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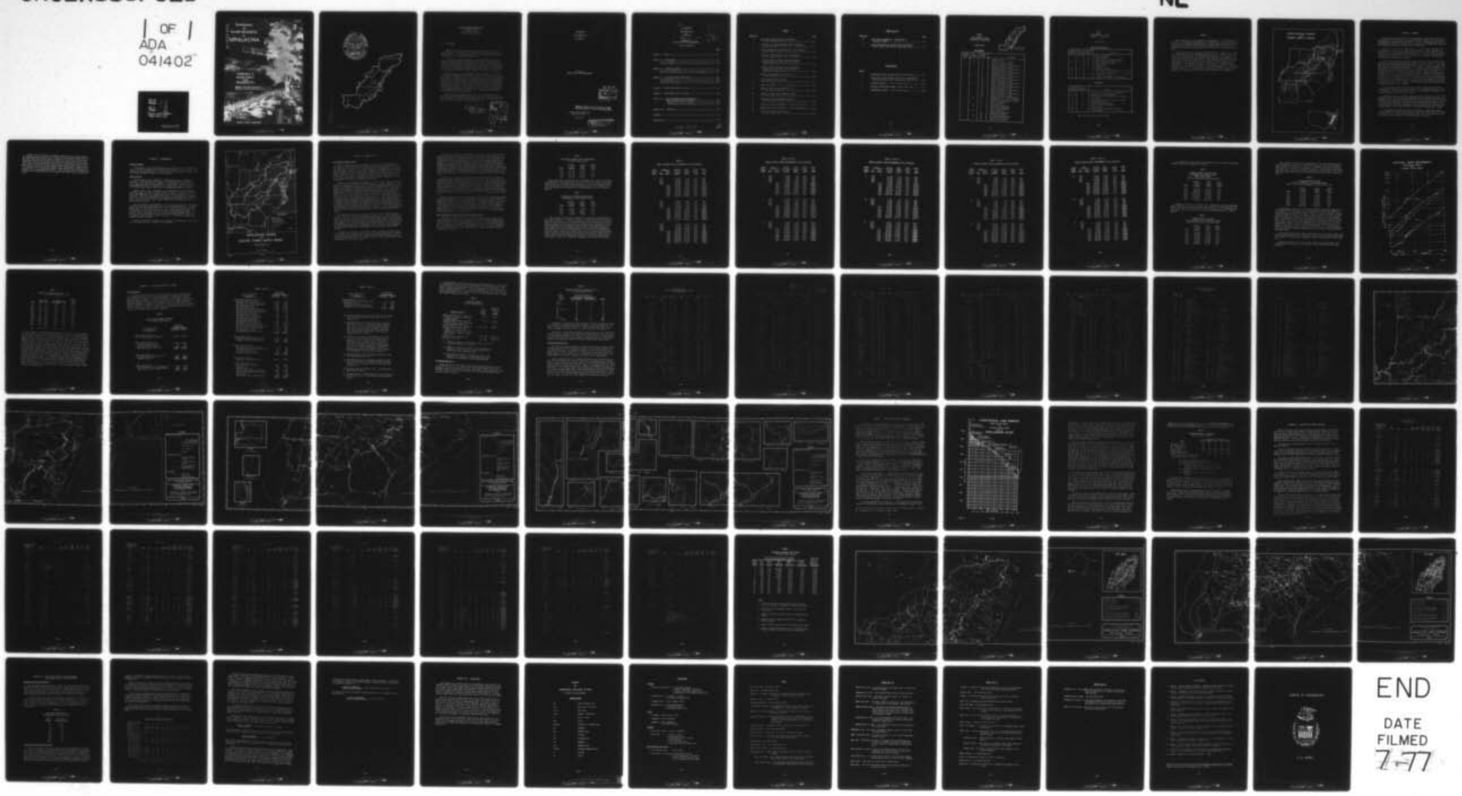

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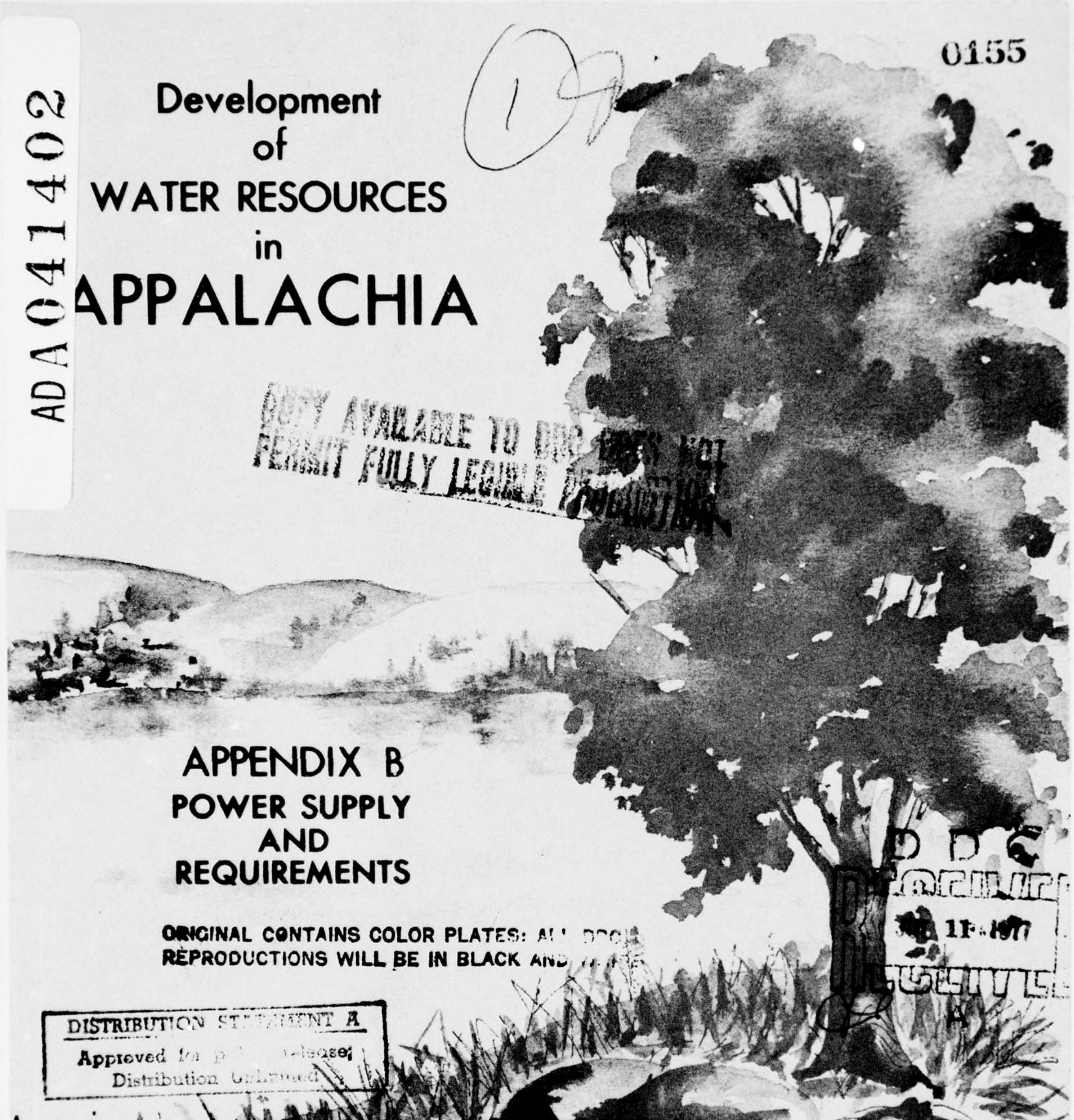

APPENDIX B
POWER SUPPLY AND REQUIREMENTS

FEDERAL POWER COMMISSION

FEDERAL POWER COMMISSION

FEDERAL POWER COMMISSION
REGIONAL OFFICE
730 Peachtree Building
Atlanta, Georgia 30308

TO: THE READER

Appendix "B" entitled "Power Supply and Requirements" is one of nine appendices to the "Report for Development of Water Resources in Appalachia." It furnishes information on the electric power industry in and adjacent to the Appalachian region.

The electric power requirements of the Appalachian region were about 23 million kilowatts of load and 128 billion kilowatt-hours of energy in 1965 and they are estimated to be about 32 million kilowatts of load and 177 billion kilowatt-hours of energy in 1970. Requirements for 2000 are estimated to be about 164 billion kilowatts of load and 930 billion kilowatt-hours of energy which represent increases of more than 500 percent in both load and energy over the 1970 requirements.

About 11 percent of the electric supply available for use in 1970 will be from hydroelectric developments and 89 percent from fuel-electric plants. A large part of the peak portions of the load is from hydroelectric facilities, and it is expected that pumped-storage projects will constitute a major part of the future hydroelectric developments. Nearly all of the lower or base portions of the load are furnished by fuel-electric plants, and most of the tremendous amounts of new supply needed for future years will continue to be from fossil- and nuclear-fired generating plants. Both water and fuel are sufficiently abundant in the Appalachian region to support the much larger power supplies needed to meet future requirements.

Water resource developments for all uses are summarized in the main report which should be consulted for an over-all view of the Appalachian region. An index for the report components and appendices is shown on pages iv and iv-a of ~~this~~ appendix.

Robert C. Price
Regional Engineer

DEVELOPMENT
OF
WATER RESOURCES
IN
APPALACHIA

APPENDIX B
POWER SUPPLY AND REQUIREMENTS

FEDERAL POWER COMMISSION
BUREAU OF POWER

June 1968

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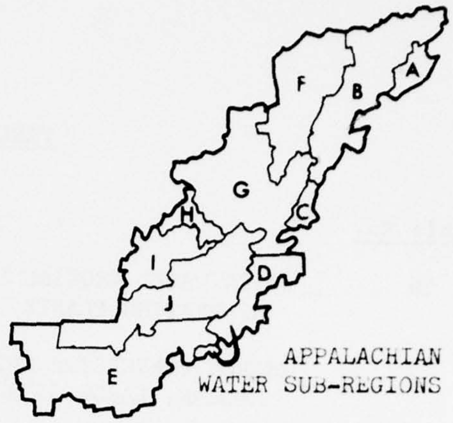

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REPORT
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DEVELOPMENT FOR WATER
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17	B	Power Supply and Requirements
18	C	Prevention of Water Pollution by Drainage from Mines
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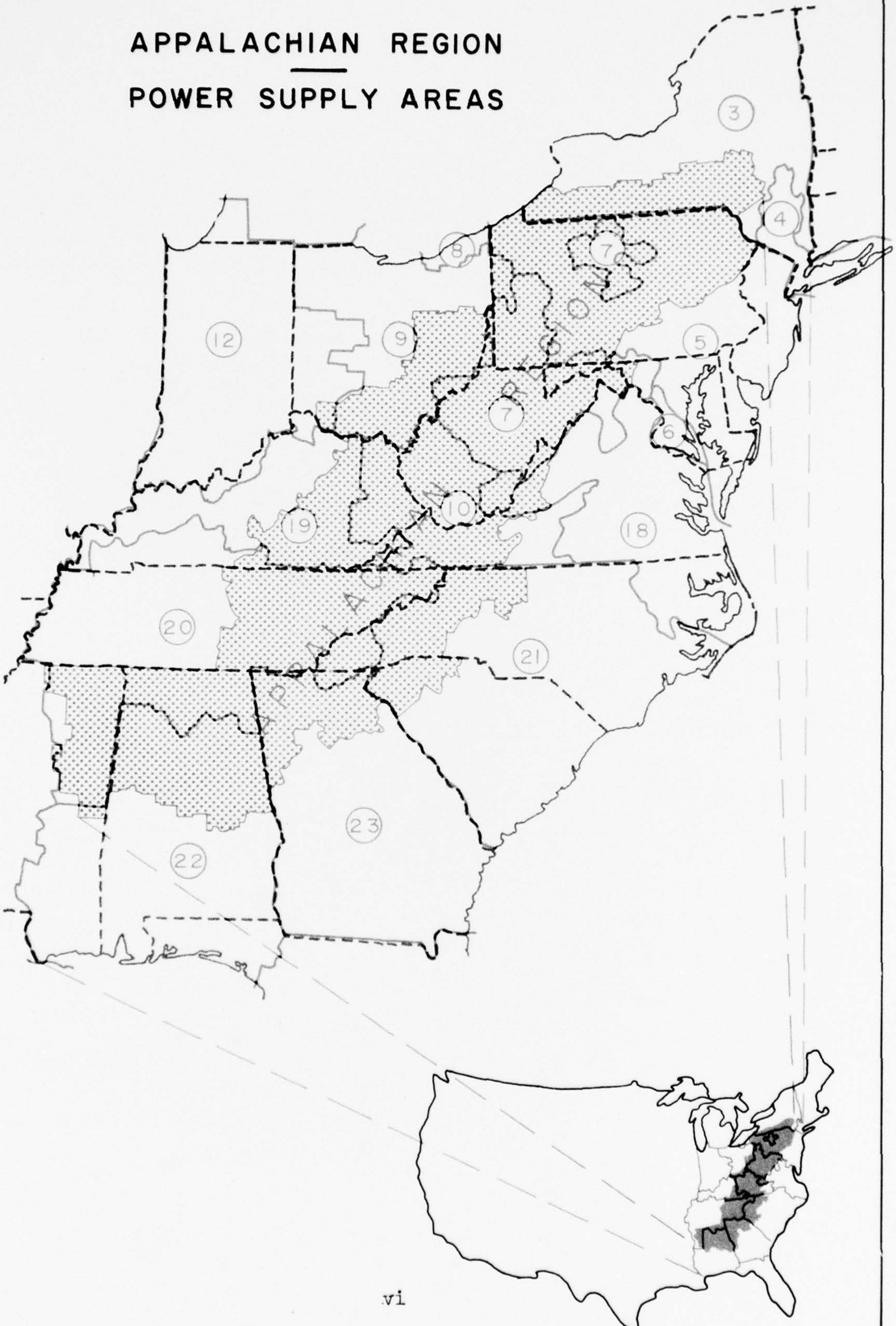
PREFACE

This Appendix B on Power Supply and Requirements is a supplement to the Report on Development of Water Resources in Appalachia. It was prepared by the staff of the Atlanta Regional Office with assistance and contributions of information and material furnished by other Bureau of Power offices of the Federal Power Commission having territorial jurisdiction in the Appalachian area.

The Appendix furnishes general information on the electric power industry in and adjacent to the Appalachian Region, and it presents estimates of future power requirements and other data which may be used for guidance in selecting resource projects for further study and future development. Some of the projects may be chiefly electric power oriented, and others may only have electric power associated with their other purposes. Some would be hydroelectric developments with either conventional or pumped-storage installations, or a combination of both. Others may be needed for condensing water requirements for large thermal-electric installations. The data in the Appendix should aid in reaching a proper judgment concerning electric power matters and in selecting the proper resource projects for development.

APPALACHIAN REGION

POWER SUPPLY AREAS



CHAPTER I - SUMMARY

Electric power requirements for the Appalachian region were estimated by proportioning to the region, on a population and area basis, electric power requirements for a larger area consisting of 15 power supply areas within which the Appalachian region is located. The locations of the Appalachian region and the 15 power supply areas are shown on the facing page.

The electric power requirements for the 15 power supply areas were about 86 million kilowatts and 489 billion kilowatt-hours in 1965. Estimated requirements for the Appalachian region for the same year were about 23 million kilowatts of demand and 128 billion kilowatt-hours of energy. For the larger area the requirements in 1967 were about 91 million kilowatts of demand and 549 billion kilowatt-hours of energy.

Future requirements to about 1980, under normally expected growth conditions, are expected to double about every 11 to 12 years. From 1980 to about year 2000 the requirements will double about every 14 to 16 years. After year 2000 they are expected to double about every 17 years. Under the goals of the Appalachian "developmental benchmarks," the requirements after 1980 may be expected to double about every 13 to 14 years. Under either the normal or "developmental benchmarks" growth rate, future electric power requirements are enormous and impose a formidable demand for large increases in electric power supply. The estimated total requirements in 1980 for the 15 power supply areas are about 234 million kilowatts of demand and 1,310 billion kilowatt-hours of energy. For the Appalachian region in 1980 they are estimated to be about 60 million kilowatts and 338 billion kilowatt-hours under normal growth conditions and about 61 million kilowatts and 340 billion kilowatt-hours under "developmental benchmarks" conditions.

The supply for electric power in the 15 power supply areas for 1970 is estimated to be about 145 million kilowatts. It is composed of about 16 million kilowatts of hydroelectric power and about 129 million kilowatts of fossil and nuclear fuel-fired electric power.

Supply for reserve is needed in addition to that required for load. When nominal reserves of 15 percent are considered, the 1980 additional supply for load above that available from the 1970 supply will amount to about 124 million kilowatts of new capacity. About 99 million kilowatts of this may be classed as a high load factor supply normally of the type furnished by fossil- or nuclear-fired plants and the remaining 25 million kilowatts as a low load factor supply normally of the type which may be furnished by hydroelectric plants.

The Appalachian region has a good and extensive transmission network. During recent years numerous high-voltage transmission lines capable of carrying large blocks of power have been constructed. Only a few small areas are not within a short distance of an adequate source of supply.

A factor which could tend to increase further the future power supply in the Appalachian region would be the location of large supply sources within the region from which power would be transported to and used in other areas. These supply sources may include both fuel-fired electric and hydroelectric facilities. With sufficient water available for condensing and other needed uses, the fuel-fired facilities could be large and near their source of fuel. Hydroelectric facilities could be obtained from conventional, pumped-storage, or a combination of conventional-pumped storage developments at numerous favorable sites in the Appalachian region. Water and fuel both are sufficiently abundant in the Appalachian region to support much larger electric power supplies.

CHAPTER II - INTRODUCTION

Purpose of Study

This Appendix provides information on the electric power requirements and supply for the Appalachian region, which was prepared for use in resource planning and development analyses. A study was made to analyze and evaluate both the present and future electric power situations.

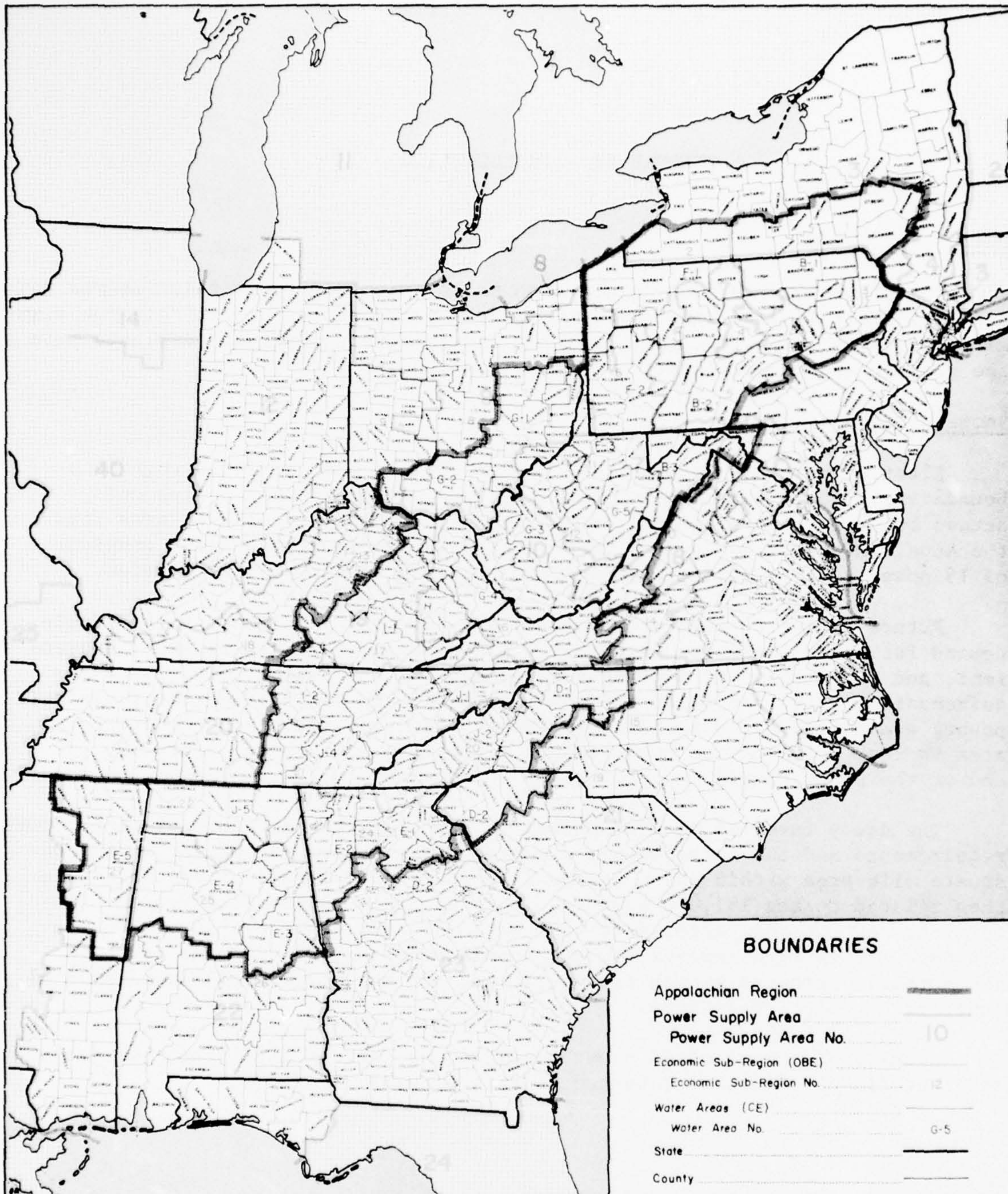
Scope of Study

Electric power is not confined to established political or geographic boundaries. The electric power supply in the eastern United States cuts across both state and regional boundaries. Accordingly, a larger area than the Appalachian region was included in the study. The larger area consists of 15 power supply areas within which the Appalachian region is located.

Future electric power requirements are enormous and impose a formidable demand for large increases in supply. Electric power is a desirable, convenient, and clean means of meeting a large part of the future total power requirements. Water and fuel, primary ingredients in the production of electric power, are sufficiently abundant in the Appalachian region and the contiguous area to meet the electric power supply requirements to beyond year 2020, the end of the study period.

The study involved determinations of the present and future electric power requirements and the accompanying electric power supply needed for a 562,000-square mile area within the selected 15 power supply areas. These data were then related to the 195,000-square mile area in the Appalachian region. Determinations for the larger area were based on normally expected growth conditions. Power requirements for the Appalachian region were made for both the normally expected growth conditions and for the stimulated "developmental benchmark" growth conditions.

Results of the electric power supply study for the Appalachian region and other pertinent data are presented in this Appendix.



APPALACHIAN REGION
AND
ELECTRIC POWER SUPPLY AREAS
ALSO
ECONOMIC SUB-REGIONS (OBE)
WATER AREAS (CE)

SCALE IN MILES
0 100 200 300

Figure 1

CHAPTER III - MARKET FOR POWER

Description of Market Area

Power Supply Areas were established by the Federal Power Commission in 1934 when it divided the Continental United States into 48 areas. The division was made to comply with the requirements of the Federal Power Act to divide the country into areas which can be served most economically, to conserve natural resources, and to encourage the voluntary interconnection and coordination of facilities for the generation, transmission, and sale of electric power. Each of the power supply areas is more or less self-contained as to its electric requirements and supply, and the geographic bounds have remained substantially as they were originally established.

Outlines of the Appalachian region and the 15 selected power supply areas located in the eastern part of the United States are shown on Figure 1. Also shown, for comparative purposes, are 27 economic subregions and 10 water areas selected for study of the Appalachian region by the Office of Business Economics and the Corps of Engineers, respectively. Twelve of the 15 selected power supply areas are partially within the Appalachian region. They are Areas 3, 5, 7, 9, 10, 12, 18, 19, 20, 21, 22, and 23. Areas 7 and 10 are nearly all within the Appalachian region, while only a small part of Area 12 is in the region. The other areas in the group of 12 range between these two extremes as to the part within the Appalachian region. The remaining three areas which must be considered in any power supply and requirements study of Appalachia are contiguous to the Appalachian region. They are Areas 4, 6, and 8. These 15 areas represent the composite area within which the electrical requirements of the Appalachian region may be supplied. The supply might come from interconnected and coordinated systems within or outside the Appalachian region or from a combination of facilities located within and outside the region.

The Appalachian region is within 12 of the 15 power supply areas mentioned, except for two very small segments in Mississippi. Small portions of two of 20 counties, that were added to the Appalachian region by Act of Congress late in 1967, extend partially into Power Supply Area 25. No data have been prepared for this area for use in the Appalachian study because there are no significant power loads in these small county segments. It is considered that the data prepared for the Appalachian study, included in this Appendix, are sufficient for any power requirements and supply studies which may be needed.

Estimates of population and available data on economic activities were the principal data used to establish potential normal growth electric markets and electric power requirements. Using these data and following usual procedures of estimating power requirements provide results which normally might be expected to occur in the future.

In order to establish a relationship between the electric power requirements of the 15 power supply areas and the Appalachian region, population estimates for past and subsequent years for the 15 power supply areas and area determination were used and compared with past and subsequent population estimates for corresponding years and the area within the Appalachian region. Population estimates for the Appalachian region were prepared by the Office of Business Economics. The resulting related estimates of electric power requirements are considered to represent normal growth conditions. These normal growth estimates for the Appalachian region have been accelerated by the use of factors and multipliers furnished by the Office of Appalachian Studies to obtain results comparable to the "developmental benchmarks" used in other activities.

Much of the mountainous area of the eastern United States is within the Appalachian region. The source of many of the streams that empty waters into both the Atlantic Ocean and the Gulf of Mexico is in the Appalachian region. The mountainous terrain and available water provide a tremendous potential for pumped storage and some remaining potential for conventional or combined conventional-pumped storage hydroelectric developments. Many of the potential hydroelectric sites, undoubtedly, will be developed as rapidly as their power can be used to satisfy a part of the total supply spectrum, provided they can be constructed and operated as economically as other comparable sources of supply.

Fossil fuels of the type burned mostly in steam-electric generating plants are found throughout most of the Appalachian region. These fuels, which are predominantly coal, are most often shipped to surrounding areas for use in producing electric power. It is possible that in lieu of shipping the fuel to other areas, large fossil fuel burning generating plants might be located in the Appalachian region and the power produced by these plants delivered by high-voltage electric transmission circuits to outlying areas. Such "mine-mouth" generation, however, faces competition from nuclear fueled generating plants located closer to load centers.

Past and Estimated Future Electric Power Requirements

During the 15 years from 1950 to 1965 the total electric energy requirements for load nearly tripled in quantity in both the 15 power supply areas shown on Figure 1 and the Appalachian region, and the demand increased about 2.75 times in size. The annual peak during this period occurred in December. The past annual electric power requirements of utilities in the 15 power supply areas and load factors are summarized by five-year intervals from 1950 through 1965 in Table 1.

TABLE 1

PAST ANNUAL ELECTRIC POWER REQUIREMENTS
(15 Power Supply Areas)

Year	Energy for Load (gwh)	Peak Demand (mw)	Load Factor (%)
1950	164,263	31,343	59.8
1955	276,754	49,952	63.2
1960	367,358	63,083	66.3
1965	488,525	86,062	64.6

Past annual power requirements for the Appalachian region were obtained by apportioning total requirements of the 15 power supply areas to the Appalachian region on a population and area basis. A ratio of two parts population and one part area was used in the apportionment. The resulting estimated past annual power requirements for the Appalachian region are shown in Table 2.

TABLE 2

ESTIMATED PAST ANNUAL ELECTRIC POWER
REQUIREMENTS IN APPALACHIAN REGION

Year	Energy for Load (gwh)	Peak Demand (mw)	Load Factor (%)
1950	45,336	8,651	59.8
1955	74,724	13,487	63.2
1960	96,982	16,264	66.3
1965	128,482	22,634	64.6

Data on power requirements for each of the selected 15 power supply areas, shown on Figure 1, are given in Table 3. Future electric power requirements are estimated at five-year intervals from 1970 through 1990, and thereafter for years 2000 and 2020. The estimates through 1990 represent results obtained through close coordination with estimates and projections of important elements such as population, housing, income, appliance, saturation, commercial activities, and manufacturing, which influence substantially or relate closely to the use of electric power. They are also in substantial agreement with estimates made by major utilities to the Federal Power Commission in connection with updating the National Power Survey. Beyond 1990 the results are obtained from projections of curves. The future power requirements shown in Table 3 are based upon normally expected growth conditions.

