7
VALID OBS	2876	2876	2876
INVALID OBS	4	4	4
TOTAL OBS	2880	2880	2880
DATA RECOVERY	99.9	99.9	99.9

TABLE 2.3-42

STATISTICS AND DIURNAL VARIATION OF METEOROLOGICAL PARAMETERS FOR THE SUSQUEHANNA SES

(DATA PERIOD: JULY 1973 - 1976)

METEOROLOGICAL PARAMETERS (HEIGHTS IN METERS)

	REL HUMID	WET BULB	DRY BULB
	9.61	9.61	9.61
HOUR	PCT	DEG C	DEG C
1	88.9	15.9	17.1
2	89.5	15.6	16.6
3	89.6	15.3	16.3
4	89.7	15.0	16.0
5	90.2	14.7	15.7
6	90.8	14.7	15.7
7	90.8	15.3	16.2
8	88.6	16.3	17.5
9	84.0	17.4	19.2
10	77.6	18.4	21.0
11	72.9	19.0	22.4
12	69.4	19.5	23.4
13	66.7	19.8	24.2
14	64.3	20.0	24.8
15	63.3	20.1	25.2
16	63.2	20.2	25.3
17	64.0	20.1	25.0
18	66.1	19.9	24.5
19	69.6	19.7	23.7
20	74.9	19.0	22.1
21	81.0	18.1	20.3
22	84.4	17.5	19.2
23	86.3	16.9	18.4
24	87.6	16.4	17.7
ABSOLUTE MAX	100.0	25.7	31.7
AVG DAILY MAX	94.0	20.8	26.0
MEAN	78.9	17.7	20.3
CLIMATIC MEAN	76.9	17.5	20.5
AVG DAILY MIN	59.9	14.1	15.1
ABSOLUTE MIN	30.9	6.9	7.8
STANDARD DEV	14.9	3.5	4.5
VALID OBS	2970	2970	2975
INVALID OBS	6	6	1
TOTAL OBS	2976	2976	2976
DATA RECOVERY	99.8	99.8	100.0

TABLE 2.3-43

STATISTICS AND DIURNAL VARIATION OF METEOROLOGICAL PARAMETERS FOR THE SUSQUEHANNA SES

(DATA PERIOD: AUGUST 1973 - 1976)

METEOROLOGICAL PARAMETERS (HEIGHTS IN METERS)

	REL HUMID	WET BULB	DRY BULB
	9.61	9.61	9.61
HOUR	PCT	DEG C	DEG C
1	91.4	16.2	17.1
2	91.7	15.8	16.7
3	92.0	15.5	16.3
4	92.5	15.3	16.1
5	92.5	15.1	15.9
6	92.9	15.0	15.7
7	93.2	15.2	15.9
8	92.4	16.1	16.8
9	88.2	17.2	18.5
10	81.6	18.3	20.4
11	75.6	19.2	22.1
12	70.5	19.7	23.5
13	67.3	20.0	24.4
14	65.5	20.3	24.9
15	65.0	20.3	25.0
16	65.2	20.2	24.9
17	66.3	20.0	24.6
18	68.9	19.8	23.9
19	73.6	19.4	22.7
20	80.5	18.7	20.9
21	85.3	17.9	19.6
22	87.8	17.4	18.7
23	89.5	16.8	17.9
24	90.7	16.5	17.4
ABSOLUTE MAX	100.0	26.8	34.3
AVG DAILY MAX	95.0	20.6	25.8
MEAN	81.7	17.7	20.0
CLIMATIC MEAN	78.2	17.6	20.4
AVG DAILY MIN	61.4	14.3	15.1
ABSOLUTE MIN	28.1	3.9	4.8
STANDARD DEV	14.6	3.7	4.7
VALID OBS	2970	2970	2972
INVALID OBS	6	6	4
TOTAL OBS	2976	2976	2976
DATA RECOVERY	99.8	99.8	99.9

TABLE 2.3-44

STATISTICS AND DIURNAL VARIATION OF METEOROLOGICAL PARAMETERS FOR THE SUSQUEHANNA SES

(DATA PERIOD: SEPTEMBER 1973 - 1976)

METEOROLOGICAL PARAMETERS (HEIGHTS IN METERS)

	REL HUMID	WET BULB	DRY BULB
	9.61	9.61	9.61
HOUR	PCT	DEG C	DEG C
1	88.6	11.4	12.5
2	88.9	11.2	12.1
3	89.5	10.9	11.8
4	89.5	10.7	11.6
5	89.6	10.5	11.4
6	90.0	10.4	11.3
7	90.6	10.4	11.2
8	90.6	11.0	11.8
9	88.2	12.0	13.1
10	82.7	13.1	14.8
11	76.3	14.1	16.6
12	70.9	14.8	18.1
13	67.2	15.2	19.0
14	65.3	15.4	19.6
15	64.2	15.5	19.8
16	64.4	15.5	19.8
17	65.7	15.3	19.4
18	69.2	14.9	18.5
19	75.2	14.3	16.9
20	80.5	13.6	15.5
21	84.2	13.0	14.5
22	85.6	12.4	13.8
23	87.1	12.0	13.2
24	88.1	11.6	12.7
ABSOLUTE MAX	99.0	25.7	31.8
AVG DAILY MAX	93.3	16.3	20.5
MEAN	80.5	12.9	15.0
CLIMATIC MEAN	77.3	12.6	15.2
AVG DAILY MIN	61.3	9.0	9.8
ABSOLUTE MIN	28.4	-1.2	-.8
STANDARD DEV	14.9	4.6	5.3
VALID OBS	2875	2875	2875
INVALID OBS	5	5	5
TOTAL OBS	2880	2880	2880
DATA RECOVERY	99.8	99.8	99.8

TABLE 2.3-45

STATISTICS AND DIURNAL VARIATION OF METEOROLOGICAL PARAMETERS FOR THE SUSQUEHANNA SES

(DATA PERIOD: OCTOBER 1973 - 1976)

METEOROLOGICAL PARAMETERS (HEIGHTS IN METERS)

	REL HUMID	WET BULB	DRY BULB
	9.61	9.61	9.61
HOUR	PCT	DEG C	DEG C
1	79.6	6.2	7.7
2	80.2	5.9	7.2
3	80.5	5.6	6.9
4	80.9	5.3	6.5
5	80.9	5.1	6.3
6	81.3	4.9	6.1
7	82.0	4.8	5.8
8	82.6	5.2	6.3
9	80.5	6.3	7.7
10	75.0	7.7	9.6
11	69.1	8.7	11.4
12	64.7	9.5	12.9
13	61.9	9.9	13.8
14	59.7	10.4	14.6
15	58.5	10.5	14.9
16	58.3	10.5	15.0
17	59.5	10.2	14.4
18	62.3	9.6	13.3
19	66.5	8.9	11.9
20	70.8	8.2	10.7
21	73.9	7.7	9.8
22	75.7	7.2	9.0
23	76.9	6.8	8.6
24	78.6	6.4	8.0
ABSOLUTE MAX	100.0	20.7	27.8
AVG DAILY MAX	86.2	11.3	15.5
MEAN	72.4	7.6	9.9
CLIMATIC MEAN	70.8	7.5	10.1
AVG DAILY MIN	55.4	3.6	4.7
ABSOLUTE MIN	22.9	-7.9	-6.4
STANDARD DEV	17.4	5.6	6.0
VALID OBS	2706	2706	2975
INVALID OBS	270	270	1
TOTAL OBS	2976	2976	2976
DATA RECOVERY	90.9	90.9	100.0

TABLE 2.3-46

STATISTICS AND DIURNAL VARIATION OF METEOROLOGICAL PARAMETERS FOR THE SUSQUEHANNA SES

(DATA PERIOD: NOVEMBER 1973 - 1976)

METEOROLOGICAL PARAMETERS (HEIGHTS IN METERS)

	REL HUMID	WET BULB	DRY BULB
	9.61	9.61	9.61
HOUR	PCT	DEG C	DEG C
1	70.2	1.6	3.5
2	71.0	1.4	3.2
3	71.2	1.2	2.9
4	71.6	1.0	2.6
5	72.0	.8	2.4
6	72.2	.6	2.2
7	72.6	.5	2.0
8	73.4	.5	2.0
9	73.2	1.2	2.8
10	71.0	2.3	4.2
11	67.0	3.4	5.8
12	63.5	4.2	7.0
13	60.5	4.7	7.9
14	58.9	5.0	8.4
15	57.7	5.1	8.7
16	57.4	5.1	8.6
17	58.4	4.7	8.0
18	59.9	4.1	7.1
19	62.3	3.5	6.3
20	64.6	3.0	5.4
21	66.1	2.5	4.8
22	67.1	2.2	4.3
23	68.0	1.9	4.0
24	68.8	1.7	3.6
ABSOLUTE MAX	100.0	19.4	23.1
AVG DAILY MAX	79.0	6.1	9.4
MEAN	66.6	2.6	4.9
CLIMATIC MEAN	65.9	2.5	4.9
AVG DAILY MIN	52.8	-1.1	.5
ABSOLUTE MIN	21.1	-15.4	-14.0
STANDARD DEV	17.7	6.0	6.3
VALID OBS	2873	2873	2880
INVALID OBS	7	7	0
TOTAL OBS	2880	2880	2880
DATA RECOVERY	99.8	99.8	100.0

TABLE 2.3-47

STATISTICS AND DIURNAL VARIATION OF METEOROLOGICAL PARAMETERS FOR THE SUSQUEHANNA SES

(DATA PERIOD: DECEMBER 1973 - 1976)

METEOROLOGICAL PARAMETERS (HEIGHTS IN METERS)

	REL HUMID	WET BULB	DRY BULB
	9.61	9.61	9.61
HOUR	PCT	DEG C	DEG C
1	68.4	-3.2	-1.8
2	68.8	-3.3	-1.9
3	68.9	-3.4	-2.1
4	68.8	-3.5	-2.2
5	68.7	-3.6	-2.3
6	68.8	-3.7	-2.4
7	68.9	-3.9	-2.6
8	68.5	-4.0	-2.7
9	68.5	-3.9	-2.5
10	68.3	-3.1	-1.6
11	66.3	-2.2	-.6
12	63.9	-1.6	.3
13	62.5	-1.1	1.0
14	60.7	-.9	1.4
15	59.6	-.6	1.8
16	59.4	-.8	1.6
17	59.7	-1.2	1.1
18	61.2	-1.6	.4
19	63.0	-2.0	-.1
20	64.9	-2.3	-.6
21	66.1	-2.6	-1.0
22	66.9	-2.8	-1.3
23	67.6	-3.0	-1.5
24	68.2	-3.2	-1.8
ABSOLUTE MAX	100.0	16.4	17.8
AVG DAILY MAX	79.2	.8	2.9
MEAN	65.7	-2.6	-.9
CLIMATIC MEAN	66.1	-2.7	-1.0
AVG DAILY MIN	52.9	-6.1	-4.8
ABSOLUTE MIN	7.9	-20.2	-19.0
STANDARD DEV	18.8	5.4	5.4
VALID OBS	2849	2849	2853
INVALID OBS	127	127	123
TOTAL OBS	2976	2976	2976
DATA RECOVERY	95.7	95.7	95.9

TABLE 2.3-48

STATISTICS AND DIURNAL VARIATION OF METEOROLOGICAL PARAMETERS FOR THE SUSQUEHANNA SES

(DATA PERIOD: JANUARY 1973-DECEMBER 1976)

METEOROLOGICAL PARAMETERS (HEIGHTS IN METERS)

	REL HUMID	WET BULB	DRY BULB
	9.61	9.61	9.61
HOUR	PCT	DEG C	DEG C
1	76.3	5.6	7.2
2	76.9	5.4	6.8
3	77.4	5.1	6.5
4	77.8	4.9	6.2
5	78.1	4.7	6.0
6	78.5	4.5	5.8
7	78.7	4.7	5.9
8	78.0	5.2	6.5
9	75.4	6.0	7.7
10	71.3	6.9	9.2
11	67.2	7.8	10.5
12	63.8	8.4	11.6
13	61.3	8.9	12.5
14	59.7	9.2	13.1
15	58.9	9.4	13.4
16	58.7	9.4	13.4
17	59.3	9.2	13.1
18	61.1	8.8	12.4
19	64.0	8.3	11.5
20	67.4	7.7	10.4
21	70.5	7.2	9.5
22	72.5	6.7	8.7
23	74.1	6.3	8.1
24	75.3	5.9	7.6
ABSOLUTE MAX	100.0	30.6	34.3
AVG DAILY MAX	84.5	10.3	14.3
MEAN	70.1	6.9	9.3
CLIMATIC MEAN	69.1	6.7	9.4
AVG DAILY MIN	53.6	3.1	4.4
ABSOLUTE MIN	3.2	-21.6	-20.9
STANDARD DEV	18.6	9.4	9.9
VALID OBS	34573	34573	34860
INVALID OBS	491	491	204
TOTAL OBS	35064	35064	35064
DATA RECOVERY	98.6	98.6	99.4

TABLE 2.3-49

PRECIPITATION DATA FOR AVOCA

(Period of Record: 1956-1974)

Month	Total (in inches)	Greatest 24-Hour (in inches)
January	2.04	1.52
February	1.96	1.60
March	2.50	2.20
April	3.06	1.59
May	3.50	2.58
June	3.40	3.61
July	4.09	2.33
August	3.21	3.18
September	2.82	3.09
October	2.71	3.27
November	3.01	2.91
December	2.51	2.30
Annual	34.81	3.61

Ref. 2.3-3

TABLE 2.3-50

EXPECTED RAINFALL BY DURATION AND RECURRENCE

INTERVAL FOR VICINITY OF SUSQUEHANNA SES

Duration	Recurrence Inverval 1 yr	2 yr	5 yr	10 yr	25 yr	50 yr	100 yr
				(in inches)			
1-Hour	1.1	1.4	1.6	2.0	2.2	2.5	2.8
2-Hour	1.4	1.6	2.1	2.5	2.8	3.2	3.5
3-Hour	1.4	1.8	2.3	2.7	3.1	3.5	3.8
6-Hour	1.8	2.2	2.8	3.3	3.9	4.2	4.8
12-Hour	2.2	2.7	3.4	4.0	4.7	5.0	5.8
24-Hour	2.5	3.0	4.0	4.7	5.3	6.0	6.8

Ref. 2.3-20

TABLE 2.3-51

PROBABLE MAXIMUM PRECIPITATION FOR VARYING

RAINFALL DURATIONS AND AREAS FOR VICINITY OF SUSQUEHANNA SES

Area	Duration (Hours)				
(Mi^2)	6	12	24	48	72
			(in inches)		
10	25.5	29.5	31.0	35.0	36.5
200	17.0	20.5	23.0	26.0	27.0

Ref. 2.3-21

TABLE 2.3-52

PRECIPITATION DATA FOR THE SUSQUEHANNA SES

(Period of Record: 1973-1976)

Month	Total (in inches)
January	3.68
February	2.53
March	3.67
April	3.73
May	4.19
June	4.82
July	4.73
August	3.59
September	7.54
October	4.40
November	2.76
December	2.21
Annual	47.83