TABLE 3

ANNUAL ELECTRIC POWER REQUIREMENTS OF ALL UTILITIES

Power Supply Area	Year Past	Year Estimated	Energy for Load (gwh)	Peak Demand (mw)	Load Factor (%)	Month of Peak
3	1950		17,291	2,793	70.7	Dec.
	1955		23,085	3,987	66.1	Dec.
	1960		27,304	4,581	67.9	Dec.
	1965		36,080	6,043	68.2	Dec.
		1970	46,100	7,730	68.1	Winter
		1975	58,700	9,850	68.0	Winter
		1980	74,900	12,600	67.9	Winter
		1985	95,700	16,150	67.6	Winter
		1990	122,200	20,650	67.6	Winter
		2000	199,000	33,600	67.6	Winter
		2020	527,000	89,000	67.6	Winter
4	1950		15,491	3,531	50.1	Dec.
	1955		20,827	4,549	52.3	Dec.
	1960		27,411	5,540	56.5	Aug.
	1965		36,830	7,538	55.8	June
		1970	48,700	9,930	56.0	Summer
		1975	64,400	12,900	57.0	Summer
		1980	85,100	16,700	58.2	Summer
		1985	111,700	21,800	58.5	Summer
		1990	147,200	28,600	58.8	Summer
		2000	251,000	48,600	59.0	Summer
		2020	715,000	137,000	59.6	Summer
5	1950		31,743	6,173	58.7	Dec.
	1955		44,057	8,719	57.7	Dec.
	1960		57,937	10,808	61.0	Aug.
	1965		81,041	14,615	63.3	Aug.
		1970	116,640	21,070	63.2	Summer
		1975	163,030	29,370	63.4	Summer
		1980	218,770	39,270	63.6	Summer
		1985	292,920	52,410	63.8	Summer
		1990	388,380	69,280	64.0	Summer
		2000	680,000	121,100	64.1	Summer
		2020	2,040,000	362,200	64.3	Summer

TABLE 3 (Cont'd)

ANNUAL ELECTRIC POWER REQUIREMENTS OF ALL UTILITIES

Power Supply Area	Year Past	Year Estimated	Energy for Load (gwh)	Peak Demand (mw)	Load Factor (%)	Month of Peak
6	1950		2,365	488	55.3	July
	1955		3,484	768	51.8	Aug.
	1960		5,079	1,196	48.5	Aug.
	1965		8,002	1,874	48.7	Aug.
		1970	12,740	3,050	47.7	Summer
		1975	18,280	4,340	48.1	Summer
		1980	25,490	6,000	48.5	Summer
		1985	34,780	8,120	48.9	Summer
		1990	47,120	10,910	49.3	Summer
		2000	84,500	19,400	49.7	Summer
		2020	261,000	58,800	50.7	Summer
7	1950		10,678	1,938	62.9	Dec.
	1955		14,507	2,558	64.7	Dec.
	1960		17,544	2,994	66.7	Jan.
	1965		23,885	3,948	69.1	Dec.
		1970	31,100	5,140	69.1	Winter
		1975	40,400	6,660	69.2	Winter
		1980	52,600	8,640	69.3	Winter
		1985	68,400	11,250	69.4	Winter
		1990	88,900	14,600	69.5	Winter
		2000	150,000	24,600	69.6	Winter
		2020	420,000	69,800	69.7	Winter
8	1950		4,778	929	58.6	Dec.
	1955		6,978	1,333	59.8	Dec.
	1960		8,574	1,590	61.6	Sept.
	1965		11,574	2,002	66.0	Sept.
		1970	15,400	2,590	68.0	Summer
		1975	20,530	3,450	68.0	Summer
		1980	27,350	4,590	68.0	Summer
		1985	36,400	6,110	68.0	Summer
		1990	48,500	8,140	68.0	Summer
		2000	85,500	14,350	68.0	Summer
		2020	260,000	43,600	68.1	Summer

TABLE 3 (Cont'd)

ANNUAL ELECTRIC POWER REQUIREMENTS OF ALL UTILITIES

Power Supply Area	Year Past	Year Estimated	Energy for Load (gwh)	Peak Demand (mw)	Load Factor (%)	Month of Peak
9	1950		13,944	2,543	62.6	Dec.
	1955		31,873	5,715	63.7	Nov.
	1960		46,949	6,839	78.2	Jan.
	1965		51,753	7,828	75.4	Dec.
		1970	63,600	10,250	70.8	Winter
		1975	96,480	15,110	72.9	Winter
		1980	131,110	20,570	72.8	Winter
		1985	172,610	27,330	72.1	Winter
		1990	230,010	36,660	71.6	Winter
		2000	414,210	66,600	71.0	Winter
		2020	1,390,210	225,800	70.3	Winter
10	1950		5,302	931	64.9	Dec.
	1955		8,376	1,341	71.3	Aug.
	1960		9,916	1,643	68.7	Dec.
	1965		13,770	2,273	69.1	Dec.
		1970	18,300	3,020	69.2	Winter
		1975	24,400	4,010	69.5	Winter
		1980	32,500	5,310	69.9	Winter
		1985	43,300	7,080	69.8	Winter
		1990	57,700	9,410	70.0	Winter
		2000	101,000	16,450	70.1	Winter
		2020	302,000	49,200	70.1	Winter
12	1950		16,246	3,233	57.4	Dec.
	1955		24,705	4,653	60.6	Dec.
	1960		32,613	5,878	63.3	Dec.
	1965		45,640	8,149	64.0	Aug.
		1970	63,120	11,500	62.6	Summer
		1975	88,900	16,000	63.5	Summer
		1980	123,000	22,000	63.9	Summer
		1985	169,000	30,000	64.3	Summer
		1990	233,200	41,400	64.4	Summer
		2000	373,100	66,000	64.5	Summer
		2020	730,400	128,700	64.8	Summer

TABLE 3 (Cont'd)

ANNUAL ELECTRIC POWER REQUIREMENTS OF ALL UTILITIES

Power Supply Area	Year Past	Year Estimated	Energy for Load (gwh)	Peak Demand (mw)	Load Factor (%)	Month of Peak
18	1950		3,639	751	55.3	Dec.
	1955		5,938	1,171	57.9	Dec.
	1960		9,380	1,815	59.0	Aug.
	1965		14,994	2,923	58.6	Sept.
		1970	23,790	4,770	56.9	Summer
		1975	37,730	7,460	57.8	Summer
		1980	57,420	11,170	58.6	Summer
		1985	82,830	15,960	59.3	Summer
		1990	114,240	21,760	60.0	Summer
		2000	171,400	30,550	64.0	Summer
		2020	335,400	55,500	69.0	Summer
19	1950		1,426	318	51.2	Dec.
	1955		2,311	471	56.0	Dec.
	1960		3,362	672	57.0	Dec.
	1965		4,897	964	57.8	Aug.
		1970	8,770	1,770	56.6	Summer
		1975	13,080	2,470	60.5	Summer
		1980	18,080	3,470	59.5	Summer
		1985	27,080	5,280	58.5	Summer
		1990	38,080	7,490	58.0	Summer
		2000	57,000	10,950	59.4	Summer
		2020	111,400	20,800	61.2	Summer
20	1950		17,622	3,033	66.3	Dec.
	1955		53,207	8,314	73.1	Nov.
	1960		66,520	10,732	70.6	Dec.
	1965		77,378	12,804	69.0	Feb.
		1970	96,720	18,050	61.0	Winter
		1975	135,900	25,260	61.4	Winter
		1980	185,550	33,610	63.0	Winter
		1985	218,760	40,210	62.0	Winter
		1990	253,160	47,010	61.4	Winter
		2000	320,000	60,000	60.8	Winter
		2020	460,000	88,000	59.6	Winter

TABLE 3 (Cont'd)

ANNUAL ELECTRIC POWER REQUIREMENTS OF ALL UTILITIES

Power Supply Area	Year Past	Year Estimated	Energy for Load (gwh)	Peak Demand (mw)	Load Factor (%)	Month of Peak
21	1950		12,282	2,430	57.7	Dec.
	1955		19,560	3,597	62.1	Dec.
	1960		27,488	4,992	62.9	Dec.
	1965		41,374	7,322	64.3	Aug.
		1970	66,500	11,460	66.2	Summer
		1975	99,230	17,000	66.6	Summer
		1980	143,650	24,560	66.7	Summer
		1985	209,320	35,650	67.0	Summer
		1990	313,880	53,300	67.1	Summer
		2000	470,800	79,500	67.5	Summer
		2020	921,600	153,800	68.4	Summer
22	1950		5,663	1,081	59.8	Dec.
	1955		8,778	1,640	61.1	Aug.
	1960		13,458	2,548	60.3	July
	1965		20,391	3,896	59.6	Aug.
		1970	32,180	6,080	60.3	Summer
		1975	47,560	9,090	59.8	Summer
		1980	67,930	12,940	59.8	Summer
		1985	96,850	18,350	60.2	Summer
		1990	126,890	23,970	60.4	Summer
		2000	190,300	33,700	64.5	Summer
		2020	372,600	61,800	68.7	Summer
23	1950		5,790	1,186	55.7	Dec.
	1955		9,068	1,757	58.9	Aug.
	1960		13,822	2,638	59.8	Aug.
	1965		20,916	3,882	61.5	Aug.
		1970	33,890	6,320	61.2	Summer
		1975	44,880	8,300	61.6	Summer
		1980	66,150	12,190	62.0	Summer
		1985	96,120	17,670	62.0	Summer
		1990	137,790	25,260	62.3	Summer
		2000	206,700	36,850	64.0	Summer
		2020	404,600	70,000	66.0	Summer

The estimated projected power requirements for the 15 power supply areas shown in Table 3 are summarized in Table 4.

TABLE 4

ESTIMATED FUTURE ELECTRIC POWER
REQUIREMENTS OF UTILITIES IN 15
POWER SUPPLY AREAS
(Normally Expected Growth Conditions)

Year	Energy for Load (gwh)	Peak Demand (mw)	Load Factor (%)
1970	677,550	122,730	63.0
1975	953,550	171,270	63.5
1980	1,309,600	233,620	63.9
1985	1,755,770	315,370	63.6
1990	2,347,250	418,440	64.3
2000	3,754,510	662,250	64.6
2020	9,251,210	1,614,000	65.4

Estimates of the future electric power requirements for the Appalachian region under normal growth conditions were obtained by apportioning the data for the 15 power supply areas to the Appalachian region on a population and area basis. The apportioned values for the Appalachian region are shown in Table 5.

TABLE 5

ESTIMATED FUTURE ELECTRIC
POWER REQUIREMENTS IN APPALACHIAN REGION
(Normally Expected Growth Conditions)

Year	Energy for Load (gwh)	Peak Demand (mw)	Load Factor (%)
1970	177,000	32,000	63.0
1975	248,000	44,500	63.5
1980	337,500	60,200	63.9
1985	449,000	80,600	63.6
1990	597,000	106,100	64.3
2000	930,000	164,100	64.6
2020	2,220,000	388,000	65.4

The estimated electric power requirements for the Appalachian region under "developmental benchmarks" conditions are greater than the requirements under normally expected growth conditions. Following the pattern of an accelerated rate of increase in population under the "developmental benchmarks", the future power requirements become significantly greater after 1980. Estimates and projections under these accelerated growth conditions are shown in Table 6.

TABLE 6

ESTIMATED FUTURE ELECTRIC
POWER REQUIREMENTS IN APPALACHIAN REGION
(Under "Developmental Benchmarks" Growth Conditions)

Year	Energy for Load (gwh)	Peak Demand (mw)	Load Factor (%)
1970	177,000	32,000	63.0
1975	248,500	44,700	63.5
1980	340,000	60,700	63.9
1985	459,000	82,400	63.6
1990	615,000	109,600	64.0
2000	984,000	173,800	64.6
2020	2,460,000	430,000	65.4

No adjustments are made to the power requirement estimates presented in this report for the collective and the individual 15 power supply areas to compensate for the Appalachian region estimates and projections under "developmental benchmarks" growth conditions. Some adjustments may need to be made if part or all of the increased population and economic activities expected under "developmental benchmarks" are drawn from outside the 15 power supply areas. It is probable that part would come from outside and part from within the 15 power supply areas. Any adjustments in the totals for the 15 power supply areas, however, would be relatively small and would have very little effect on the results of this study. No adjustments will be needed in the totals if increased activities all come from within the 15 power supply areas, but there could be cases where adjustments would be needed among and between individual areas.

Past and estimated future power requirements for the 15 power supply areas under normally expected growth conditions, and for the Appalachian region under both normal and "developmental benchmarks" growth conditions are shown on Figure 2.

Monthly distributions in 1967 of peak loads, energy requirements, and load factors of the major suppliers in the 15 power supply areas are shown in Table 7.

ELECTRICAL POWER REQUIREMENTS

APPALACHIAN REGION
and
15 POWER SUPPLY AREAS

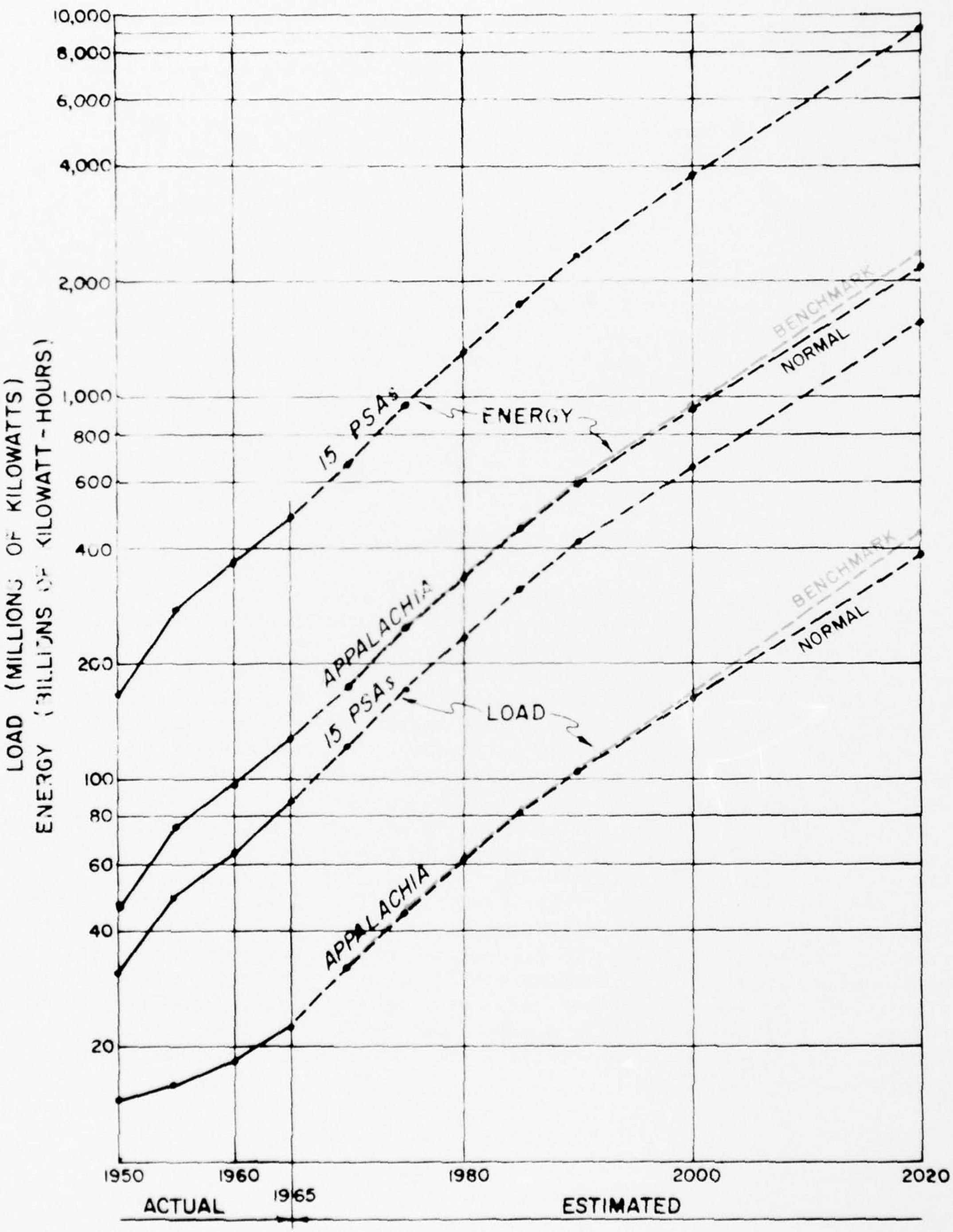


Figure 2

TABLE 7

MONTHLY DISTRIBUTION OF LOADS - 1967
(15 Power Supply Areas)

Time	Peak Load (gw)	Peak Load (%)	Energy (1000 gwh)	Energy (%)	Load Factor (%)
Jan.	85.9	94.7	47.4	8.6	74.2
Feb.	86.0	94.8	43.8	8.0	75.8
Mar.	82.0	90.4	45.6	8.3	74.8
Apr.	78.8	86.9	42.1	7.7	74.2
May	79.7	87.9	43.9	8.0	74.0
June	90.5	99.8	46.1	8.4	70.7
July	89.5	98.7	46.3	8.4	69.5
Aug.	89.4	98.6	48.2	8.8	72.5
Sept.	84.0	92.6	43.7	8.0	72.2
Oct.	82.7	91.2	45.8	8.3	74.5
Nov.	89.3	98.4	47.1	8.5	73.2
Dec.	90.7	100.0	49.3	9.0	73.0
Year	90.7	100.0	549.3	100.0	69.1

Peak loads in the Appalachian region and most of the 15 power supply areas have occurred, until recent years, during winter months. During the past 10 to 15 years annual peaks have occurred in some of the areas during summer months, and the frequency of occurrence of summer peaks continues to increase. Summer loads are increasing faster over previous summer loads than the corresponding increase of winter loads. The higher rate of increase of summer peaks is due chiefly to large increases in air-conditioning loads. The load factors of summer loads are also increasing faster than those of winter loads. This will eventually result in the summer loads requiring more energy per given load. This condition, together with the leveling of summer and winter peaks, results in higher annual load factors. However, if subsequent summer loads continue to increase at a faster rate than winter loads the result will be a gradually decreasing annual load factor. This condition of unbalanced summer and winter loads does not adapt to the best economical use of supply facilities and it increases operating problems. To prevent the summer loads from becoming unproportionally large, utility companies will probably promote heating and other winter loads to keep the winter peaks in line with the summer peaks. Load shapes and load factors of the summer loads, however, are expected to remain "fatter" and higher than the winter loads. Annual load factors shown in Table 4 reflect this condition.

CHAPTER IV - EXISTING ELECTRIC POWER SUPPLY

Utility Systems

There were 78 major electric suppliers in the 15 power supply areas in 1967. They furnished about 91 million kilowatts of demand and 549 billion kilowatt-hours of energy at an annual load factor of about 68.9 percent. These supplies accounted for most of the electric power needs of the region. The major suppliers, located by power supply areas, are shown in Table 8. Installed capacities available for supply are given as of December 31, 1967, and the capacities scheduled at that time to be available for service through 1970 are also shown. About 99 percent of the total electric power supply in 1970 will be furnished by these major suppliers.

TABLE 8

MAJOR ELECTRIC POWER SUPPLIERS
(15 Power Supply Areas)

Power Supply Area Supplier	Installed Capacity (mw) Dec. 1967	1970 1/
Power Supply Areas 3 & 4		
N. Y. Interconnected System 2/	18,016	21,702
Power Supply Areas 5 & 6		
P.J.M. Interconnection 3/	21,963	29,119
Vineland Municipal System	52	52
Safe Harbor Water Power Corp.	228	228
	22,243	29,399
Power Supply Area 7		
Allegheny Power System, Inc. 4/	2,646	4,222
Duquesne Light Co.	1,538	2,063
	4,184	6,285
Power Supply Area 8		
The Cleveland Elec. Illuminating Co.	2,146	2,771
Cleveland Division of Light & Power	138	223
	2,284	2,994

TABLE 8 (Cont'd)

Power Supply Area Supplier	Installed Capacity (mw) Dec. 1967	 1970 1/
Power Supply Areas 9, 10, & 12		
Columbus Municipal Plant	58	58
Columbus & Sou. Ohio Electric Co.	1,045	1,103
Ohio Edison Co. & Penn. Pwr. Co.	3,089	3,712
The Toledo Edison Co.	835	1,072
Ohio Valley Electric Corp.	2,390	2,390
American Electric Power System 5/	9,351	11,566
Danville Water, Gas and Elec. Dept.	39	39
Anderson Municipal Plant	19	19
Cincinnati Gas & Electric Co.	1,619	2,674
The Dayton Power & Light Co.	872	929
Fort Wayne Municipal Works	48	48
Hamilton Municipal Plant	97	97
Indianapolis Power & Light Co.	1,101	1,522
Louisville Gas & Electric Co.	1,258	1,603
Northern Indiana Public Service Co.	871	1,467
Pub. Serv. Co. of Indiana, Inc.	1,713	2,634
Richmond Power & Light	60	60
So. Indiana Gas & Electric Co.	289	589
	24,754	31,582
Power Supply Area 18		
Southeastern Power Administration	218	218
Virginia Electric and Power Co.	4,272	5,171
	4,490	5,389
Power Supply Area 19		
Big River Electric Cooperative	96	416
East Kentucky Rural Elec. Coop. Corp.	300	500
Kentucky Utilities Co.	762	762
Owensboro Municipal System	203	203
	1,361	1,881
Power Supply Area 20		
Tennessee Valley Authority 6/	18,095	20,539
Power Supply Area 21		
Carolina Power & Light Co.	2,258	2,972
Duke Power Co.	4,723	6,153
Lockhart Power Co.	17	17
South Carolina Electric & Gas Co.	1,413	1,865
South Carolina Public Service Auth.	420	766
Yadkin, Inc.	201	201
Southeastern Power Administration	280	280
	9,312	12,254

TABLE 8 (Cont'd)

Power Supply Area Supplier	Installed Capacity (mw) Dec. 1967	1970 1/
Power Supply Areas 22 & 23		
Alabama Electric Cooperative, Inc.	58	124
The Southern Co. 7/	9,247	12,072
Savannah Electric and Power Co.	319	319
Southeastern Power Administration	552	627
	10,176	13,142

1/ Includes installed capacity as of December 31, 1967, plus capacity scheduled at that time for service through 1970.

2/ Jamestown Municipal System; Long Sault, Inc.; New York State Electric & Gas Corp.; Niagara-Mohawk Power Corp.; New York Power Authority; Rochester Gas & Electric Corp.; Central Hudson Gas & Electric Corp.; Consolidated Edison Co. of New York, Inc.; Long Island Lighting Co.; and Orange and Rockland Utilities, Inc.

3/ Atlantic City Electric Co.; Baltimore Gas & Electric Co.; Bethlehem Steel Co.; Delmarva Power & Light Co.; General Electric Co.; Hershey Chocolate Corp.; Jersey Central Power & Light Co.; United Gas Improvement Co.; Metropolitan Edison Co.; New Jersey Power & Light Co.; Pennsylvania Electric Co.; Pennsylvania Power & Light Co.; Philadelphia Electric Co.; Potomac Electric Power Co.; and Public Service Electric and Gas Co.

4/ Monongahela Power Co.; The Potomac Edison Co.; and West Pennsylvania Power Co.

5/ Appalachian Power Co.; Indiana & Michigan Electric Co.; Kentucky Power Co.; Kingsport Power Co.; Ohio Power Co.; Wheeling Electric Co.; and Kanawha Valley Power Co.

6/ Includes capacity of Tapoco, Inc., and Southeastern Power Administration.

7/ Alabama Power Co.; Georgia Power Co.; Gulf Power Co.; Mississippi Power Co.; and Southern Electric Generating Co.

All the major electric power suppliers are interconnected to the network of transmission lines which extend through the 15 power supply areas. Most of the largest privately-owned utilities within the area are grouped into power pools through agreements. Installed capacities of the power pools for 1970 are shown in Table 9. The Tennessee Valley Authority, an agency of the Federal Government is not a member, as such, of any pool group but is included in Table 9 because of its size.

TABLE 9

POWER POOL GROUPS
(15 Power Supply Areas)

Supplier Group 1/	Power Supply Area	Installed Capacity (1970) (mw)
New York Interconnected System 2/	3 & 4	21,463
Pennsylvania-New Jersey-Maryland Systems (PJM) 3/	5 & 6	29,119
Alleghany Power System, Inc. 4/	7	4,222
Combined Systems - Ohio Edison Co. and Pennsylvania Power Co.	9	3,712
American Electric Power System 5/	9, 10, & 12	11,566
Carolina-Virginia Power Pool (CARVA) - Va. Elec. & Pwr. Co., Carolina Pwr. & Light Co., Duke Power Company, and S. C. Elec. & Gas Co.	18 & 21	16,161 8/
Tennessee Valley Authority 6/	20	20,567
The Southern Co. 7/	22 & 23	12,072 9/

1/ Footnote references 2/ through 7/ refer to the corresponding footnotes in Table 8.

8/ CARVA as of December 31, 1967, also dispatched 336 megawatts of power available under contract from Southeastern Power Administration.

9/ The Southern Company as of December 31, 1967, also dispatched 497 megawatts of power available under contract from Southeastern Power Administration.

Generating Facilities

About 99 percent of the total electric power supply available for service by 1970 in the 15 power supply areas will be from plants with 10,000 kilowatts or more of installed capacity. The total supply scheduled for 1970 by power supply areas and division between fuel-electric and hydroelectric power are given in Table 10.

TABLE 10

INSTALLED CAPACITY AVAILABLE FOR 1970
(15 Power Supply Areas)

Power Supply Area	Installed Capacity (Millions of Kilowatts)		Total
	Fuel-Electric	Hydroelectric	
3 & 4	18	4	22
5 & 6	27	2	29
7	6	-	6
8	3	0	3
9, 10, & 12	31	1	32
18	5	1	6
19	2	-	2
20	16	4	20
21	10	2	12
22 & 23	11	2	13
Total	129	16	145

Information on generating supply available by 1970 by individual plants, and according to ownership and types of supply, is given in Table 11. The owner codes are explained in Table 12. Plant locations and plant numbers listed in Table 11 are keyed to the electric facilities map, Figure 3.

The types of supply shown in Table 11 include hydroelectric, conventional fuel-electric, nuclear and pumped-storage installations. The latter two are both recent additions to the sources of supply. Current trends, however, indicate that they will become important contributors and their proportions to the total supply are expected to increase substantially and rapidly.

Transmission Facilities

All major transmission circuits of 100,000 volts and above and all generating plants of 10,000 kilowatts and larger in the 15 power supply areas are shown on Figure 3. As indicated on the map, nearly all places in the entire area are within a few miles of a major source of supply. Those few small places, in most instances, are served by lower voltage circuits, not shown on the map, which are adequate for their current requirements.

Until recently most of the transmission circuits were operated at 115, 138, and 169 thousand volts with a few 230 and 345 thousand volt overlying lines. During recent years a large number of 230 and 500 thousand volt lines have been and are being added, and some lines of 765 thousand volts are being constructed. The higher voltage lines, capable of handling many times the loads of the lower voltage lines, will soon completely overlay the older 115, 138, and 169 thousand volt lines. These high-voltage trunk lines will interconnect between and among the major supply sources and load centers. Also, they will provide strong interconnection sources between the power supply areas and regions, and will aid in the degree of reliability of service.

TABLE II
AVAILABLE POWER SUPPLY
GENERATING PLANTS - EXISTING AND UNDER CONSTRUCTION
(15 Power Supply Areas)

ALABAMA

PLANT NUMBER	NAME OF PLANT	MW CAPACITY AND TYPE	OWNER CODE	PLANT LOCATION
1	Barry	578.3 St	ALAP	L-5
		403.8 St*	ALAP	L-5
2	Beaunit Mills	15.0 St	BEMI	J-7
5	Gadsden	20.0 St	RESC	J-7
6	Central	17.5 St	WOIC	J-6, K-2
		2.0 St 25c	WOIC	J-6, K-2
7	Chickasaw	138.0 St	ALAP	L-5, L-2
8	Childersburg	15.0 St	CORN	J-7
10	Colbert	1,396.5 St	TVA	H-6
13	Ensley	10.0 St	UNSS	J-6, K-2
		11.0 St 25c	UNSS	J-6, K-2
14	Fairfield	60.0 St	UNSS	J-6, K-2
17	Gadsden Nos. 1 & 2	138.0 St	ALAP	J-7
20	Gorgas No. 2	379.0 St	ALAP	J-6
21	Gorgas No. 3	377.9 St	ALAP	J-6
22	Guntersville	97.2 Hy	TVA	H-7
24	Jordan Dam	100.0 Hy	ALAP	K-7
25	Lay Dam	32.4 Hy	ALAP	K-7
		177.0 Hy*	ALAP	K-7
27	Martin Dam	154.2 Hy	ALAP	K-7
28	McWilliams	40.0 St	ALEC	L-7
29	Mitchell Dam	72.5 Hy	ALAP	K-7
30	Mobile	22.5 St	ALCA	M-5, L-2
31	Mobile	44.0 St	SCPC	M-5, L-2
32	Mobile Mill	73.8 St	INPC	L-5, L-2
33	New Plant	12.5 St	USPF	J-6, K-2
36	Smith Dam	157.5 Hy	ALAP	J-6
38	Thurlow Dam	58.0 Hy	ALAP 1/	K-7
40	Tuscaloosa	13.3 St	GUSP	J-6
42	Wheeler Dam	356.4 Hy	TVA	H-6
43	Widows Creek	1,978.0 St	TVA	H-7
44	Wilson Dam	629.9 Hy	TVA	H-6
46	Weiss	87.8 Hy	ALAP	J-7
47	Gaston, Ernest G.	1,060.8 St	SOEG	J-7
48	Yates	32.0 Hy	ALAP	K-7
49	Bankhead Lock 17	45.1 Hy	ALAP	J-6
50	Martin, Logan	128.3 Hy	ALAP	J-7
52	Greene County	568.5 St	ALAP 2/	K-6
53	H. Neely Henry	72.9 Hy	ALAP	J-7
54	Millers Ferry	75.0 Hy*	USAR	K-6
55	Bouldin Dam	255.0 Hy	ALAP	K-7
56	Jones Bluff	68.0 Hy*	USAR	K-6
57	Jackson	66.0 St	ALEC	L-5
A	Browns Ferry	3,456.0 Nu*	TVA	H-6
B	Holt Dam	40.0 Hy*	ALAP	J-6

1/ 3.0 MW owned by Mt. Vernon Woodbury Mills, Inc.
2/ Jointly owned by ALAP (60%) and MIPR (40%).

DELAWARE

PLANT NUMBER	NAME OF PLANT	MW CAPACITY AND TYPE	OWNER CODE	PLANT LOCATION
2	Delaware City	129.4 St	DEPL	D-9
		21.3 GT	DEPL	D-9
4	Edgemoor	363.0 St	DEPL	D-10
		15.0 GT	DEPL	D-10
5	Indian River	163.2 St	DEPL	E-10
		150.0 St*	DEPL	E-10
		21.7 GT	DEPL	E-10
9	Madison St.	11.5 GT	DEPL	D-9
10	Marshallton	17.6 GT	DEPL	D-9
11	McKee Run	44.1 St	DODE	D-10
12	Dover-Kent	23.5 GT	DEPL	D-10
13	Seaford	22.5 St	SEAF	E-10

DISTRICT OF COLUMBIA

PLANT NUMBER	NAME OF PLANT	MW CAPACITY AND TYPE	OWNER CODE	PLANT LOCATION
1	Benning	553.1 St	POEP	D-9, N-7
2	Buzzard Point	270.0 St	POEP	D-9, N-7
		288.0 GT	POEP	D-9, N-7

FLORIDA

PLANT NUMBER	NAME OF PLANT	MW CAPACITY AND TYPE	OWNER CODE	PLANT LOCATION
7	Crist	281.3 St	GUPC	L-5
		209.8 St*	GUPC	L-5
26	Jim Woodruff	30.0 Hy	USAR	L-8
47	Panama City	44.5 St	INPC	M-7
50	Pensacola	21.0 St	USN	M-6
61	Scholz	98.0 St	GUPC	M-8
76	Smith, Lansing	340.0 St	GUPC	M-7
81	Portland	10.7 GT	CHEC	M-7

GEORGIA

PLANT NUMBER	NAME OF PLANT	MW CAPACITY AND TYPE	OWNER CODE	PLANT LOCATION
1	Allatoona	74.0 Hy	USAR 1/	J-8
2	Arkwright	181.3 St	GEPC	K-9
3	Atkinson	258.0 St	GEPC	J-8
7	Bartletts Ferry	65.0 Hy	GEPC	K-8
8	Blue Ridge	20.0 Hy	TVA	H-8
10	Buford	86.0 Hy	USAR	J-8
20	Goat Rock	26.0 Hy	GEPC	K-8
22	Hammond	375.0 St	GEPC	J-7
		578.0 St*	GEPC	J-7
23	Hartwell	264.0 Hy	USAR	H-9
27	Lloyd Shoals	14.4 Hy	GEPC	J-8
29	McManus	143.8 St	GEPC	L-10
30	Morgan Falls	16.8 Hy	GEPC	J-8
32	Crisp	10.0 St	CRCP	L-8
		5.0 GT	CRCP	L-8
33	North Highlands	29.6 Hy	GEPC	K-8
34	Nottely	15.0 Hy	TVA	H-8
35	Oliver	60.0 Hy	GEPC	K-8
37	Port Wentworth	207.9 St	SAEP	K-10
		116.0 St*	SAEP	K-10
38	Riverside	111.0 St	SAEP	K-10
40	Sinclair Dam	45.0 Hy	GEPC	J-9
41	Stevens Creek	18.9 Hy	SOCG	J-10
43	Tallulah Falls	72.0 Hy	GEPC	H-9
44	Terrora	16.0 Hy	GEPC	H-9
46	Tugalo	45.0 Hy	GEPC	H-9
47	Warwick	15.2 Hy	CRCP	L-8
49	Mitchell, Wm.	218.3 St	GEPC	L-8
50	Yates	680.0 St	GEPC	J-8
51	Yonah	22.5 Hy	GEPC	H-9
52	McDonough	598.4 St	GEPC	J-8
53	Carters	250.0 Hy*	USAR	H-8
54	Branch, Harllee	658.2 St	GEPC	J-8
		544.0 St*	GEPC	J-8
55	George, W. F.	130.0 Hy	USAR	L-8
A	West Point	73.4 Hy*	USAR	K-8
B	Hatch	800.0 Nu*	GEPC	L-10

1/ Power marketing under Southeastern Power Administration.

INDIANA

PLANT NUMBER	NAME OF PLANT	MW CAPACITY AND TYPE	OWNER CODE	PLANT LOCATION
1	Anderson	19.0 St	ANDE	C-3
4	Breed	450.0 St	INME	D-2
5	Bluffington	22.5 St 25c	UNSS	B-2, N-15
6	Charleston No. 1 and No. 2	55.0 St	OLMA	E-3
7	Clifty Creek	1,350.0 St	INKE	E-3
8	Crawfordsville	40.0 St	CRAW	C-2
		11.5 St*	CRAW	C-2
9	Mitchell, Dean H.	414.3 St	NOIP	B-2, N-15
12	Dresser	210.0 St	PSIN	D-2
13	Edwardsport	144.3 St	PSIN	D-2
15	Culley, F. B.	40.0 St	SOIG	E-2
		93.0 St*	SOIG	E-2
16	Frankfort	36.0 St	FRAF	C-3
17	Gary (5 Plants)	75.0 St 25c	UNSS	B-2, N-16
		71.0 IC 25c	UNSS	B-2, N-16
19	Stout, E. W.	372.1 St	INPL	D-3, O-8
21	Indiana Harbor	95.0 St	YOST	B-2, N-15
22	Jasper	9.5 St	JASI	E-2
		24.0 St*	JASI	E-2
23	Johnson St.	40.0 St	RICI	D-4
26	Lawton Park	47.5 St	FOWA	C-4
27	Logansport	55.5 St	LOSP	C-3
29	Michigan City	211.0 St	NOIP	B-2, N-16
31	Nappanee	12.3 St	NAPE	B-3
32	Gallagher, R. A.	600.0 St	PSIN	E-3, R-5
34	Nobelsville	100.0 St	PSIN	D-3
36	Oakdale	11.0 Hy	NOIP	C-3
37	Ohio River	112.5 St	SOIG	E-2
38	Perry - Sec "K"	47.5 St	INPL 1/	D-3, O-9
39	Perry - Sec "W"	10.0 St	INPL	D-3, O-9
40	Peru	40.0 St	PERI	C-3
41	Portland	10.0 St	INME	C-4
42	Rensselaer	10.0 IC	RENS	C-2
47	State Line	322.0 St	COED	B-2, N-15
48	Tanners Creek	518.0 St	INME	D-4
51	Twin Branch	394.0 St	INME	B-3
54	Wabash River	575.0 St	PSIN	D-2
55	Washington	18.0 St	WALP	E-2
57	Pritchard, H. T.	393.6 St	INPL	D-3

General Notes: *Under construction; 25c - Indicates frequencies other than 60 cycle;
St - Steam; Nu - Nuclear; IC - Internal Combustion; Hy - Hydro; GT - Gas Turbine.

TABLE II (Cont'd)

INDIANA (Cont'd)

PLANT NUMBER	NAME OF PLANT	MW CAPACITY AND TYPE	OWNER CODE	PLANT LOCATION
59	White Water Valley	30.0 St	RICI	E-4
60	Chicago (4 Plants)	130.5 St 25c	INST	B-2, B-15
		40.0 St	INST	B-2, B-15
61	Bailly	194.0 St	NOIP	B-2, B-15
62	Warrick	125.0 St	ALCO	E-2
		150.0 St*	ALCO	E-2
63	East Chicago	30.0 St	NICA	B-2, B-15
65	Northeast	22.2 GT	IOIN	E-2
66	Petersburg	220.0 St*	INPL	E-2
67	Markland	81.0 Hy	PSIN	D-4
A	Wabash Peaking Station	65.0 IC	PSIN	C-3
B	Cayuga	500.0 St*	PSIN	C-2
C	Petersburg	200.0 St*	SEDI	E-2

1/ Includes 3,000 kw in industrial plants which receive steam from this plant.

KENTUCKY

PLANT NUMBER	NAME OF PLANT	MW CAPACITY AND TYPE	OWNER CODE	PLANT LOCATION
2	Canal	50.0 St	LOGE	E-3, R-5
3	Cane Run	535.3 St	LOGE	E-3, R-5
4	Dix Dam	28.3 Hy	KEUC	E-4
6	Brown, E. W.	293.2 St	KEUC	E-4
		430.9 St*	KEUC	E-4
8	Green River	263.7 St	KEUC	F-2
10	Henderson	43.5 St	HEND	E-2
		2.5 IC	HEND	E-2
11	Kentucky Dam	160.0 Hy	TVA	F-1
15	Ohio Falls	80.3 Hy	LOGE	E-3, R-5
16	Owensboro	50.5 St	OWEN	E-2
17	Paddys Run	337.5 St	LOGE	E-3, R-5
19	Pineville	37.5 St	KEUC	F-4
20	Shawnee	1,750.0 St	TVA	F-1
21	Tyrone	137.5 St	KEUC	E-4
22	Waterside	43.0 St	LOGE	E-3, R-6
23	Dale, Wm. C.	196.0 St	EAKR	E-4
24	Wolf Creek	270.0 Hy	USAR	F-3
25	Barkley	130.0 Hy	USAR	F-1
26	Paradise	1,408.0 St	TVA	F-2
		1,150 St*	TVA	F-2
27	Big Sandy	265.0 St	KEPC 1/	E-5
		800.0 St*	APPC 1/	E-5
28	Cooper, John Sherman	122.0 St	EAKR	F-4
		200.0 St*	EAKR	F-4
29	Smith, Elmer	151.0 St	OWEN	E-2
30	Reid	80.0 St*	BIRI	E-2
A	Coleman	320.0 St*	BIRI	E-2

1/ KEPC and APPC are part of American Electric Power Service Corp.

MARYLAND

PLANT NUMBER	NAME OF PLANT	MW CAPACITY AND TYPE	OWNER CODE	PLANT LOCATION
3	Celanese	10.0 St	POEC	D-7
5	Conowingo	474.5 Hy	SUEC	D-9
6	Cumberland	30.0 St	POEC	D-8
7	Deep Creek	19.2 Hy	PEEC	D-7
8	Dickerson	590.5 St	POEP	D-8
		19.0 GT	POEP	D-8
9	Easton	19.9 IC	EAST	D-9
11	Gould Street	171.5 St	BAGE	D-9, O-11
12	Hagerstown	33.8 St	HAGE	D-8
		1.0 IC	HAGE	D-8
13	Wagner, Herbert A.	587.8 St	BAGE	D-9, P-11
14	Penwood	128.5 St	BESC	D-9, P-12
15	Pratt Street	30.0 St 25c	BAGE	D-9, O-11
16	Riverside	333.5 St	BAGE	D-9, O-12
		121.5 GT	BAGE	D-9, O-12
17	Smith, R. Paul	159.5 St	POEC	D-8
20	Sparrows Point	30.0 St 25c	BESC	D-9, P-12
22	Vienna	94.5 St	DEPL	E-9
		21.3 GT	DEPL	E-9
23	Westport	194.0 St	BAGE	D-9, O-11
		117.5 St 25c	BAGE	D-9, O-11
25	Crane, Charles P.	399.8 St	BAGE	D-9
26	Chalk Point	727.6 St	POEP	E-9
		18.0 GT	POEP	E-9
27	Lake	52.2 St	WEPC	D-7
A	Morgantown	1,148.0 St*	POEP	E-9
		33.3 GT*	POEP	E-9
B	Calvert Cliffs	1,600.0 Nu*	BAGE	E-9
C	Crisfield	11.0 IC	DEPL	D-9
D	(Not available)	134.0 GT*	POEP	1/

1/ Site not selected.

MICHIGAN

PLANT NUMBER	NAME OF PLANT	MW CAPACITY AND TYPE	OWNER CODE	PLANT LOCATION
A	Cook	2,200.0 Nu*	INMR	B-3

MISSISSIPPI

PLANT NUMBER	NAME OF PLANT	MW CAPACITY AND TYPE	OWNER CODE	PLANT LOCATION
7	Eaton	77.6 St	MIPR	L-5
9	Jack Watson	541.3 St	MIPR	M-5
12	Laurel	30.0 St	MACO	L-5
13	Sweatt	96.0 St	MIPR	K-5

NEW JERSEY

PLANT NUMBER	NAME OF PLANT	MW CAPACITY AND TYPE	OWNER CODE	PLANT LOCATION
1	Bergen	650.4 St	PSEG	C-10, N-4
		17.5 GT	PSEG	C-10
2	Burlington	490.5 St	PSEG	C-10, R-13
		17.5 GT	PSEG	C-10
3	Deepwater	304.3 St	ATCE	D-10
		21.0 GT	ATCE	D-10
4	Werner, E. H.	118.3 St	JECP	C-10, P-3
5	Essex	320.5 St	PSEG	C-10, O-4
		30.0 GT	PSEG	C-10, O-4
6	Gilbert	126.1 St	NEJP	C-10
7	Greenwich	11.6 St	ATCE	D-10, S-11
8	Kearney	579.5 St	PSEG	C-10, O-4
		17.5 GT	PSEG	C-10
		270.4 GT*	PSEG	C-10
9	Linden	519.4 St	PSEG	C-10, O-4
		17.5 GT	PSEG	C-10, O-4
11	Marion	125.0 St	PSEG	C-10, O-4
12	Mercer	652.8 St	PSEG	C-10, Q-3
		116.2 GT	PSEG	C-10, Q-3
14	Millville	0.5 Hy	MIMC	D-10
		17.4 St	MIMC	D-10
15	Missouri Avenue	50.0 St	ATCE	D-10
		2.0 IC	ATCE	D-10
		56.8 GT*	ATCE	D-10
19	Sayreville	343.8 St	JECP	D-10, P-3
21	Sewaren	811.2 St	PSEG	D-10, P-3
		115.0 GT	PSEG	D-10, P-3
22	Vineland	52.3 St	VINE	E-17, D-10
		25.0 St*	VINE	E-17, D-10
25	England, B. L.	299.2 St	ATCE	D-10
26	Oyster Creek	1,540.0 Nu*	JECP	D-10
27	Yards Creek	330.0 Hy	JECP	C-10
29	Hudson	400.0 St	PSEG	C-10, N-4
		620.0 St*	PSEG	C-10, N-4
		115.2 GT	PSEG	C-10, N-4
30	Whippany	10.0 St	WHPA	C-10, N-3
A	Longwood Valley	150.0 Hy*	JECP	C-10
B	Salem	2,044.0 Nu*	PSEG	C-10
		60.0 GT*	PSEG	C-10

NEW YORK

PLANT NUMBER	NAME OF PLANT	MW CAPACITY AND TYPE	OWNER CODE	PLANT LOCATION
2	Albany	400.0 St	NIMP	A-10
5	Arthur Kill	376.2 St	CONE	C-10, P-4
		535.5 St*	CONE	C-10
6	Astoria	1,553.6 St	CONE	C-11, O-5
8	Moses, Robert-Niagara	912.0 Hy	POAS	A-13
9	Beardslee Falls	20.0 Hy	NIMP	C-10
13	Bennetts Bridge	5.0 Hy 25c	NIMP	B-12
		19.8 Hy	NIMP	B-12
15	Blake	14.4 Hy	NIMP	A-13
17	Browns Falls	15.0 Hy	NIMP	A-13
18	Buffalo	[illegible] St 25c	NIMP	A-7, S-9
21	Greenidge, C. A.	106.0 St	NYTE	A-8
24	Huntley, Charles R.	828.0 St	NIMP	A-7, R-9
26	Colton	[illegible] Hy	NIMP	A-13
29	Danskammer	508.6 St	CEHU	C-10
31	Deferiet	10.8 Hy	NIMP	A-13
36	Dunkirk	628.0 St	NIMP	B-7
40	East River	771.7 St	CONE	C-11, O-4
		[illegible] St 25c	CONE	C-11, O-4
42	Barrett, E. F.	375.0 St	LOIL	C-11, [illegible]
		18.0 GT	LOIL	C-11
		144.0 GT*	LOIL	C-11
44	West, E. J.	[illegible] Hy	NIMP	A-12
47	Far Rockaway No. 1 & 2	115.0 St	LOIL	C-11, P-5
52	Five Falls	22.5 Hy	NIMP	A-13
57	Freeport	12.1 St	FREP	C-11, [illegible]
		20.0 IC	FREP	C-11, [illegible]
62	Glenwood Landing 2 & 3	377.1 St	LOIL	C-11, [illegible]
		16.0 GT	LOIL	C-11
63	Goudey	145.8 St	NYSE	A-9
65	Grahamsville	18.0 Hy	CENY	B-10
69	Hell Gate	105.0 St 25c	CONE	C-11, O-4
		511.3 St	CONE	C-11, O-4
74	Hickling	70.0 St	NYTE	A-8
78	High Falls	14.1 Hy	NYTE	A-14
82	Hudson Avenue	545.0 St	CONE	C-11, O-4
		35.7 GT	CONE	C-11

General Notes: *Under construction; 25c, 40c - Indicate frequencies other than 60 cycles; St - Steam; Nu - Nuclear; IC - Internal Combustion; Hy - Hydro; GT - Gas Turbine

TABLE II (Cont'd)

NEW YORK (Cont'd)

PLANT NUMBER	NAME OF PLANT	MW CAPACITY AND TYPE	OWNER CODE	PLANT LOCATION
94	Indian Point	275.0 Nu	COEN	B-10
		2,138.0 Nu*	COEN	B-10
		16.6 GT	COEN	B-10
86	Jennison	60.0 St	NEYE	B-9
91	Kodak Park	88.1 St	EAKC	A-8, P-13
		50.0 St*	EAKC	A-8
		0.5 Hy	EAKC	A-8, P-13
97	Lovett	294.5 St	ORRU	B-10
		195.0 St*	ORRU	B-10
105	Milliken	270.0 St	NEYE	A-9
111	Neversink	25.0 Hy	CEHG	B-10
114	Northport	774.2 St	LOIL	C-11
		16.0 GT	LOIL	C-11
		4.0 IC	LOIL	C-11
121	Oswego	376.0 St	NIMP	B-12
129	Port Jefferson	467.0 St	LOIL	C-11
		16.0 GT	LOIL	C-11
131	Poughkeepsie	12.0 St	CEHG	B-10
132	Prospect	17.3 Hy	NIMP	A-13
135	Rainbow	22.5 Hy	NIMP	A-13
137	Rio	10.0 Hy	ORRU	B-10
139	Rockville Centre	18.7 IC	ROCK	C-11, 0-6
		5.0 IC*	ROCK	C-11, 0-6
140	Schaghticoke	13.1 Hy	NIMP	A-11
141	Schenectady	27.5 St 40c	GEEC	A-10
143	School Street	38.8 Hy	NIMP	A-10
147	Sherman Creek	216.5 St	COEN	C-11, N-5
148	Sherman Island	28.3 Hy	NIMP	A-14
150	Soft Maple	15.0 Hy	NIMP	A-13
151	South Colton	19.4 Hy	NIMP	A-13
154	Spier Falls	44.4 Hy	NIMP	A-14
156	Stark	22.5 Hy	NIMP	B-13
157	Station No. 3	206.2 St	ROGE	A-8, P-13
158	Station No. 5	38.3 Hy	ROGE	A-8, P-13
159	Station No. 7 (Russell)	252.6 St	ROGE	A-8, 0-13
161	S. A. Carlson	57.5 St*	JAME	B-7
		25.0 St*	JAME	B-7
162	Stewarts Bridge	30.0 Hy	NIMP	B-14
163	Sturgeon Pool	14.4 Hy	CEHG	B-10
170	Trenton Falls	23.6 Hy	NIMP	B-13
180	Waterside No. 1 & 2	162.2 St 25c	COEN	C-10, 0-4
		572.3 St	COEN	C-10, 0-4
		14.8 GT	COEN	C-10
184	Kent Avenue	107.5 St 25c	COEN	C-10, 0-5
		29.7 GT	COEN	C-10
185	59th Street	149.5 St 25c	COEN	C-10, 0-4
		35.0 St	COEN	C-10, 0-4
		34.2 GT	COEN	C-10, 0-4
186	74th Street	125.0 St 25c	COEN	C-10, 0-5
		144.0 St	COEN	C-10, 0-5
		37.2 GT	COEN	C-10
187	Moses, Robt-St Lawrence	1,954.0 Hy	POAS	A-7, R-8
188	Lewiston Pump	240.0 Hy	POAS	A-7, R-9
189	Ravenswood	1,600.0 St	COEN	C-10, 0-5
191	Buell	10.0 IC*	LOIL	C-11
		2.0 IC*	LOIL	C-11
193	Southampton	11.5 GT	LOIL	C-11
195	Brooklyn	23.5 St	USN	C-10, 0-4
197	Deferiet	11.0 St	SARP	A-13
198	Lackawanna (2 Plts)	47.5 St 25c	BESC	A-7, S-9
199	Nine Mile Point	620.0 Nu*	NIMP	B-12
		5.5 IC	NIMP	B-12
200	Syracuse	54.5 St	ALCC	A-9
201	Southold	14.0 GT	LOIL	C-11
202	West Babylon	55.8 GT	LOIL	C-11
A	R. E. Ginna	517.0 Nu*	ROGE	A-8, 0-14
B	Easton	790.0 Nu*	NIMP	A-10
C	Bell Station	853.3 Nu*	NEYE	A-8
D	Shoreham	545.0 Nu*	LOIL	C-11
		48.0 GT*	LOIL	C-11
		2.7 IC*	LOIL	C-11
E	Cornwall	1,800.0 Hy*	COEN	B-10
F	(Not available)	1,148.7 Nu*	COEN	1/

1/ Site not selected.

NORTH CAROLINA

PLANT NUMBER	NAME OF PLANT	MW CAPACITY AND TYPE	OWNER CODE	PLANT LOCATION
3	Blewett	24.6 Hy	CAPO	H-11
4	Bridgewater	20.0 Hy	DUPC	G-10
6	Buck	443.0 St	DUPC	G-11
10	Canton	51.0 St	CHPF	G-9
11	Cape Fear	421.0 St	CAPO	G-12
13	Chapel Hill	12.5 St	UNNC	G-12
14	Chatuge	10.0 Hy	TVA	H-8
15	Cheoah	110.0 Hy	TAPI	H-8
16	Cherry Point	15.0 St	USN	H-13
17	Cliffside	210.0 St	DUPC	H-10

NORTH CAROLINA (Cont'd)

PLANT NUMBER	NAME OF PLANT	MW CAPACITY AND TYPE	OWNER CODE	PLANT LOCATION
20	Dan River	290.0 St	DUPC	G-11
		65.2 GT*	DUPC	G-11
25	Enka	23.3 St	AMEC	H-9
		2.6 St 136c	AMEC	H-9
28	Fontana	202.5 Hy	TVA	H-8
30	Allen, G. G.	1,155.0 St	DUPC	H-10
31	Gaston	177.9 Hy	VIEP	G-12
32	Lee, H. F.	402.5 St	CAPO	H-12
		16.1 GT*	CAPO	H-12
33	Greenville	13.0 St	GRAV	G-13
34	High Rock	33.0 Hy	YADI	G-11
36	Hiwassee	117.1 Hy	TVA	H-8
38	Kannapolis	10.0 St	CAMI	H-10
39	Kinston	34.9 St	KIPU	H-13
41	Sutton, L. V.	225.0 St	CAPO	H-12
		16.1 GT*	CAPO	H-12
45	Lookout Shoals	18.7 Hy	DUPC	G-10
46	Weatherspoon	165.5 St	CAPO	H-12
52	Mt. Island	60.0 Hy	DUPC	H-10
53	Nantahala	43.2 Hy	NAPL	H-9
55	Oxford	36.0 Hy	DUPC	G-10
57	Pisgah Forest	16.0 St	OLMC	H-9
58	Rhodhiss	25.5 Hy	DUPC	G-10
59	Riverbend	631.0 St	DUPC	H-10
60	Roanoke Rapids	100.1 Hy	VIEP	G-12
61	Rocky Mount	33.0 St	ROMP	G-12
64	Santeetlah	45.0 Hy	TAPI	H-8
66	Tennessee Creek	10.4 Hy	NAPL	H-9
67	Thorpe	21.6 Hy	NAPL	H-9
68	Tillery	84.0 Hy	CAPO	H-11
72	Walters	108.0 Hy	CAPO	G-9
76	Yadkin Falls	29.5 Hy	YADI	H-11
77	Yadkin Narrows	96.5 Hy	YADI	H-11
78	Cowans Ford	350.0 Hy	DUPC	H-10
79	Tuckertown	42.0 Hy	YADI	H-11
80	Ashville	206.6 St	CAPO	H-9
81	Marshall	700.0 St	DUPC	H-10
		1,300.0 St*	DUPC	H-10
82	Roxboro	1,060.9 St	CAPO	G-12
		16.2 GT	CAPO	G-12
A	Morehead	16.1 GT*	CAPO	H-13
B	Southport	1,640.0 Nu*	CAPO	H-12

OHIO

PLANT NUMBER	NAME OF PLANT	MW CAPACITY AND TYPE	OWNER CODE	PLANT LOCATION
1	Acme	30.0 St 25c	TOEC	B-4
		307.0 St	TOEC	B-4
2	Akron	57.5 St	FITR	C-6
3	Akron	12.5 St	GORF	C-6
4	Akron	64.5 St	GOTR	C-6
6	Armco	15.3 St 25c	ARSC	D-4
7	Ashtabula	456.0 St	CLEI	B-6
8	Ashtabula	160.0 St	UNCA	B-6
9	Avon	595.0 St	CLEI	B-5, P-5
		625.0 St*	CLEI	B-5
11	Barberton	34.0 St	PIPG	C-6
		3.0 St dc	PIPG	C-6
12	Bay Shore	471.9 St	TOEC	B-5, R-4
		16.0 GT	TOEC	B-5
		217.6 St*	TOEC	B-5
13	Beckjord, Walter C.	760.5 St	COSO	D-4
		434.0 1/ St*	COSO	D-4
16	Bryan	6.8 IC	BRAN	B-4
		7.0 GT	BRAN	B-4
		2.0 IC*	BRAN	B-4
17	Campbell	53.5 St	YOST	C-6, 0-2
18	Celina	12.5 St	CELI	C-4
22	Columbus (Elec.)	45.5 St	COLU	D-5
		12.5 GT*	COLU	D-5
24	Conesville	433.5 St	COSO	C-6
		13.8 IC	COSO	C-6
27	Dover	33.0 St	DOVE	C-6
28	East 53rd	50.0 St	CLEV	B-6, P-6
29	East Lake	577.0 St	CLEI	B-6, 0-7
		680.0 St*	CLEI 2/	B-6, 0-7
30	East Palestine	16.5 St	EAPA	C-6, 0-2
31	Edgewater	192.9 St	OHEC	B-5
32	Fairport	54.5 St	DIAC	B-6
34	Tait, Frank M.	444.1 St	DAPO	D-4
37	Gorge	37.5 St	OHEC	C-6
39	Hamilton	58.5 St	HAMI	D-4, R-8
		11.3 IC	HAMI	D-4, R-8
		2.3 Hy	HAMI	D-4
40	Hamilton	26.5 St	CHPF	D-4, R-7
42	Kyger Creek	1,086.3 St	OHVE	D-5
43	Lake Road	172.5 St	CLEV	B-6, P-6
44	Lake Shore	514.0 St	CLEI	B-6, P-6
45	Lebanon	8.7 IC	LEOH	D-4
		6.0 GT	LEOH	D-4
46	Lorain	28.0 St	USSS	B-5

General Notes: *Under construction; 25c, 136c - Indicate frequencies other than 60 cycle;
St - Steam; Nu - Nuclear; IC - Internal Combustion; Hy - Hydro; GT - Gas Turbine

TABLE II (Cont'd)

PLANT NUMBER	NAME OF PLANT	MW CAPACITY AND TYPE	OWNER CODE	PLANT LOCATION
	OHIO (Cont'd)			
48	Mad River	75.0 St	OHEC	D-4
49	Mahoningside	87.4 St	OHEC	C-6, N-1
54	Miami Fort	539.2 St	CIGE	D-4, S-7
56	Montpelier	3.0 St	MONP	B-4
		7.5 St*	MONP	B-4
57	Muskingum River	876.0 St	OHPC	D-6
		615.0 St*	OHPC	D-6
58	Napoleon	11.0 St	NAPO	B-4
		12.7 St*	NAPO	B-4
60	Niles	250.0 St	OHEC	C-6, N-2
61	Norwalk	13.0 St	NORW	C-5
		13.3 St*	NORW	C-5
		1.0 IC	NORW	C-5
62	Oberlin	10.5 IC	OBOH	C-5
		3.0 IC*	OBOH	C-5
63	Hutchings, O. H.	414.0 St	DAPO	D-4
64	Ohio State Univ.	14.0 St	OHSU	C-5
65	Orrville	33.5 St	ORRV	C-6
		31.3 St*	ORRV	C-6
66	Painesville	21.5 St	PAIN	B-6
		16.5 St*	PAIN	B-6
67	Painesville	21.0 St	MIRC	B-6
69	Philo	600.0 St	OHPC	D-6
70	Picway	230.3 St	COSO	D-5
71	Piqua	53.0 St	PIQU	C-4
73	Poston	232.0 St	COSO	D-5
		13.3 IC	COSO	D-5
74	Reading	11.5 St	READ	D-4, R-3
		4.0 IC	READ	D-4
75	Burger, R. E.	544.0 St	OHEC	D-6, S-1
76	Rittman	14.0 St	PACA	C-5
77	Rockaway	13.0 St	OHEC	D-4
78	Rossford	27.6 St	LIOF	B-4, S-4
81	St. Mary's	12.0 St	SAMA	C-4
		10.0 St*	SAMA	C-4
82	Scioto	46.3 St	OHEC	C-5
83	Shelby	17.0 St	SHBY	C-5
		3.0 IC	SHBY	C-5
		12.5 St*	SHBY	C-5
84	Sammis, W. H.	1,057.5 St	OHEC	C-6, Q-2
		1,246.0 St*	OHEC	C-6
87	Tidd	222.2 St	OHPC	C-6, Q-2
89	Toledo Furnace	20.0 St	INIC	B-4, R-4
90	Toronto	315.0 St	OHEC	C-6, Q-2
91	Troy	15.0 St	TROY	D-4
93	Walnut	75.0 St	COSO	D-5
		51.0 GT*	COSO1/	D-5
95	Water Street	10.0 St	TOEC	B-4, S-4
98	West End	224.3 St	CIGE	D-4, S-3
100	Woodcock	42.5 St	OHPC	C-4
102	Youngstown	27.5 St	RESC	C-6, O-2
109	Marietta	160.0 St	UNCA	D-6
110	Portsmouth	21.5 St	DEST	E-5
111	South Point	15.0 St	ALCC	E-5
112	Chillicothe	48.1 St	MECP	D-5
113	Cardinal	1,230.0 St	OHPC&	C-6, Q-2
			BUPI	C-6, Q-2
114	Dick's Creek	104.0 GT	CIGE	D-4
		45.0 GT	CIGE	D-4
115	Defiance-Richland	70.0 GT*	TOEC	C-4
116	J. M. Stuart	1,830.0 St*	COSO1/	E-4
		11.0 IC*	COSO1/	E-4
A	Pedro	13.8 IC	COLU	E-5
B	Addison	13.8 IC	COLU	E-5
C	Jones and Loflin	20.0 St	JOLS	B-6, P-6
D	Republic Steel	42.5 St	RESC	B-6, P-6
E	Toledo	800.0 Nu*	TOEC3/	B-5

1/ Jointly owned by CIGE, COSO, and DAPO.
2/ Jointed owned by CLEI and DULC.
3/ Jointly owned by TOEC and CLEI.