TABLE 2.3-53

FREQUENCY DISTRIBUTION OF PRECIPITATION FOR THE SUSQUEHANNA SES

(DATA PERIOD: JANUARY 1973 - 1976)

PRECIPITATION CLASS INTERVAL (INCHES)			FREQUENCY DISTRIBUTION OF PRECIPITATION 1 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 2 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 3 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 6 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 12 HOUR DURATION		FREQUENCY DISTRIBUTION PRECIPITATION 24 HOUR DURATION	
			NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT
.0	TO	.1	190	89.20	34	45.95	0	0.00	0	0.00	0	0.00	0	0.0
.1	TO	.2	15	7.04	33	44.59	28	75.68	0	0.00	0	0.00	0	0.0
.2	TO	.3	3	1.41	2	2.70	5	13.51	3	27.27	0	0.00	0	0.0
.3	TO	.4	2	.94	2	2.70	2	5.41	6	54.55	0	0.00	0	0.0
.4	TO	.5	1	.47	0	0.00	1	2.70	0	0.00	0	0.00	0	0.0
.5	TO	.6	0	0.00	1	1.35	1	2.70	1	9.09	0	0.00	0	0.0
.6	TO	.7	1	.47	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
.7	TO	.8	0	0.00	0	0.00	0	0.00	1	9.09	1	50.00	0	0.0
.8	TO	.9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
.9	TO	1.0	1	.47	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.0	TO	1.1	0	0.00	1	1.35	0	0.00	0	0.00	0	0.00	0	0.0
1.1	TO	1.2	0	0.00	0	0.00	0	0.00	0	0.00	1	50.00	0	0.0
1.2	TO	1.3	0	0.00	1	1.35	0	0.00	0	0.00	0	0.00	0	0.0
1.3	TO	1.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.4	TO	1.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.5	TO	1.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.6	TO	1.7	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.7	TO	1.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.8	TO	1.9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.9	TO	2.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.0	TO	2.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.2	TO	2.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.4	TO	2.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.6	TO	2.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.8	TO	3.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.0	TO	3.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.2	TO	3.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.4	TO	3.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.6	TO	3.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.8	TO	4.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
4.0	TO	4.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
4.5	TO	5.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
5.0	TO	5.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
5.5	TO	6.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
6.0	TO	6.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
6.5	TO	7.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
7.0	TO	7.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
7.5	TO	8.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
8.0	TO	9.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
9.0	TO	10.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
10.0	TO	11.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
11.0	TO	12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
	GT	12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
TOTAL			213	100.00	74	100.00	37	100.00	11	100.00	2	100.00	0	0.0
MAXIMUM AMT.			.91		1.30		.60		.76		1.12		0.00	

TOTAL PRECIPITATION FOR DATA PERIOD 14.71 INCHES

	NO.	PCT.
OBSERVATIONS WITH NO PRECIPITATION	2763	92.84
OBSERVATIONS WITH PRECIPITATION GE 0.01 INCH	213	7.16
TOTAL VALID OBSERVATIONS	2976	100.00

	NO.	PC
VALID OBSERVATIONS	2976	100.
INVALID OBSERVATIONS	0	0.
TOTAL OBSERVATIONS	2976	100.

ESTIMATED MAXIMUM 60 MINUTE PRECIPITATION: 1.03 INCHES
ESTIMATED MAXIMUM 30 MINUTE PRECIPITATION: .81 INCHES
ESTIMATED MAXIMUM 15 MINUTE PRECIPITATION: .59 INCHES
ESTIMATED MAXIMUM 10 MINUTE PRECIPITATION: .46 INCHES
ESTIMATED MAXIMUM 5 MINUTE PRECIPITATION: .30 INCHES

SOURCE FOR ESTIMATES: U. S. WEATHER BUREAU TECHNICAL PAPER NO. 40

TABLE 2.3-54

FREQUENCY DISTRIBUTION OF PRECIPITATION FOR THE SUSQUEHANNA SES

(DATA PERIOD: FEBRUARY 1973 - 1976)

PRECIPITATION CLASS INTERVAL (INCHES)	FREQUENCY DISTRIBUTION OF PRECIPITATION 1 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 2 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 3 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 6 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 12 HOUR DURATION		FREQUENCY DISTRIBUTION PRECIPITATION 24 HOUR DURATION	
	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT
.0 TO .1	155	88.07	37	60.66	0	0.00	0	0.00	0	0.00	0	0.0
.1 TO .2	19	10.80	19	31.15	24	82.76	0	0.00	0	0.00	0	0.0
.2 TO .3	2	1.14	2	3.28	1	3.45	0	0.00	0	0.00	0	0.0
.3 TO .4	0	0.00	3	4.92	3	10.34	3	60.00	0	0.00	0	0.0
.4 TO .5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
.5 TO .6	0	0.00	0	0.00	1	3.45	1	20.00	0	0.00	0	0.0
.6 TO .7	0	0.00	0	0.00	0	0.00	1	20.00	0	0.00	0	0.0
.7 TO .8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
.8 TO .9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
.9 TO 1.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.0 TO 1.1	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.1 TO 1.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.2 TO 1.3	0	0.00	0	0.00	0	0.00	0	0.00	1	100.00	0	0.0
1.3 TO 1.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.4 TO 1.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.5 TO 1.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.6 TO 1.7	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.7 TO 1.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.8 TO 1.9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.9 TO 2.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.0 TO 2.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.2 TO 2.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.4 TO 2.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.6 TO 2.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.8 TO 3.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.0 TO 3.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.2 TO 3.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.4 TO 3.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.6 TO 3.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.8 TO 4.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
4.0 TO 4.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
4.5 TO 5.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
5.0 TO 5.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
5.5 TO 6.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
6.0 TO 6.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
6.5 TO 7.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
7.0 TO 7.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
7.5 TO 8.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
8.0 TO 9.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
9.0 TO 10.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
10.0 TO 11.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
11.0 TO 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
GT 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
TOTAL	176	100.00	61	100.00	29	100.00	5	100.00	1	100.00	0	0.0
MAXIMUM AMT.	.28		.40		.52		.64		1.16		0.00	

TOTAL PRECIPITATION FOR DATA PERIOD 10.12 INCHES

	NO.	PCT.
OBSERVATIONS WITH NO PRECIPITATION	2536	93.51
OBSERVATIONS WITH PRECIPITATION GE 0.01 INCH	176	6.49
TOTAL VALID OBSERVATIONS	2712	100.00

	NO.	PC
VALID OBSERVATIONS	2712	100.
INVALID OBSERVATIONS	0	0.
TOTAL OBSERVATIONS	2712	100.

ESTIMATED MAXIMUM 60 MINUTE PRECIPITATION: .32 INCHES
ESTIMATED MAXIMUM 30 MINUTE PRECIPITATION: .25 INCHES
ESTIMATED MAXIMUM 15 MINUTE PRECIPITATION: .18 INCHES
ESTIMATED MAXIMUM 10 MINUTE PRECIPITATION: .14 INCHES
ESTIMATED MAXIMUM 5 MINUTE PRECIPITATION: .09 INCHES

SOURCE FOR ESTIMATES: U. S. WEATHER BUREAU TECHNICAL PAPER NO. 40

TABLE 2.3-55

FREQUENCY DISTRIBUTION OF PRECIPITATION FOR THE SUSQUEHANNA SES

(DATA PERIOD: MARCH 1973 - 1976)

PRECIPITATION CLASS INTERVAL (INCHES)	FREQUENCY DISTRIBUTION OF PRECIPITATION 1 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 2 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 3 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 6 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 12 HOUR DURATION		FREQUENCY DISTRIBUTION PRECIPITATION 24 HOUR DURATION	
	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT
.0 TO .1	187	84.23	32	46.38	0	0.00	0	0.00	0	0.00	0	0.0
.1 TO .2	33	14.86	25	36.23	11	40.74	0	0.00	0	0.00	0	0.0
.2 TO .3	1	.45	8	11.59	8	29.63	0	0.00	0	0.00	0	0.0
.3 TO .4	0	0.00	4	5.80	5	18.52	0	0.00	0	0.00	0	0.0
.4 TO .5	0	0.00	0	0.00	2	7.41	2	40.00	0	0.00	0	0.0
.5 TO .6	0	0.00	0	0.00	1	3.70	1	20.00	0	0.00	0	0.0
.6 TO .7	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
.7 TO .8	0	0.00	0	0.00	0	0.00	2	40.00	0	0.00	0	0.0
.8 TO .9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
.9 TO 1.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.0 TO 1.1	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.1 TO 1.2	1	.45	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.2 TO 1.3	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.3 TO 1.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.4 TO 1.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.5 TO 1.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.6 TO 1.7	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.7 TO 1.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.8 TO 1.9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.9 TO 2.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.0 TO 2.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.2 TO 2.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.4 TO 2.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.6 TO 2.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.8 TO 3.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.0 TO 3.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.2 TO 3.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.4 TO 3.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.6 TO 3.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.8 TO 4.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
4.0 TO 4.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
4.5 TO 5.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
5.0 TO 5.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
5.5 TO 6.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
6.0 TO 6.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
6.5 TO 7.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
7.0 TO 7.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
7.5 TO 8.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
8.0 TO 9.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
9.0 TO 10.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
10.0 TO 11.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
11.0 TO 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
GT 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
TOTAL	222	100.00	69	100.00	27	100.00	5	100.00	0	0.00	0	0.0
MAXIMUM AMT.	1.18		.32		.52		.72		0.00		0.00	

TOTAL PRECIPITATION FOR DATA PERIOD 14.66 INCHES

	NO.	PCT.
OBSERVATIONS WITH NO PRECIPITATION	2752	92.54
OBSERVATIONS WITH PRECIPITATION GE 0.01 INCH	222	7.46
TOTAL VALID OBSERVATIONS	2974	100.00

	NO.	PC
VALID OBSERVATIONS	2974	99.
INVALID OBSERVATIONS	2	.
TOTAL OBSERVATIONS	2976	100.

ESTIMATED MAXIMUM 60 MINUTE PRECIPITATION: 1.33 INCHES
ESTIMATED MAXIMUM 30 MINUTE PRECIPITATION: 1.05 INCHES
ESTIMATED MAXIMUM 15 MINUTE PRECIPITATION: .76 INCHES
ESTIMATED MAXIMUM 10 MINUTE PRECIPITATION: .60 INCHES
ESTIMATED MAXIMUM 5 MINUTE PRECIPITATION: .39 INCHES

SOURCE FOR ESTIMATES: U. S. WEATHER BUREAU TECHNICAL PAPER NO. 40

TABLE 2.3-56

FREQUENCY DISTRIBUTION OF PRECIPITATION FOR THE SUSQUEHANNA SES

(DATA PERIOD: APRIL 1973 - 1976)

PRECIPITATION CLASS INTERVAL (INCHES)	FREQUENCY DISTRIBUTION OF PRECIPITATION 1 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 2 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 3 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 6 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 12 HOUR DURATION		FREQUENCY DISTRIBUTION PRECIPITATION 24 HOUR DURATION	
	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT
.0 TO .1	198	88.39	37	46.25	0	0.00	0	0.00	0	0.00	0	0.0
.1 TO .2	16	7.14	31	38.75	24	66.67	0	0.00	0	0.00	0	0.0
.2 TO .3	6	2.68	4	5.00	4	11.11	3	37.50	0	0.00	0	0.0
.3 TO .4	3	1.34	3	3.75	3	8.33	1	12.50	0	0.00	0	0.0
.4 TO .5	0	0.00	2	2.50	0	0.00	2	25.00	0	0.00	0	0.0
.5 TO .6	0	0.00	2	2.50	3	8.33	0	0.00	1	100.00	0	0.0
.6 TO .7	0	0.00	0	0.00	2	5.56	0	0.00	0	0.00	0	0.0
.7 TO .8	1	.45	1	1.25	0	0.00	2	25.00	0	0.00	0	0.0
.8 TO .9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
.9 TO 1.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.0 TO 1.1	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.1 TO 1.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.2 TO 1.3	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.3 TO 1.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.4 TO 1.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.5 TO 1.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.6 TO 1.7	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.7 TO 1.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.8 TO 1.9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.9 TO 2.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.0 TO 2.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.2 TO 2.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.4 TO 2.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.6 TO 2.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.8 TO 3.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.0 TO 3.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.2 TO 3.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.4 TO 3.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.6 TO 3.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.8 TO 4.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
4.0 TO 4.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
4.5 TO 5.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
5.0 TO 5.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
5.5 TO 6.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
6.0 TO 6.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
6.5 TO 7.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
7.0 TO 7.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
7.5 TO 8.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
8.0 TO 9.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
9.0 TO 10.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
10.0 TO 11.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
11.0 TO 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
GT 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
TOTAL	224	100.00	80	100.00	36	100.00	8	100.00	1	100.00	0	0.0
MAXIMUM AMT.	.71		.79		.64		.72		.52		0.00	

TOTAL PRECIPITATION FOR DATA PERIOD 14.92 INCHES

	NO.	PCT.
OBSERVATIONS WITH NO PRECIPITATION	2607	92.09
OBSERVATIONS WITH PRECIPITATION GE 0.01 INCH	224	7.91
TOTAL VALID OBSERVATIONS	2831	100.00

	NO.	PC
VALID OBSERVATIONS	2831	98.
INVALID OBSERVATIONS	49	1.
TOTAL OBSERVATIONS	2880	100.