PLANT NUMBER	NAME OF PLANT	MW CAPACITY AND TYPE	OWNER CODE	PLANT LOCATION
	PENNSYLVANIA			
1	Armstrong	326.4 St	WEPP	C-7
4	Barbadoes	130.0 St	PHEC	C-10, R-11
		2.8 IC	PHEC	C-10
		45.0 GT	PHEC	C-10
5	Bethlehem	12.5 St	BESC	C-10
		14.0 St 25c	BESC	C-10
		17.5 IC 25c	BESC	C-10
10	Chambersburg	15.0 St	CHAM	C-8
		5.0 IC	CHAM	C-8
11	Chester	256.0 St	PHEC	D-10, S-11
		74.4 GT*	PHEC	D-10
		2.8 IC	PHEC	D-10
12	Colfax	262.5 St	DULC	C-7, N-14
14	Crawford	116.8 St	MEEC	C-9
15	Cromby	417.5 St	PHEC	C-9, R-11
		2.8 IC	PHEC	C-9
16	Crucible	24.0 St 25c	CRSC	C-6
	PENNSYLVANIA (Cont'd)			
17	Delaware	400.0 St	PHEC	C-10, R-11
		74.4 GT*	PHEC	C-10, R-11
		2.8 IC	PHEC	C-10, R-11
19	Eddystone	707.2 St	PHEC	C-10
		37.2 GT	PHEC	C-10
21	Elrama	425.0 St	DULC	C-7, N-14
24	Eyler	19.0 St	MEEC	C-9
26	Phillips, Frank R.	315.0 St	DULC	C-7, N-13
27	Front Street	118.7 St	PEEC	B-7
32	Hauto	30.0 St 25c	PEPL	C-9
		74.0 St	PEPL	C-9
34	Hershey	28.5 St	HECC	C-9
35	Holtwood	105.0 St	PEPL	D-9
36	Holtwood	107.2 Hy	PEPL	D-9
38	Hunlock Creek	93.0 St	UGDI	B-9
41	Reed, James H.	180.0 St	DULC	C-7, N-13
42	Johnstown (3 Plts)	74.9 St 25c	BESC	C-7
43	Lansdale	24.8 St	LADA	C-10, Q-12
		12.5 St*	LADA	C-10
		11.3 GT	LADA	C-10, Q-12
		12.5 St*	LADA	C-10, Q-12
44	Martins Creek	312.5 St	PEPL	C-10
		5.5 IC	PEPL	C-10
45	Milesburg	46.0 St	WEPP	C-8
46	Mitchell	449.7 St	WEPP	C-7
48	Nanticoke	31.3 St	GLAC	B-9
50	Neville	10.0 St	[illegible]	C-7, [illegible]
51	New Castle	425.3 St	PEPC	C-6
		5.5 IC	PEPC	C-6
53	Piney	23.3 Hy	PEEC	C-7
56	Pittsburgh Works	70.0 St 25c	JOLS	C-6, I
62	Portland	426.7 St	MEEC	C-10
		16.0 GT	MEEC	C-10
63	Quakertown	16.0 GT	QUAK	C-10
65	Richmond	474.3 St	PHEC	C-10, R-
		2.4 IC	PHEC	C-10
67	Safe Harbor	160.6 Hy	SAHA1/	D-9
		70.0 Hy 25c	SAHA	D-9
68	Saxton	10.0 St	SAEC2/	C-8
		40.0 St	PEEI	C-8
69	Schuylkill	50.0 St 25c	PHEC	C-10, S-12
		275.4 St	PHEC	C-10, S-12
		55.8 GT*	PHEC	C-10, S-12
		2.8 IC	PHEC	C-10, S-12
70	Seward	268.5 St	PEEC	C-7
72	Shawville	625.0 St	PEEC	C-8
		4.0 IC	PEEC	C-8
73	Beaver Valley	100.0 Nu	DULC	C-6
		800.0 Nu*	DULC	C-6
75	Southwark	345.0 St	PHEC	C-10, S-12
		2.8 IC	PHEC	C-10, S-12
		35.8 GT	PHEC	C-10, S-12
		18.6 GT*	PHEC	C-10, S-12
76	Springdale	414.1 St	WEPP	C-7, N-14
77	Spring Grove	13.0 St	GLPC	D-9
78	Stanton	140.5 St	PEPL	C-9
82	Suburban	30.0 GT	PEPL	C-9
		5.5 IC	PEPL	C-9
83	Sunbury	397.8 St	PEPL	C-9
85	Titus	225.0 St	MEEC	C-9
		16.0 GT	MEEC	C-9
86	Wallenpaupack	40.0 Hy	PEPL	B-10
87	Warren	73.4 St	PEEC	B-7
90	Williamsburg	43.7 St	PEEC	C-8
91	York Haven	19.6 Hy	MEEC	C-9
92	Brunner Island	768.3 St	PEPL	C-9
		3.8 IC	PEPL	C-9
		711.9 St*	PEPL	C-9
94	Peach Bottom	40.0 Nu*	HITR	D-9
		2,163.0 Nu*	HITR	D-9
96	Kinzua	180.0 Hy*	PEEC2/	C-7
98	E. Pittsburgh	43.1 St	WECO	C-7, N-14
99	Johnsonburg	20.0 St	NYPC	C-8
100	Weston, G. E.	130.0 St	SAMC	C-7
103	Keystone	1,730.0 St*	PEPL3/	C-7
		11.0 IC*	PEPL	C-7
104	Muddy Run	800.0 Hy*	PEEC	C-9
A	Harwood	32.0 GT	PEPL	C-1, S-1
B	Fishback	40.0 GT	PEPL	C-9
C	West Shore	40.0 GT	PEPL	C-9
D	Williamsport	32.0 GT	PEPL	C-9
E	Allentown	64.0 GT	PEPL	C-9
F	Georgetown	32.0 GT	PEPL	C-9
G	Harrisburg	64.0 GT	PEPL	C-9
H	Lockhaven	20.0 GT	PEPL	C-8
I	Conemaugh	1,770.0 St*	PEPL3/	C-7
		11.0 IC*	PEPL3/	C-7
J	Homer City	1,319.0 St*	PEEC	C-7
		4.4 IC*	PEEC	C-7
K	Hatfields Ferry	1,800.0 St*	PEOP2/	C-7
L	Cheswick	565.1 St*	DULC	C-10, N-14
M	Three Mile Island	437.5 Nu*	MEEC	C-9

General Notes: *Under construction; 25c - Indicates frequencies other than 60 cycle; St - Steam; Nu - Nuclear; IC - Internal Combustion; Hy - Hydro; GT - Gas Turbine

TABLE II (Cont'd)

PLANT NUMBER	NAME OF PLANT	MW CAPACITY AND TYPE	OWNER CODE	PLANT LOCATION
	PENNSYLVANIA (Cont'd)			
N	Montour	729.7 St*	PEPL	C-9
O	Falls	55.8 GT*	PHEC	D-9
P	Moser	55.8 GT*	PHEC	C-9
Q	West Chester	55.8 GT*	PHEC	D-9

1/ One-third owned by Penna. Power & Light Company.
2/ Financed by GPU Subsidiaries under the name of Saxton Experimental Corporation.
3/ Jointly owned by PEPL, PHEC, BAGE, JECP, PSEG, ATCE, & DEPL.
4/ Jointly owned by PEEC & NEYE.
5/ Owned by PJM Companies.
6/ Jointly owned by Penelec and N. Y. State Elec. and Gas.
7/ Jointly owned by PEPL, PHEC, BAGE, MEEC, PSEG, DEPL, ATCE, and UNGI.
8/ Jointly owned by PEOP, WEPP, and MOPC.
9/ Jointly owned by CLEI and PEEC.

PLANT NUMBER	NAME OF PLANT	MW CAPACITY AND TYPE	OWNER CODE	PLANT LOCATION
	SOUTH CAROLINA			
3	Buzzards Roost	15.0 Hy	GRCE	J-10
4	Buzzards Roost	16.0 St	DUPC	J-10
6	Wylie	60.0 Hy	DUPC	H-10
7	Cedar Creek	45.0 Hy	DUPC	H-10
8	Charleston	48.3 St	WEPC	K-11
11	Charleston	10.5 St	USN	K-11
12	Clark Hill	280.0 Hy	USAR 1/	J-10
14	Columbia	10.6 Hy	SOCG	J-10
15	Dearborn	45.0 Hy	DUPC	H-10
16	Fishing Creek	36.7 Hy	DUPC	H-10
19	Great Falls	24.0 Hy	DUPC	H-10
20	Hagood	94.4 St	SOCG	K-11
21	Hartsville	26.2 St	SOPC	H-11
23	Lee	345.0 St	DUPC	H-9
		97.8 GT*	DUPC	H-9
24	Lockhart	12.3 Hy	LOPC	H-10
26	Mathews No. 1	20.0 St	GRMI	J-10
27	Mathews No. 2	32.5 St	GRMI	J-10
31	99 Islands	13.0 Hy	DUPC	H-10
32	Parr	14.9 Hy	SOCG	J-10
33	Parr	38.5 St	SOCG	J-10
36	Jeffries	100.0 St	SOCA	J-11
		345.6 St*	SOCA	J-11
39	Rocky Creek	28.0 Hy	DUPC	H-10
41	McMeekin, S. C.	293.8 St	SOCG	J-10
42	Saluda	130.0 Hy	SOCG	J-10
		70.0 Hy*	SOCG	J-10
44	Jeffries	132.6 Hy	SOCA	J-11
48	Tiger	30.0 St	DUPC	H-10
49	Urquhart	250.0 St	SOCG	J-10
51	Wateree	56.0 Hy	DUPC	J-11
53	Robinson, H. B.	206.6 St	CAPO	H-11
		700.0 Nu*	CAPO	H-11
		16.1 GT*	CAPO	H-11
54	Conway (Grainger)	163.2 St*	SOCA	J-12
55	Parr Nuclear	17.0 Nu	CAVN	J-10
56	Canadys	472.0 St	SOCG	K-11
57	Burton	34.5 GT	SOCG	K-11
58	Charleston	11.2 GT	SOCG	K-11
59	Myrtle Beach	22.5 GT	SOCA	J-12
A	Oconee	2,655.0 Nu*	DUPC	H-9
B	Keowee	140.0 Hy*	DUPC	H-9
C	Jocassee	610.0 Hy*	DUPC	H-9
D	Wateree	350.0 St*	SOCG	J-11

PLANT NUMBER	NAME OF PLANT	MW CAPACITY AND TYPE	OWNER CODE	PLANT LOCATION
	TENNESSEE			
1	Appalachia	75.0 Hy	TVA	H-8
2	Boone Dam	75.0 Hy	TVA	G-9
3	Calderwood	121.5 Hy	TAPI	H-8
4	Calhoun	45.0 St	BOSP	H-8
5	Cheatham	36.0 Hy	USAR	G-6
6	Center Hill	135.0 Hy	USAR	G-7
7	Cherokee	120.0 Hy	TVA	G-9
8	Chickamauga	108.0 Hy	TVA	H-7
9	Chilhowee	50.0 Hy	TAPI	H-8
11	Dale Hollow	54.0 Hy	USAR	G-7
12	Douglas	112.0 Hy	TVA	G-9
14	Fort Loudon	128.0 Hy	TVA	G-8
15	Fort P. Henry	36.0 Hy	TVA	G-9
17	Gallatin	1,255.2 St	TVA	G-7
18	Great Falls	31.9 Hy	TVA	G-7
21	Sevier, John	823.3 St	TVA	G-9
22	Johnsonville	1,485.2 St	TVA	G-6
23	Kingston	1,700.0 St	TVA	G-8
24	Allen, Thomas H.	990.0 St	MELG	H-4, H-1
26	Nolichuky	10.6 Hy	TVA	G-9
27	Norris Dam	100.8 Hy	TVA	G-8
28	Ocoee No. 1	18.0 Hy	TVA	H-8
29	Ocoee No. 2	21.0 Hy	TVA	H-8
30	Ocoee No. 3	27.0 Hy	TVA	H-8
31	Old Hickory	100.0 Hy	USAR	G-7
	TENNESSEE (Cont'd)			
33	Pickwick Landing	216.0 Hy	TVA	H-5
34	South Holston	35.0 Hy	TVA	G-10
35	Watts Bar	150.0 Hy	TVA	G-8
36	Watts Bar	240.0 St	TVA	G-8
37	Wilbur	10.7 Hy	TVA	G-10
39	Watauga	50.0 Hy	TVA	G-10
40	Melton Hill	72.0 Hy	TVA	G-8
41	Bull Run	950.0 St	TVA	G-8
42	Nickajack	97.2 Hy	TVA	H-7
43	Cordell Hull	100.0 Hy*	USAR	G-7
44	J. Percy Priest	28.0 Hy*	USAR	G-7
A	Tims Ford	45.0 Hy*	TVA	H-7
B	Clarksville	2,600.0 St*	TVA	G-6
C	East Tennessee	2,350.0 Nu*	TVA	1/

1/ Site not selected.

PLANT NUMBER	NAME OF PLANT	MW CAPACITY AND TYPE	OWNER CODE	PLANT LOCATION
	VIRGINIA - 45			
8	Brantly	29.0 St	DAVI	F-7
9	Bremo Bluff	234.3 St	VIEP	F-8
12	Byllesby	21.6 Hy	APPC	F-6
15	Chesterfield	790.5 St	VIEP	F-8
		694.0 St*	VIEP	F-8
16	Claytor	75.0 Hy	APPC	F-6
17	Clinch River	669.0 St	APPC	F-5
21	Dan River Mills	4.3 Hy	DARM	F-7
		11.0 St 25c	DARM	F-7
		1.0 Hy 25c	DARM	F-7
		4.0 St	DARM	F-7
25	Glen Lyn	401.1 St	APPC	F-6
32	Kerr, John H.	204.0 Hy	USAR 1/	F-8
43	Philpott	14.0 Hy	USAR 1/	F-7
44	Pinnacles	10.1 Hy	DAVI	F-6
46	Portsmouth	27.0 St	USN	F-9
47	Portsmouth	649.6 St	VIEP	F-9
		20.6 GT*	VIEP	F-9
48	Possum Point	491.0 St	VIEP	E-8
		93.8 GT*	VIEP	E-8
50	Radford Arsenal	24.0 St	USAR 2/	F-6
51	Reeves Avenue	100.0 St	VIEP	F-9
52	Reusens	12.5 Hy	APPC	F-7
54	Riverton	34.5 St	NOVP	E-8
55	Potomac River	514.8 St	POEP	D-9, N-7
56	Smith Mtn. Upper	400.0 Hy	APPC	F-7
57	Spruance	31.9 St	DUNE	F-8
		5.2 St 140c	DUNE	F-8
58	Yorktown	375.0 St	VIEP	F-9
59	12th Street	3.3 Hy	VIEP	E-8
		102.5 St	VIEP	E-8
60	Smith Mtn. Lower (Leesville)	40.0 Hy	APPC	F-7
61	Bayview	10.0 IC	EASS	F-9
A	Surry	1,624.0 Nu*	VIEP	F-9
B	North Anna	820.0 Nu*	VIEP	E-8
C	New River	900.0 Hy	APPC	F-6

1/ Power marketing under Southeastern Power Administration.
2/ Operated since 7-1-51 by Appalachian Electric Power Co. for U. S. Government.

PLANT NUMBER	NAME OF PLANT	MW CAPACITY AND TYPE	OWNER CODE	PLANT LOCATION
	WEST VIRGINIA			
1	Albright	263.0 St	MOPC & POEC 1/	D-7
3	Cabin Creek	273.5 St	APPC	E-6
5	Charleston	40.0 St	FOMA	E-6
6	So. Charleston	28.5 St	UNCA	E-6
10	Kammer	675.0 St	OHPC	D-6, B-1
11	Kanawha River	426.0 St	APPC	E-6
13	Lake Lynn	51.2 Hy	WEPP	D-7
15	London	14.4 Hy	KAVP	E-6
16	Marmet	14.4 Hy	KAVP	E-6
19	Nitro	17.5 St	FOMA	E-6
21	Parkersburg	22.0 St	FOMA	D-6
		3.4 St 120c	FOMA	D-6
22	Sporn, Philip	1,060.0 St	APPC & OHPC	D-5
23	Rivesville	174.8 St	MOPC 2/	D-7
25	Willow Island	215.0 St	MOPC	D-6
26	Windsor	300.0 St	OHPC & WEPP 3/	C-6, B-2
27	Winfield	14.8 Hy	KAVP	E-5
28	Mt. Storm	1,140.5 St*	VIEP	D-7
29	Ft. Martin	500.0 St	MOPC 4/	D-7
		500.0 St*	MOPC	D-7
A	Mitchell	1,600.0 St	APPC	D-6

1/ 40.0 MW Operated by Monogahela Pwr. Co.
2/ Plant operated by Central Operating Co.
3/ Operated by Beech Bottom Power Co.
4/ Jointly owned with Potomac Edison Co. and Duquesne Light Co.

General Notes: *Under construction; 25c, 120c, and 140c - Indicate frequencies other than 60 cycle; St - Steam; Nu - Nuclear, IC - Internal Combustion; Hy - Hydro; GT - Gas Turbine

TABLE 12

OWNERSHIP OF MAJOR ELECTRIC FACILITIES

(15 Power Supply Areas)

UTILITY ABBREVI-ATIONS	TYPE OF OWNER	UTILITIES
		ALABAMA
ALAP	PRI	Alabama Power Company
ALCA	IND	Aluminum Company of America
ALEC	COOP	Alabama Electric Cooperative
BEMI	IND	Beaunit Mills, Inc.
CORN	IND	Coosa River Newsprint Company
GEPC	PRI	Georgia Power Co.
GUSP	PRI	Gulf States Paper Co.
INPC	IND	International Paper Co.
RESC	IND	Republic Steel Corporation
SCPC	IND	Scott Paper Co.
SOEG	PRI	Southern Electric Generating Company
TVA	FED	Tennessee Valley Authority
USAR	FED	U. S. Army
USPF	IND	United States Pipe and Foundry Company
UNSS	IND	United States Steel Corp.
WOIC	IND	Woodward Iron Company
		DELAWARE
DEPL	PRI	Delmarva Power & Light Co. of Delaware
DODE	MUN	Dover
DUNE	IND	DuPont de Nemours, E.I., & Co.
SEAF	MUN	Seaford
		DISTRICT OF COLUMBIA
PERC	IND	Pennsylvania Railroad Company, The
POEP	PRI	Potomac Electric Power Co.
		FLORIDA
ALEC	COOP	Alabama Electric Coop.
CHEC	COOP	Choctawhatchee Electric Coop., Inc.
GUPC	PRI	Gulf Power Co.
INPC	IND	International Paper Company
USAR	FED	U. S. Army
USN	FED	U. S. Navy
		GEORGIA
CRCP	MUN	Crisp County Power Commission
GEPC	PRI	Georgia Power Co.
SAEP	PRI	Savannah Electric & Power Co.
SOCG	PRI	South Carolina Electric & Gas Co.
TVA	FED	Tennessee Valley Authority
USAR	FED	U. S. Army
		INDIANA
ALCO	IND	Alcoa Generating Corp.
ANDE	MUN	Anderson
COED	PRI	Commonwealth Edison Co. of Indiana, Inc.
CRAW	MUN	Crawfordsville
FOWA	MUN	Fort Wayne
FRAF	MUN	Frankfort
HEDI	COOP	Hoosier Energy Division, R.E.C., Inc.
INKE	PRI	Indiana-Kentucky Electric Corp.
INME	PRI	Indiana & Michigan Electric Co.
INPL	PRI	Indianapolis Power & Light Co.
INST	IND	Inland Steel Co.
JASI	MUN	Jasper
LOSP	MUN	Logansport
MIPC	PRI	Miami Power Corporation
NAPE	MUN	Nappanee
NOIP	PRI	Northern Indiana Public Service Co.
OHVT	PRI	Ohio Valley Transmission Corp.
OLMA	IND	Olin-Mathieson Chemical Corp.
PERI	PRI	Peru
PSIN	PRI	Public Service Co. of Indiana
RENS	MUN	Rensselaer
RICI	MUN	Richmond
SOIG	PRI	Southern Indiana Gas & Electric Co.
UNCA	IND	Union Carbide Corp.
UNSS	IND	U. S. Steel Corp.
WALP	MUN	Washington
YOST	IND	Youngstown Sheet & Tube Co.
		KENTUCKY
APPC	PRI	Appalachian Power Co.
BIRI	COOP	Big Rivers Rural Electric Coop. Corp.
EAKR	COOP	East Kentucky Rural Elec. Coop. Assn.
ELEN	PRI	Electric Energy, Inc.
HEND	MUN	Henderson
KEPC	PRI	Kentucky Power Co., The
KEUC	PRI	Kentucky Utilities Co.
LOGE	PRI	Louisville Gas & Electric Co.
		KENTUCKY (Cont'd)
OHVE	PRI	Ohio Valley Electric Corp.
OWEN	MUN	Owensboro
TVA	FED	Tennessee Valley Authority
USAR	FED	U. S. Army
		MARYLAND
BAGE	PRI	Baltimore Gas & Electric Company
BESC	IND	Bethlehem Steel Co.
DEPL	PRI	Delmarva Power & Light Co. of Delaware
EAST	MUN	Easton
HAGE	MUN	Hagerstown
PEEC	PRI	Pennsylvania Electric Co.
PERC	IND	Pennsylvania Railroad Co., The
POEC	PRI	Potomac Edison Co., The
POEP	PRI	Potomac Electric Power Co.
POTC	PRI	Potomac Transmission Co.
SUEC	PRI	Susquehanna Electric Co., The
USAR	FED	U. S. Army
WEPC	IND	West Virginia Pulp & Paper Co.
		MICHIGAN
INME	PRI	Indiana and Michigan Electric Co.
		MISSISSIPPI
MACO	IND	Masonite Corp.
MIPR	PRI	Mississippi Power Co.
PERV	COOP	Pearl River Valley EPA
TVA	FED	Tennessee Valley Authority
		NEW JERSEY
ATCE	PRI	Atlantic City Electric Company
JECP	PRI	Jersey Central Power & Light Co.
MIMC	IND	Millville Manufacturing Co.
NEJP	PRI	New Jersey Power & Light Co.
PSEG	PRI	Public Service Electric & Gas Co.
VINE	MUN	Vineland
WHPA	IND	Whippany Paper Board Co.
		NEW YORK
ALCC	IND	Allied Chemical Corp.
BESC	IND	Bethlehem Steel Co.
CEHG	PRI	Central Hudson Gas & Electric Corp.
COED	PRI	Consolidated Edison Company of New York
EAKC	IND	Eastman Kodak Co.
FREP	MUN	Freeport
GEEC	IND	General Electric Co.
JAME	MUN	Jamestown
LOIL	PRI	Long Island Lighting Co.
LOSI	PRI	Long Sault, Inc.
NEYE	PRI	New York State Electric & Gas Corp.
NEYS	STATE	New York State, Dept. Public Works
NIMP	PRI	Niagara Mohawk Power Corporation
ORRU	PRI	Orange and Rockland Utilities, Inc.
POAS	STATE	Power Authority of the State of New York
RESC	IND	Republic Steel Corp.
ROCK	MUN	Rockville Centre
ROGE	PRI	Rochester Gas & Electric Corp.
SARP	IND	St. Regis Paper Co.
USN	FED	U. S. Navy
		NORTH CAROLINA
AMEC	IND	American Enka Corporation
BLRI	COOP	Blue Ridge Electric Membership Corp.
CAMN	IND	Cannon Mills
CAPO	PRI	Carolina Power and Light Co.
CHPF	IND	Champion Paper & Fiber Company
DUPC	PRI	Duke Power Co.
GREN	MUN	Greenville
KIPU	MUN	Kinston
NAPL	PRI	Nantahala Power and Light Co.
OLMC	IND	Olin-Mathiewson Chemical Corp.
ROMP	MUN	Rocky Mount
TAPI	PRI	Tapoco, Inc.
TVA	FED	Tennessee Valley Authority
UNNC	STATE	University of North Carolina
USN	FED	U. S. Navy
VIEP	PRI	Virginia Electric and Power Co.
WIUT	MUN	Wilson
YADI	IND	Yadkin, Inc.

TABLE 12 (Cont'd.)

OHIO

UTILITY ABBREVI-ATIONS	TYPE OF OWNER	UTILITIES
ALCC	IND	Allied Chemical Corp.
ARSC	IND	Armco Steel Corp.
BRAN	MUN	Bryan
BUPI	COOP	Buckeye Power Inc.
CELI	MUN	Celina
CHPF	IND	Champion Paper and Fibre Co., The
CIGE	PRI	Cincinnati Gas & Electric Co., The
CLEI	PRI	Cleveland Electric Illuminating Co., The
CLEV	MUN	Cleveland
COLU	MUN	Columbus
COSO	PRI	Columbus & Southern Ohio Elec. Co.
DAPO	PRI	Dayton Power & Light Co., The
DEST	IND	Detroit Steel Co.
DIAC	IND	Diamond Alkali
DOVE	MUN	Dover
DULC	PRI	Duquesne Light Co.
EAPA	MUN	East Palestine
FITR	IND	Firestone Tire and Rubber Co.
GOBF	IND	Goodrich, B. F., Co.
GOTR	IND	Goodyear Tire and Rubber Co.
HAMI	MUN	Hamilton
INIC	IND	Interlake Iron Corp.
JOLS	IND	Jones and Loflin Co.
LEON	MUN	Lebanon
LIOF	IND	Libby-Owens-Ford Glass Co.
MECP	IND	Mead Corp.
MIRC	IND	Midland-Ross Corp.
MONP	MUN	Montpelier
MOPC	PRI	Mongahela Power Co.
NAPO	MUN	Napoleon
NORW	MUN	Norwalk
OBOH	MUN	Oberlin
OHEC	PRI	Ohio Edison Co.
OHPC	PRI	Ohio Power Co., The
OHSU	STATE	Ohio State University
OHVE	PRI	Ohio Valley Electric Corp.
ORRV	MUN	Orrville
PACA	IND	Packaging Corp. of America
PAIN	MUN	Painesville
PIQU	MUN	Piqua
PIPG	IND	Pittsburgh Plate Glass Co.
READ	MUN	Reading
RESC	IND	Republic Steel Corp.
SAMA	MUN	Saint Mary's
SHBY	MUN	Shelby
SOCP	COOP	South Central Power Co.
TOEC	PRI	Toledo Edison Co., The
TROY	MUN	Troy
UNCA	IND	Union Carbide Corp.
UNSS	IND	United States Steel Corp.
YOST	IND	Youngstown Sheet & Tube Co., The

PENNSYLVANIA

UTILITY ABBREVI-ATIONS	TYPE OF OWNER	UTILITIES
ATCE	PRI	Atlantic City Electric Co.
BAGE	PRI	Baltimore Gas & Electric Co.
BESC	IND	Bethlehem Steel Co.
CHAM	MUN	Chambersburg
CRSC	IND	Crucible Steel Co. of America
DEPL	PRI	Delaware Power & Light Co.
DULC	PRI	Duquesne Light Co.
GLPC	IND	Glatfelter, P.M., Paper Company
GLAC	IND	Glen Alden Coal Co.
HECC	IND	Hershey Chocolate Corp.
HITR	PRI	High Temperature Reactor Development Associates, Inc.
JECP	PRI	Jersey Central Power & Light Co.
JOLS	IND	Jones & Laughlin Steel Co.
LADA	MUN	Lansdale
MEEC	PRI	Metropolitan Edison Co.
MOPC	PRI	Monongahela Power Co.
NEYE	PRI	New York State Electric & Gas Corp.
NYPC	IND	New York and Pennsylvania Co., Inc.
PEEC	PRI	Pennsylvania Electric Co.
PEPC	PRI	Pennsylvania Power Co.
PEPL	PRI	Pennsylvania Power & Light Co.
PERC	IND	Pennsylvania Railroad Co., The
PHEC	PRI	Philadelphia Electric Co.
PSEG	PRI	Public Service Electric & Gas Co.
QUAK	MUN	Quakertown
SAHW	PRI	Safe Harbor Water Power Corp.

PENNSYLVANIA (Cont'd)

UTILITY ABBREVI-ATIONS	TYPE OF OWNER	UTILITIES
SAJC	IND	St. Joseph Lead Co.
SAEC	PRI	Saxton Experimental Corp.
SHEI	IND	Shenango, Inc.
UNGI	PRI	United Gas Improvement Co.
WEPP	PRI	West Penn. Power Co.
WECO	IND	Westinghouse Elec. Corp.

SOUTH CAROLINA

UTILITY ABBREVI-ATIONS	TYPE OF OWNER	UTILITIES
CAPO	PRI	Carolina Power & Light Co.
CAVN	IND	Carolinas-Virginia Nuclear Pwr. Assn.
CEPC	COOP	Central Electric Power Coop.
DUPC	PRI	Duke Power Co.
GEPC	PRI	Georgia Power Co.
GRCE	COOP	Greenwood County Electric Power Comm.
GRMI	COOP	Greenwood Mills
LOPC	PRI	Lockhart Power Co.
SOCA	STATE	South Carolina Public Service Authority
SOCG	PRI	South Carolina Electric & Gas Co.
SOPC	IND	Sonoco Products Company
USAR	FED	U. S. Army
USN	FED	U. S. Navy
WEPC	IND	West Virginia Pulp & Paper Company

TENNESSEE

UTILITY ABBREVI-ATIONS	TYPE OF OWNER	UTILITIES
APPC	PRI	Appalachian Power Company
BOSP	IND	Bowaters Southern Paper Co.
KEUC	PRI	Kentucky Utilities Co.
KNUB	MUN	Knoxville Utilities Board
MELG	MUN	Memphis
TAPI	IND	Taporo, Inc.
TVA	FED	Tennessee Valley Authority
USAR	FED	U. S. Army
USAT	FED	Atomic Energy Commission

VIRGINIA

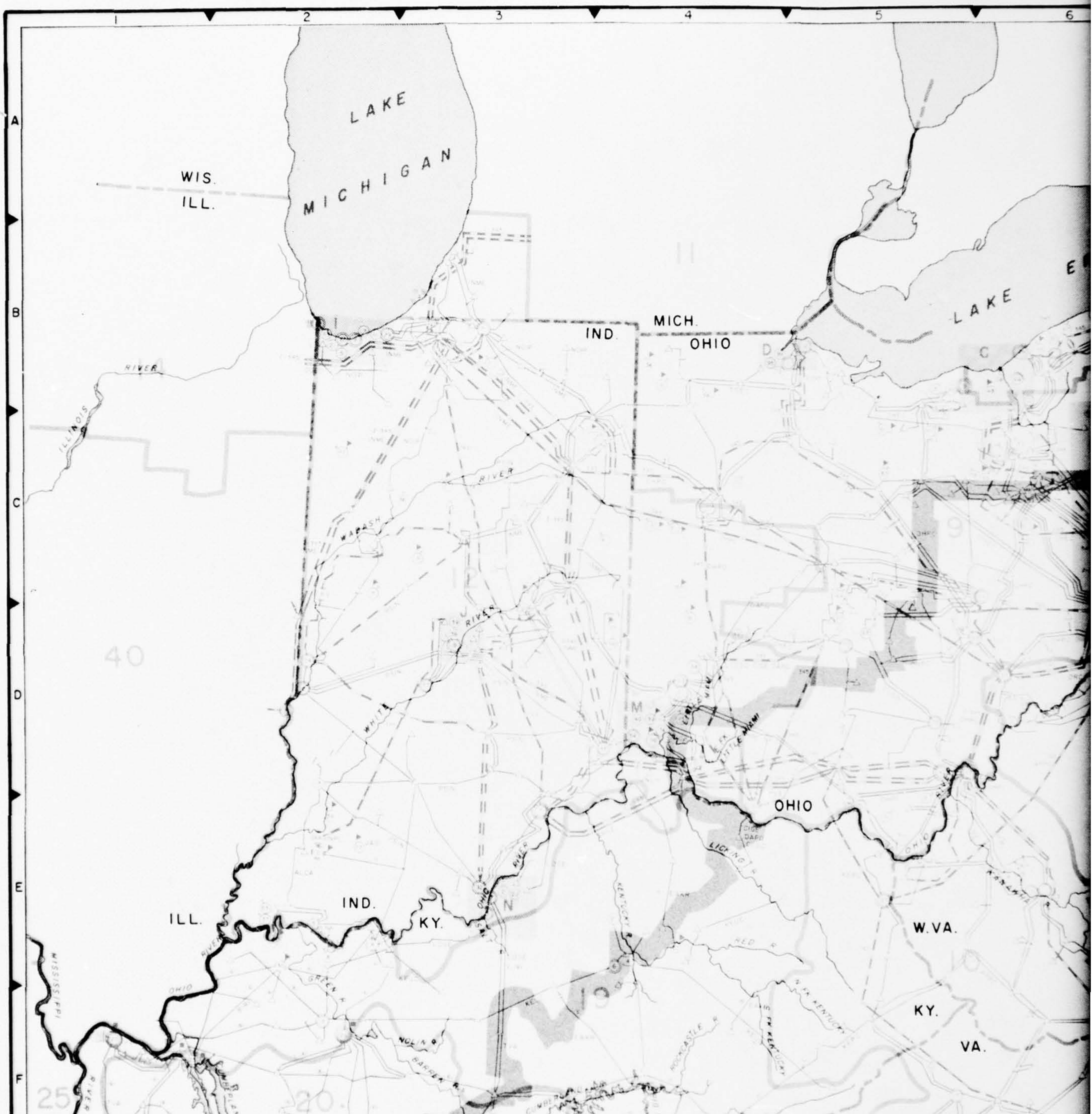
UTILITY ABBREVI-ATIONS	TYPE OF OWNER	UTILITIES
APPC	PRI	Appalachian Power Co.
DARM	IND	Dan River Mills
DAVI	MUN	Danville
DUNE	IND	Du Pont de Nemours, E.I., & Co.
EASS	PRI	Eastern Shore Public Service Co. of Va.
NOVP	PRI	Northern Virginia Power Co.
POEP	PRI	Potomac Electric Power Company
POEV	PRI	Potomac Edison Co. of Virginia
TVA	FED	Tennessee Valley Authority
USAR	FED	U. S. Army
USN	FED	U. S. Navy
VIEP	PRI	Virginia Electric & Power Co.

WEST VIRGINIA

UTILITY ABBREVI-ATIONS	TYPE OF OWNER	UTILITIES
APPC	PRI	Appalachian Power Company
FOMA	IND	Food Machinery & Chemical Corp.
KAVP	PRI	Kanawha Valley Power Co.
MOPC	PRI	Monongahela Power Co.
OHPC	PRI	Ohio Power Co., The
ORCO	PRI	Ormet Generating Company
POEC	PRI	Potomac Edison Co.
POLP	PRI	Potomac Light & Power Company
POTC	PRI	Potomac Transmission Co.
UNCA	IND	Union Carbide Corp.
VIEP	PRI	Virginia Electric & Power Co.
WEPP	PRI	West Penn Power Co.
WHEC	PRI	Wheeling Electric Company

TYPE OF OWNERSHIP

PRI	Private
COOP	Cooperatives
MUN	Municipalities
STATE	State or Territory
FED	Federal
IND	Industrial and Privately-Owned Schools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WHITE RIVER
OHIO RIVER
MISSISSIPPI RIVER
ILLINOIS RIVER
LICKING R.
KENTUCKY R.
GREEN R.
RED R.
LITTLE MIAMI
KANAWHA R.
BARREN R.


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PENN.
DELAWARE R.
SUSQUEHANNA R.
WEST BRANCH
JUNIATA R.
N.J.
PENN.
MD.
VA.
W. VA.
DEL.
MD.
POTOMAC RIVER
SHENANDOAH RIVER
CALF PASTURE
GAULEY R.
JAMES RIVER
ROANOKE R.
DAN RIVER
CHESAPEAKE BAY
ATLANTIC OCEAN
VA.
N.C.
N.C.
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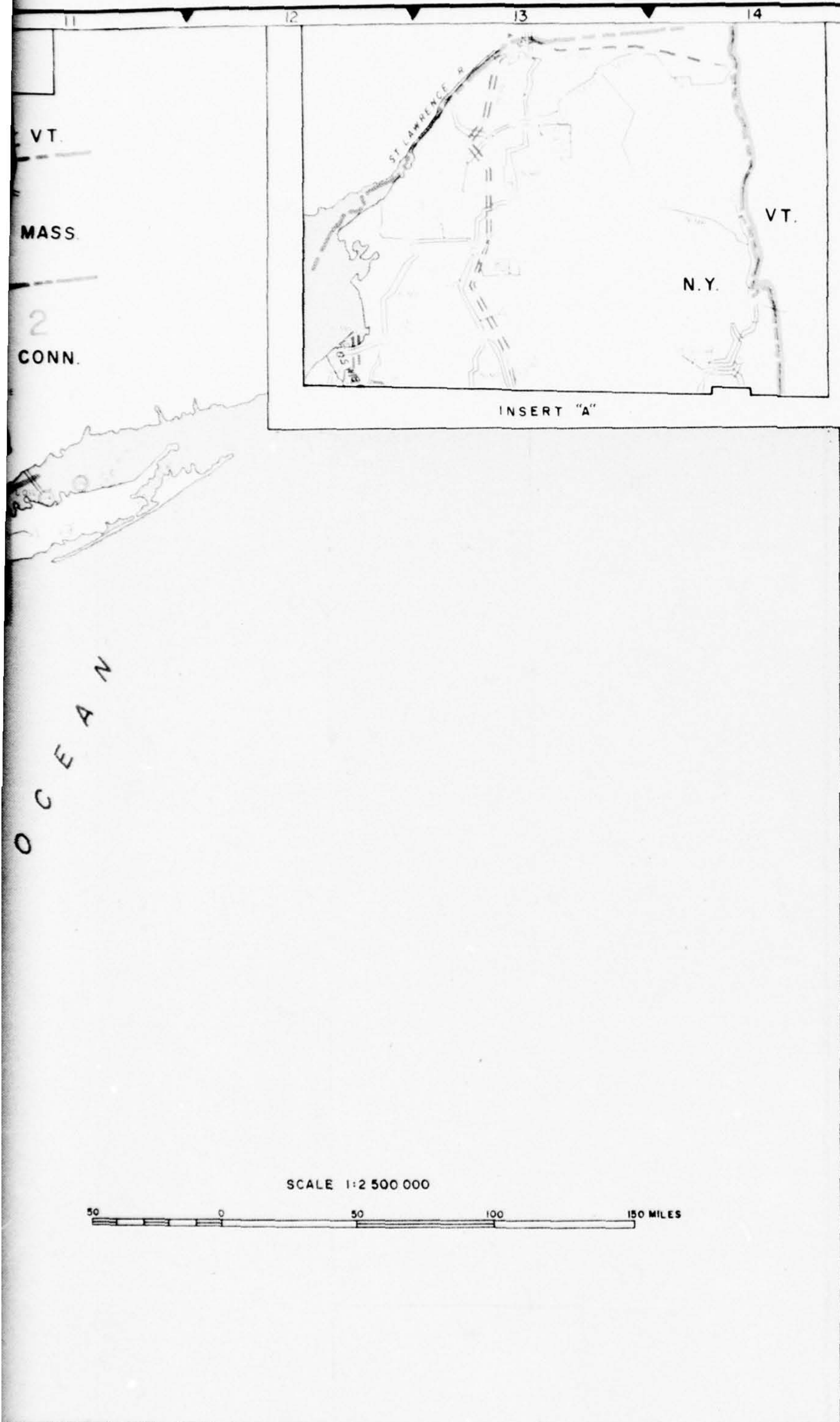


A NOTE: For city area inserts see sheet 3 of 3

LEGEND

GENERATING STATIONS

OVER 1,000,000 KW — 200,000 TO 999,000 KW — 10,000 TO 199,000 KW

FUEL (Numbers in symbols refer to plant list. T above symbol indicates plant is tied into transmission system by low voltage lines.)

HYDRO

FEDERAL — NON-FEDERAL: PUBLICLY OWNED PLANTS

UNDER CONSTRUCTION

SUBSTATIONS

TRANSMISSION LINES

100 TO 200 KILOVOLTS (Voltages shown on lines greater than 138 KV)

201 TO 765 KILOVOLTS (Voltages shown on lines greater than 245 KV)

Underground and submarine cable

FACO ALRR — Connection between companies (Abbrev refer to company list)

Connecting lines — Crossover

BOUNDARIES

Appalachian Region

Power Supply Area

6 — Power Supply Area Number

FEDERAL POWER COMMISSION
BUREAU OF POWER

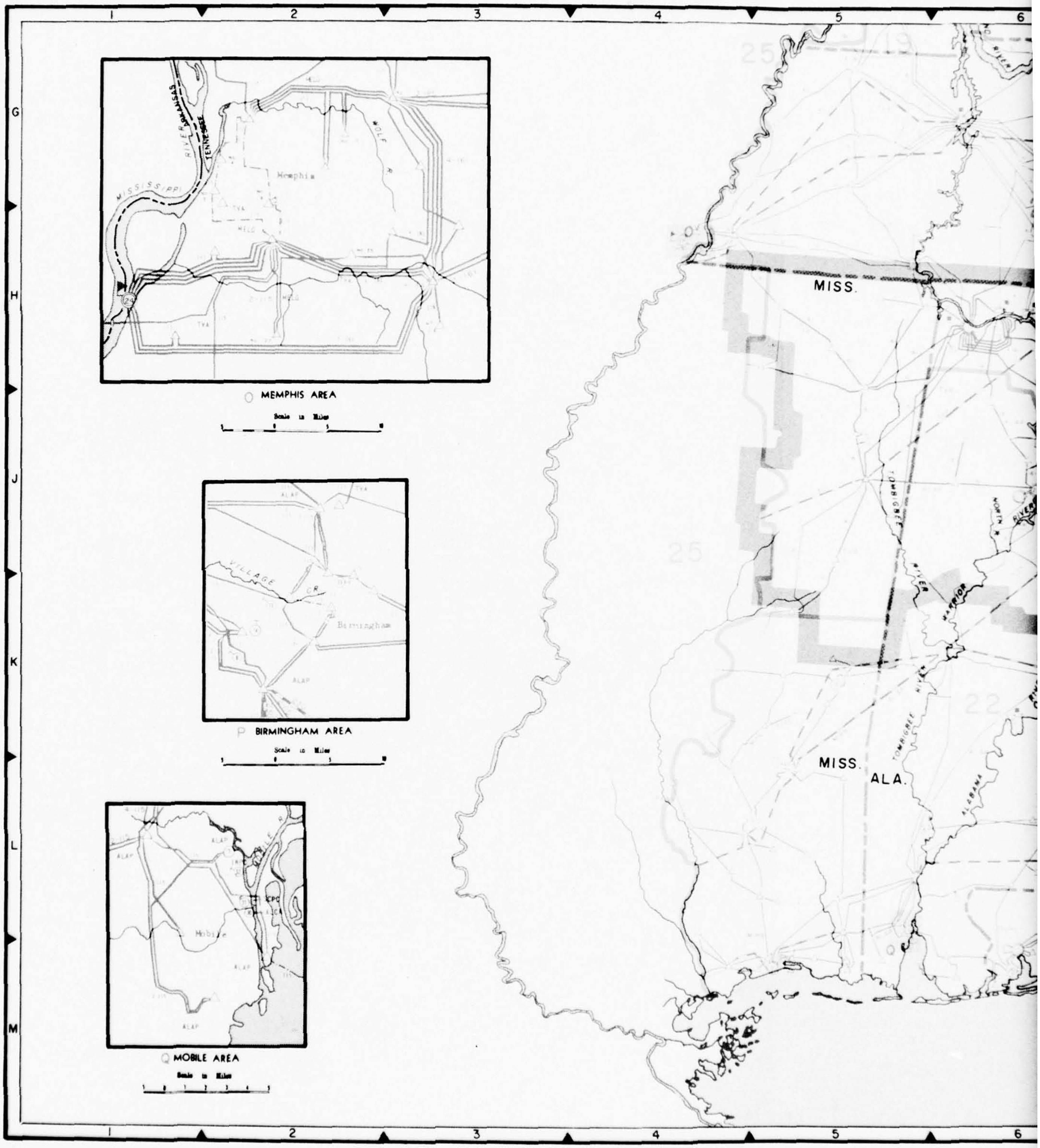
ELECTRIC FACILITIES
APPALACHIAN REGION AND SURROUNDING AREA

SHOWING

TRANSMISSION LINES OF 100,000 VOLTS* AND ABOVE, AND GENERATING STATIONS OF 100,000 KILOWATTS AND OVER.

*69,000 VOLTS ON INSERTS

1968


O MEMPHIS AREA
Scale in Miles
P BIRMINGHAM AREA
Scale in Miles
Q MOBILE AREA
Scale in Miles
Memphis
Birmingham
Mobile
MISSISSIPPI RIVER
ARKANSAS
TENNESSEE
WOLF R.
VILLAGE CR.
TVA
ALAP
MISS.
MISS.
ALA.
TOMBIGBEE RIVER
WARRIOR
ALABAMA
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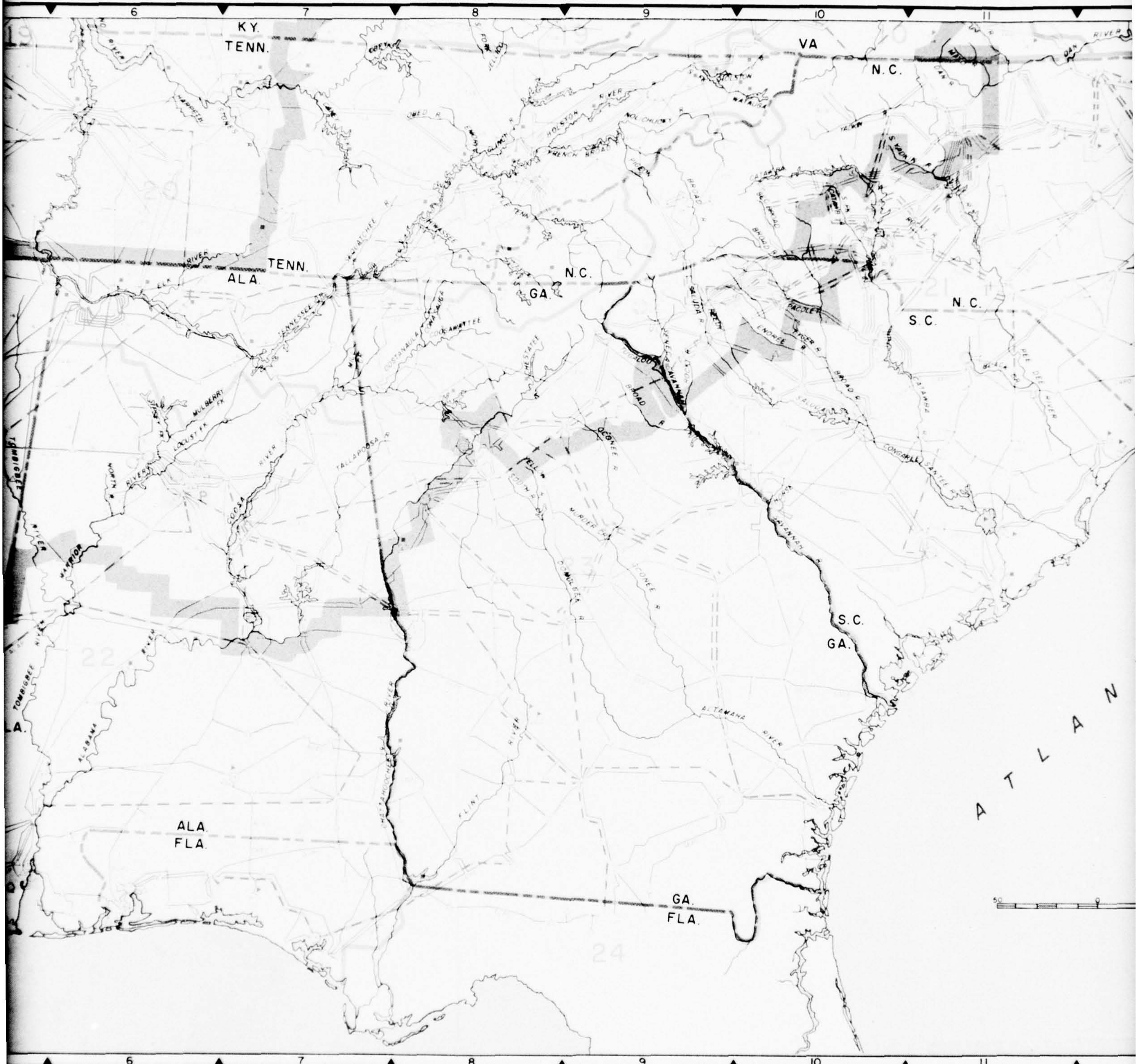

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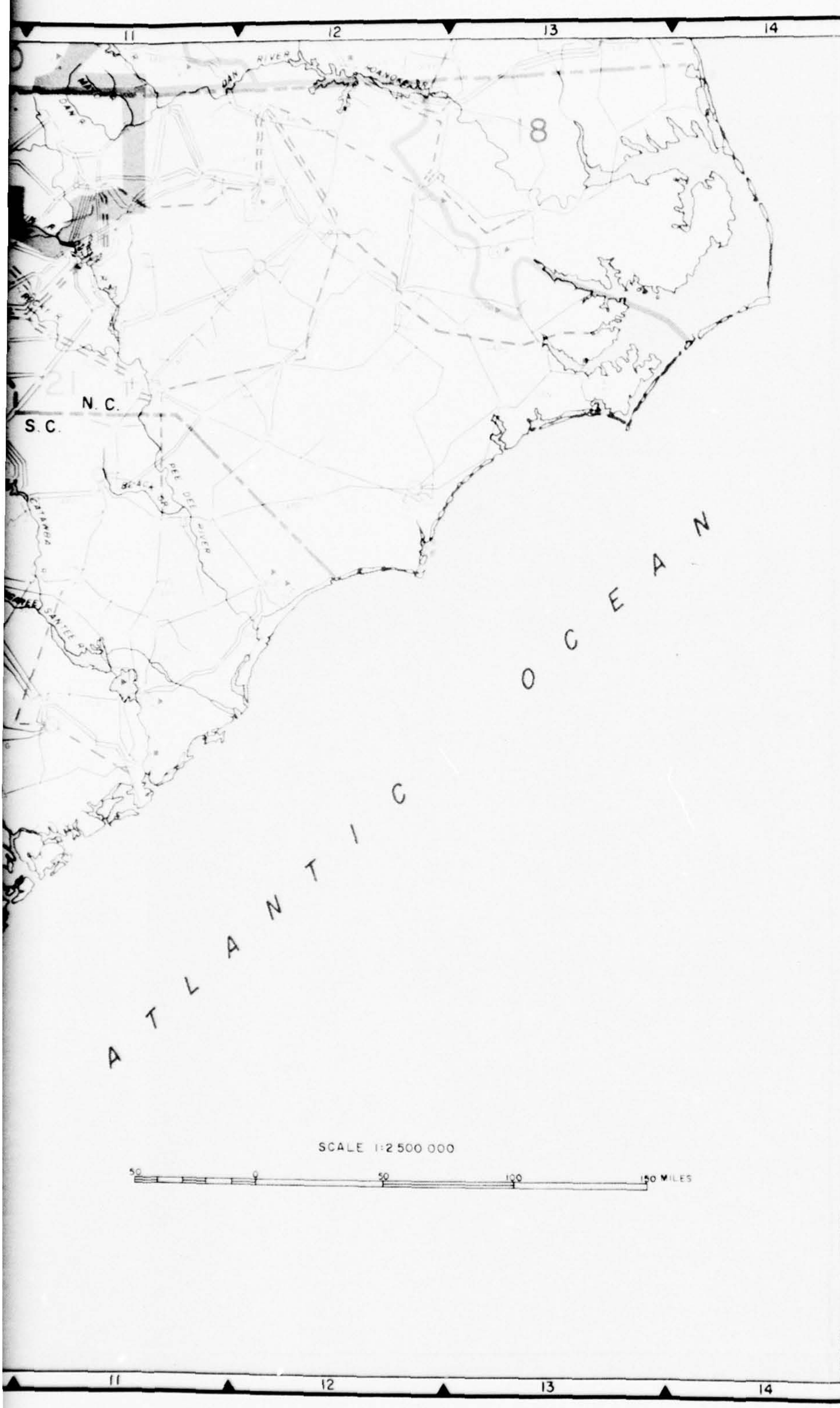


LEGEND

GENERATING STATIONS

OVER 1,000,000 KW	200,000 TO 999,000 KW	10,000 TO 199,000 KW	
20	12	8	FUEL (Numbers in symbols refer to plant list. T above symbol indicates plant is tied into transmission system by low voltage lines.)
6	31	15	HYDRO
FEDERAL	NON-FEDERAL		PUBLICLY OWNED PLANTS
			UNDER CONSTRUCTION
			SUBSTATIONS

TRANSMISSION LINES

- 100 TO 200 KILOVOLTS (Voltages shown on lines greater than 138 KV)
- 201 TO 765 KILOVOLTS (Voltages shown on lines greater than 245 KV)
- Underground and submarine cable
- FACO / ALBR — Connection between companies (Abbrev refer to company list)
- Connecting lines — Crossover

BOUNDARIES

- Appalachian Region
- Power Supply Area
- 18 — Power Supply Area Number

FEDERAL POWER COMMISSION
BUREAU OF POWER

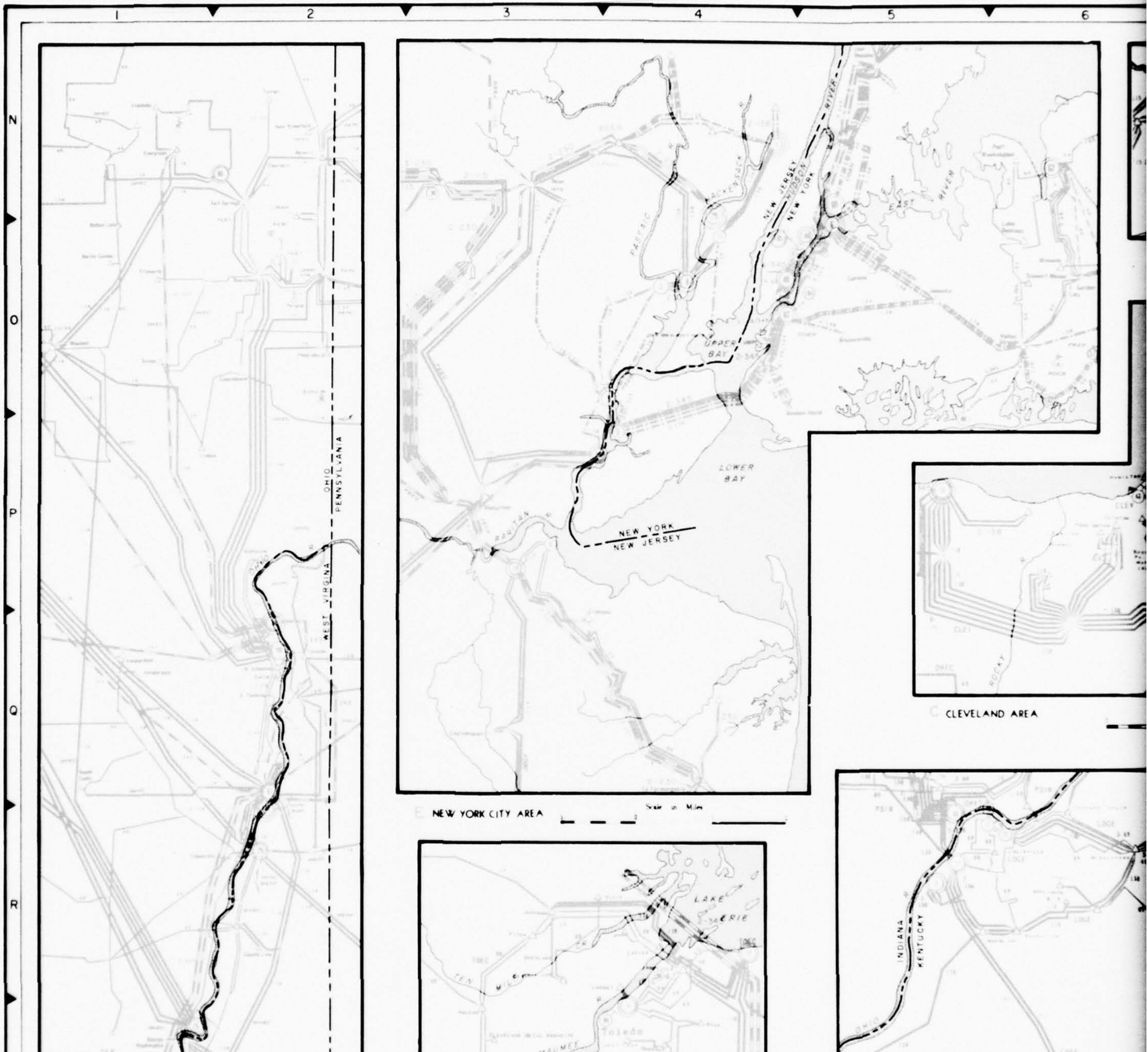
ELECTRIC FACILITIES
APPALACHIAN REGION AND SURROUNDING AREA

SHOWING

TRANSMISSION LINES OF 100,000 VOLTS* AND ABOVE, AND GENERATING STATIONS OF 100,000 KILOWATTS AND OVER.

*69,000 VOLTS ON INSERTS.

1968



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NEW YORK
HUDSON
RIVER
EAST
RIVER
UPPER
BAY
LOWER
BAY
RARITAN
NEW YORK
NEW JERSEY
NEW YORK CITY AREA
Scale in Miles
LAKE
ERIE
MAUMEE
Toledo
D TOLEDO AREA
Scale in Miles
CLEVELAND AREA
INDIANA
KENTUCKY
OHIO
N LOUISVILLE AREA
Scale in Miles

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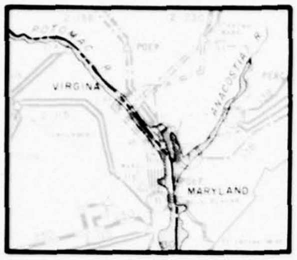
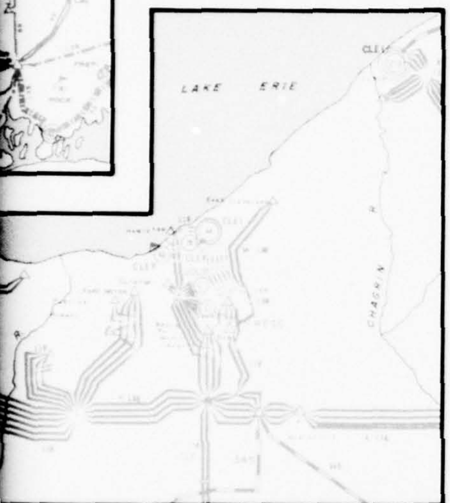
6 7 8 9 10 11 12



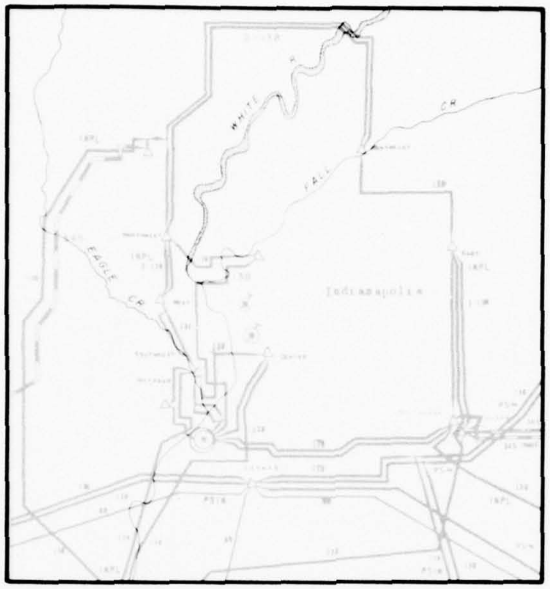
DIST OF COLUMBIA AREA

Scale in Miles



AREA

Scale in Miles

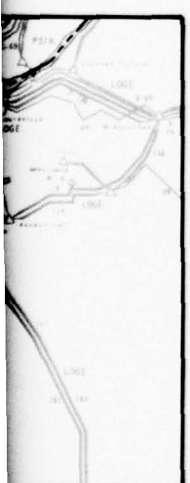


J INDIANAPOLIS AREA

Scale in Miles

K BALTIMORE AREA

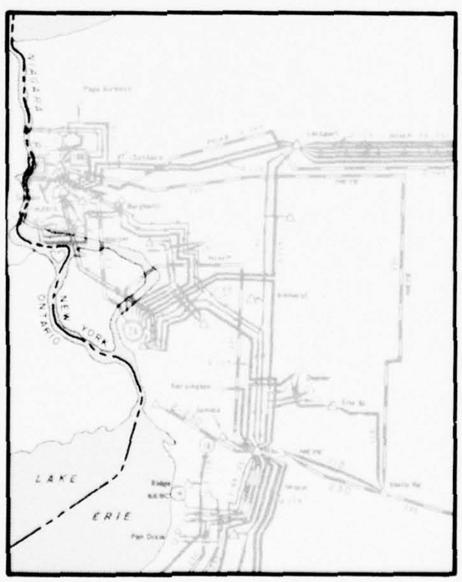
Scale in Miles



Scale in Miles

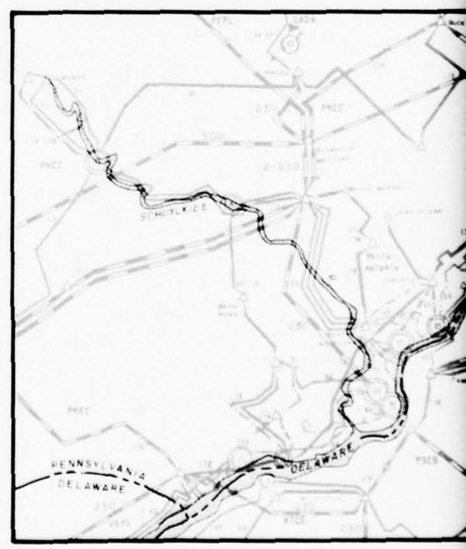
M CINCINNATI AREA

Scale in Miles



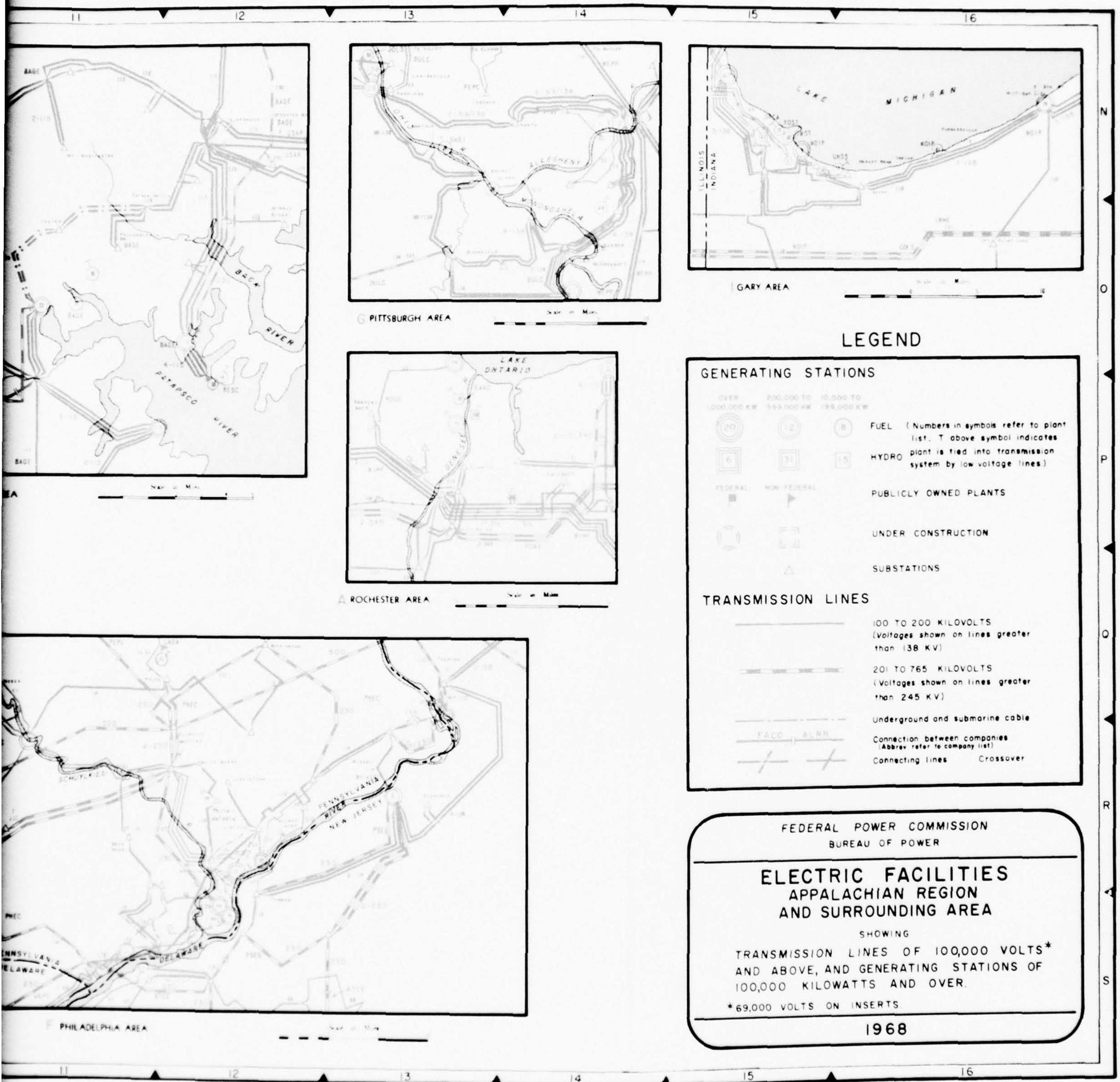
B BUFFALO AREA

Scale in Miles



F PHILADELPHIA AREA

6 7 8 9 10 11 12



3 of 3 Figure 3

A hypothetical duration (demand-time) diagram for a summer month in 1980 for the 15 selected power supply areas is shown on Figure 4. This type of diagram is often used in load analyses. It is a "fat" curve which represents a summer peak month with a high load factor requirement. The summer peak by that time is expected to be a little greater than the winter peak. The ordinate of the diagram is drawn to represent a load of about 234 million kilowatts and the abscissa to represent the 744 hours in the month. The area under the curve represents energy required for load, including losses, of about 125,000 gigawatt-hours.[1/] The monthly load factor is about 72 percent.