ESTIMATED MAXIMUM 60 MINUTE PRECIPITATION: .80 INCHES
ESTIMATED MAXIMUM 30 MINUTE PRECIPITATION: .63 INCHES
ESTIMATED MAXIMUM 15 MINUTE PRECIPITATION: .46 INCHES
ESTIMATED MAXIMUM 10 MINUTE PRECIPITATION: .36 INCHES
ESTIMATED MAXIMUM 5 MINUTE PRECIPITATION: .23 INCHES

SOURCE FOR ESTIMATES: U. S. WEATHER BUREAU TECHNICAL PAPER NO. 40

TABLE 2.3-57

FREQUENCY DISTRIBUTION OF PRECIPITATION FOR THE SUSQUEHANNA SES

(DATA PERIOD: MAY 1973 - 1976)

PRECIPITATION CLASS INTERVAL (INCHES)	FREQUENCY DISTRIBUTION OF PRECIPITATION 1 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 2 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 3 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 6 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 12 HOUR DURATION		FREQUENCY DISTRIBUTION PRECIPITATION 24 HOUR DURATION	
	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT
.0 TO .1	182	81.98	37	50.00	0	0.00	0	0.00	0	0.00	0	0.0
.1 TO .2	29	13.06	24	32.43	19	55.88	0	0.00	0	0.00	0	0.0
.2 TO .3	3	1.35	3	4.05	10	29.41	1	20.00	0	0.00	0	0.0
.3 TO .4	4	1.80	2	2.70	0	0.00	1	20.00	0	0.00	0	0.0
.4 TO .5	2	.90	1	1.35	1	2.94	0	0.00	0	0.00	0	0.0
.5 TO .6	1	.45	5	6.76	0	0.00	1	20.00	0	0.00	0	0.0
.6 TO .7	0	0.00	0	0.00	1	2.94	0	0.00	0	0.00	0	0.0
.7 TO .8	0	0.00	1	1.35	1	2.94	0	0.00	0	0.00	0	0.0
.8 TO .9	0	0.00	0	0.00	1	2.94	1	20.00	0	0.00	0	0.0
.9 TO 1.0	0	0.00	0	0.00	0	0.00	1	20.00	0	0.00	0	0.0
1.0 TO 1.1	1	.45	1	1.35	0	0.00	0	0.00	0	0.00	0	0.0
1.1 TO 1.2	0	0.00	0	0.00	1	2.94	0	0.00	0	0.00	0	0.0
1.2 TO 1.3	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.3 TO 1.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.4 TO 1.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.5 TO 1.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.6 TO 1.7	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.7 TO 1.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.8 TO 1.9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.9 TO 2.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.0 TO 2.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.2 TO 2.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.4 TO 2.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.6 TO 2.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.8 TO 3.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.0 TO 3.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.2 TO 3.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.4 TO 3.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.6 TO 3.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.8 TO 4.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
4.0 TO 4.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
4.5 TO 5.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
5.0 TO 5.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
5.5 TO 6.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
6.0 TO 6.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
6.5 TO 7.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
7.0 TO 7.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
7.5 TO 8.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
8.0 TO 9.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
9.0 TO 10.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
10.0 TO 11.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
11.0 TO 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
GT 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
TOTAL	222	100.00	74	100.00	34	100.00	5	100.00	0	0.00	0	0.0
MAXIMUM AMT.	1.06		1.10		1.14		.99		0.00		0.00	

TOTAL PRECIPITATION FOR DATA PERIOD 16.75 INCHES

	NO.	PCT.
OBSERVATIONS WITH NO PRECIPITATION	2754	92.54
OBSERVATIONS WITH PRECIPITATION GE 0.01 INCH	222	7.46
TOTAL VALID OBSERVATIONS	2976	100.00

	NO.	PC
VALID OBSERVATIONS	2976	100.
INVALID OBSERVATIONS	0	0.
TOTAL OBSERVATIONS	2976	100.

ESTIMATED MAXIMUM 60 MINUTE PRECIPITATION: 1.20 INCHES
ESTIMATED MAXIMUM 30 MINUTE PRECIPITATION: .95 INCHES
ESTIMATED MAXIMUM 15 MINUTE PRECIPITATION: .68 INCHES
ESTIMATED MAXIMUM 10 MINUTE PRECIPITATION: .54 INCHES
ESTIMATED MAXIMUM 5 MINUTE PRECIPITATION: .35 INCHES

SOURCE FOR ESTIMATES: U. S. WEATHER BUREAU TECHNICAL PAPER NO. 40

SUSQUEHANNA SES-ER-OL

TABLE 2.3-58

FREQUENCY DISTRIBUTION OF PRECIPITATION FOR THE SUSQUEHANNA SES

(DATA PERIOD: JUNE 1973 - 1976)

PRECIPITATION CLASS INTERVAL (INCHES)	FREQUENCY DISTRIBUTION OF PRECIPITATION 1 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 2 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 3 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 6 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 12 HOUR DURATION		FREQUENCY DISTRIBUTION PRECIPITATION 24 HOUR DURATION	
	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT
.0 TO .1	180	78.60	44	58.67	0	0.00	0	0.00	0	0.00	0	0.0
.1 TO .2	33	14.41	16	21.33	22	68.75	0	0.00	0	0.00	0	0.0
.2 TO .3	5	2.18	5	6.67	5	15.63	4	57.14	0	0.00	0	0.0
.3 TO .4	4	1.75	4	5.33	1	3.13	1	14.29	0	0.00	0	0.0
.4 TO .5	2	.87	2	2.67	1	3.13	0	0.00	1	100.00	0	0.0
.5 TO .6	3	1.31	2	2.67	0	0.00	2	28.57	0	0.00	0	0.0
.6 TO .7	2	.87	1	1.33	2	6.25	0	0.00	0	0.00	0	0.0
.7 TO .8	0	0.00	1	1.33	0	0.00	0	0.00	0	0.00	0	0.0
.8 TO .9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
.9 TO 1.0	0	0.00	0	0.00	1	3.13	0	0.00	0	0.00	0	0.0
1.0 TO 1.1	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.1 TO 1.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.2 TO 1.3	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.3 TO 1.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.4 TO 1.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.5 TO 1.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.6 TO 1.7	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.7 TO 1.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.8 TO 1.9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.9 TO 2.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.0 TO 2.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.2 TO 2.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.4 TO 2.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.6 TO 2.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.8 TO 3.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.0 TO 3.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.2 TO 3.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.4 TO 3.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.6 TO 3.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.8 TO 4.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
4.0 TO 4.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
4.5 TO 5.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
5.0 TO 5.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
5.5 TO 6.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
6.0 TO 6.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
6.5 TO 7.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
7.0 TO 7.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
7.5 TO 8.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
8.0 TO 9.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
9.0 TO 10.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
10.0 TO 11.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
11.0 TO 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
GT 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
TOTAL	229	100.00	75	100.00	32	100.00	7	100.00	1	100.00	0	0.0
MAXIMUM AMT.	.67		.71		.99		.60		.48		0.00	

TOTAL PRECIPITATION FOR DATA PERIOD 19.29 INCHES

	NO.	PCT.
OBSERVATIONS WITH NO PRECIPITATION	2651	92.05
OBSERVATIONS WITH PRECIPITATION GE 0.01 INCH	229	7.95
TOTAL VALID OBSERVATIONS	2880	100.00

	NO.	PC
VALID OBSERVATIONS	2880	100.
INVALID OBSERVATIONS	0	0.
TOTAL OBSERVATIONS	2880	100.

ESTIMATED MAXIMUM 60 MINUTE PRECIPITATION: .76 INCHES
ESTIMATED MAXIMUM 30 MINUTE PRECIPITATION: .60 INCHES
ESTIMATED MAXIMUM 15 MINUTE PRECIPITATION: .43 INCHES
ESTIMATED MAXIMUM 10 MINUTE PRECIPITATION: .34 INCHES
ESTIMATED MAXIMUM 5 MINUTE PRECIPITATION: .22 INCHES

SOURCE FOR ESTIMATES: U. S. WEATHER BUREAU TECHNICAL PAPER NO. 40

TABLE 2.3-59

FREQUENCY DISTRIBUTION OF PRECIPITATION FOR THE SUSQUEHANNA SES

(DATA PERIOD: JULY 1973 - 1976)

PRECIPITATION CLASS INTERVAL (INCHES)	1 HOUR DURATION		2 HOUR DURATION		3 HOUR DURATION		6 HOUR DURATION		12 HOUR DURATION		24 HOUR DURATION	
	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT
.0 TO .1	128	72.73	14	33.33	0	0.00	0	0.00	0	0.00	0	0.0
.1 TO .2	34	19.32	15	35.71	8	40.00	0	0.00	0	0.00	0	0.0
.2 TO .3	3	1.70	3	7.14	4	20.00	1	33.33	0	0.00	0	0.0
.3 TO .4	3	1.70	6	14.29	4	20.00	0	0.00	0	0.00	0	0.0
.4 TO .5	1	.57	0	0.00	1	5.00	0	0.00	0	0.00	0	0.0
.5 TO .6	2	1.14	0	0.00	0	0.00	1	33.33	0	0.00	0	0.0
.6 TO .7	1	.57	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
.7 TO .8	1	.57	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
.8 TO .9	1	.57	1	2.38	0	0.00	0	0.00	0	0.00	0	0.0
.9 TO 1.0	0	0.00	1	2.38	0	0.00	0	0.00	0	0.00	0	0.0
1.0 TO 1.1	1	.57	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.1 TO 1.2	0	0.00	1	2.38	2	10.00	0	0.00	0	0.00	0	0.0
1.2 TO 1.3	0	0.00	1	2.38	0	0.00	0	0.00	0	0.00	0	0.0
1.3 TO 1.4	0	0.00	0	0.00	1	5.00	0	0.00	0	0.00	0	0.0
1.4 TO 1.5	0	0.00	0	0.00	0	0.00	1	33.33	0	0.00	0	0.0
1.5 TO 1.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.6 TO 1.7	1	.57	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.7 TO 1.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.8 TO 1.9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.9 TO 2.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.0 TO 2.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.2 TO 2.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.4 TO 2.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.6 TO 2.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.8 TO 3.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.0 TO 3.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.2 TO 3.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.4 TO 3.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.6 TO 3.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.8 TO 4.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
4.0 TO 4.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
4.5 TO 5.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
5.0 TO 5.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
5.5 TO 6.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
6.0 TO 6.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
6.5 TO 7.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
7.0 TO 7.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
7.5 TO 8.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
8.0 TO 9.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
9.0 TO 10.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
10.0 TO 11.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
11.0 TO 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
GT 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
TOTAL	176	100.00	42	100.00	20	100.00	3	100.00	0	0.00	0	0.0
MAXIMUM AMT.	1.61		1.22		1.38		1.46		0.00		0.00	

TOTAL PRECIPITATION FOR DATA PERIOD 18.90 INCHES

	NO.	PCT.
OBSERVATIONS WITH NO PRECIPITATION	2799	94.08
OBSERVATIONS WITH PRECIPITATION GE 0.01 INCH	176	5.92
TOTAL VALID OBSERVATIONS	2975	100.00

	NO.	PC
VALID OBSERVATIONS	2975	99.
INVALID OBSERVATIONS	1	.
TOTAL OBSERVATIONS	2976	100.

ESTIMATED MAXIMUM 60 MINUTE PRECIPITATION:	1.82 INCHES
ESTIMATED MAXIMUM 30 MINUTE PRECIPITATION:	1.44 INCHES
ESTIMATED MAXIMUM 15 MINUTE PRECIPITATION:	1.04 INCHES
ESTIMATED MAXIMUM 10 MINUTE PRECIPITATION:	.82 INCHES
ESTIMATED MAXIMUM 5 MINUTE PRECIPITATION:	.53 INCHES

SOURCE FOR ESTIMATES: U. S. WEATHER BUREAU TECHNICAL PAPER NO. 40

SUSQUEHANNA SES-ER-OL

TABLE 2.3-60

FREQUENCY DISTRIBUTION OF PRECIPITATION FOR THE SUSQUEHANNA SES

(DATA PERIOD: AUGUST 1973 - 1976)

PRECIPITATION CLASS INTERVAL (INCHES)	FREQUENCY DISTRIBUTION OF PRECIPITATION 1 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 2 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 3 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 6 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 12 HOUR DURATION		FREQUENCY DISTRIBUTION PRECIPITATION 24 HOUR DURATION	
	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT
.0 TO .1	152	83.06	29	58.00	0	0.00	0	0.00	0	0.00	0	0.0
.1 TO .2	19	10.38	7	14.00	12	50.00	0	0.00	0	0.00	0	0.0
.2 TO .3	6	3.28	4	8.00	4	16.67	2	50.00	0	0.00	0	0.0
.3 TO .4	3	1.64	5	10.00	4	16.67	0	0.00	0	0.00	0	0.0
.4 TO .5	1	.55	1	2.00	0	0.00	0	0.00	0	0.00	0	0.0
.5 TO .6	0	0.00	2	4.00	0	0.00	1	25.00	0	0.00	0	0.0
.6 TO .7	1	.55	0	0.00	0	0.00	1	25.00	0	0.00	0	0.0
.7 TO .8	0	0.00	0	0.00	2	8.33	0	0.00	0	0.00	0	0.0
.8 TO .9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
.9 TO 1.0	0	0.00	1	2.00	1	4.17	0	0.00	0	0.00	0	0.0
1.0 TO 1.1	1	.55	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.1 TO 1.2	0	0.00	1	2.00	0	0.00	0	0.00	0	0.00	0	0.0
1.2 TO 1.3	0	0.00	0	0.00	1	4.17	0	0.00	0	0.00	0	0.0
1.3 TO 1.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.4 TO 1.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.5 TO 1.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.6 TO 1.7	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.7 TO 1.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.8 TO 1.9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.9 TO 2.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.0 TO 2.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.2 TO 2.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.4 TO 2.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.6 TO 2.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.8 TO 3.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.0 TO 3.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.2 TO 3.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.4 TO 3.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.6 TO 3.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.8 TO 4.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
4.0 TO 4.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
4.5 TO 5.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
5.0 TO 5.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
5.5 TO 6.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
6.0 TO 6.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
6.5 TO 7.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
7.0 TO 7.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
7.5 TO 8.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
8.0 TO 9.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
9.0 TO 10.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
10.0 TO 11.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
11.0 TO 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
GT 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
TOTAL	183	100.00	50	100.00	24	100.00	4	100.00	0	0.00	0	0.0
MAXIMUM AMT.	1.06		1.14		1.30		.68		0.00		0.00	

TOTAL PRECIPITATION FOR DATA PERIOD 14.37 INCHES

	NO.	PCT.
OBSERVATIONS WITH NO PRECIPITATION	2793	93.85
OBSERVATIONS WITH PRECIPITATION GE 0.01 INCH	183	6.15
TOTAL VALID OBSERVATIONS	2976	100.00

	NO.	PC
VALID OBSERVATIONS	2976	100.
INVALID OBSERVATIONS	0	0.
TOTAL OBSERVATIONS	2976	100.