Reserve capacity must be provided for unexpected growth, unpredicted load changes, and any loss of capacity occasioned by an emergency outage of equipment or planned outages for inspection, maintenance, and repairs. The reserve capacity is in addition to the capacity required for load. It may range from a low to a high percentage of the load requirement. Fifteen percent of the 234 million kilowatts, or 35 million kilowatts, has been used for this analysis and, as shown on the diagram, has been added above the load requirement. This brings the estimated total capacity supply needed for the 1980 summer load to about 269 million kilowatts.

There will be about 145 million kilowatts available for supply in 1970 from plants located within the 15 power supply areas that have capacities of 10,000 kilowatts or larger. This total includes installed capacities from existing plants, those currently under construction, and plants scheduled for service by 1970. A major part of the retirements that will occur by 1980 can be accounted for by the capacity not included in the 145 million kilowatts from existing plants under 10,000 kilowatts in size.

The 145 million kilowatts of capacity available for supply in 1970 consist of about 16 million kilowatts of hydroelectric and 129 million kilowatts of fuel-electric capacity. About 35 million kilowatts of the fuel-electric capacity are at older and less efficient plants and are assigned to reserve use. This leaves 94 million kilowatts available for load. The 16 million kilowatts of hydroelectric power are first assigned to supply duty at their best operating position in the load. Since they would furnish supply at a relatively low load factor during an adverse period, they would operate best near the top or peak of the load. For the example shown, the 16 million kilowatts are divided about equally into two parts. Eight million kilowatts are placed in the top of the load and the remainder is placed lower down where it will operate at about 20 percent plant factor. During an adverse water period the average plant factor for the total hydroelectric supply of 16 million kilowatts is about 12 percent. During other periods the hydroelectric supply may operate at a higher plant factor.

A remaining unfilled part of the top or peak portion of the load may be supplied by capacity from future hydroelectric developments, either of the

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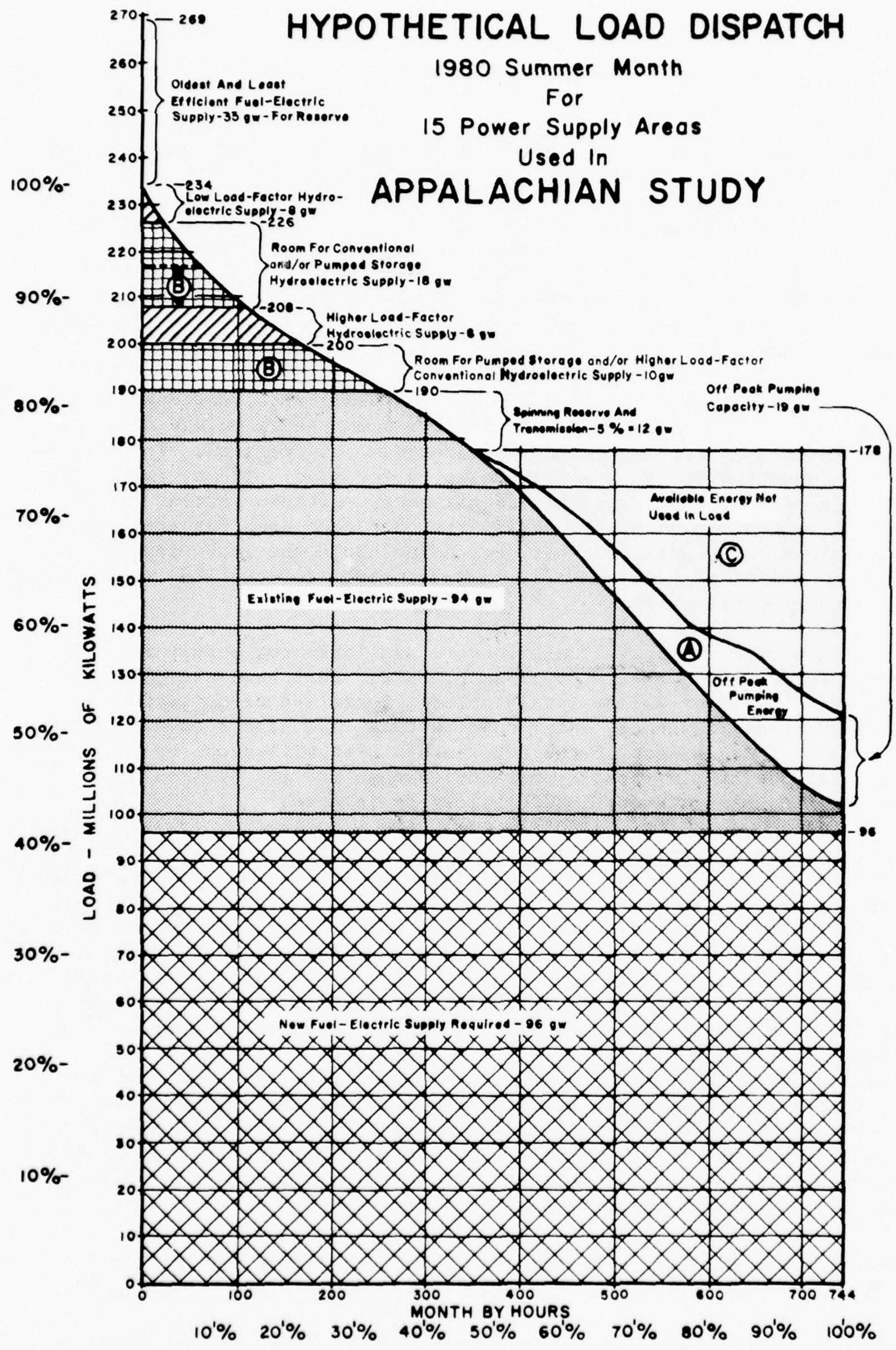
1/ A gigawatt-hour is 1,000,000 kilowatt-hours.



HYPOTHETICAL LOAD DISPATCH
1980 Summer Month
For
15 Power Supply Areas
Used In
APPALACHIAN STUDY
269
Oldest And Least Efficient Fuel-Electric Supply-35 gw-For Reserve
234
Low Load-Factor Hydroelectric Supply-8 gw
226
Room For Conventional and/or Pumped Storage Hydroelectric Supply-18 gw
208
Higher Load-Factor Hydroelectric Supply-8 gw
200
Room For Pumped Storage and/or Higher Load-Factor Conventional Hydroelectric Supply-10gw
190
Spinning Reserve And Transmission-5 % = 12 gw
Off Peak Pumping Capacity-19 gw
178
Available Energy Not Used In Load
Existing Fuel-Electric Supply-94 gw
Off Peak Pumping Energy
96
New Fuel-Electric Supply Required-96 gw
LOAD - MILLIONS OF KILOWATTS
MONTH BY HOURS

Figure 4

conventional, pumped-storage, or a combination of both types of installations. The conventional hydroelectric supply will, undoubtedly, be designed to operate at a rather low plant factor as most of the better sites for plants with higher plant factor operating capacities have been developed and are supplying load. There are many good pumped-storage sites, however, and plants at these sites can be designed to operate at plant factors up to nearly 40 percent, provided off-peak energy for pumping is available. There may be instances, however, where projects can be designed to operate at higher plant factors than 40 percent when a greater pumping capacity is provided in the plant than the generating capacity.

For this study a maximum of 40 percent plant factor from pumped-storage hydroelectric plants was determined on the basis that three kilowatt-hours of off-peak pumping are required for each two that are regenerated for load. This requires a three to two ratio of energy for pumping to energy for load if equal pumping versus generating capacity is maintained. The areas shown as blocks (A) and (C) of Figure 4 outside and above the load requirements under the duration curve represent the theoretical additional energy from existing supply that is not needed for current load requirements. This energy can be made available for use if it is needed. Only part, however, can be used for off-peak pumping without installing additional pumping capacity. As the pumping capacity is increased its use factor would decrease and would soon become uneconomical to provide. Only the energy shown in block (A) in the diagram could be used for off-peak pumping, assuming equal pumping and generating capacity. On the basis of three kilowatt-hours of off-peak pumping to two for on-peak generation, the area in block (A) would be 1.5 times as great as the area in block (B).

The demand-time diagram shows a five percent spinning reserve reduction of the fuel-electric supply during valley hours, or 12 million kilowatts, between the top of the fuel-electric supply in the load and when off-peak pumping can commence. This, together with the slope of the curve, usually limits the energy for load from the pump-back regeneration to less than 40 percent plant factor operation. The older fuel-electric supply of 94 million kilowatts is then placed in the load so that the energy area under (A) of the diagram will be 1.5 of the regenerated energy under (B). This establishes the lowest point that the top of the older fuel-electric supply may be operated. For the diagram shown it is at about 190 million kilowatts on the ordinate.

The unfilled spaces on the diagram may be filled with new supply. About 28 million kilowatts are available for new hydroelectric supply plus 96 million for new fuel-electric supply, or any combination of these where the hydroelectric portion is decreased and the fuel-electric portion increased.

Additional capacity to supply load at about 65 percent annual load factor will be needed for load growth beyond 1980. This supply can be divided into two components like the supply above, a high load factor base supply and a low load factor peak load supply. The high load factor part can be supplied from new fuel-electric supply and the low load factor part from new hydroelectric sources. The division of the new supply, depending upon economics, and the availability of sites for hydroelectric development, will divide about 80 and 20 percent between the high and low load factor portions. Estimates of the additional power supply needed are shown in Table 13.

TABLE 13

ADDITIONAL POWER REQUIREMENTS
(15 Power Supply Areas)

Item	Millions of Kilowatts				
	1970	1980	1990	2000	2020
Supply for load 1/	123	234	418	662	1,614
For reserves 2/	18	35	63	99	242
For retirements 3/	-	0	11	19	77
Total needed	141	269	492	780	1,933
Supply available 4/	145	145	269	492	780
Additional needed 5/	-	124	223	288	1,153
High load factor portion (80%)	-	99	178	230	922
Low load factor portion (20%)	-	25	45	58	231

1/ Load requirements from Table 4.
2/ Fifteen percent of load adopted.
3/ Four percent per decade of previous load and reserve. None assumed for 1980, and adjusted for 2020 to account for two decades.
4/ Amount after 1970 is that available for last decade.
5/ Amount needed to be added over previous amount.

The last item on Table 13 is the amount of supply needed for future low factor load which is of the type that may be supplied from new hydroelectric sources. The total amounts to about 359 million kilowatts by year 2020. It is unlikely that all of the requirements can or will be supplied from hydroelectric sources, chiefly pumped storage, but a large proportion can be supplied if resource planning and development are started in time.

Transmission lines existing and being built are extensive throughout the 15 power supply areas. Additional lines will be constructed, as the load grows, to connect between and among the loads and new supply sources that are added. It is unlikely that more than relatively short lines will be needed to connect most of the new hydroelectric developments to the supply.

CHAPTER VI - HYDROELECTRIC POWER RESOURCES

Most of the better sites for development of conventional hydroelectric power in the 15 power supply areas are being utilized. There are, however, some good sites remaining which may be developed with conventional hydroelectric installations, and many good sites available where pumped-storage installations can be placed. Information on hydroelectric resources is presented in Table 14. It includes information both for existing developments and those potential sites which may appear feasible of development.

The location of the hydroelectric power sites given in Table 14 are shown on Figure 5.

It may be observed from the map that most of the undeveloped or potential sites are physically located in the Appalachian region. This is chiefly because of the favorable topography of the region for development of hydroelectric power, and especially for development of pumped-storage facilities.

The potential undeveloped hydroelectric sites listed in Table 14 may not all be feasible of development at one time. The projects need to be tested first for their general economic feasibility and then selections made from a few of the more favorable sites for a more detailed study to determine their final justification. Estimates of the value of power are needed in both cases, but they may be general for the first selection and specific for each individual project in the more detailed studies.

General estimates of at-market values of power are presented in Table 15. The estimates may or may not include adequate transmission and other adjustments for specific projects, but they are adequate for use in testing and selecting apparently feasible projects for more detailed and specific study.

The estimated power values are based upon the cost of power from an alternative steam-electric plant in each area. The alternative plant contains modern and efficient fuel-burning units of the size generally being installed in the area. The estimated values are divided into two components. One is based upon fixed costs which relate more nearly to the capacity component of the plant and is shown as "capacity value." The other relates more nearly to the quantity of energy generated and is shown as "energy value."

Two sets of capacity values are given. One is based upon Federal financing and the other on private financing. There are, however, no Federally financed alternatives in any of the 15 power supply areas. Private financing predominates in 14 of the areas and TVA financing predominates in Power Supply Area 20. "Federal Financing" values are included because the constructing agency, if Federal, as a matter of policy shows a comparison of the cost of project power with the cost of power from the cheapest alternative source using Federal financing. Other than for this purpose, the capacity values under "Private Financing" represent the capacity component of the value of power for each of the 15 power supply areas and are the estimates which should be used in determining the economic feasibility of the allocated electrical portion of any hydroelectric project.

TABLE 14
HYDROELECTRIC POWER RESOURES
(15 Power Supply Areas)

MAJOR GEOGRAPHIC DRAINAGE MAJOR RIVER BASIN HYDROELECTRIC PROJECT DEVELOPED UNDEVELOPED	MAP SYMBOL	RIVER	STATE	IN APPALACHIAN REGION	INSTALLED CAPACITY MW	AVERAGE ANNUAL GENERATION 10^3 MWH	USABLE POWER STORAGE 1,000 A.F.	GROSS POWER HEAD FT.	TYPE CONVENTIONAL, PUMPED STOR., COMBINED
GREAT LAKES-ST. LAWRENCE DRAINAGE									
LAKE ERIE BASIN									
CUYAHOGA FALLS	1-0.2	CUYAHOGA	OHIO	NO	0.2	0.4	N.A.	11	CONVENTIONAL
CHAUTAUQUA CR.	2-37	CHAUTAUQUA CR.	N.Y.	YES	37	108	[illegible]	[illegible]	CONVENTIONAL
CATTARAUGUS	3-0.5	CATTARAUGUS CR.	N.Y.	NO	0.5	2	N.A.	N.A.	CONVENTIONAL
GENESEE RIVER BASIN									
MILLS NO. 172	1-0.2	WISCOY CR.	N.Y.	YES	0.2	0.9	N.A.	58	CONVENTIONAL
WISCOY NO. 170	2-1.1	WISCOY CR.	N.Y.	YES	1.1	4.9	N.A.	104	CONVENTIONAL
PORTAGE	3-82	GENESEE	N.Y.	NO	[illegible]	[illegible]	[illegible]	410	CONVENTIONAL
MT. MORRIS 1/	4-[illegible]	GENESEE	N.Y.	NO	[illegible]	[illegible]	[illegible]	[illegible]	CONVENTIONAL
MT. MORRIS NO. 160	5-0.3	GENESEE	N.Y.	NO	0.3	2.9	N.A.	20	CONVENTIONAL
CANASERAGA	6-[illegible]	CANASERAGA CR.	N.Y.	NO	8	[illegible]	10	[illegible]	CONVENTIONAL
ROCHESTER NO. 26	7-3.0	GENESEE	N.Y.	NO	3	16	N.A.	25	CONVENTIONAL
ROCHESTER NO. 2	8-6.5	GENESEE	N.Y.	NO	6.5	51	U	91	CONVENTIONAL
ROCHESTER UPPER FALLS 1/	8A-[illegible]	GENESEE	N.Y.	NO	[illegible]	137	U	126	CONVENTIONAL
ROCHESTER NO. 5	9-38	GENESEE	N.Y.	NO	38	144	U	137	CONVENTIONAL
OSWEGO RIVER BASIN									
KEUKA	1-2.0	KEUKA LAKE	N.Y.	YES	2	6.4	6	380	CONVENTIONAL
WATERLOO	2-1.9	SENECA CANAL	N.Y.	NO	1.9	3.6	107	17	CONVENTIONAL
SENECA FALLS	3-8.0	SENECA	N.Y.	NO	8	11.5	U	50	CONVENTIONAL
NUMBER 1	4-0.7	FALL CR.	N.Y.	YES	0.7	5.3	N.A.	143	CONVENTIONAL
SHANK PLANT	5-0.3	OWASCO	N.Y.	NO	0.3	0.8	N.A.	21	CONVENTIONAL
AUBURN	6-0.5	OWASCO	N.Y.	NO	0.5	0.6	N.A.	16	CONVENTIONAL
AUBURN	7-0.7	OWASCO	N.Y.	NO	0.7	2.3	N.A.	21	CONVENTIONAL
WOOLEN MILL	8-0.8	OWASCO	N.Y.	NO	0.8	2.6	N.A.	21	CONVENTIONAL
BALDWINSVILLE	9-0.6	SENECA	N.Y.	NO	0.6	3.7	N.A.	8	CONVENTIONAL
OSWEGO FALLS	10-9.2	OSWEGO	N.Y.	NO	9.2	39	N.A.	18	CONVENTIONAL
FULTON	11-1.3	OSWEGO	N.Y.	NO	1.3	7.2	U	17	CONVENTIONAL
RIVERSIDE	12-0.8	OSWEGO	N.Y.	NO	0.8	5.3	U	23	CONVENTIONAL
GRANBY	13-3.7	OSWEGO	N.Y.	NO	3.7	21	U	24	CONVENTIONAL
MINETTO	14-8.0	OSWEGO	N.Y.	NO	8	40.6	U	17	CONVENTIONAL
HIGH DAM NO. 6	15-7.6	OSWEGO	N.Y.	NO	7.6	50	U	22	CONVENTIONAL
HIGH DAM NO. 6 1/	15A-1.4	OSWEGO	N.Y.	NO	1.4	4	U	22	CONVENTIONAL
VARICK	16-8.8	OSWEGO	N.Y.	NO	8.8	44.2	U	20	CONVENTIONAL
NORTH ATLANTIC DRAINAGE									
DELAWARE RIVER BASIN									
HAWK MOUNTAIN	1-21	E. BR. DELAWARE	N.Y.	YES	21	94	233	113	CONVENTIONAL
HANCOCK	2-10	E. BR. DELAWARE	N.Y.	YES	10	39	20	55	CONVENTIONAL
NARROWSBURG	3-16	DELAWARE	N.Y.	YES	16	[illegible]	9	40	CONVENTIONAL
WALLENPAUPACK	4-40	LACKAWAXEN	PA.	YES	40	77.6	158	370	CONVENTIONAL
SWINGING BRIDGE NO. 2	5-6.8	MONGAUP	N.Y.	NO	6.8	11.4	16	122	CONVENTIONAL
SWINGING BRIDGE NO. 1	6-5.0	MONGAUP	N.Y.	NO	5	6	10	122	CONVENTIONAL
MONGAUP FALLS	7-4.0	MONGAUP	N.Y.	NO	4	20	U	115	CONVENTIONAL
RIO	8-10	MONGAUP	N.Y.	NO	10	30.7	13	185	CONVENTIONAL
TOCKS ISLAND	9-1,300	DELAWARE	N.J.	YES	1,300	N.A.	N.A.	1,100	PUMPED STOR.
TOCKS ISLAND	10-46	DELAWARE	N.J.	YES	46	241.5	410	[illegible]	CONVENTIONAL
YARDS CREEK	11-338	YARDS CREEK	N.J.	NO	338	N.A.	U	700	PUMPED STOR.
BELVIDERE	12-170	DELAWARE	N.J.-PA.	NO	170	[illegible]	100	41	CONVENTIONAL
CHESTNUT HILL	13-40	DELAWARE	N.J.-PA.	NO	40	180	N.A.	25	CONVENTIONAL
WARREN MILL	14-0.7	MUSCONETCONG	N.J.	NO	0.7	4	N.A.	50	CONVENTIONAL
HUGESVILLE	15-0.4	MUSCONETCONG	N.J.	NO	0.4	1.9	N.A.	27	CONVENTIONAL
RIEGELSVILLE	16-0.3	MUSCONETCONG	N.J.	NO	0.3	1.1	N.A.	21	CONVENTIONAL
RIEGELSVILLE	17-60	DELAWARE	N.J.-PA.	NO	60	200	N.A.	30	CONVENTIONAL
LUMBERVILLE	18-60	DELAWARE	N.J.-PA.	NO	60	200	N.A.	30	CONVENTIONAL
YARDLEY	19-60	DELAWARE	N.J.-PA.	NO	60	200	N.A.	25	CONVENTIONAL
MILLVILLE	20-0.5	MAURICE	N.J.	NO	0.5	2.6	N.A.	114	CONVENTIONAL
SUSQUEHANNA RIVER BASIN									
ONEONTA	2-0.5	SUSQUEHANNA	N.Y.	YES	0.5	0.9	N.A.	N.A.	CONVENTIONAL
HALLSTEAD	4-12	SUSQUEHANNA	PA.	YES	12	52	U	[illegible]	CONVENTIONAL
FALLS	5-290	SUSQUEHANNA	PA.	YES	290	[illegible]	1,000	150	CONVENTIONAL
KEATING	6-375	W. BR. SUSQUEHANNA	PA.	YES	375	[illegible]	1,250	[illegible]	CONVENTIONAL
FIRST FORK	7-18	FIRST FORK	PA.	YES	18	[illegible]	120	164	CONVENTIONAL
KETTLE CREEK	8-16	KETTLE CR.	PA.	YES	16	[illegible]	90	[illegible]	CONVENTIONAL
LOCK HAVEN	9-80	W. BR. SUSQUEHANNA	PA.	YES	80	[illegible]	14	40	CONVENTIONAL
CAMMAL	10-85	PINE CR.	PA.	YES	85	[illegible]	[illegible]	[illegible]	CONVENTIONAL
HILLSGROVE	11-0.1	LOYALSOCK	PA.	YES	0.1	0.4	N.A.	N.A.	CONVENTIONAL
MUNCY	12-60	W. BR. SUSQUEHANNA	PA.	YES	60	[illegible]	N.A.	[illegible]	CONVENTIONAL
HALF FALLS	13-160	SUSQUEHANNA	PA.	YES	160	[illegible]	[illegible]	[illegible]	CONVENTIONAL
RAYSTOWN	14-270	RAYSTOWN BR.	PA.	YES	270	[illegible]	[illegible]	166	CONVENTIONAL
WARRIOR RIDGE	15-2.0	JUNIATA	PA.	YES	2	8.9	U	27	CONVENTIONAL
RAYSTOWN	16-2.1	RAYSTOWN BR.	PA.	YES	2.1	12	U	32	CONVENTIONAL
VINEYARD	17-24	JUNIATA	PA.	YES	24	[illegible]	18	[illegible]	CONVENTIONAL
MARYSVILLE	18-180	SUSQUEHANNA	PA.	YES	[illegible]	[illegible]	[illegible]	[illegible]	CONVENTIONAL
YORK HAVEN	19-2.5	SUSQUEHANNA	PA.	NO	2.5	16	N.A.	21	CONVENTIONAL
YORK HAVEN	20-20	SUSQUEHANNA	PA.	NO	20	115	U	22	CONVENTIONAL
SAFE HARBOR	21-231	SUSQUEHANNA	PA.	NO	231	920	63	54	CONVENTIONAL
SAFE HARBOR 1/	21A-120	SUSQUEHANNA	PA.	NO	120	-	-	52	CONVENTIONAL
HOLTWOOD	22-107	SUSQUEHANNA	PA.	NO	107	590	19	51	CONVENTIONAL
HOLTWOOD 1/	22A-[illegible]	SUSQUEHANNA	PA.	NO	[illegible]	[illegible]	-	[illegible]	CONVENTIONAL
MUDDY RUN	23-800	MUDDY RUN-SUSQU.	PA.	NO	800	N.A.	35.5	411	PUMPED STOR.
CONOWINGO	24-474	SUSQUEHANNA	MD.	NO	474	1,719	71	89	CONVENTIONAL

TABLE 14 (Cont'd)

MAJOR GEOGRAPHIC DRAINAGE MAJOR RIVER BASIN HYDROELECTRIC PROJECT DEVELOPED UNDEVELOPED	MAP SYMBOL	RIVER	STATE	IN APPALACHIAN REGION	INSTALLED CAPACITY MW	AVERAGE ANNUAL GENERATION 10^3 MWH	USABLE POWER STORAGE 1,000 A.F.	GROSS POWER HEAD FT.	TYPE CONVENTIONAL, PUMPED STOR., COMBINED
PATAPSCO RIVER BASIN									
OELLA	1-0.6	PATAPSCO	MD.	NO	0.6	3.6	N.A.	45	CONVENTIONAL
POTOMAC RIVER BASIN									
DAM NO. 5	11-1.1	POTOMAC	W.VA.	YES	1.1	7.6	U	17	CONVENTIONAL
DAM NO. 4	12-1.0	POTOMAC	W.VA.	YES	1	7.5	U	19	CONVENTIONAL
SHENANDOAH	13-0.9	S. FK. SHENANDOAH	VA.	NO	0.9	4.8	U	12	CONVENTIONAL
NEWPORT	14-1.4	S. FK. SHENANDOAH	VA.	NO	1.4	9	U	24	CONVENTIONAL
LURAY	15-1.6	S. FK. SHENANDOAH	VA.	NO	1.6	9	U	18	CONVENTIONAL
WARREN	16-0.8	SHENANDOAH	VA.	NO	0.8	4.2	U	12	CONVENTIONAL
MILLVILLE	18-2.8	SHENANDOAH	W.VA.	YES	2.8	14.7	U	27	CONVENTIONAL
HARPERS FERRY	19-0.8	POTOMAC	W.VA.	NO	0.8	6.1	U	36	CONVENTIONAL
DALECARLIA	24-3.0	POTOMAC CANAL	D.C.	NO	3	5	U	140	CONVENTIONAL
SOUTH ATLANTIC DRAINAGE									
JAMES RIVER BASIN									
FALLING SPRINGS	4-0.4	FALLING SPRGS. CR.	VA.	YES	0.4	1.5	N.A.	515	CONVENTIONAL
MEADOW CREEK	5-0.3	MEADOW CR.	VA.	YES	0.3	1.7	N.A.	606	CONVENTIONAL
BALCONY FALLS 2/	11-0.6	JAMES	VA.	NO	0.6	10	N.A.	15	CONVENTIONAL
CUSHAW	12-7.5	JAMES	VA.	NO	7.5	28	0.4	27	CONVENTIONAL
SNOWDEN	13-1	JAMES	VA.	NO	1	7	N.A.	13	CONVENTIONAL
BIG ISLAND	14-0.5	JAMES	VA.	NO	0.5	2.4	N.A.	12	CONVENTIONAL
HOLCOMB ROCK	15-1.9	JAMES	VA.	NO	1.9	9	N.A.	17	CONVENTIONAL
REUSENS	17-12	JAMES	VA.	NO	12	40	2.5	35	CONVENTIONAL
SCHUYLER NO. 2	20-0.5	ROCKFISH CR.	VA.	NO	0.5	1.7	N.A.	32	CONVENTIONAL
SCHUYLER NO. 1	21-0.4	ROCKFISH CR.	VA.	NO	0.4	1.4	N.A.	17	CONVENTIONAL
BYRD PARK 2/	25-1.1	JAMES	VA.	NO	1.1	7.6	N.A.	20	CONVENTIONAL
HOLLYWOOD 2/	28-2.0	JAMES	VA.	NO	2	21	N.A.	19	CONVENTIONAL
HOLLYWOOD	29-0.3	JAMES	VA.	NO	0.3	3.1	N.A.	42	CONVENTIONAL
PARK	30-2.1	JAMES	VA.	NO	2.1	12	N.A.	47	CONVENTIONAL
ROANOKE RIVER BASIN									
NIAGARA	1-2.4	ROANOKE	VA.	NO	2.4	12	0.2	60	CONVENTIONAL
SMITH MOUNTAIN	2-432	ROANOKE	VA.	NO	432	516	160	182	COMBINED
LEESVILLE	3-40	ROANOKE	VA.	NO	40	60	33	73	CONVENTIONAL
PINNACLES	7-10	DAN	VA.	NO	10	30	N.A.	701	CONVENTIONAL
WALNUT COVE	8-0.5	DAN	N.C.	YES	0.5	2.2	N.A.	18	CONVENTIONAL
MAYO	9-0.7	MAYO	N.C.	NO	0.7	2.6	N.A.	35	CONVENTIONAL
AVALON	10-0.6	MAYO	N.C.	NO	0.6	3	N.A.	35	CONVENTIONAL
PHILPOTT	11-14	SMITH	VA.	NO	14	25	111	162	CONVENTIONAL
MARTINSVILLE	12-1.3	SMITH	VA.	NO	1.3	5	N.A.	32	CONVENTIONAL

TABLE 14 (Cont'd.)