ESTIMATED MAXIMUM 60 MINUTE PRECIPITATION:	1.20 INCHES
ESTIMATED MAXIMUM 30 MINUTE PRECIPITATION:	.95 INCHES
ESTIMATED MAXIMUM 15 MINUTE PRECIPITATION:	.68 INCHES
ESTIMATED MAXIMUM 10 MINUTE PRECIPITATION:	.54 INCHES
ESTIMATED MAXIMUM 5 MINUTE PRECIPITATION:	.35 INCHES

SOURCE FOR ESTIMATES: U. S. WEATHER BUREAU TECHNICAL PAPER NO. 40

SUSQUEHANNA SES-ER-OL

TABLE 2.3-61

FREQUENCY DISTRIBUTION OF PRECIPITATION FOR THE SUSQUEHANNA SES

(DATA PERIOD: SEPTEMBER 1973 - 1976)

PRECIPITATION CLASS INTERVAL (INCHES)	FREQUENCY DISTRIBUTION OF PRECIPITATION 1 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 2 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 3 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 6 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 12 HOUR DURATION		FREQUENCY DISTRIBUTION PRECIPITATION 24 HOUR DURATION	
	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT
.0 TO .1	225	76.01	47	41.59	0	0.00	0	0.00	0	0.00	0	0.0
.1 TO .2	37	12.50	31	27.43	27	49.09	0	0.00	0	0.00	0	0.0
.2 TO .3	14	4.73	7	6.19	7	12.73	1	6.25	0	0.00	0	0.0
.3 TO .4	8	2.70	10	8.85	4	7.27	3	18.75	0	0.00	0	0.0
.4 TO .5	6	2.03	5	4.42	1	1.82	1	6.25	0	0.00	0	0.0
.5 TO .6	4	1.35	5	4.42	6	10.91	1	6.25	1	33.33	0	0.0
.6 TO .7	0	0.00	2	1.77	2	3.64	2	12.50	0	0.00	0	0.0
.7 TO .8	1	.34	3	2.65	4	7.27	1	6.25	0	0.00	0	0.0
.8 TO .9	0	0.00	1	.88	3	5.45	1	6.25	0	0.00	0	0.0
.9 TO 1.0	0	0.00	0	0.00	0	0.00	1	6.25	0	0.00	0	0.0
1.0 TO 1.1	0	0.00	1	.88	0	0.00	4	25.00	0	0.00	0	0.0
1.1 TO 1.2	0	0.00	0	0.00	0	0.00	1	6.25	0	0.00	0	0.0
1.2 TO 1.3	0	0.00	0	0.00	1	1.82	0	0.00	0	0.00	0	0.0
1.3 TO 1.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.4 TO 1.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.5 TO 1.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.6 TO 1.7	0	0.00	0	0.00	0	0.00	0	0.00	1	33.33	0	0.0
1.7 TO 1.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.8 TO 1.9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.9 TO 2.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.0 TO 2.2	0	0.00	0	0.00	0	0.00	0	0.00	1	33.33	0	0.0
2.2 TO 2.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.4 TO 2.6	1	.34	1	.88	0	0.00	0	0.00	0	0.00	0	0.0
2.6 TO 2.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.8 TO 3.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.0 TO 3.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.2 TO 3.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.4 TO 3.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.6 TO 3.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.8 TO 4.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
4.0 TO 4.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
4.5 TO 5.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
5.0 TO 5.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
5.5 TO 6.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
6.0 TO 6.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
6.5 TO 7.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
7.0 TO 7.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
7.5 TO 8.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
8.0 TO 9.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
9.0 TO 10.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
10.0 TO 11.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
11.0 TO 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
GT 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
TOTAL	296	100.00	113	100.00	55	100.00	16	100.00	3	100.00	0	0.0
MAXIMUM AMT.	2.56		2.60		1.27		1.11		2.19		0.00	

TOTAL PRECIPITATION FOR DATA PERIOD 30.17 INCHES

	NO.	PCT.
OBSERVATIONS WITH NO PRECIPITATION	2578	89.70
OBSERVATIONS WITH PRECIPITATION GE 0.01 INCH	296	10.30
TOTAL VALID OBSERVATIONS	2874	100.00

	NO.	PC
VALID OBSERVATIONS	2874	99.
INVALID OBSERVATIONS	6	.
TOTAL OBSERVATIONS	2880	100.

ESTIMATED MAXIMUM 60 MINUTE PRECIPITATION: 2.89 INCHES
ESTIMATED MAXIMUM 30 MINUTE PRECIPITATION: 2.29 INCHES
ESTIMATED MAXIMUM 15 MINUTE PRECIPITATION: 1.65 INCHES
ESTIMATED MAXIMUM 10 MINUTE PRECIPITATION: 1.30 INCHES
ESTIMATED MAXIMUM 5 MINUTE PRECIPITATION: .84 INCHES

SOURCE FOR ESTIMATES: U. S. WEATHER BUREAU TECHNICAL PAPER NO. 40

SUSQUEHANNA SES-ER-OL

TABLE 2.3-62

FREQUENCY DISTRIBUTION OF PRECIPITATION FOR THE SUSQUEHANNA SES

(DATA PERIOD: OCTOBER 1973 - 1976)

PRECIPITATION CLASS INTERVAL (INCHES)	FREQUENCY DISTRIBUTION OF PRECIPITATION 1 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 2 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 3 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 6 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 12 HOUR DURATION		FREQUENCY DISTRIBUTION PRECIPITATION 24 HOUR DURATION	
	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT
.0 TO .1	187	82.02	37	47.44	0	0.00	0	0.00	0	0.00	0	0.0
.1 TO .2	29	12.72	27	34.62	21	56.76	0	0.00	0	0.00	0	0.0
.2 TO .3	3	1.32	3	3.85	4	10.81	1	11.11	0	0.00	0	0.0
.3 TO .4	4	1.75	4	5.13	6	16.22	2	22.22	0	0.00	0	0.0
.4 TO .5	2	.88	3	3.85	2	5.41	1	11.11	0	0.00	0	0.0
.5 TO .6	2	.88	3	3.85	1	2.70	0	0.00	0	0.00	0	0.0
.6 TO .7	0	0.00	0	0.00	1	2.70	1	11.11	0	0.00	0	0.0
.7 TO .8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
.8 TO .9	1	.44	0	0.00	1	2.70	2	22.22	0	0.00	0	0.0
.9 TO 1.0	0	0.00	0	0.00	0	0.00	1	11.11	0	0.00	0	0.0
1.0 TO 1.1	0	0.00	0	0.00	0	0.00	0	0.00	1	50.00	0	0.0
1.1 TO 1.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.2 TO 1.3	0	0.00	1	1.28	0	0.00	0	0.00	0	0.00	0	0.0
1.3 TO 1.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.4 TO 1.5	0	0.00	0	0.00	1	2.70	0	0.00	0	0.00	0	0.0
1.5 TO 1.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.6 TO 1.7	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.7 TO 1.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.8 TO 1.9	0	0.00	0	0.00	0	0.00	1	11.11	0	0.00	0	0.0
1.9 TO 2.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.0 TO 2.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.2 TO 2.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.4 TO 2.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.6 TO 2.8	0	0.00	0	0.00	0	0.00	0	0.00	1	50.00	0	0.0
2.8 TO 3.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.0 TO 3.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.2 TO 3.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.4 TO 3.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.6 TO 3.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.8 TO 4.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
4.0 TO 4.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
4.5 TO 5.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
5.0 TO 5.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
5.5 TO 6.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
6.0 TO 6.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
6.5 TO 7.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
7.0 TO 7.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
7.5 TO 8.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
8.0 TO 9.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
9.0 TO 10.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
10.0 TO 11.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
11.0 TO 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
GT 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
TOTAL	228	100.00	78	100.00	37	100.00	9	100.00	2	100.00	0	0.0
MAXIMUM AMT.	.83		1.26		1.50		1.90		2.74		0.00	

TOTAL PRECIPITATION FOR DATA PERIOD 17.59 INCHES

	NO.	PCT.
OBSERVATIONS WITH NO PRECIPITATION	2748	92.34
OBSERVATIONS WITH PRECIPITATION GE 0.01 INCH	228	7.66
TOTAL VALID OBSERVATIONS	2976	100.00

	NO.	PC
VALID OBSERVATIONS	2976	100.
INVALID OBSERVATIONS	0	0.
TOTAL OBSERVATIONS	2976	100.

ESTIMATED MAXIMUM 60 MINUTE PRECIPITATION: .94 INCHES
ESTIMATED MAXIMUM 30 MINUTE PRECIPITATION: .74 INCHES
ESTIMATED MAXIMUM 15 MINUTE PRECIPITATION: .53 INCHES
ESTIMATED MAXIMUM 10 MINUTE PRECIPITATION: .42 INCHES
ESTIMATED MAXIMUM 5 MINUTE PRECIPITATION: .27 INCHES

SOURCE FOR ESTIMATES: U. S. WEATHER BUREAU TECHNICAL PAPER NO. 40

TABLE 2.3-63

FREQUENCY DISTRIBUTION OF PRECIPITATION FOR THE SUSQUEHANNA SES

(DATA PERIOD: NOVEMBER 1973 - 1976)

PRECIPITATION CLASS INTERVAL (INCHES)	FREQUENCY DISTRIBUTION OF PRECIPITATION 1 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 2 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 3 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 6 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 12 HOUR DURATION		FREQUENCY DISTRIBUTION PRECIPITATION 24 HOUR DURATION	
	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT
.0 TO .1	156	86.67	34	58.62	0	0.00	0	0.00	0	0.00	0	0.0
.1 TO .2	19	10.56	15	25.86	18	75.00	0	0.00	0	0.00	0	0.0
.2 TO .3	4	2.22	6	10.34	0	0.00	3	42.86	0	0.00	0	0.0
.3 TO .4	1	.56	3	5.17	5	20.83	1	14.29	0	0.00	0	0.0
.4 TO .5	0	0.00	0	0.00	1	4.17	0	0.00	0	0.00	0	0.0
.5 TO .6	0	0.00	0	0.00	0	0.00	1	14.29	1	50.00	0	0.0
.6 TO .7	0	0.00	0	0.00	0	0.00	1	14.29	0	0.00	0	0.0
.7 TO .8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
.8 TO .9	0	0.00	0	0.00	0	0.00	1	14.29	0	0.00	0	0.0
.9 TO 1.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.0 TO 1.1	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.1 TO 1.2	0	0.00	0	0.00	0	0.00	0	0.00	1	50.00	0	0.0
1.2 TO 1.3	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.3 TO 1.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.4 TO 1.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.5 TO 1.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.6 TO 1.7	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.7 TO 1.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.8 TO 1.9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.9 TO 2.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.0 TO 2.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.2 TO 2.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.4 TO 2.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.6 TO 2.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.8 TO 3.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.0 TO 3.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.2 TO 3.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.4 TO 3.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.6 TO 3.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.8 TO 4.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
4.0 TO 4.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
4.5 TO 5.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
5.0 TO 5.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
5.5 TO 6.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
6.0 TO 6.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
6.5 TO 7.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
7.0 TO 7.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
7.5 TO 8.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
8.0 TO 9.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
9.0 TO 10.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
10.0 TO 11.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
11.0 TO 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
GT 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
TOTAL	180	100.00	58	100.00	24	100.00	7	100.00	2	100.00	0	0.0
MAXIMUM AMT.	.35		.40		.48		.84		1.20		0.00	

TOTAL PRECIPITATION FOR DATA PERIOD 11.03 INCHES

	NO.	PCT.
OBSERVATIONS WITH NO PRECIPITATION	2700	93.75
OBSERVATIONS WITH PRECIPITATION GE 0.01 INCH	180	6.25
TOTAL VALID OBSERVATIONS	2880	100.00

	NO.	PC
VALID OBSERVATIONS	2880	100.
INVALID OBSERVATIONS	0	0.
TOTAL OBSERVATIONS	2880	100.

ESTIMATED MAXIMUM 60 MINUTE PRECIPITATION: .40 INCHES
ESTIMATED MAXIMUM 30 MINUTE PRECIPITATION: .31 INCHES
ESTIMATED MAXIMUM 15 MINUTE PRECIPITATION: .23 INCHES
ESTIMATED MAXIMUM 10 MINUTE PRECIPITATION: .18 INCHES
ESTIMATED MAXIMUM 5 MINUTE PRECIPITATION: .12 INCHES

SOURCE FOR ESTIMATES: U. S. WEATHER BUREAU TECHNICAL PAPER NO. 40

SUSQUEHANNA SES-ER-0L

TABLE 2.3-64

FREQUENCY DISTRIBUTION OF PRECIPITATION FOR THE SUSQUEHANNA SES

(DATA PERIOD: DECEMBER 1973 - 1976)

PRECIPITATION CLASS INTERVAL (INCHES)	FREQUENCY DISTRIBUTION OF PRECIPITATION 1 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 2 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 3 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 6 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 12 HOUR DURATION		FREQUENCY DISTRIBUTION PRECIPITATION 24 HOUR DURATION	
	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT
.0 TO .1	53	68.83	3	12.50	0	0.00	0	0.00	0	0.00	0	0.0
.1 TO .2	15	19.48	12	50.00	5	50.00	0	0.00	0	0.00	0	0.0
.2 TO .3	3	3.90	6	25.00	1	10.00	0	0.00	0	0.00	0	0.0
.3 TO .4	1	1.30	1	4.17	3	30.00	0	0.00	0	0.00	0	0.0
.4 TO .5	2	2.60	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
.5 TO .6	0	0.00	0	0.00	0	0.00	3	100.00	0	0.00	0	0.0
.6 TO .7	1	1.30	1	4.17	0	0.00	0	0.00	0	0.00	0	0.0
.7 TO .8	2	2.60	1	4.17	0	0.00	0	0.00	0	0.00	0	0.0
.8 TO .9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
.9 TO 1.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.0 TO 1.1	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.1 TO 1.2	0	0.00	0	0.00	1	10.00	0	0.00	1	100.00	0	0.0
1.2 TO 1.3	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.3 TO 1.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.4 TO 1.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.5 TO 1.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.6 TO 1.7	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.7 TO 1.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.8 TO 1.9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.9 TO 2.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.0 TO 2.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.2 TO 2.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.4 TO 2.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.6 TO 2.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.8 TO 3.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.0 TO 3.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.2 TO 3.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.4 TO 3.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.6 TO 3.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.8 TO 4.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
4.0 TO 4.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
4.5 TO 5.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
5.0 TO 5.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
5.5 TO 6.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
6.0 TO 6.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
6.5 TO 7.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
7.0 TO 7.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
7.5 TO 8.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
8.0 TO 9.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
9.0 TO 10.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
10.0 TO 11.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
11.0 TO 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
GT 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
TOTAL	77	100.00	24	100.00	10	100.00	3	100.00	1	100.00	0	0.0
MAXIMUM AMT.	.75		.79		1.18		.60		1.12		0.00	

TOTAL PRECIPITATION FOR DATA PERIOD 8.82 INCHES

	NO.	PCT.
OBSERVATIONS WITH NO PRECIPITATION	1645	95.53
OBSERVATIONS WITH PRECIPITATION GE 0.01 INCH	77	4.47
TOTAL VALID OBSERVATIONS	1722	100.00

	NO.	PC
VALID OBSERVATIONS	1722	57.
INVALID OBSERVATIONS	1254	42.
TOTAL OBSERVATIONS	2976	100.

ESTIMATED MAXIMUM 60 MINUTE PRECIPITATION: .85 INCHES
ESTIMATED MAXIMUM 30 MINUTE PRECIPITATION: .67 INCHES
ESTIMATED MAXIMUM 15 MINUTE PRECIPITATION: .48 INCHES
ESTIMATED MAXIMUM 10 MINUTE PRECIPITATION: .38 INCHES
ESTIMATED MAXIMUM 5 MINUTE PRECIPITATION: .25 INCHES

SOURCE FOR ESTIMATES: U. S. WEATHER BUREAU TECHNICAL PAPER NO. 40

SUSQUEHANNA SES-ER-OL

TABLE 2.3-65

FREQUENCY DISTRIBUTION OF PRECIPITATION FOR THE SUSQUEHANNA SES

(DATA PERIOD: JANUARY 1973-DECEMBER 1976)

PRECIPITATION CLASS INTERVAL (INCHES)	FREQUENCY DISTRIBUTION OF PRECIPITATION 1 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 2 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 3 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 6 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 12 HOUR DURATION		FREQUENCY DISTRIBUTION PRECIPITATION 24 HOUR DURATION	
	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT
.0 TO .1	1993	82.15	385	48.25	0	0.00	0	0.00	0	0.00	0	0.0
.1 TO .2	298	12.28	255	31.95	219	60.00	0	0.00	0	0.00	0	0.0
.2 TO .3	53	2.18	53	6.64	53	14.52	19	22.89	0	0.00	0	0.0
.3 TO .4	33	1.36	47	5.89	40	10.96	18	21.69	0	0.00	0	0.0
.4 TO .5	17	.70	14	1.75	10	2.74	6	7.23	1	7.69	0	0.0
.5 TO .6	12	.49	20	2.51	13	3.56	13	15.66	3	23.08	0	0.0
.6 TO .7	6	.25	4	.50	8	2.19	6	7.23	0	0.00	0	0.0
.7 TO .8	5	.21	7	.88	7	1.92	6	7.23	1	7.69	0	0.0
.8 TO .9	2	.08	2	.25	5	1.37	5	6.02	0	0.00	0	0.0
.9 TO 1.0	1	.04	2	.25	2	.55	3	3.61	0	0.00	0	0.0
1.0 TO 1.1	3	.12	3	.38	0	0.00	4	4.82	1	7.69	0	0.0
1.1 TO 1.2	1	.04	2	.25	4	1.10	1	1.20	4	30.77	0	0.0
1.2 TO 1.3	0	0.00	3	.38	2	.55	0	0.00	0	0.00	0	0.0
1.3 TO 1.4	0	0.00	0	0.00	1	.27	0	0.00	0	0.00	0	0.0
1.4 TO 1.5	0	0.00	0	0.00	1	.27	1	1.20	0	0.00	0	0.0
1.5 TO 1.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.6 TO 1.7	1	.04	0	0.00	0	0.00	0	0.00	1	7.69	0	0.0
1.7 TO 1.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
1.8 TO 1.9	0	0.00	0	0.00	0	0.00	1	1.20	0	0.00	0	0.0
1.9 TO 2.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.0 TO 2.2	0	0.00	0	0.00	0	0.00	0	0.00	1	7.69	0	0.0
2.2 TO 2.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
2.4 TO 2.6	1	.04	1	.13	0	0.00	0	0.00	0	0.00	0	0.0
2.6 TO 2.8	0	0.00	0	0.00	0	0.00	0	0.00	1	7.69	0	0.0
2.8 TO 3.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.0 TO 3.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.2 TO 3.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.4 TO 3.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.6 TO 3.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
3.8 TO 4.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
4.0 TO 4.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
4.5 TO 5.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
5.0 TO 5.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
5.5 TO 6.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
6.0 TO 6.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
6.5 TO 7.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
7.0 TO 7.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
7.5 TO 8.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
8.0 TO 9.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
9.0 TO 10.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
10.0 TO 11.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
11.0 TO 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
GT 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0
TOTAL	2426	100.00	798	100.00	365	100.00	83	100.00	13	100.00	0	0.0
MAXIMUM AMT.	2.56		2.60		1.50		1.90		2.74		0.00	

TOTAL PRECIPITATION FOR DATA PERIOD 191.33 INCHES

	NO.	PCT.
OBSERVATIONS WITH NO PRECIPITATION	31326	92.81
OBSERVATIONS WITH PRECIPITATION GE 0.01 INCH	2426	7.19
TOTAL VALID OBSERVATIONS	33752	100.00

	NO.	PC
VALID OBSERVATIONS	33752	96.
INVALID OBSERVATIONS	1312	3.
TOTAL OBSERVATIONS	35064	100.

ESTIMATED MAXIMUM 60 MINUTE PRECIPITATION:	2.89 INCHES
ESTIMATED MAXIMUM 30 MINUTE PRECIPITATION:	2.29 INCHES
ESTIMATED MAXIMUM 15 MINUTE PRECIPITATION:	1.65 INCHES
ESTIMATED MAXIMUM 10 MINUTE PRECIPITATION:	1.30 INCHES
ESTIMATED MAXIMUM 5 MINUTE PRECIPITATION:	.84 INCHES

SOURCE FOR ESTIMATES: U. S. WEATHER BUREAU TECHNICAL PAPER NO. 40

TABLE 2.3-66

PRECIPITATION WIND ROSE FOR THE SUSQUEHANNA SES

(DATA PERIOD: JANUARY 1973 - 1976)

WIND SECTOR	WIND SPEED CATEGORIES (METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	8 3.88	8 3.88	0 0.00	0 0.00	0 0.00	0 0.00	16 7.77	1.53
NE	7 3.40	6 2.91	0 0.00	0 0.00	0 0.00	0 0.00	13 6.31	1.56
ENE	6 2.91	4 1.94	0 0.00	0 0.00	0 0.00	0 0.00	10 4.85	1.44
E	3 1.46	6 2.91	0 0.00	0 0.00	0 0.00	0 0.00	9 4.37	2.09
ESE	10 4.85	8 3.88	2 .97	0 0.00	0 0.00	0 0.00	20 9.71	1.70
SE	4 1.94	4 1.94	0 0.00	2 .97	0 0.00	0 0.00	10 4.85	2.38
SSE	7 3.40	5 2.43	1 .49	1 .49	0 0.00	0 0.00	14 6.80	1.89
S	7 3.40	5 2.43	3 1.46	0 0.00	0 0.00	0 0.00	15 7.28	2.03
SSW	4 1.94	2 .97	5 2.43	4 1.94	0 0.00	0 0.00	15 7.28	3.69
SW	4 1.94	4 1.94	3 1.46	0 0.00	0 0.00	0 0.00	11 5.34	2.05
WSW	3 1.46	4 1.94	4 1.94	2 .97	0 0.00	0 0.00	13 6.31	3.29
W	9 4.37	0 0.00	4 1.94	3 1.46	0 0.00	0 0.00	16 7.77	2.70
WNW	6 2.91	2 .97	0 0.00	1 .49	0 0.00	0 0.00	9 4.37	1.83
NW	10 4.85	1 .49	0 0.00	0 0.00	0 0.00	0 0.00	11 5.34	1.25
NNW	7 3.40	0 0.00	1 .49	0 0.00	0 0.00	0 0.00	8 3.88	1.32
N	7 3.40	7 3.40	0 0.00	0 0.00	0 0.00	0 0.00	14 6.80	1.51
CALM	2 .97						2 .97	CALM
TOTAL	104 50.49	66 32.04	23 11.17	13 6.31	0 0.00	0 0.00	206 100.00	2.03

NUMBER OF VALID OBSERVATIONS WITH PRECIPITATION	206	6.92 PCT.
NUMBER OF VALID OBSERVATIONS WITHOUT PRECIPITATION	2112	70.97 PCT.
NUMBER OF INVALID OBSERVATIONS	658	22.11 PCT.
TOTAL NUMBER OF OBSERVATIONS	2976	100.00 PCT.
TOTAL AMOUNT OF PRECIPITATION FOR DATA PERIOD		14.08 INCHES

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES

SUSQUEHANNA SES-ER-OL

TABLE 2.3-67

PRECIPITATION WIND ROSE FOR THE SUSQUEHANNA SES

(DATA PERIOD: FEBRUARY 1973 - 1976)

WIND SECTOR	WIND SPEED CATEGORIES (METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	12 7.50	5 3.12	0 0.00	0 0.00	0 0.00	0 0.00	17 10.62	1.32
NE	2 1.25	4 2.50	0 0.00	0 0.00	0 0.00	0 0.00	6 3.75	1.87
ENE	6 3.75	5 3.12	2 1.25	0 0.00	0 0.00	0 0.00	13 8.12	1.96
E	4 2.50	2 1.25	3 1.87	0 0.00	0 0.00	0 0.00	9 5.62	2.10
ESE	5 3.12	2 1.25	0 0.00	0 0.00	0 0.00	0 0.00	7 4.37	1.26
SE	5 3.12	6 3.75	1 .62	1 .62	0 0.00	0 0.00	13 8.12	2.05
SSE	7 4.37	2 1.25	4 2.50	0 0.00	0 0.00	0 0.00	13 8.12	2.05
S	2 1.25	4 2.50	1 .62	6 3.75	2 1.25	0 0.00	15 9.37	4.55
SSW	3 1.87	1 .62	4 2.50	6 3.75	0 0.00	0 0.00	14 8.75	4.37
SW	3 1.87	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	3 1.87	.83
WSW	4 2.50	2 1.25	2 1.25	0 0.00	0 0.00	0 0.00	8 5.00	2.06
W	1 .62	0 0.00	2 1.25	1 .62	0 0.00	0 0.00	4 2.50	3.87
WNW	3 1.87	6 3.75	1 .62	0 0.00	0 0.00	0 0.00	10 6.25	1.95
NW	2 1.25	9 5.62	1 .62	0 0.00	0 0.00	0 0.00	12 7.50	2.13
NNW	1 .62	2 1.25	1 .62	0 0.00	0 0.00	0 0.00	4 2.50	2.17
N	9 5.62	3 1.87	0 0.00	0 0.00	0 0.00	0 0.00	12 7.50	1.21
CALM	0 0.00						0 0.00	CALM
TOTAL	69 43.12	53 33.12	22 13.75	14 8.75	2 1.25	0 0.00	160 100.00	2.33

NUMBER OF VALID OBSERVATIONS WITH PRECIPITATION	160	5.90	PCT.
NUMBER OF VALID OBSERVATIONS WITHOUT PRECIPITATION	1951	71.94	PCT.
NUMBER OF INVALID OBSERVATIONS	601	22.16	PCT.
TOTAL NUMBER OF OBSERVATIONS	2712	100.00	PCT.
TOTAL AMOUNT OF PRECIPITATION FOR DATA PERIOD		8.92	INCHES

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES

TABLE 2.3-68

PRECIPITATION WIND ROSE FOR THE SUSQUEHANNA SES

(DATA PERIOD: MARCH 1973 - 1976)

WIND SECTOR	WIND SPEED CATEGORIES (METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	3 1.36	6 2.71	0 0.00	0 0.00	0 0.00	0 0.00	9 4.07	1.92
NE	5 2.26	12 5.43	2 .90	3 1.36	0 0.00	0 0.00	22 9.95	2.71
ENE	3 1.36	11 4.98	6 2.71	1 .45	0 0.00	0 0.00	21 9.50	2.70
E	7 3.17	8 3.62	9 4.07	2 .90	0 0.00	0 0.00	26 11.76	2.92
ESE	3 1.36	4 1.81	4 1.81	0 0.00	0 0.00	0 0.00	11 4.98	2.41
SE	3 1.36	6 2.71	3 1.36	0 0.00	0 0.00	0 0.00	12 5.43	2.14
SSE	3 1.36	2 .90	0 0.00	1 .45	0 0.00	0 0.00	6 2.71	1.97
S	5 2.26	4 1.81	2 .90	2 .90	0 0.00	0 0.00	13 5.88	2.53
SSW	7 3.17	2 .90	3 1.36	1 .45	0 0.00	0 0.00	13 5.88	2.23
SW	5 2.26	4 1.81	0 0.00	1 .45	0 0.00	0 0.00	10 4.52	1.92
WSW	3 1.36	5 2.26	2 .90	5 2.26	0 0.00	0 0.00	15 6.79	3.21
W	8 3.62	2 .90	7 3.17	7 3.17	0 0.00	0 0.00	24 10.86	3.43
WNW	4 1.81	0 0.00	1 .45	4 1.81	1 .45	0 0.00	10 4.52	4.20
NW	5 2.26	0 0.00	2 .90	0 0.00	0 0.00	0 0.00	7 3.17	1.60
NNW	2 .90	6 2.71	1 .45	1 .45	0 0.00	0 0.00	10 4.52	2.62
N	2 .90	3 1.36	1 .45	4 1.81	0 0.00	0 0.00	10 4.52	3.73
CALM	2 .90						2 .90	CALM
TOTAL	70 31.67	75 33.94	43 19.46	32 14.48	1 .45	0 0.00	221 100.00	2.72

NUMBER OF VALID OBSERVATIONS WITH PRECIPITATION	221	7.43 PCT.
NUMBER OF VALID OBSERVATIONS WITHOUT PRECIPITATION	2730	91.73 PCT.
NUMBER OF INVALID OBSERVATIONS	25	.84 PCT.
TOTAL NUMBER OF OBSERVATIONS	2976	100.00 PCT.
TOTAL AMOUNT OF PRECIPITATION FOR DATA PERIOD		14.62 INCHES

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES

SUSQUEHANNA SES-ER-OL

TABLE 2.3-69

PRECIPITATION WIND ROSE FOR THE SUSQUEHANNA SES

(DATA PERIOD: APRIL 1973 - 1976)

WIND SECTOR	WIND SPEED CATEGORIES (METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	4 1.79	14 6.25	8 3.57	0 0.00	0 0.00	0 0.00	26 11.61	2.53
NE	4 1.79	10 4.46	32 14.29	0 0.00	0 0.00	0 0.00	46 20.54	3.25
ENE	3 1.34	5 2.23	4 1.79	3 1.34	0 0.00	0 0.00	15 6.70	3.23
E	4 1.79	4 1.79	4 1.79	0 0.00	0 0.00	0 0.00	12 5.36	2.26
ESE	4 1.79	1 .45	1 .45	0 0.00	0 0.00	0 0.00	6 2.68	1.83
SE	2 .89	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	2 .89	.80
SSE	6 2.68	2 .89	0 0.00	1 .45	0 0.00	0 0.00	9 4.02	1.81
S	7 3.12	1 .45	3 1.34	1 .45	0 0.00	0 0.00	12 5.36	2.29
SSW	5 2.23	1 .45	2 .89	0 0.00	0 0.00	0 0.00	8 3.57	1.85
SW	7 3.12	4 1.79	1 .45	0 0.00	0 0.00	0 0.00	12 5.36	1.51
WSW	4 1.79	16 7.14	5 2.23	2 .89	0 0.00	0 0.00	27 12.05	2.70
W	4 1.79	4 1.79	8 3.57	1 .45	0 0.00	0 0.00	17 7.59	3.02
WNW	0 0.00	2 .89	7 3.12	3 1.34	0 0.00	0 0.00	12 5.36	4.34
NW	1 .45	0 0.00	4 1.79	1 .45	0 0.00	0 0.00	6 2.68	3.42
NNW	1 .45	2 .89	3 1.34	2 .89	0 0.00	0 0.00	8 3.57	3.69
N	2 .89	2 .89	1 .45	0 0.00	0 0.00	0 0.00	5 2.23	1.98
CALM	1 .45						1 .45	CALM
TOTAL	59 26.34	68 30.36	83 37.05	14 6.25	0 0.00	0 0.00	224 100.00	2.75

NUMBER OF VALID OBSERVATIONS WITH PRECIPITATION	224	7.78 PCT.
NUMBER OF VALID OBSERVATIONS WITHOUT PRECIPITATION	2604	90.42 PCT.
NUMBER OF INVALID OBSERVATIONS	52	1.81 PCT.
TOTAL NUMBER OF OBSERVATIONS	2880	100.00 PCT.
TOTAL AMOUNT OF PRECIPITATION FOR DATA PERIOD		14.92 INCHES

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES

SUSQUEHANNA SES-ER-OL

TABLE 2.3-70

PRECIPITATION WIND ROSE FOR THE SUSQUEHANNA SES

(DATA PERIOD: MAY 1973 - 1976)