MAJOR GEOGRAPHIC DRAINAGE MAJOR RIVER BASIN HYDROELECTRIC PROJECT DEVELOPED UNDEVELOPED	MAP SYMBOL	RIVER	STATE	IN APPALACHIAN REGION	INSTALLED CAPACITY MW	AVERAGE ANNUAL GENERATION 10^3 MWH	USABLE POWER STORAGE 1,000 A.F.	GROSS POWER HEAD FT.	TYPE CONVENTIONAL, PUMPED STOR., COMBINED
ROANOKE RIVER BASIN (CONTINUED)									
[illegible]	[illegible]	SMITH	VA.	NO	12	[illegible]	[illegible]	[illegible]	CONVENTIONAL
SPRAY	14-1.0	SMITH	N.C.	NO	1	2.6	N.A.	32	CONVENTIONAL
SCHOOLFIELD	15-5.3	DAN	VA.	NO	5.3	17	N.A.	28	CONVENTIONAL
[illegible]	[illegible]	DAN	VA.	NO	[illegible]	[illegible]	[illegible]	[illegible]	CONVENTIONAL
RIVERSIDE	16-1.2	DAN	VA.	NO	1.2	3.9	N.A.	20	CONVENTIONAL
KERR	17-206	ROANOKE	VA.	NO	206	440	1,046	92	CONVENTIONAL
GASTON	18-178	ROANOKE	N.C.	NO	178	334	N.A.	63	CONVENTIONAL
ROANOKE RAPIDS	19-100	ROANOKE	N.C.	NO	100	343	33	37	CONVENTIONAL
YADKIN-PEE DEE RIVER BASIN									
BUFFALO COVE	1-280	BUFFALO CR.	N.C.	YES	280	[illegible]	1.6	800	COMBINED
ELK CREEK	2-330	ELK CR.	N.C.	YES	330	352	2.4	735	COMBINED
[illegible]	3-365	[illegible]	N.C.	YES	365	323	3.1	500	COMBINED
ELKIN	4-17	YADKIN	N.C.	YES	17	44	122	77	CONVENTIONAL
PILOT MOUNTAIN	8-0.5	ARARAT	N.C.	YES	0.5	1.6	N.A.	18	CONVENTIONAL
UPPER DONNAHA	[illegible]	YADKIN	N.C.	YES	40	131	222	122	CONVENTIONAL
[illegible]	10-34	YADKIN	N.C.	YES	34	76	135	65	CONVENTIONAL
IDOLS	11-1.4	YADKIN	N.C.	YES	1.4	5.9	N.A.	10	CONVENTIONAL
[illegible]	[illegible]	YADKIN	N.C.	YES	[illegible]	81	[illegible]	61	CONVENTIONAL
[illegible]	13-15	SOUTH YADKIN	N.C.	YES	15	29	[illegible]	46	CONVENTIONAL
HIGH ROCK	14-33	YADKIN	N.C.	NO	33	113	235	59	CONVENTIONAL
TUCKERTOWN	15-42	YADKIN	N.C.	NO	42	150	6.7	54	CONVENTIONAL
NARROWS	16-97	YADKIN	N.C.	NO	97	405	129	177	CONVENTIONAL
BASIN	[illegible]	YADKIN	N.C.	NO	[illegible]	[illegible]	1.8	[illegible]	PUMPED STOR.
FALLS	18-30	YADKIN	N.C.	NO	30	116	1.3	55	CONVENTIONAL
DUTCHMAN'S CREEK	19-375	PEE DEE	N.C.	NO	375	[illegible]	[illegible]	122	COMBINED
TATES TOP MOUNTAIN	20-287	PEE DEE	N.C.	NO	287	[illegible]	11	237	COMBINED
UPPER WOOD RUN	21-280	PEE DEE	N.C.	NO	280	[illegible]	3.8	312	COMBINED
TILLERY	22-84	PEE DEE	N.C.	NO	84	190	83	73	CONVENTIONAL
LOVES FORD	23-12	ROCKY	N.C.	NO	12	46	122	108	CONVENTIONAL
NANCES FORD	24-5.2	ROCKY	N.C.	NO	5.2	19	17	68	CONVENTIONAL
[illegible] FORD	25-79	ROCKY	N.C.	NO	79	90	220	135	CONVENTIONAL
COLEMAN'S CREEK	26-238	PEE DEE	N.C.	NO	238	262	9.2	141	COMBINED
McCOYS CREEK	27-280	PEE DEE	N.C.	NO	280	362	4.8	275	COMBINED
BLEWETT FALLS 2/	28-25	PEE DEE	N.C.	NO	25	136	32	51	CONVENTIONAL
GREATER BLEWETT 2/	28A-82	PEE DEE	N.C.	NO	82	367	179	80	CONVENTIONAL
MORVEN	29-22	PEE DEE	N.C.	NO	22	125	N.A.	34	CONVENTIONAL
HARTSVILLE	30-0.3	BLACK CR.	S.C.	NO	0.3	0.8	N.A.	10	CONVENTIONAL
SANTEE RIVER BASIN									
LAKE TAHOMA	1-0.2	BUCK CR.	N.C.	YES	0.2	1.1	N.A.	60	CONVENTIONAL
LONG ARM RIDGE	2-261	LINVILLE CR.	N.C.	YES	261	229	7.0	930	COMBINED
LAUREL KNOB	3-450	LINVILLE CR.	N.C.	YES	450	394	2.9	770	COMBINED
CHIMNEY MOUNTAIN	4-432	LINVILLE CR.	N.C.	YES	432	378	3	535	COMBINED
BRIDGEWATER	5-20	CATAWBA	N.C.	YES	20	49	172	141	CONVENTIONAL
RIPSHIN BRANCH	6-280	UPPER CR.	N.C.	YES	280	245	1.5	900	COMBINED
PHILLIPS BRANCH	7-280	RAIDERS CR.	N.C.	YES	280	245	1.8	750	COMBINED
BROWN MOUNTAIN	8-280	UPPER CR.	N.C.	YES	280	245	1.3	960	COMBINED
MORGANTON	9-41	CATAWBA	N.C.	YES	41	56	330	70	CONVENTIONAL
BATON	10-200	CATAWBA	N.C.	YES	200	175	8.5	105	COMBINED
ISLAND CREEK	11-174	CATAWBA	N.C.	YES	174	152	2.6	135	COMBINED
RHODHISS	12-26	CATAWBA	N.C.	YES	26	57	39	60	CONVENTIONAL
GUNPOWDER NO. 1	13-0.4	GUNPOWDER CR.	N.C.	YES	0.4	1	N.A.	75	CONVENTIONAL
LITTLE RIVER	15-0.5	UPPER LITTLE	N.C.	YES	0.5	0.5	N.A.	31	CONVENTIONAL
OXFORD	16-36	CATAWBA	N.C.	YES	36	94	52	92	CONVENTIONAL
MILLERSVILLE	17-0.3	LOWER LITTLE	N.C.	YES	0.3	0.2	N.A.	35	CONVENTIONAL
MILLERSVILLE	18-420	CATAWBA	N.C.	NO	420	368	10	163	COMBINED
ELK SHOALS	19-300	CATAWBA	N.C.	NO	300	131	9	163	PUMPED STOR.
LOOKOUT SHOALS	20-19	CATAWBA	N.C.	NO	19	33	4.8	78	CONVENTIONAL
COWANS FORD	21-350	CATAWBA	N.C.	NO	350	140	618	113	CONVENTIONAL
MOUNTAIN ISLAND	22-60	CATAWBA	N.C.	NO	60	104	19	78	CONVENTIONAL
HENRY RIVER	23-0.1	HENRY FK.	N.C.	YES	0.1	0.5	N.A.	35	CONVENTIONAL
SOUTH MOUNTAIN	24-241	JACOBS FK.	N.C.	YES	241	[illegible]	2.5	520	COMBINED
LINCOLNTON	25-15	SO. FK. CATAWBA	N.C.	NO	15	13	200	43	CONVENTIONAL
CAROLINIAN	26-1.7	SO. FK. CATAWBA	N.C.	NO	1.7	5.4	N.A.	30	CONVENTIONAL
DALLAS	27-0.2	SO. FK. CATAWBA	N.C.	NO	0.2	0.7	N.A.	20	CONVENTIONAL
SPENCER MOUNTAIN	28-0.6	SO. FK. CATAWBA	N.C.	NO	0.6	3.9	N.A.	25	CONVENTIONAL
McADENVILLE	29-0.4	SO. FK. CATAWBA	N.C.	NO	0.4	3.2	N.A.	20	CONVENTIONAL
BELMONT	30-110	SO. FK. CATAWBA	N.C.	NO	110	96	3.4	90	COMBINED
WYLIE	31-60	CATAWBA	S.C.	NO	60	137	150	75	CONVENTIONAL
SUGAR CREEK	32-42	CATAWBA	S.C.	NO	42	35	6.8	27	CONVENTIONAL
COURTNEY ISLAND	33-37	CATAWBA	S.C.	NO	37	112	24	56	CONVENTIONAL
[illegible]	33A-75	CATAWBA	S.C.	NO	75	22	N.A.	N.A.	CONVENTIONAL
FISHING CREEK	34-37	CATAWBA	S.C.	NO	37	139	37	61	CONVENTIONAL
DEARBORN	35-45	CATAWBA	S.C.	NO	45	133	1.6	71 8/	CONVENTIONAL
GREAT FALLS	36-25	CATAWBA	S.C.	NO	25	30	N.A.	71 3/	CONVENTIONAL
CEDAR CREEK	37-45	CATAWBA	S.C.	NO	45	132	N.A.	59 3/	CONVENTIONAL
ROCKY CREEK	38-28	CATAWBA	S.C.	NO	28	11	1.5	59 3/	CONVENTIONAL
WATEREE	39-56	WATEREE	S.C.	NO	56	221	175	83	CONVENTIONAL
LAKE LURE	40-3.6	BROAD	N.C.	YES	3.6	10	14	108	CONVENTIONAL
[illegible] CREEK	41-300	GREEN	N.C.	YES	300	263	[illegible]	745	COMBINED
TUXEDO	42-5.0	GREEN	N.C.	YES	5	21	2.1	297	CONVENTIONAL
SALUDA	43-40	GREEN	N.C.	YES	40	96	[illegible]	689	CONVENTIONAL
FOSTER	44-14	GREEN	N.C.	YES	14	16	12	115	CONVENTIONAL

TABLE 14 (Cont'd.)

MAJOR GEOGRAPHIC DRAINAGE MAJOR RIVER BASIN HYDROELECTRIC PROJECT DEVELOPED UNDEVELOPED	MAP SYMBOL	RIVER	STATE	IN APPALACHIAN REGION	INSTALLED CAPACITY MW	AVERAGE ANNUAL GENERATION 10^3 MWH	USABLE POWER STORAGE 1,000 A F	GROSS POWER HEAD FT	TYPE CONVENTIONAL, PUMPED STOR., COMBINED
SANTEE RIVER BASIN (CONTINUED)									
TURNER SHOALS	45-5.5	GREEN	N.C.	YES	5.5	15	1.3	89	CONVENTIONAL
[illegible]	[illegible]	BROAD	N.C.	YES	[illegible]	[illegible]	[illegible]	[illegible]	CONVENTIONAL
CLIFFSIDE	47-1.5	SECOND BROAD	N.C.	YES	1.5	2	N.A.	30	CONVENTIONAL
LAWNDALE	48-0.9	FIRST BROAD	N.C.	NO	0.9	2.6	N.A.	30	CONVENTIONAL
SHELBY	49-0.6	FIRST BROAD	N.C.	NO	0.6	1.3	N.A.	25	CONVENTIONAL
[illegible] CREEK	[illegible]	BROAD	S.C.	YES	[illegible]	[illegible]	[illegible]	[illegible]	COMBINED
GASTON SHOALS 2/	51-9.1	BROAD	S.C.	YES	9.1	32	N.A.	51	CONVENTIONAL
GREATER GASTON SHOALS 2/	[illegible]	BROAD	S.C.	YES	[illegible]	[illegible]	[illegible]	[illegible]	CONVENTIONAL
CHEROKEE FALLS 2/	52-1.8	BROAD	S.C.	YES	1.8	5	N.A.	20	CONVENTIONAL
GREATER CHEROKEE 2/	52A-[illegible]	BROAD	S.C.	YES	[illegible]	[illegible]	[illegible]	[illegible]	CONVENTIONAL
99 ISLANDS 2/	53-18	BROAD	S.C.	YES	18	64	N.A.	70	CONVENTIONAL
SPARTANBURG	54-1.0	SOUTH PACOLET	S.C.	YES	1	4.4	N.A.	58	CONVENTIONAL
CLIFTON NOS. 1, 2 and 3	55-3.0	PACOLET	S.C.	YES	3	7.9	N.A.	68	CONVENTIONAL
TROUGH	56-[illegible]	PACOLET	S.C.	YES	[illegible]	[illegible]	[illegible]	[illegible]	CONVENTIONAL
PACOLET 2/	57-0.8	PACOLET	S.C.	YES	0.8	2.7	N.A.	27	CONVENTIONAL
LOCKHART 2/	58-12	BROAD	S.C.	NO	12	70	N.A.	53	CONVENTIONAL
GREATER LOCKHART 2/	58A-[illegible]	BROAD	S.C.	NO	[illegible]	[illegible]	[illegible]	[illegible]	CONVENTIONAL
NEAL SHOALS 2/	59-5.2	BROAD	S.C.	NO	5.2	26	N.A.	26	CONVENTIONAL
STARTEX MILLS	60-1.2	MIDDLE TYGER	S.C.	YES	1.2	2.3	N.A.	54	CONVENTIONAL
BERRY SHOALS	62-2.0	SOUTH TYGER	S.C.	YES	2	3.4	N.A.	78	CONVENTIONAL
NESBIT	63-17	TYGER	S.C.	YES	17	[illegible]	[illegible]	[illegible]	CONVENTIONAL
BURNT FACTORY	64-10	TYGER	S.C.	YES	10	[illegible]	[illegible]	[illegible]	CONVENTIONAL
VAN PATTON	65-0.8	ENOREE	S.C.	YES	0.8	2.8	N.A.	60	CONVENTIONAL
BLAIRS	66-184	BROAD	S.C.	NO	184	[illegible]	[illegible]	[illegible]	CONVENTIONAL
PARR SHOALS	67-15	BROAD	S.C.	NO	15	75	N.A.	35	CONVENTIONAL
PARR SHOALS 1/	67A-5.0	BROAD	S.C.	NO	5	[illegible]	–	–	CONVENTIONAL
FROST SHOALS	68-183	BROAD	S.C.	NO	183	[illegible]	[illegible]	[illegible]	CONVENTIONAL
BIG FALLS	69-400	NO. FK. SALUDA	S.C.	YES	400	[illegible]	[illegible]	[illegible]	COMBINED
SALUDA (GREENVILLE)	70-2.4	SALUDA	S.C.	YES	2.4	8	N.A.	42	CONVENTIONAL
PIEDMONT	71-1.0	SALUDA	S.C.	YES	1	3.3	N.A.	24	CONVENTIONAL
UPPER PELZER	72-1.7	SALUDA	S.C.	YES	1.7	6	N.A.	25	CONVENTIONAL
LOWER PELZER	73-3.3	SALUDA	S.C.	YES	3.3	10	N.A.	42	CONVENTIONAL
HOLIDAYS BRIDGE	74-3.5	SALUDA	S.C.	YES	3.5	11	0.9	43	CONVENTIONAL
WARE SHOALS	75-4.3	SALUDA	S.C.	NO	4.3	19	N.A.	58	CONVENTIONAL
TUMBLING SHOALS	76-0.3	REEDY	S.C.	NO	0.3	0.9	N.A.	16	CONVENTIONAL
BOYDS MILL	77-1.0	REEDY	S.C.	NO	1	5.2	N.A.	49	CONVENTIONAL
BUZZARDS ROOST	78-15	SALUDA	S.C.	NO	15	47	174	65	CONVENTIONAL
SALUDA	79-208.8	SALUDA	S.C.	NO	208.8	225	1,614	189	CONVENTIONAL
LEXINGTON	80-0.3	12 MILE CREEK	S.C.	NO	0.3	1	N.A.	51	CONVENTIONAL
COLUMBIA 2/	81-11	CONGAREE	S.C.	NO	11	51	N.A.	33	CONVENTIONAL
COLUMBIA 2/ 1/	81A-1.6	CONGAREE	S.C.	NO	1.6	[illegible]	–	–	CONVENTIONAL
REREGULATOR	82-[illegible]	CONGAREE	S.C.	NO	[illegible]	[illegible]	15	42	CONVENTIONAL
BRADY LAKE	83-140	CONGAREE	S.C.	NO	140	[illegible]	[illegible]	[illegible]	COMBINED
SPILLWAY	84-1.9	SANTEE	S.C.	NO	1.9	13	1,100	50	CONVENTIONAL
BUCKINGHAM LANDING 11/	84X-[illegible]	SANTEE	S.C.	NO	[illegible]	[illegible]	[illegible]	[illegible]	CONVENTIONAL
JEFFRIES	85-133	COOPER CANAL	S.C.	NO	133	557	660	77	CONVENTIONAL
JEFFRIES 1/	85A-31	COOPER CANAL	S.C.	NO	31	–	–	–	CONVENTIONAL
ST. STEPHEN	86-84	SANTEE	S.C.	NO	84	[illegible]	[illegible]	[illegible]	CONVENTIONAL
SAVANNAH RIVER BASIN									
BURTON	1-6.1	TALLULAH	GA.	YES	6.1	20	85	114	CONVENTIONAL
NACOOCHEE	2-4.8	TALLULAH	GA.	YES	4.8	12	2	63	CONVENTIONAL
TERRORA	3-16	TALLULAH	GA.	YES	16	45	3.9	190	CONVENTIONAL
TALLULAH FALLS	4-72	TALLULAH	GA.	YES	72	163	0.3	603	CONVENTIONAL
WAR WOMAN	5-80	CHATTOOGA	S.C.	YES	80	[illegible]	[illegible]	182	CONVENTIONAL
SAND BOTTOM	6-66	CHATTOOGA	S.C.	YES	66	[illegible]	N.A.	141	CONVENTIONAL
ROGUES FORD	7-120	CHATTOOGA	GA.	YES	120	[illegible]	[illegible]	216	CONVENTIONAL
CAMP CREEK	8-100	CHATTOOGA	S.C.	YES	100	[illegible]	[illegible]	130	CONVENTIONAL
BATTLE CREEK	9-400	CHATTOOGA	S.C.	YES	400	[illegible]	[illegible]	[illegible]	COMBINED
TUGALO	10-45	TUGALO	GA.	YES	45	111	3.5	144	CONVENTIONAL
YONAH	11-23	TUGALO	GA.	YES	23	54	0.6	70	CONVENTIONAL
HORSEPASTURE	12-58	HORSEPASTURE	N.C.	YES	58	[illegible]	12	1,360	CONVENTIONAL
UPPER WHITEWATER	13-12	WHITEWATER	S.C.	YES	12	[illegible]	[illegible]	800	CONVENTIONAL
LOWER WHITEWATER	14-22	WHITEWATER	S.C.	YES	22	[illegible]	[illegible]	900	CONVENTIONAL
JOCASSEE	15-610	KEOWEE	S.C.	YES	610	[illegible]	[illegible]	[illegible]	COMBINED
KEOWEE	16-140	LITTLE & KEOWEE	S.C.	YES	140	[illegible]	[illegible]	[illegible]	CONVENTIONAL
NORRIS PLANT	17-0.9	12 MILE CREEK	S.C.	YES	0.9	4.2	N.A.	33	CONVENTIONAL
HARTWELL	18-264	SAVANNAH	GA.	YES	264	450	1,428	185	CONVENTIONAL
HARTWELL 1/	18A-66	SAVANNAH	GA.	YES	66	–	–	–	CONVENTIONAL
ROCKY RIVER	19-2.8	ROCKY	S.C.	NO	2.8	8.3	26	80	CONVENTIONAL
TROTTERS SHOALS	20-310	SAVANNAH	S.C.	NO	310	[illegible]	[illegible]	152	CONVENTIONAL
TALLOW HILL	21-172	BROAD	GA.	NO	172	[illegible]	[illegible]	190	CONVENTIONAL
ANTHONY SHOALS	22-100	BROAD	GA.	NO	100	[illegible]	[illegible]	[illegible]	CONVENTIONAL
CLARK HILL	23-282	SAVANNAH	GA.	NO	282	700	1,340	152	CONVENTIONAL
STEVENS CREEK	24-19	SAVANNAH	GA.	NO	19	90	11	28	CONVENTIONAL
AUGUSTA CANAL 11/	24X-12	SAVANNAH	GA.	NO	12	96	N.A.	38	CONVENTIONAL
BLANCHE	25-0.3	AUGUSTA CANAL	GA.	NO	0.3	0.3	N.A.	12	CONVENTIONAL
SIBLEY	26-2.1	AUGUSTA CANAL	GA.	NO	2.1	11	N.A.	30	CONVENTIONAL
ENTERPRISE	27-1.2	AUGUSTA CANAL	GA.	NO	1.2	6.2	N.A.	30	CONVENTIONAL
KING	28-2.3	AUGUSTA CANAL	GA.	NO	2.3	11	N.A.	33	CONVENTIONAL
VAUCLUSE	29-0.4	HORSE CR.	S.C.	NO	0.4	0.8	N.A.	50	CONVENTIONAL
GRANITEVILLE	30-0.5	HORSE CR.	S.C.	NO	0.5	1.2	N.A.	40	CONVENTIONAL
BURTONS LANDING	31-100	SAVANNAH	GA.	NO	100	273	90	48	CONVENTIONAL
STOKES BLUFF	32-60	SAVANNAH	GA.	NO	60	225	100	35	CONVENTIONAL

TABLE 14 (Cont'd)

MAJOR GEOGRAPHIC DRAINAGE / MAJOR RIVER BASIN / HYDROELECTRIC PROJECT / DEVELOPED / UNDEVELOPED	MAP SYMBOL	RIVER	STATE	IN APPALACHIAN REGION	INSTALLED CAPACITY MW	AVERAGE ANNUAL GENERATION 10^3 MWH	USABLE POWER STORAGE 1,000 A.F.	GROSS POWER HEAD FT.	TYPE CONVENTIONAL, PUMPED STOR., COMBINED
ALTAMAHA RIVER BASIN									
PORTERDALE	2-1.5	YELLOW	GA.	NO	1.5	5	N.A.	43	CONVENTIONAL
LLOYD SHOALS	3-14	OCMULGEE	GA.	NO	14	63	45	102	CONVENTIONAL
JULIETTE	4-1.0	OCMULGEE	GA.	NO	1	4.5	N.A.	19	CONVENTIONAL
BARNETT SHOALS 2/	8-2.8	OCONEE	GA.	NO	2.8	15	–	50	CONVENTIONAL
SINCLAIR	12-45	OCONEE	GA.	NO	45	160	111	93	CONVENTIONAL
EAST GULF DRAINAGE									
APALACHICOLA RIVER BASIN									
WARWICK	6-15	FLINT	GA.	NO	15	42	35	35	CONVENTIONAL
FLINT RIVER	8-5.4	FLINT	GA.	NO	5.4	47	4.5	29	CONVENTIONAL
HABERSHAM	10-1.6	SOQUE CR.	GA.	YES	1.6	4.7	N.A.	90	CONVENTIONAL
BUFORD	14-36	CHATTAHOOCHEE	GA.	YES	36	170	1,049	154	CONVENTIONAL
MORGAN FALLS 2/	15-17	CHATTAHOOCHEE	GA.	NO	17	68	3.2	57	CONVENTIONAL
WEST POINT	21-74	CHATTAHOOCHEE	GA.	YES	74	193	306	73	CONVENTIONAL
LANGDALE 2/	22-1.0	CHATTAHOOCHEE	GA.	YES	1	6.5	N.A.	16	CONVENTIONAL
RIVERVIEW 2/	23-0.5	CHATTAHOOCHEE	GA.	YES	0.5	3.6	N.A.	10	CONVENTIONAL
BARTLETTS FERRY	25-65	CHATTAHOOCHEE	GA.	NO	65	319	57	117	CONVENTIONAL
GOAT ROCK	26-26	CHATTAHOOCHEE	GA.	NO	26	119	5	67	CONVENTIONAL
OLIVER	27-60	CHATTAHOOCHEE	GA.	NO	60	255	6	63	CONVENTIONAL
NORTH HIGHLANDS	28-30	CHATTAHOOCHEE	GA.	NO	30	142	0.5	33	CONVENTIONAL
CITY MILLS 2/	29-0.2	CHATTAHOOCHEE	GA.	NO	0.2	0.3	N.A.	10	CONVENTIONAL
EAGLE & PHENIX 2/	30-4.1	CHATTAHOOCHEE	GA.	NO	4.1	25	N.A.	26	CONVENTIONAL
WALTER F. GEORGE	32-130	CHATTAHOOCHEE	GA.	NO	130	443	207	37	CONVENTIONAL
JIM WOODRUFF	33-30	APALACHICOLA	FLA.	NO	30	226	36	32	CONVENTIONAL
BLUE SPRINGS	34-0.2	BLUE SPRINGS	FLA.	NO	0.2	0.5	N.A.	14	CONVENTIONAL
ALABAMA-COOSA RIVER BASIN									
CARTERS	4-500	COOSAWATTEE	GA.	YES	500	572	161	404	COMBINED
ALLATOONA	9-74	ETOWAH	GA.	YES	74	152	285	146	CONVENTIONAL
CARTERSVILLE	10-0.6	ETOWAH	GA.	YES	0.6	2.5	N.A.	–	CONVENTIONAL
WEISS	16-88	COOSA	ALA.	YES	88	214	212	56	CONVENTIONAL
H. NEELY HENRY	17-73	COOSA	ALA.	YES	73	202	44	47	CONVENTIONAL
LOGAN MARTIN	18-128	COOSA	ALA.	YES	128	400	142	59	CONVENTIONAL
LAY	20-177	COOSA	ALA.	YES	177	639	33	33	CONVENTIONAL
MITCHELL 2/	24-73	COOSA	ALA.	YES	73	351	33	67	CONVENTIONAL

TABLE 14 (Cont'd)