WIND SECTOR	WIND SPEED CATEGORIES (METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	4 1.80	5 2.25	0 0.00	0 0.00	0 0.00	0 0.00	9 4.05	1.58
NE	5 2.25	10 4.50	1 .45	0 0.00	0 0.00	0 0.00	16 7.21	1.90
ENE	10 4.50	7 3.15	0 0.00	0 0.00	0 0.00	0 0.00	17 7.66	1.52
E	7 3.15	5 2.25	0 0.00	0 0.00	0 0.00	0 0.00	12 5.41	1.44
ESE	5 2.25	3 1.35	0 0.00	0 0.00	0 0.00	0 0.00	8 3.60	1.36
SE	5 2.25	1 .45	0 0.00	0 0.00	0 0.00	0 0.00	6 2.70	1.17
SSE	9 4.05	10 4.50	4 1.80	0 0.00	0 0.00	0 0.00	23 10.36	2.00
S	8 3.60	4 1.80	4 1.80	0 0.00	0 0.00	0 0.00	16 7.21	2.08
SSW	8 3.60	2 .90	2 .90	0 0.00	0 0.00	0 0.00	12 5.41	1.66
SW	8 3.60	10 4.50	0 0.00	0 0.00	0 0.00	0 0.00	18 8.11	1.67
WSW	4 1.80	8 3.60	3 1.35	0 0.00	0 0.00	0 0.00	15 6.76	2.46
W	8 3.60	13 5.86	6 2.70	5 2.25	0 0.00	0 0.00	32 14.41	2.82
WNW	6 2.70	3 1.35	2 .90	0 0.00	0 0.00	0 0.00	11 4.95	1.94
NW	3 1.35	4 1.80	0 0.00	0 0.00	0 0.00	0 0.00	7 3.15	2.06
NNW	5 2.25	3 1.35	1 .45	1 .45	0 0.00	0 0.00	10 4.50	2.06
N	5 2.25	4 1.80	0 0.00	0 0.00	0 0.00	0 0.00	9 4.05	1.54
CALM	1 .45						1 .45	CALM
TOTAL	101 45.50	92 41.44	23 10.36	6 2.70	0 0.00	0 0.00	222 100.00	1.95

NUMBER OF VALID OBSERVATIONS WITH PRECIPITATION	222	7.46 PCT.
NUMBER OF VALID OBSERVATIONS WITHOUT PRECIPITATION	2705	90.89 PCT.
NUMBER OF INVALID OBSERVATIONS	49	1.65 PCT.
TOTAL NUMBER OF OBSERVATIONS	2976	100.00 PCT.
TOTAL AMOUNT OF PRECIPITATION FOR DATA PERIOD		16.75 INCHES

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES

TABLE 2.3-71

PRECIPITATION WIND ROSE FOR THE SUSQUEHANNA SES

(DATA PERIOD: JUNE 1973 - 1976)

WIND SECTOR	WIND SPEED CATEGORIES (METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	7 3.18	4 1.82	0 0.00	0 0.00	0 0.00	0 0.00	11 5.00	1.43
NE	19 8.64	9 4.09	3 1.36	0 0.00	0 0.00	0 0.00	31 14.09	1.62
ENE	11 5.00	12 5.45	1 .45	0 0.00	0 0.00	0 0.00	24 10.91	1.77
E	17 7.73	10 4.55	1 .45	0 0.00	0 0.00	0 0.00	28 12.73	1.47
ESE	4 1.82	4 1.82	1 .45	0 0.00	0 0.00	0 0.00	9 4.09	1.89
SE	1 .45	8 3.64	0 0.00	0 0.00	0 0.00	0 0.00	9 4.09	1.81
SSE	7 3.18	4 1.82	0 0.00	0 0.00	0 0.00	0 0.00	11 5.00	1.30
S	8 3.64	2 .91	2 .91	0 0.00	0 0.00	0 0.00	12 5.45	1.55
SSW	4 1.82	3 1.36	0 0.00	0 0.00	0 0.00	0 0.00	7 3.18	1.59
SW	11 5.00	5 2.27	0 0.00	0 0.00	0 0.00	0 0.00	16 7.27	1.48
WSW	8 3.64	8 3.64	2 .91	0 0.00	0 0.00	0 0.00	18 8.18	1.68
W	9 4.09	9 4.09	3 1.36	0 0.00	0 0.00	0 0.00	21 9.55	1.95
WNW	4 1.82	2 .91	1 .45	0 0.00	0 0.00	0 0.00	7 3.18	1.86
NW	3 1.36	1 .45	0 0.00	0 0.00	0 0.00	0 0.00	4 1.82	1.15
NNW	5 2.27	2 .91	0 0.00	0 0.00	0 0.00	0 0.00	7 3.18	1.29
N	2 .91	1 .45	1 .45	0 0.00	0 0.00	0 0.00	4 1.82	1.97
CALM	1 .45						1 .45	CALM
TOTAL	121 55.00	84 38.18	15 6.82	0 0.00	0 0.00	0 0.00	220 100.00	1.62

NUMBER OF VALID OBSERVATIONS WITH PRECIPITATION	220	7.64	PCT.
NUMBER OF VALID OBSERVATIONS WITHOUT PRECIPITATION	2452	85.14	PCT.
NUMBER OF INVALID OBSERVATIONS	208	7.22	PCT.
TOTAL NUMBER OF OBSERVATIONS	2880	100.00	PCT.
TOTAL AMOUNT OF PRECIPITATION FOR DATA PERIOD		18.49	INCHES

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES

SUSQUEHANNA SES-ER-OL

TABLE 2.3-72

PRECIPITATION WIND ROSE FOR THE SUSQUEHANNA SES

(DATA PERIOD: JULY 1973 - 1976)

WIND SECTOR	WIND SPEED CATEGORIES (METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	6 3.41	1 .57	1 .57	0 0.00	0 0.00	0 0.00	8 4.55	1.35
NE	11 6.25	6 3.41	1 .57	0 0.00	0 0.00	0 0.00	18 10.23	1.48
ENE	8 4.55	4 2.27	0 0.00	0 0.00	0 0.00	0 0.00	12 6.82	1.19
E	11 6.25	2 1.14	0 0.00	0 0.00	0 0.00	0 0.00	13 7.39	1.10
ESE	2 1.14	3 1.70	0 0.00	0 0.00	0 0.00	0 0.00	5 2.84	1.54
SE	2 1.14	1 .57	0 0.00	0 0.00	0 0.00	0 0.00	3 1.70	1.23
SSE	1 .57	1 .57	1 .57	0 0.00	0 0.00	0 0.00	3 1.70	2.07
S	3 1.70	4 2.27	0 0.00	0 0.00	0 0.00	0 0.00	7 3.98	1.83
SSW	9 5.11	5 2.84	0 0.00	0 0.00	0 0.00	0 0.00	14 7.95	1.36
SW	9 5.11	3 1.70	0 0.00	0 0.00	0 0.00	0 0.00	12 6.82	1.37
WSW	7 3.98	4 2.27	4 2.27	0 0.00	0 0.00	0 0.00	15 8.52	2.13
W	6 3.41	5 2.84	9 5.11	1 .57	0 0.00	0 0.00	21 11.93	2.86
WNW	11 6.25	0 0.00	4 2.27	0 0.00	0 0.00	0 0.00	15 8.52	1.63
NW	3 1.70	1 .57	4 2.27	0 0.00	0 0.00	0 0.00	8 4.55	2.42
NNW	5 2.84	3 1.70	3 1.70	1 .57	0 0.00	0 0.00	12 6.82	2.43
N	3 1.70	6 3.41	0 0.00	0 0.00	0 0.00	0 0.00	9 5.11	1.91
CALM	1 .57						1 .57	CALM
TOTAL	98 55.68	49 27.84	27 15.34	2 1.14	0 0.00	0 0.00	176 100.00	1.79

NUMBER OF VALID OBSERVATIONS WITH PRECIPITATION	176	5.91	PCT.
NUMBER OF VALID OBSERVATIONS WITHOUT PRECIPITATION	2798	94.02	PCT.
NUMBER OF INVALID OBSERVATIONS	2	.07	PCT.
TOTAL NUMBER OF OBSERVATIONS	2976	100.00	PCT.
TOTAL AMOUNT OF PRECIPITATION FOR DATA PERIOD		18.90	INCHES

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES

SUSQUEHANNA SES-ER-OL

TABLE 2.3-73

PRECIPITATION WIND ROSE FOR THE SUSQUEHANNA SES

(DATA PERIOD: AUGUST 1973 - 1976)

WIND SECTOR	WIND SPEED CATEGORIES (METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	7 3.83	10 5.46	1 .55	0 0.00	0 0.00	0 0.00	18 9.84	1.79
NE	8 4.37	12 6.56	4 2.19	0 0.00	0 0.00	0 0.00	24 13.11	1.98
ENE	9 4.92	2 1.09	2 1.09	0 0.00	0 0.00	0 0.00	13 7.10	1.51
E	8 4.37	3 1.64	0 0.00	0 0.00	0 0.00	0 0.00	11 6.01	1.17
ESE	15 8.20	3 1.64	0 0.00	0 0.00	0 0.00	0 0.00	18 9.84	1.11
SE	4 2.19	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	4 2.19	.92
SSE	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
S	3 1.64	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	3 1.64	.70
SSW	7 3.83	1 .55	0 0.00	0 0.00	0 0.00	0 0.00	8 4.37	1.10
SW	12 6.56	11 6.01	0 0.00	0 0.00	0 0.00	0 0.00	23 12.57	1.55
WSW	2 1.09	11 6.01	2 1.09	0 0.00	0 0.00	0 0.00	15 8.20	2.17
W	7 3.83	10 5.46	3 1.64	0 0.00	0 0.00	0 0.00	20 10.93	2.12
WNW	7 3.83	1 .55	1 .55	0 0.00	0 0.00	0 0.00	9 4.92	1.20
NW	1 .55	2 1.09	0 0.00	0 0.00	0 0.00	0 0.00	3 1.64	1.63
NNW	2 1.09	2 1.09	0 0.00	0 0.00	0 0.00	0 0.00	4 2.19	1.37
N	7 3.83	1 .55	1 .55	0 0.00	0 0.00	0 0.00	9 4.92	1.49
CALM	1 .55						1 .55	CALM
TOTAL	100 54.64	69 37.70	14 7.65	0 0.00	0 0.00	0 0.00	183 100.00	1.60

NUMBER OF VALID OBSERVATIONS WITH PRECIPITATION	183	6.15	PCT.
NUMBER OF VALID OBSERVATIONS WITHOUT PRECIPITATION	2791	93.78	PCT.
NUMBER OF INVALID OBSERVATIONS	2	.07	PCT.
TOTAL NUMBER OF OBSERVATIONS	2976	100.00	PCT.
TOTAL AMOUNT OF PRECIPITATION FOR DATA PERIOD		14.37	INCHES

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES

TABLE 2.3-74

PRECIPITATION WIND ROSE FOR THE SUSQUEHANNA SES

(DATA PERIOD: SEPTEMBER 1973 - 1976)

WIND SECTOR	WIND SPEED CATEGORIES (METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	18 6.08	18 6.08	2 .68	1 .34	0 0.00	0 0.00	39 13.18	1.77
NE	22 7.43	30 10.14	8 2.70	0 0.00	0 0.00	0 0.00	60 20.27	1.98
ENE	16 5.41	15 5.07	11 3.72	0 0.00	0 0.00	0 0.00	42 14.19	2.13
E	13 4.39	9 3.04	5 1.69	1 .34	0 0.00	0 0.00	28 9.46	1.93
ESE	6 2.03	3 1.01	0 0.00	0 0.00	0 0.00	0 0.00	9 3.04	1.38
SE	4 1.35	1 .34	0 0.00	0 0.00	0 0.00	0 0.00	5 1.69	1.00
SSE	8 2.70	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	8 2.70	.96
S	5 1.69	1 .34	0 0.00	0 0.00	0 0.00	0 0.00	6 2.03	.88
SSW	11 3.72	3 1.01	1 .34	0 0.00	0 0.00	0 0.00	15 5.07	1.13
SW	8 2.70	10 3.38	2 .68	0 0.00	0 0.00	0 0.00	20 6.76	1.82
WSW	3 1.01	10 3.38	2 .68	0 0.00	0 0.00	0 0.00	15 5.07	2.05
W	4 1.35	8 2.70	3 1.01	0 0.00	0 0.00	0 0.00	15 5.07	2.15
WNW	3 1.01	3 1.01	0 0.00	0 0.00	0 0.00	0 0.00	6 2.03	1.68
NW	4 1.35	2 .68	0 0.00	0 0.00	0 0.00	0 0.00	6 2.03	1.17
NNW	5 1.69	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	5 1.69	1.12
N	5 1.69	5 1.69	0 0.00	0 0.00	0 0.00	0 0.00	10 3.38	1.48
CALM	7 2.36						7 2.36	CALM
TOTAL	142 47.97	118 39.86	34 11.49	2 .68	0 0.00	0 0.00	296 100.00	1.74

NUMBER OF VALID OBSERVATIONS WITH PRECIPITATION	296	10.28 PCT.
NUMBER OF VALID OBSERVATIONS WITHOUT PRECIPITATION	2574	89.38 PCT.
NUMBER OF INVALID OBSERVATIONS	10	.35 PCT.
TOTAL NUMBER OF OBSERVATIONS	2880	100.00 PCT.
TOTAL AMOUNT OF PRECIPITATION FOR DATA PERIOD		30.17 INCHES

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES

SUSQUEHANNA SES-ER-OL

TABLE 2.3-75

PRECIPITATION WIND ROSE FOR THE SUSQUEHANNA SES

(DATA PERIOD: OCTOBER 1973 - 1976)

WIND SECTOR	WIND SPEED CATEGORIES (METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	8 3.52	19 8.37	4 1.76	0 0.00	0 0.00	0 0.00	31 13.66	2.18
NE	12 5.29	26 11.45	14 6.17	0 0.00	0 0.00	0 0.00	52 22.91	2.31
ENE	10 4.41	15 6.61	3 1.32	1 .44	0 0.00	0 0.00	29 12.78	2.08
E	13 5.73	4 1.76	0 0.00	6 2.64	0 0.00	0 0.00	23 10.13	2.64
ESE	4 1.76	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	4 1.76	.87
SE	2 .88	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	2 .88	1.05
SSE	2 .88	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	2 .88	.80
S	5 2.20	1 .44	0 0.00	0 0.00	0 0.00	0 0.00	6 2.64	1.03
SSW	7 3.08	2 .88	0 0.00	0 0.00	0 0.00	0 0.00	9 3.96	1.36
SW	3 1.32	3 1.32	0 0.00	0 0.00	0 0.00	0 0.00	6 2.64	1.63
WSW	7 3.08	4 1.76	7 3.08	3 1.32	0 0.00	0 0.00	21 9.25	2.97
W	2 .88	1 .44	2 .88	2 .88	0 0.00	0 0.00	7 3.08	3.16
WNW	5 2.20	3 1.32	0 0.00	2 .88	0 0.00	0 0.00	10 4.41	2.20
NW	0 0.00	3 1.32	1 .44	0 0.00	0 0.00	0 0.00	4 1.76	2.62
NNW	4 1.76	1 .44	1 .44	0 0.00	0 0.00	0 0.00	6 2.64	1.57
N	7 3.08	3 1.32	4 1.76	0 0.00	0 0.00	0 0.00	14 6.17	2.11
CALM	1 .44						1 .44	CALM
TOTAL	92 40.53	85 37.44	36 15.86	14 6.17	0 0.00	0 0.00	227 100.00	2.20

NUMBER OF VALID OBSERVATIONS WITH PRECIPITATION	227	7.63 PCT.
NUMBER OF VALID OBSERVATIONS WITHOUT PRECIPITATION	2732	91.80 PCT.
NUMBER OF INVALID OBSERVATIONS	17	.57 PCT.
TOTAL NUMBER OF OBSERVATIONS	2976	100.00 PCT.
TOTAL AMOUNT OF PRECIPITATION FOR DATA PERIOD		17.55 INCHES

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES

TABLE 2.3-76

PRECIPITATION WIND ROSE FOR THE SUSQUEHANNA SES

(DATA PERIOD: NOVEMBER 1973 - 1976)

WIND SECTOR	WIND SPEED CATEGORIES (METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	5 2.91	4 2.33	0 0.00	0 0.00	0 0.00	0 0.00	9 5.23	1.64
NE	4 2.33	4 2.33	1 .58	0 0.00	0 0.00	0 0.00	9 5.23	1.74
ENE	8 4.65	4 2.33	0 0.00	0 0.00	0 0.00	0 0.00	12 6.98	1.27
E	4 2.33	1 .58	0 0.00	0 0.00	0 0.00	0 0.00	5 2.91	.96
ESE	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
SE	3 1.74	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	3 1.74	.73
SSE	6 3.49	2 1.16	0 0.00	0 0.00	0 0.00	0 0.00	8 4.65	1.22
S	7 4.07	12 6.98	2 1.16	2 1.16	0 0.00	0 0.00	23 13.37	2.33
SSW	5 2.91	5 2.91	2 1.16	0 0.00	0 0.00	0 0.00	12 6.98	1.91
SW	9 5.23	4 2.33	0 0.00	0 0.00	0 0.00	0 0.00	13 7.56	1.44
WSW	8 4.65	8 4.65	14 8.14	7 4.07	0 0.00	0 0.00	37 21.51	3.33
W	7 4.07	3 1.74	10 5.81	0 0.00	0 0.00	0 0.00	20 11.63	2.46
WNW	1 .58	0 0.00	2 1.16	0 0.00	0 0.00	0 0.00	3 1.74	3.53
NW	0 0.00	0 0.00	1 .58	0 0.00	0 0.00	0 0.00	1 .58	3.80
NNW	1 .58	2 1.16	0 0.00	0 0.00	0 0.00	0 0.00	3 1.74	1.93
N	9 5.23	2 1.16	0 0.00	0 0.00	0 0.00	0 0.00	11 6.40	1.20
CALM	3 1.74						3 1.74	CALM
TOTAL	80 46.51	51 29.65	32 18.60	9 5.23	0 0.00	0 0.00	172 100.00	2.11

NUMBER OF VALID OBSERVATIONS WITH PRECIPITATION	172	5.97 PCT.
NUMBER OF VALID OBSERVATIONS WITHOUT PRECIPITATION	2552	88.61 PCT.
NUMBER OF INVALID OBSERVATIONS	156	5.42 PCT.
TOTAL NUMBER OF OBSERVATIONS	2880	100.00 PCT.
TOTAL AMOUNT OF PRECIPITATION FOR DATA PERIOD		10.63 INCHES

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES

TABLE 2.3-77

PRECIPITATION WIND ROSE FOR THE SUSQUEHANNA SES

(DATA PERIOD: DECEMBER 1973 - 1976)

WIND SECTOR	WIND SPEED CATEGORIES (METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	1 1.30	3 3.90	1 1.30	0 0.00	0 0.00	0 0.00	5 6.49	1.96
NE	0 0.00	14 18.18	2 2.60	0 0.00	0 0.00	0 0.00	16 20.78	2.37
ENE	0 0.00	2 2.60	1 1.30	0 0.00	0 0.00	0 0.00	3 3.90	2.43
E	1 1.30	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	1 1.30	1.10
ESE	2 2.60	0 0.00	0 0.00	1 1.30	0 0.00	0 0.00	3 3.90	2.40
SE	1 1.30	0 0.00	1 1.30	0 0.00	0 0.00	0 0.00	2 2.60	2.95
SSE	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
S	4 5.19	6 7.79	0 0.00	0 0.00	0 0.00	0 0.00	10 12.99	1.88
SSW	4 5.19	5 6.49	1 1.30	0 0.00	0 0.00	0 0.00	10 12.99	1.85
SW	6 7.79	3 3.90	1 1.30	0 0.00	0 0.00	0 0.00	10 12.99	1.51
WSW	1 1.30	2 2.60	1 1.30	0 0.00	0 0.00	0 0.00	4 5.19	1.85
W	0 0.00	1 1.30	0 0.00	3 3.90	0 0.00	0 0.00	4 5.19	5.60
WNW	2 2.60	1 1.30	0 0.00	2 2.60	0 0.00	0 0.00	5 6.49	2.72
NW	0 0.00	1 1.30	0 0.00	0 0.00	0 0.00	0 0.00	1 1.30	1.80
NNW	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
N	0 0.00	1 1.30	0 0.00	2 2.60	0 0.00	0 0.00	3 3.90	4.83
CALM	0 0.00						0 0.00	CALM
TOTAL	22 28.57	39 50.65	8 10.39	8 10.39	0 0.00	0 0.00	77 100.00	2.35

NUMBER OF VALID OBSERVATIONS WITH PRECIPITATION	77	2.59	PCT.
NUMBER OF VALID OBSERVATIONS WITHOUT PRECIPITATION	1522	51.14	PCT.
NUMBER OF INVALID OBSERVATIONS	1377	46.27	PCT.
TOTAL NUMBER OF OBSERVATIONS	2976	100.00	PCT.
TOTAL AMOUNT OF PRECIPITATION FOR DATA PERIOD		8.82	INCHES

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES

SUSQUEHANNA SES-ER-OL

TABLE 2.3-78

PRECIPITATION WIND ROSE FOR THE SUSQUEHANNA SES

(DATA PERIOD: JAN. 1973 - DEC. 1976)

WIND SECTOR	WIND SPEED CATEGORIES (METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	83 3.48	97 4.07	17 .71	1 .04	0 0.00	0 0.00	198 8.31	1.84
NE	99 4.15	143 6.00	68 2.85	3 .13	0 0.00	0 0.00	313 13.13	2.20
ENE	90 3.78	86 3.61	30 1.26	5 .21	0 0.00	0 0.00	211 8.85	1.99
E	92 3.86	54 2.27	22 .92	9 .38	0 0.00	0 0.00	177 7.42	1.96
ESE	60 2.52	31 1.30	8 .34	1 .04	0 0.00	0 0.00	100 4.19	1.59
SE	36 1.51	27 1.13	5 .21	3 .13	0 0.00	0 0.00	71 2.98	1.74
SSE	56 2.35	28 1.17	10 .42	3 .13	0 0.00	0 0.00	97 4.07	1.72
S	64 2.68	44 1.85	17 .71	11 .46	2 .08	0 0.00	138 5.79	2.24
SSW	74 3.10	32 1.34	20 .84	11 .46	0 0.00	0 0.00	137 5.75	2.11
SW	85 3.57	61 2.56	7 .29	1 .04	0 0.00	0 0.00	154 6.46	1.61
WSW	54 2.27	82 3.44	48 2.01	19 .80	0 0.00	0 0.00	203 8.52	2.64
W	65 2.73	56 2.35	57 2.39	23 .96	0 0.00	0 0.00	201 8.43	2.75
WNW	52 2.18	23 .96	19 .80	12 .50	1 .04	0 0.00	107 4.49	2.39
NW	32 1.34	24 1.01	13 .55	1 .04	0 0.00	0 0.00	70 2.94	1.96
NNW	38 1.59	23 .96	11 .46	5 .21	0 0.00	0 0.00	77 3.23	2.08
N	58 2.43	38 1.59	8 .34	6 .25	0 0.00	0 0.00	110 4.61	1.88
CALM	20 .84						20 .84	CALM
TOTAL	1058 44.38	849 35.61	360 15.10	114 4.78	3 .13	0 0.00	2384 100.00	2.08

NUMBER OF VALID OBSERVATIONS WITH PRECIPITATION	2384	6.80 PCT.
NUMBER OF VALID OBSERVATIONS WITHOUT PRECIPITATION	29523	84.20 PCT.
NUMBER OF INVALID OBSERVATIONS	3157	9.00 PCT.
TOTAL NUMBER OF OBSERVATIONS	35064	100.00 PCT.
TOTAL AMOUNT OF PRECIPITATION FOR DATA PERIOD		188.22 INCHES

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES

TABLE 2.3-79

HEAVY FOG (VISIBILITY ¼ MILE OR LESS) AT AVOCA

	Year			
Month	1972	1973	1974	1975
January	3	3	0	3
February	0	0	1	3
March	1	3	1	2
April	2	2	0	1
May	3	3	0	0
June	2	0	1	2
July	5	2	0	0
August	0	1	2	4
September	1	2	7	3
October	3	4	2	0
November	0	1	2	3
December	8	2	0	3
Annual	28	23	16	24

Ref. 2.3-11

TABLE 2.3-80

JOINT FREQUENCY (%) OF WIND

DIRECTION, WIND SPEED AND STABILITY FOR AVOCA

(Period of Record: 1971-1975)

Stability Class A

Wind Speed (kts)

Sector	0-3	4-6	7-10	11-16	17-21	>21	Total
N	.0139	.0205	0	0	0	0	.0345
NNE	.0046	.0068	0	0	0	0	.0115
NE	.0230	.0000	0	0	0	0	.0230
ENE	.0046	.0068	0	0	0	0	.0115
E	.0000	0	0	0	0	0	0
ESE	.0046	.0068	0	0	0	0	.0115
SE	.0000	0	0	0	0	0	0
SSE	.0046	.0068	0	0	0	0	.0115
S	.0254	.0205	0	0	0	0	.0460
SSW	.0093	.0137	0	0	0	0	.0230
SW	.0046	.0068	0	0	0	0	.0115
WSW	.0139	.0205	0	0	0	0	.0345
W	.0186	.0274	0	0	0	0	.0460
SNW	.0093	.0137	0	0	0	0	.0230
NW	.0046	.0068	0	0	0	0	.0115
NNW	.0093	.0137	0	0	0	0	.0230
Total	.1507	.1712	0	0	0	0	

Relative frequency of occurrences of A Stability = .3219
Relative frequency of calms distributed with A Stability = .1301

Ref. 2.3-4

TABLE 2.3-81

JOINT FREQUENCY (%) OF WIND

DIRECTION, WIND SPEED AND STABILITY FOR AVOCA

(Period of Record: 1971-1975)

Stability Class B

Wind Speed (kts)

Sector	0-3	4-6	7-10	11-16	17-21	>21	Total
N	.0898	.1507	.1164	0	0	0	.3569
NNE	.0975	.0548	.0548	0	0	0	.2071
NE	.0654	.0548	.0616	0	0	0	.1819
ENE	.1112	.0411	.0137	0	0	0	.1660
E	.0768	.0274	.0342	0	0	0	.1385
ESE	.0516	.0205	0	0	0	0	.0721
SE	.0528	.0274	.0068	0	0	0	.0870
SSE	.0424	.0137	.0137	0	0	0	.0698
S	.1675	.0890	.0205	0	0	0	.2771
SSW	.0898	.1507	.0959	0	0	0	.3364
SW	.0991	.2055	.1507	0	0	0	.4553
WSW	.1773	.2877	.2123	0	0	0	.6773
W	.2118	.2493	.1301	0	0	0	.6913
WNW	.1449	.1918	.1164	0	0	0	.4531
NW	.1449	.1986	.0890	0	0	0	.3856
NNW	.0748	.1096	.1027	0	0	0	.2871
Total	1.6507	1.9726	1.2192				

Relative frequency of occurrences of B Stability = 4.8425

Relative frequency of calms distributed with B stability = 0.5274

Ref. 2.3-4

Rev. 1, 1/79

TABLE 2.3-82

JOINT FREQUENCY (%) OF WIND

DIRECTION, WIND SPEED AND STABILITY FOR AVOCA

(Period of Record: 1971-1975)

Stability Class C

	Wind Speed (kts)						
Sector	0-3	4-6	7-10	11-16	17-21	>21	Total
N	.0707	.2808	.3014	.0274	0	0	.6803
NNE	.0631	.1164	.0822	.0137	0	0	.2754
NE	.0488	.2055	.0959	.0137	0	0	.3639
ENE	.1069	.2671	.0685	0	0	0	.4425
E	.0712	.1233	.1233	.0068	0	0	.3246
ESE	.0132	.0616	.0411	0	0	0	.1159
SE	.0175	.0274	.0479	0	0	0	.0928
SSE	.0480	.0342	.0411	.0068	0	0	.1302
S	.0556	.1164	.1781	.0753	.0068	0	.1302
SSW	.0326	.1918	.5000	.1096	.00137	0	.8340
SW	.0413	.2055	.7877	.1507	0	0	1.1989
WSW	0.415	.3699	.6164	.1027	0	0	1.1306
W	.0714	.2877	.3630	.0342	0	0	.7563
WNW	.0681	.1712	.3493	.0959	0	0	.6846
NW	.0613	.1781	.3836	.0890	.0068	0	.7188
NNW	.0313	.1781	.4178	.1096	.0068	0	.7437
Total	.8425	2.8151	4.3973	.8356	.0342	0	

Relative frequency of occurrence of C Stability = 8.9247
Relative frequency of calms distributed with C Stability = .3082

Ref. 2.3-4

TABLE 2.3-83

JOINT FREQUENCY (%) OF WIND

DIRECTION, WIND SPEED AND STABILITY FOR AVOCA

(Period of Record: 1971-1975)

Stability Class D

Wind Speed (kts)

Sector	0-3	4-6	7-10	11-16	17-21	>21	Total
N	.4311	1.2808	1.6027	.7671	.0137	0	4.0955
NNE	.2648	.9041	1.0342	.1918	.068	0	2.4018
NE	.2677	1.0068	.8425	.3562	.0205	0	2.4937
ENE	.4100	1.4452	.9863	.4726	.0274	.0137	3.3552
E	.2648	.9041	1.0959	.3973	.0479	0	2.7100
ESE	.1397	.5616	.5616	.1233	.0205	0	1.4068
SE	.1684	.3973	.3493	.1644	.0274	.0068	1.1136
SSE	.1610	.5479	.5205	.4932	.0342	0	1.7568
S	.4506	1.5479	1.8288	1.2945	.1027	.0068	5.2314
SSW	.2837	1.2397	2.7123	1.4658	.0685	.0068	5.7768
SW	.2740	1.2192	3.3082	2.8699	.1507	.0205	7.8425
WSW	.3542	1.1164	1.2945	1.2192	.1164	.0205	4.1213
W	.2210	.9178	.7808	.8562	.1514	.0274	2.9607
WNW	.1836	.5479	1.0753	1.7740	.2949	.0411	3.9165
NW	.1995	.7055	1.8767	2.5822	.2123	.0205	5.5968
NNW	.2344	.6027	1.4589	1.5068	.0616	0	3.8645
Total	4.3082	14.9452	21.3288	16.5342	1.3630	.1644	

Relative frequency occurrence of D Stability = 58.6438
Relative frequency of calms distributed with D Stability = 1.7671

Ref. 2.3-4

TABLE 2.3-84

JOINT FREQUENCY (%) OF WIND

DIRECTION, WIND SPEED AND STABILITY FOR AVOCA

(Period of Record: 1971-1975)

Stability Class E

Wind Speed (kts)

Sector	0-3	4-6	7-10	11-16	17-21	>21	Total
N	0	.3904	.4521	0	0	0	.8425
NNE	0	.2329	.781	0	0	0	.4110
NE	0	.2534	.0479	0	0	0	.3014
ENE	0	.6574	.2945	0	0	0	.9521
E	0	.7055	.6849	0	0	0	1.3904
ESE	0	.3836	.6918	0	0	0	1.0753
SE	0	.2603	.1096	0	0	0	.3699
SSE	0	.4726	.1096	0	0	0	.5822
S	0	1.0753	.5685	0	0	0	1.6438
SSW	0	.6906	.6507	0	0	0	1.2603
SW	0	.3973	.8288	0	0	0	1.2260
WSW	0	.3836	.3014	0	0	0	.6849
W	0	.2123	.2534	0	0	0	.4658
WNW	0	.1575	.3151	0	0	0	.4726
NW	0	.2740	.5137	0	0	0	.7877
NNW	0	.2055	.4178	0	0	0	.6233
Total	0	6.6712	6.4178	0	0	0	

Relative frequency of occurrence of E Stability = 13.0890
Relative frequency of calms distributed with E Stability = 0

Ref. 2.3-4

TABLE 2.3-85

JOINT FREQUENCY (%) OF WIND

DIRECTION, WIND SPEED AND STABILITY FOR AVOCA

(Period of Record: 1971-1975)

Stability Class F

Wind Speed (kts)

Sector	0-3	4-6	7-10	11-16	17-21	>21	Total
N	.0986	.4247	0	0	0	0	.5232
NNE	.0335	.2466	0	0	0	0	.2800
NE	.0813	.2945	0	0	0	0	.3758
ENE	.2463	1.1096	0	0	0	0	1.3559
E	.2782	1.3356	0	0	0	0	1.6139
ESE	.1387	.8562	0	0	0	0	.9948
SE	.1323	.3836	0	0	0	0	.5158
SSE	.1647	.6164	0	0	0	0	.7811
S	.2420	1.2466	0	0	0	0	1.4886
SSW	.1241	.6644	0	0	0	0	.7885
SW	.0875	.4726	0	0	0	0	.5601
WSW	.1028	.3836	0	0	0	0	.4864
W	.0809	.1918	0	0	0	0	.2727
WNW	.0440	.1918	0	0	0	0	.2358
NW	.0581	.3767	0	0	0	0	.4348
NNW	.0939	.3630	0	0	0	0	.4569
Total	2.0068	9.1575	0	0	0	0	

Relative frequency of occurrence of F Stability = 11.1644
Relative frequency of calms distributed with F Stability = .7877

Ref. 2.3-4

TABLE 2.3-86

JOINT FREQUENCY (%) OF WIND

DIRECTION, WIND SPEED AND STABILITY FOR AVOCA

(Period of Record: 1971-1975)

Stability Class G

Wind Speed (kts)

Sector	0-3	4-6	7-10	11-16	17-21	>21	Total
N	.0976	0	0	0	0	0	.0976
NNE	.0366	0	0	0	0	0	.0366
NE	.1464	0	0	0	0	0	.1464
ENE	.3416	0	0	0	0	0	.3416
E	.6467	0	0	0	0	0	.6467
ESE	.2684	0	0	0	0	0	.2884
SE	.1342	0	0	0	0	0	.1342
SSE	.2562	0	0	0	0	0	.2562
S	.3782	0	0	0	0	0	.3782
SSW	.1586	0	0	0	0	0	.1586
SW	.0732	0	0	0	0	0	.0732
WSW	.1342	0	0	0	0	0	.1342
W	.0732	0	0	0	0	0	.0732
WNW	.0732	0	0	0	0	0	.0732
NW	.0732	0	0	0	0	0	.0732
NWN	.1220	0	0	0	0	0	.1220
Total	3.0137	0	0	0	0	0	

Relative frequency of occurrence of G Stability = 3.0137
Relative frequency of calms distributed with G Stability = 1.3219

Ref. 2.3-4

TABLE 2.3-87

JOINT FREQUENCY (%) OF WIND

DIRECTION, WIND SPEED AND STABILITY FOR AVOCA

(Period of Record: 1971-1975)

All Stability Classes

Wind Speed (kts)

Sector	0-3	4-6	7-10	11-16	17-21	>21	Total
N	.8291	2.5479	2.4726	.7945	.0137	0	6.6579
NNE	.5271	1.5616	1.3493	.2055	.0068	0	3.6504
NE	.6243	1.8151	1.0479	.3699	.0205	0	3.8778
ENE	1.2294	3.5274	1.3630	.4726	.0274	.0137	6.6335
E	1.2417	3.0959	1.9384	.4041	.0479	0	6.7280
ESE	.5947	1.8904	1.2945	.1233	.0205	0	3.9235
SE	.5050	1.0959	.5137	.1644	.0274	.0068	2.3132
SSE	.6638	1.6918	.6840	.5000	.0342	0	3.5747
S	1.3470	4.0959	2.5959	1.3699	.1092	.0068	9.5251
SSW	.7359	2.8699	3.9589	1.5753	.0685	.0068	9.2153
SW	.6186	2.5068	5.0753	3.0205	.1644	.0205	11.4063
WSW	.8230	2.5616	2.4247	1.3219	.1164	.0205	7.2682
W	.6589	1.9863	1.5274	.8904	.1574	.0274	5.2480
WNW	.5098	1.2740	1.8562	1.8699	.2945	.0411	5.8455
NW	.5091	1.7397	2.8630	2.6712	.2192	.0205	8.0228
NNW	.5551	1.4726	2.3973	1.6164	.0685	0	6.1099
Total	11.9726	35.7328	33.3630	17.3699	1.3973	.1644	

Relative frequency of occurrence of observations = 100
Relative frequency of calms distributed above = 4.8425

Ref. 2.3-4

TABLE 2.3-88

REGIONAL MIXING HEIGHTS

(in meters)

	Season			
Time	Spring	Summer	Autumn	Winter
4 AM-9 PM	706	510	562	774
4 PM-9 PM	1750	1816	1306	979
Other Times	1228	1163	934	877

Ref. 2.3-12

TABLE 2.3-89

MEAN MONTHLY WIND SPEED, DRY-BULB AND WET-BULB TEMPERATURE VALUES FOR HARRISBURG, PENNSYLVANIA

(Period of Record: 1973-1976)

	Wind Speed (MPS)	Dry Bulb (C)	Wet Bulb (C)
January	3.2	.9	-1.1
February	3.5	.0	-2.2
March	3.8	5.3	2.6
April	4.1	10.9	7.1
May	3.1	16.5	13.0
June	2.7	21.8	18.2
July	2.7	24.5	20.0
August	2.3	24.3	20.4
September	2.8	18.3	15.4
October	2.7	12.8	9.9
November	3.4	8.3	5.5
December	3.5	1.9	- .1
Annual	3.1	12.2	9.1

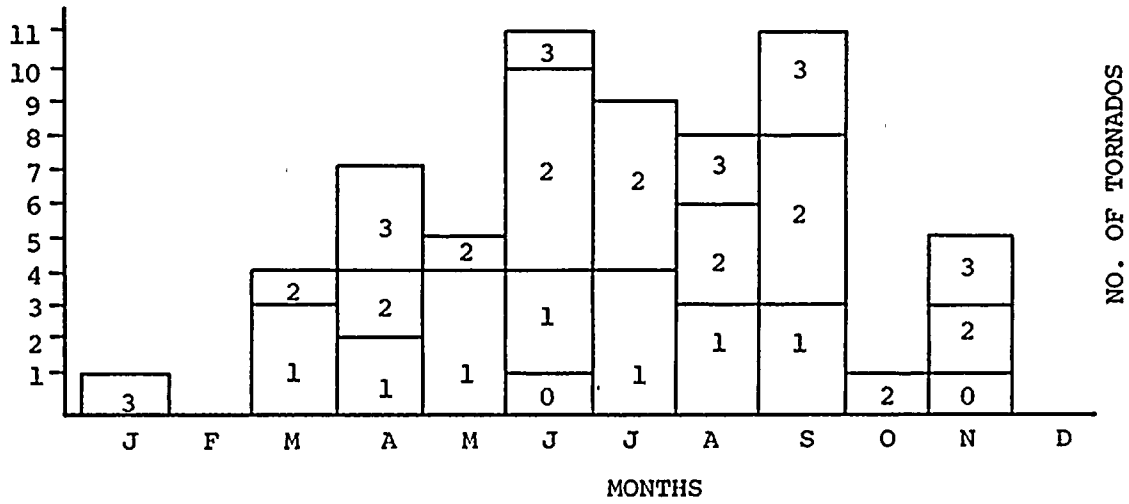
Ref. 2.3-16

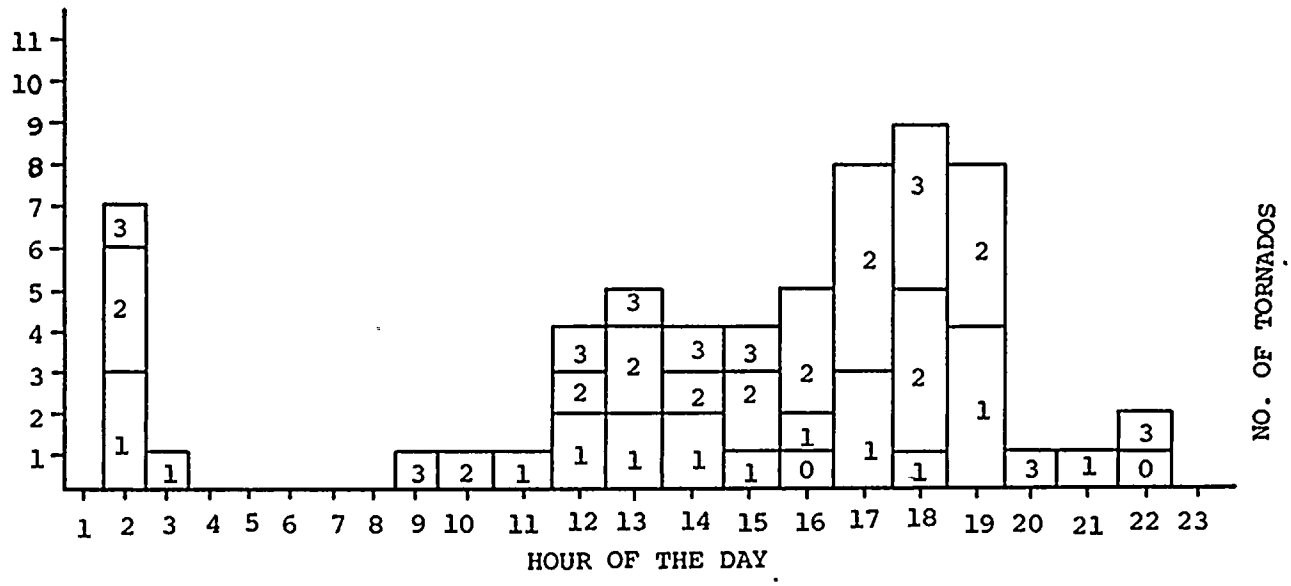
TABLE 2.3-90

MEAN MONTHLY WIND SPEED, DRY-BULB AND WET-BULB

TEMPERATURE VALUES FOR THE SUSQUEHANNA SES (1973-1976)

	Wind Speed (m/sec)	Dry Bulb (C)	Wet Bulb (C)
January	2.3	-2.1	-3.6
February	2.0	-1.4	-3.4
March	2.7	3.6	1.1
April	2.8	8.8	5.2
May	2.0	13.8	10.6
June	1.7	18.8	16.1
July	1.5	20.3	17.7
August	1.4	20.0	17.7
September	1.6	15.0	12.9
October	1.9	9.9	7.6
November	2.1	4.9	2.6
December	2.1	-0.9	-2.6
Annual	2.0	9.3	6.9





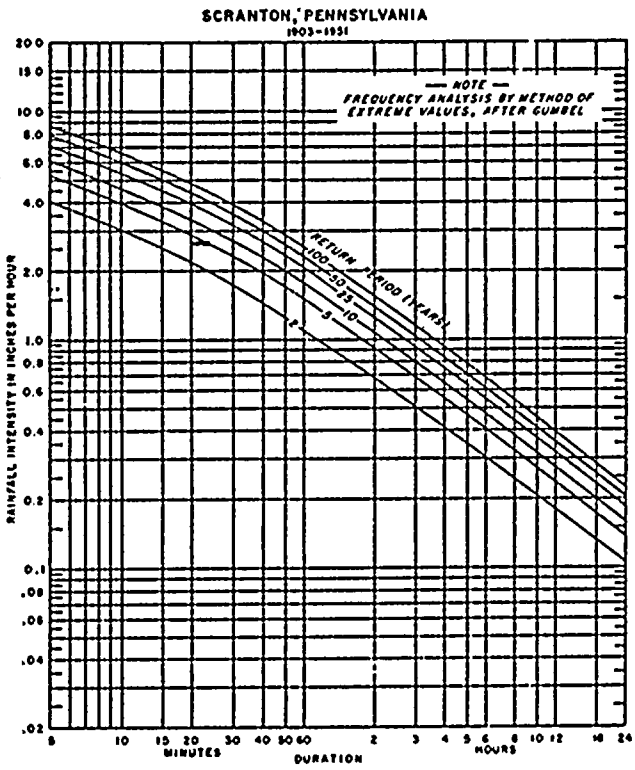
Fugita Intensity Classification

F-Scale	Wind Speed (MPH)	Description
0	40-75	Very Weak Tornado (light damage)
1	73-112	Weak Tornado
2	113-154	Strong Tornado
3	155-206	Severe Tornado
4	207-260	Devastating Tornado
5	261-318	Incredible Tornado
6	319 and higher	Inconceivable Tornado

SUSQUEHANNA STEAM ELECTRIC STATION
ER-OPERATING LICENSE STAGE
UNITS 1 AND 2

TORNADO OCCURENCE AND INTENSITY IN THE SUSQUEHANNA SES REGION.

FIGURE 2.3-1



SUSQUEHANNA STEAM ELECTRIC STATION
ER–OPERATING LICENSE STAGE
UNITS 1 AND 2

RAINFALL INTENSITY–DURATION FREQUENCY CURVES USDC WB, 1955

FIGURE 2.3-2