MAJOR GEOGRAPHIC DRAINAGE / MAJOR RIVER BASIN / HYDROELECTRIC PROJECT / DEVELOPED / UNDEVELOPED	MAP SYMBOL	RIVER	STATE	IN APPALACHIAN REGION	INSTALLED CAPACITY MW	AVERAGE ANNUAL GENERATION 10^3 MWH	USABLE POWER STORAGE 1,000 A.F.	GROSS POWER HEAD FT	TYPE CONVENTIONAL, PUMPED STOR., COMBINED
ALABAMA-COOSA RIVER BASIN (CONTINUED)									
JORDAN 1/	25-100	COOSA	ALA.	YES	100	212	55	103	CONVENTIONAL
JORDAN 2/	[illegible]	COOSA	ALA.	YES	[illegible]	-	-	-	[illegible]
WALTER BOULDIN	26-225	COOSA DIVERSION	ALA.	YES	225	490	N.A.	127	CONVENTIONAL
[illegible]	[illegible]	TALLAPOOSA	ALA.	YES	[illegible]	[illegible]	[illegible]	[illegible]	CONVENTIONAL
CROOKED CREEK	[illegible]	TALLAPOOSA	ALA.	YES	[illegible]	[illegible]	[illegible]	[illegible]	CONVENTIONAL
[illegible]	[illegible]	TALLAPOOSA	ALA.	YES	[illegible]	[illegible]	N.A.	[illegible]	CONVENTIONAL
[illegible]	[illegible]	TALLAPOOSA	ALA.	YES	[illegible]	[illegible]	[illegible]	[illegible]	CONVENTIONAL
[illegible]	[illegible]	TALLAPOOSA	ALA.	YES	[illegible]	[illegible]	[illegible]	[illegible]	CONVENTIONAL
[illegible]	[illegible]	TALLAPOOSA	ALA.	YES	[illegible]	[illegible]	[illegible]	[illegible]	COMBINED
MARTIN 1/	33-154	TALLAPOOSA	ALA.	YES	154	321	1,375	146	CONVENTIONAL
MARTIN 2/	[illegible]	TALLAPOOSA	ALA.	YES	[illegible]	[illegible]	[illegible]	-	CONVENTIONAL
IRON CREEK	[illegible]	TALLAPOOSA	ALA.	YES	[illegible]	[illegible]	[illegible]	[illegible]	COMBINED
YATES	35-32	TALLAPOOSA	ALA.	YES	32	133	3.9	55	CONVENTIONAL
YATES 2/	[illegible]	TALLAPOOSA	ALA.	YES	[illegible]	-	-	-	CONVENTIONAL
THURLOW	36-58	TALLAPOOSA	ALA.	YES	58	253	2.8	96	CONVENTIONAL
THURLOW 2/	[illegible]	TALLAPOOSA	ALA.	YES	[illegible]	-	-	-	CONVENTIONAL
[illegible]	[illegible]	TALLAPOOSA	ALA.	YES	[illegible]	[illegible]	N.A.	[illegible]	CONVENTIONAL
[illegible]	[illegible]	TALLAPOOSA	ALA.	YES	[illegible]	[illegible]	N.A.	[illegible]	CONVENTIONAL
JONES BLUFF	39-68	ALABAMA	ALA.	NO	68	390	15	45	CONVENTIONAL
[illegible]	[illegible]	ALABAMA	ALA.	NO	[illegible]	[illegible]	[illegible]	[illegible]	COMBINED
MILLERS FERRY	41-76	ALABAMA	ALA.	NO	76	429	22	49	CONVENTIONAL
SILVER CREEK	[illegible]	ALABAMA	ALA.	NO	[illegible]	[illegible]	[illegible]	[illegible]	COMBINED
TOMBIGBEE-WARRIOR RIVER BASIN									
[illegible]	[illegible]	[illegible]	ALA.	YES	[illegible]	[illegible]	[illegible]	[illegible]	CONVENTIONAL
LEWIS SMITH	2-158	SIPSEY FK.	ALA.	YES	158	209	600	255	CONVENTIONAL
UPPER DEVELOPMENT	[illegible]	LOCUST FK.	ALA.	YES	[illegible]	[illegible]	[illegible]	[illegible]	CONVENTIONAL
[illegible]	[illegible]	LOCUST FK.	ALA.	YES	[illegible]	[illegible]	N.A.	[illegible]	CONVENTIONAL
[illegible]	[illegible]	LOCUST FK.	ALA.	YES	[illegible]	[illegible]	[illegible]	[illegible]	CONVENTIONAL
[illegible]	[illegible]	LOCUST FK.	ALA.	YES	31	[illegible]	N.A.	[illegible]	CONVENTIONAL
BANKHEAD	7-45	WARRIOR	ALA.	YES	45	188	26	69	CONVENTIONAL
HOLT LOCK AND DAM	8-40	WARRIOR	ALA.	YES	40	165	3.2	64	CONVENTIONAL
NORTH RIVER	[illegible]	NORTH	ALA.	YES	[illegible]	[illegible]	[illegible]	[illegible]	CONVENTIONAL
[illegible]	[illegible]	WARRIOR	ALA.	YES	[illegible]	[illegible]	N.A.	[illegible]	CONVENTIONAL
DEMOPOLIS	[illegible]	TOMBIGBEE	ALA.	NO	[illegible]	[illegible]	N.A.	[illegible]	CONVENTIONAL
OHIO RIVER DRAINAGE									
TENNESSEE RIVER BASIN									
NORRIS	[illegible]	CLINCH	TENN.	YES	[illegible]	[illegible]	[illegible]	[illegible]	CONVENTIONAL
MELTON HILL	[illegible]	CLINCH	TENN.	YES	[illegible]	[illegible]	[illegible]	[illegible]	CONVENTIONAL
[illegible]	[illegible]	[illegible]	TENN.	YES	[illegible]	N.A.	[illegible]	[illegible]	COMBINED
SOUTH HOLSTON	5-35	S. FK. HOLSTON	TENN.	YES	35	120	520	244	CONVENTIONAL
WATAUGA	6-50	WATAUGA	TENN.	YES	50	120	518	309	CONVENTIONAL
WILBUR	7-11	WATAUGA	TENN.	YES	11	25	N.A.	69	CONVENTIONAL
BOONE	8-75	S. FK. HOLSTON	TENN.	YES	75	190	150	125	CONVENTIONAL
FT. PATRICK HENRY	9-36	S. FK. HOLSTON	TENN.	YES	36	100	4	77	CONVENTIONAL
[illegible]	[illegible]	HOLSTON	TENN.	YES	[illegible]	[illegible]	[illegible]	[illegible]	CONVENTIONAL
CHEROKEE	11-120	HOLSTON	TENN.	YES	120	330	1,412	152	CONVENTIONAL
[illegible]	[illegible]	[illegible]	N.C.	YES	[illegible]	[illegible]	[illegible]	[illegible]	CONVENTIONAL
[illegible]	[illegible]	NOLICHUCKY	TENN.	YES	[illegible]	[illegible]	[illegible]	[illegible]	CONVENTIONAL
NOLICHUCKY	14-11	NOLICHUCKY	TENN.	YES	11	40	5	72	CONVENTIONAL
CASCADE	15-1.0	LITTLE	N.C.	YES	1	4.3	N.A.	90	CONVENTIONAL
MARSHALL	16-3.0	FRENCH BROAD	N.C.	YES	3	20.5	N.A.	34	CONVENTIONAL
FINES CREEK	[illegible]	PIGEON	N.C.	YES	[illegible]	[illegible]	[illegible]	[illegible]	CONVENTIONAL
WALTERS	18-109	PIGEON	N.C.	YES	109	352	20.2	863	CONVENTIONAL
HARTFORD	[illegible]	PIGEON	TENN.	YES	[illegible]	[illegible]	[illegible]	[illegible]	CONVENTIONAL
DOUGLAS	20-112	FRENCH BROAD	TENN.	YES	112	355	1,358	132	CONVENTIONAL
RACCOON MOUNTAIN	[illegible]	TENNESSEE	TENN.	YES	[illegible]	N.A.	N.A.	[illegible]	PUMPED STOR.
FORT LOUDON	22-128	TENNESSEE	TENN.	YES	128	530	79	72	CONVENTIONAL
TENNESSEE CREEK	23-11	E. FK. TUCKASEGEE	N.C.	YES	11	33.3	7.8	520	CONVENTIONAL
BEAR CREEK	24-9.0	E. FK. TUCKASEGEE	N.C.	YES	9	28.3	4.5	230	CONVENTIONAL
CEDAR CLIFF	25-6.4	E. FK. TUCKASEGEE	N.C.	YES	6.4	20.8	0.7	173	CONVENTIONAL
THORPE	26-22	W. FK. TUCKASEGEE	N.C.	YES	22	79.4	67.1	1,207	CONVENTIONAL
TUCKASEGEE	27-3.0	W. FK. TUCKASEGEE	N.C.	YES	3	10.6	N.A.	120	CONVENTIONAL
DILLSBORO	28-0.2	TUCKASEGEE	N.C.	YES	0.2	1.1	N.A.	12	CONVENTIONAL
BRYSON	29-1.0	OCONALUFTEE	N.C.	YES	1	6	N.A.	35	CONVENTIONAL
ESTATOAH	31-0.2	ESTATOAH CR.	GA.	YES	0.2	2.1	N.A.	624	CONVENTIONAL
FRANKLIN	32-1.0	LITTLE TENNESSEE	N.C.	YES	1	6.6	0.4	26	CONVENTIONAL
NANTAHALA	33-43	NANTAHALA	N.C.	YES	43	218	126	1,008	CONVENTIONAL
QUEENS CREEK	34-1.4	QUEENS CR.	N.C.	YES	1.4	4.9	0.5	999	CONVENTIONAL
FONTANA	35-203	LITTLE TENNESSEE	N.C.	YES	203	910	1,136	433	CONVENTIONAL
SANTEETLAH	36-45	LITTLE TENNESSEE	N.C.	YES	45	155	133	663	CONVENTIONAL
CHEOAH	37-110	LITTLE TENNESSEE	N.C.	YES	110	416	1.8	189	CONVENTIONAL
CALDERWOOD	38-122	LITTLE TENNESSEE	TENN.	YES	122	512	1.6	214	CONVENTIONAL
CHILHOWEE	39-50	LITTLE TENNESSEE	TENN.	YES	50	183	6.3	67	CONVENTIONAL
WATTS BAR	40-150	TENNESSEE	TENN.	YES	150	700	214	59	CONVENTIONAL
CHATUGE	41-10	HIWASSEE	TENN.	YES	10	30	222	126	CONVENTIONAL
MISSION	42-1.8	HIWASSEE	N.C.	YES	1.8	10.3	0.2	44	CONVENTIONAL
NOTTELY	43-15	NOTTELY	GA.	YES	15	40	167	174	CONVENTIONAL
HIWASSEE	44-117	HIWASSEE	N.C.	YES	117	250	353	244	COMBINED
APPALACHIA	45-75	HIWASSEE	N.C.	YES	75	460	36	442	CONVENTIONAL
[illegible]	[illegible]	HIWASSEE	TENN.	YES	[illegible]	[illegible]	[illegible]	[illegible]	CONVENTIONAL
BLUE RIDGE	47-20	TOCCOA	GA.	YES	20	35	183	151	CONVENTIONAL
OCOEE NO. 3	48-27	OCOEE	TENN.	YES	27	140	6	320	CONVENTIONAL

TABLE 14 (Cont'd)

MAJOR GEOGRAPHIC DRAINAGE / MAJOR RIVER BASIN / HYDROELECTRIC PROJECT / DEVELOPED / UNDEVELOPED	MAP SYMBOL	RIVER	STATE	IN APPALACHIAN REGION	INSTALLED CAPACITY MW	AVERAGE ANNUAL GENERATION 10^3 MWH	USABLE POWER STORAGE 1,000 A.F.	GROSS POWER HEAD FT	TYPE CONVENTIONAL, PUMPED STOR., COMBINED
TENNESSEE RIVER BASIN (CONTINUED)									
OCOEE NO. 2	49-21	OCOEE	TENN.	YES	21	130	N.A.	255	CONVENTIONAL
OCOEE NO. 1 2/	51-18	OCOEE	TENN.	YES	18	65	34	117	CONVENTIONAL
CHICKAMAUGA	52-108	TENNESSEE	TENN.	YES	108	760	221	48	CONVENTIONAL
NICKAJACK	54-97	TENNESSEE	ALA.	YES	97	666	21	39	CONVENTIONAL
GUNTERSVILLE	55-97	TENNESSEE	ALA.	YES	97	740	132	39	CONVENTIONAL
TIMS FORD	56-45	ELK CR.	TENN.	NO	45	64	240	144	CONVENTIONAL
WHEELER	58-356	TENNESSEE	ALA.	YES	356	1,292	328	49	CONVENTIONAL
WILSON	59-625	TENNESSEE	ALA.	YES	625	2,552	47	93	CONVENTIONAL
PICKWICK LANDING	60-216	TENNESSEE	TENN.	NO	216	1,300	239	55	CONVENTIONAL
KENTUCKY	61-160	TENNESSEE	KY.	NO	160	1,160	721	57	CONVENTIONAL
CUMBERLAND RIVER BASIN									
LAUREL	3-50	LAUREL	KY.	YES	50	56	195	253	CONVENTIONAL
WOLF CREEK	7-271	CUMBERLAND	KY.	YES	271	867	2,142	180	CONVENTIONAL
DALE HOLLOW	9-55	OBEY	TENN.	YES	55	127	496	147	CONVENTIONAL
CORDELL HULL	10-100	CUMBERLAND	TENN.	YES	100	350	54	59	CONVENTIONAL
GREAT FALLS	11-32	CANEY FORK	TENN.	YES	32	150	49	156	CONVENTIONAL
CENTER HILL	12-136	CANEY FORK	TENN.	YES	136	351	492	172	CONVENTIONAL
OLD HICKORY	13-100	CUMBERLAND	TENN.	NO	100	420	63	60	CONVENTIONAL
J. PERCY PRIST	14-28	STONES	TENN.	NO	28	70	124	102	CONVENTIONAL
CHEATHAM	16-36	CUMBERLAND	TENN.	NO	36	160	20	26	CONVENTIONAL
BARKLEY	17-130	CUMBERLAND	KY.	NO	130	582	259	57	CONVENTIONAL
KENTUCKY RIVER BASIN									
DIX DAM	4-28	DIX	KY.	YES	28	65	123	243	CONVENTIONAL
LOCK NO. 7	5-2.0	KENTUCKY	KY.	NO	2	11	N.A.	15	CONVENTIONAL
OHIO RIVER BASIN (MAIN STREAM)									
MARKLAND	11-81	OHIO	IND.-KY.	NO	81	450	17	35	CONVENTIONAL
OHIO FALLS	12-80	OHIO	IND.-KY.	NO	80	369	0	33	CONVENTIONAL
LICKING RIVER BASIN									
LITTLE MIAMI RIVER BASIN									
GREEN RIVER BASIN									
SALT RIVER BASIN									
KANAWHA RIVER BASIN									
HYDRO	1-0.2	NEW	N.C.	YES	0.2	0.9	N.A.	N.A.	CONVENTIONAL
SHARPE FALLS	2-0.2	NEW	N.C.	YES	0.2	1	N.A.	16	CONVENTIONAL
MOUTH OF WILSON	3-0.3	WILSON CR.	VA.	YES	0.3	0.6	N.A.	N.A.	CONVENTIONAL

TABLE 14 (Cont'd)

MAJOR GEOGRAPHIC DRAINAGE / MAJOR RIVER BASIN / HYDROELECTRIC PROJECT / DEVELOPED / UNDEVELOPED	MAP SYMBOL	RIVER	STATE	IN APPALACHIAN REGION	INSTALLED CAPACITY MW	AVERAGE ANNUAL GENERATION 10^3 MWH	USABLE POWER STORAGE 1,000 A.F.	GROSS POWER HEAD FT	TYPE CONVENTIONAL, PUMPED STOR., COMBINED
KANAWHA RIVER BASIN (CONTINUED)									
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
FRIES	6-3.1	NEW	VA.	YES	3.1	16	N.A.	40	CONVENTIONAL
BYLLESBY	7-22	NEW	VA.	YES	22	42	U	54	CONVENTIONAL
BUCK	8-3.5	NEW	VA.	YES	3.5	32	U	44	CONVENTIONAL
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
CLAYTOR	10-75	NEW	VA.	YES	75	190	95	116	CONVENTIONAL
RADFORD	11-0.8	LITTLE	VA.	YES	0.8	4	N.A.	40	CONVENTIONAL
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
HAWKS NEST	15-102	NEW	W.VA.	YES	102	495	U	164	CONVENTIONAL
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
GLEN FERRIS	21-4.7	KANAWHA	W.VA.	YES	4.7	38	N.A.	35	CONVENTIONAL
LONDON	22-14	KANAWHA	W.VA.	YES	14	80	U	24	CONVENTIONAL
MARMET	23-14	KANAWHA	W.VA.	YES	14	80	U	24	CONVENTIONAL
WINFIELD	24-15	KANAWHA	W.VA.	YES	15	100	U	27	CONVENTIONAL
BEAVER RIVER BASIN									
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
BEAVER FALLS	5-0.2	BEAVER	PA.	YES	0.2	0.8	N.A.	N.A.	CONVENTIONAL
MONONGAHELA RIVER BASIN									
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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LAKE LYNN	8-51	CHEAT	W.VA.	YES	51	139	20	82	CONVENTIONAL
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
DEEP CREEK	11-19	DEEP CR.	MD.	YES	19	27.2	93	437	CONVENTIONAL
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
ALLEGHENY RIVER BASIN									
KINZUA 1/	1-330	ALLEGHENY	PA.	YES	355	530	N.A.	798 2/	PUMPED STOR.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
PINEY 2/	3-29	CLARION	PA.	YES	29	73.9	13	83	CONVENTIONAL
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

N.A. NOT AVAILABLE.
U UNDER 5,000 ACRE FEET.
1/ ADDITIONAL GENERATING CAPACITY AT EXISTING PLANT.
2/ REDEVELOPMENT.
3/ EXISTING FEDERAL FLOOD CONTROL RESERVOIR.
4/ INCLUDES 120 MW OF REVERSIBLE GENERATING UNITS.
5/ REVERSIBLE GENERATING UNITS.
6/ INCLUDES 300 MW OF REVERSIBLE GENERATING UNITS.
7/ PUMPING AT 665' MINIMUM HEAD AND GENERATION AT 665' AND 798' MINIMUM HEAD.
8/ COMMON RESERVOIR.
9/ PROJECT WILL BE DROWNED OUT BY PROPOSED PROJECT.
10/ ALTERNATIVE PROJECTS.
11/ PROJECTS ADDED SUBSEQUENT TO INITIAL MAP SYMBOL DESIGNATION.

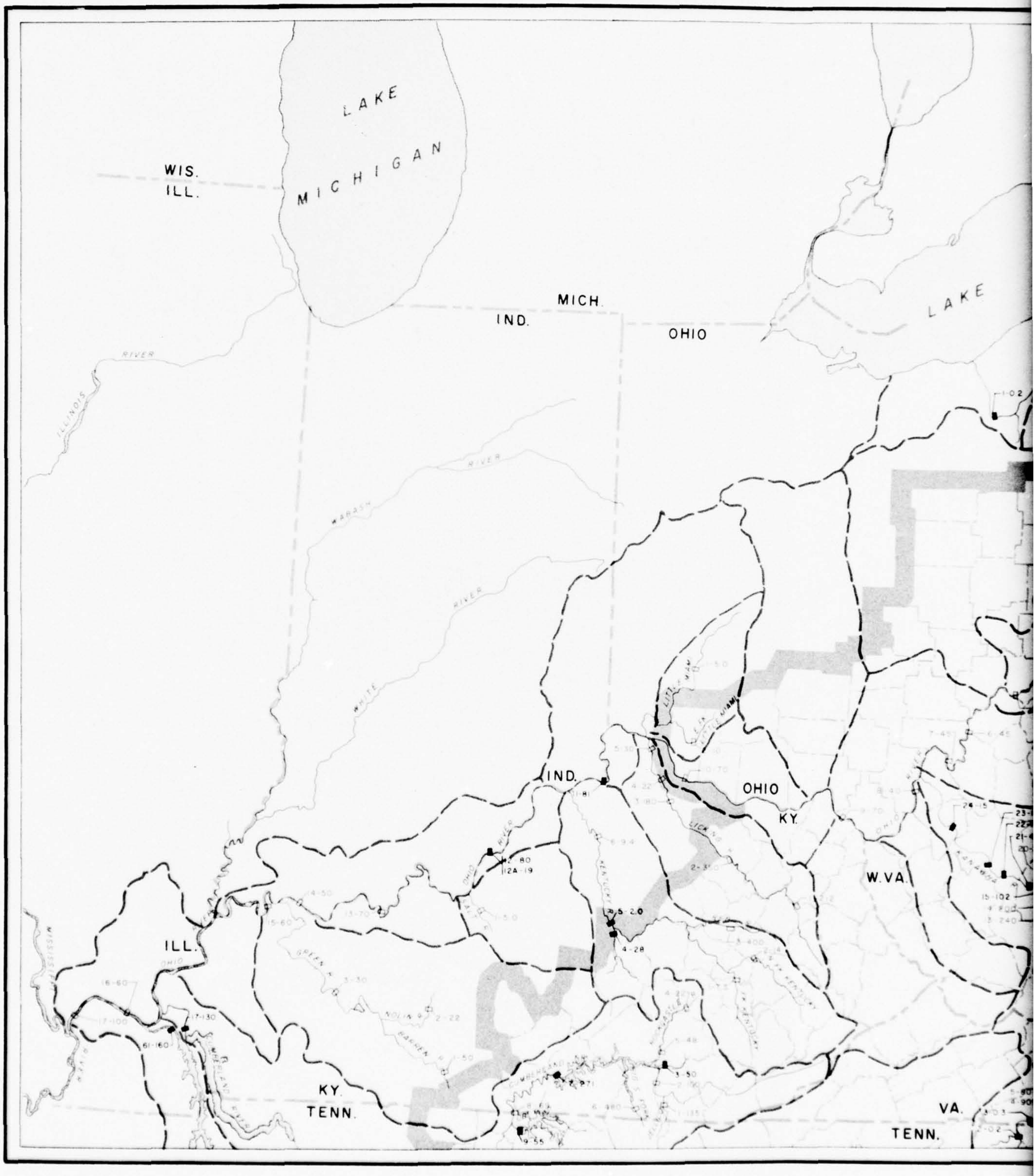
TABLE 15

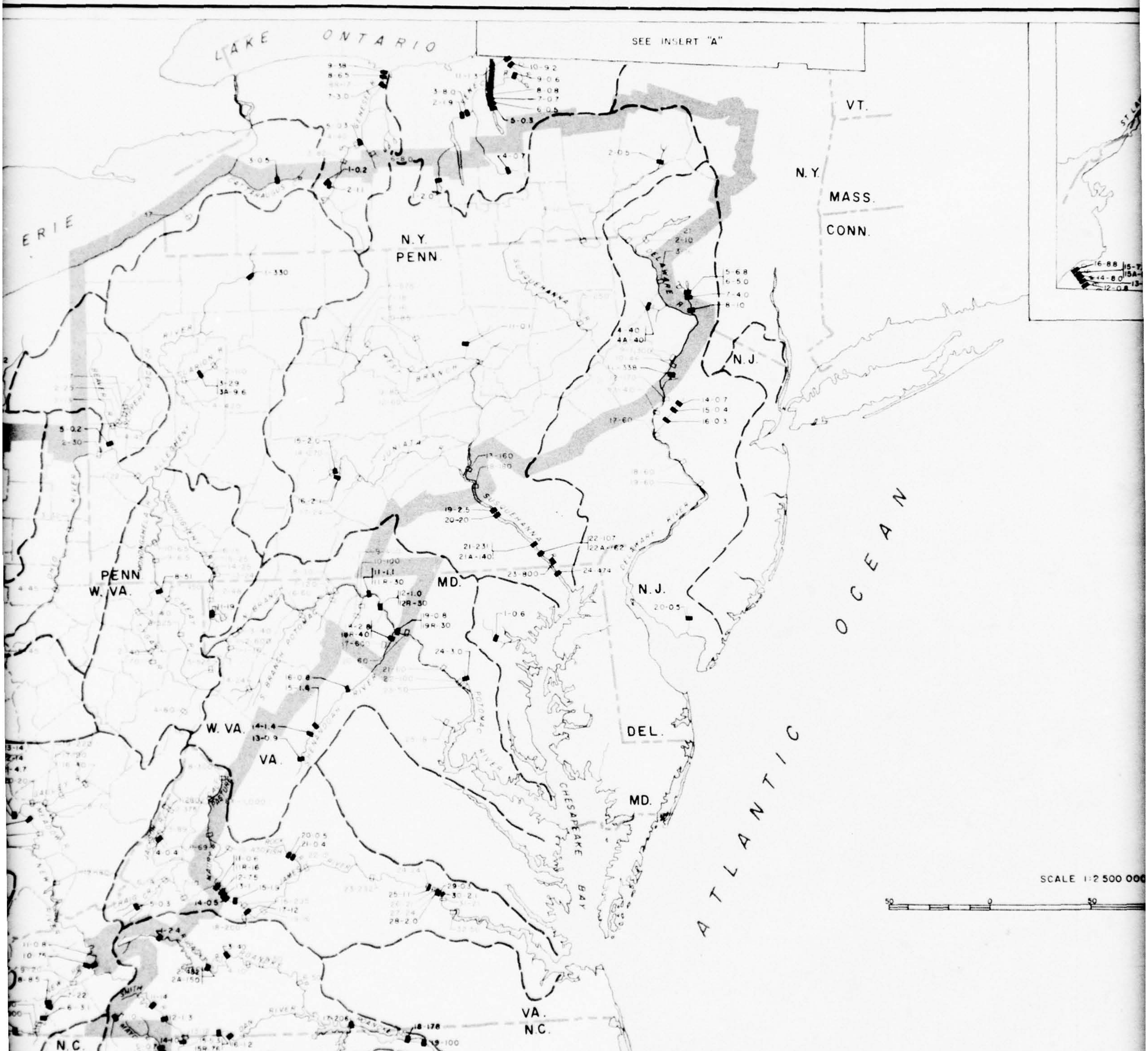
ESTIMATED AT-MARKET POWER VALUES
(15 Power Supply Areas)

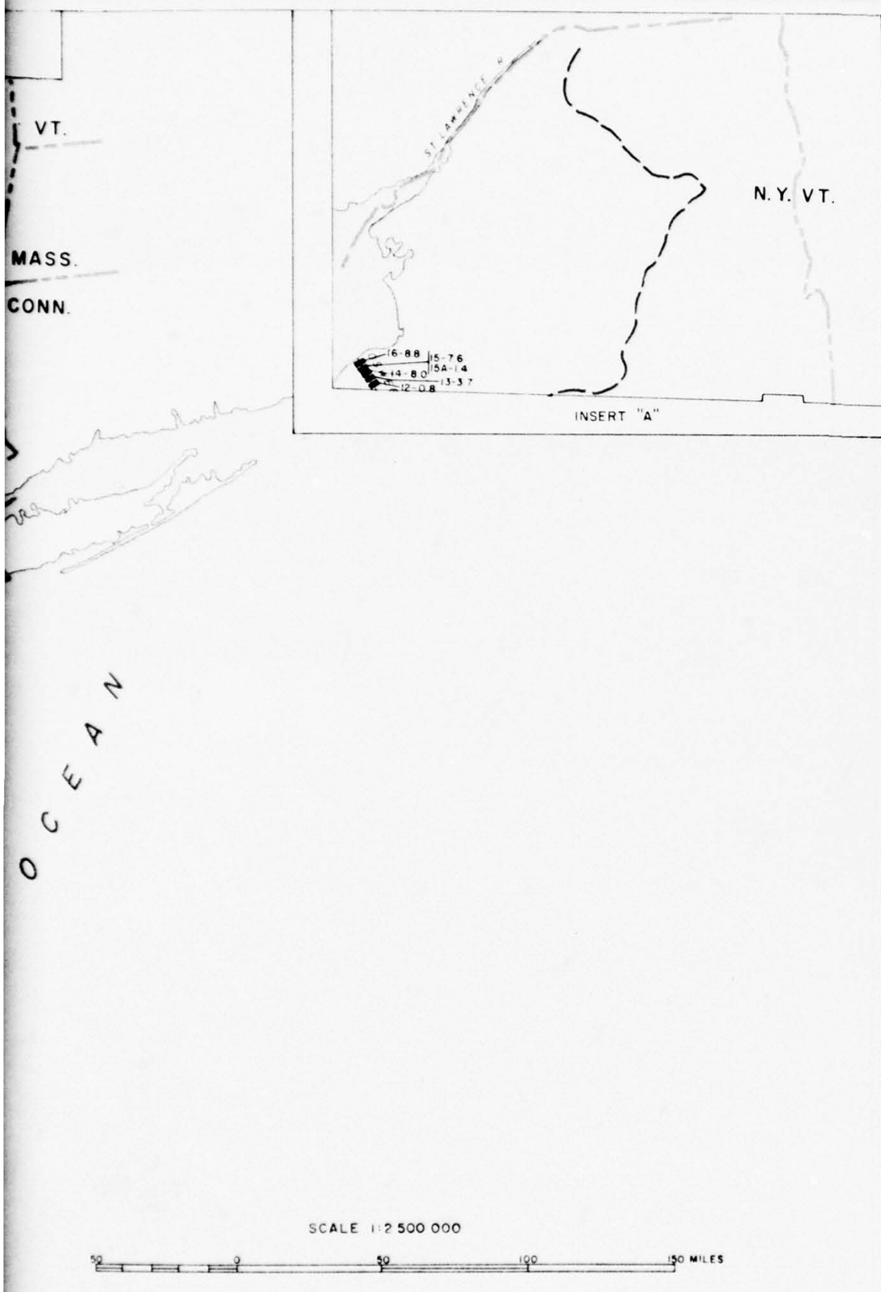
	Alternative Steam-Electric Plant Private Financing (Except Area 20)					Capacity Cost with Federal Financing
Power Supply Area	Unit Size (mw)	Capital Cost ($/kw)	Fuel Cost (¢/M Btu)	Capacity Value ($/kw/yr.)	Energy Value (Mills/kwh)	($/kw/yr.)
3	1,000	160	Nuclear	29.75	1.20	14.00
4	1,000	160	Nuclear	31.00	1.20	14.00
5	800	130	18.0	20.00	1.50	11.50
6	1,000	155	Nuclear	26.50	1.20	14.00
7	500	135	19.0	24.50	1.60	12.75
8	750	155	Nuclear	33.75	1.20	14.25
9	800	130	18.0	24.25	1.50	11.25
10	800	130	18.0	22.50	1.50	11.25
12	800	125	21.0	22.50	1.80	11.00
18	650	120	29.5	21.80	2.50	11.35
19	800	125	21.2	21.90	1.80	11.10
20	1,000	120	18.4	14.05	1.55	10.55
21	650	110	28.0	21.65	2.35	10.65
22	500	110	22.8	18.90	2.00	10.70
23	500	110	28.4	19.35	2.45	11.00

Notes

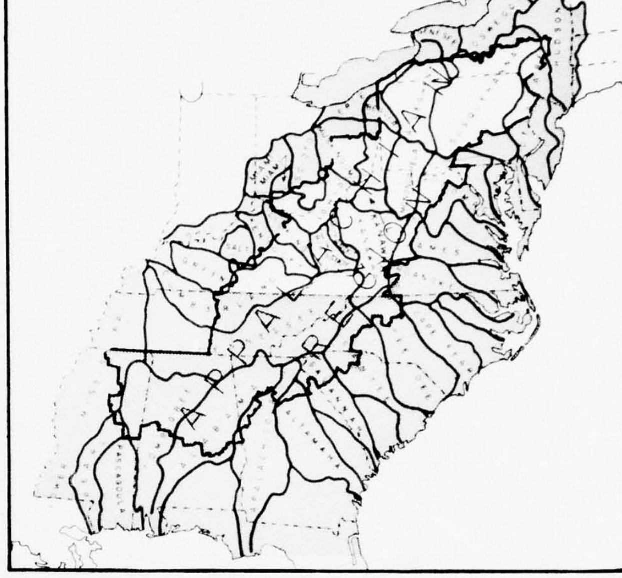
1. Cost data used in preparing power-value estimates have been adjusted to January 1, 1968, price levels.
2. Capital cost of alternative plants exclude step-up substation.
3. Values are based on typical two-unit thermal-electric plants.
4. Capacity value of $14.05 for P.S.A. 20 is based on TVA financing.
5. Values shown are suitable for screening purposes only.
6. Based on energy values shown, fuel for nuclear plants would be between 14 and 15 cents per million Btu.


LAKE
MICHIGAN
WIS.
ILL.
MICH.
IND.
OHIO
LAKE
IND.
OHIO
KY.
W.VA.
ILL.
KY.
TENN.
VA.
TENN.


LAKE ONTARIO
SEE INSERT "A"
ERIE
VT.
N.Y.
MASS.
CONN.
N.Y.
PENN.
N.J.
PENN
W. VA.
MD.
N.J.
W. VA.
VA.
DEL.
MD.
CHESAPEAKE BAY
ATLANTIC OCEAN
VA.
N.C.
N.C.
SCALE 1:2 500 000



KEY MAP



LEGEND

Appalachian Boundary

River Basin Boundary

County Line in Region

Existing Project (first figure indicates order of project from source of stream and second figure indicates installed capacity in mw) — 1-50

Potential Project — 2-100

Existing Project With Potential Additional Unit or Units indicated By The Letter Suffix "A" — 3-100, 3A-20

Existing Project With Potential Redevelopment Indicated By The Letter Suffix "R" — 4-50, 4R-200

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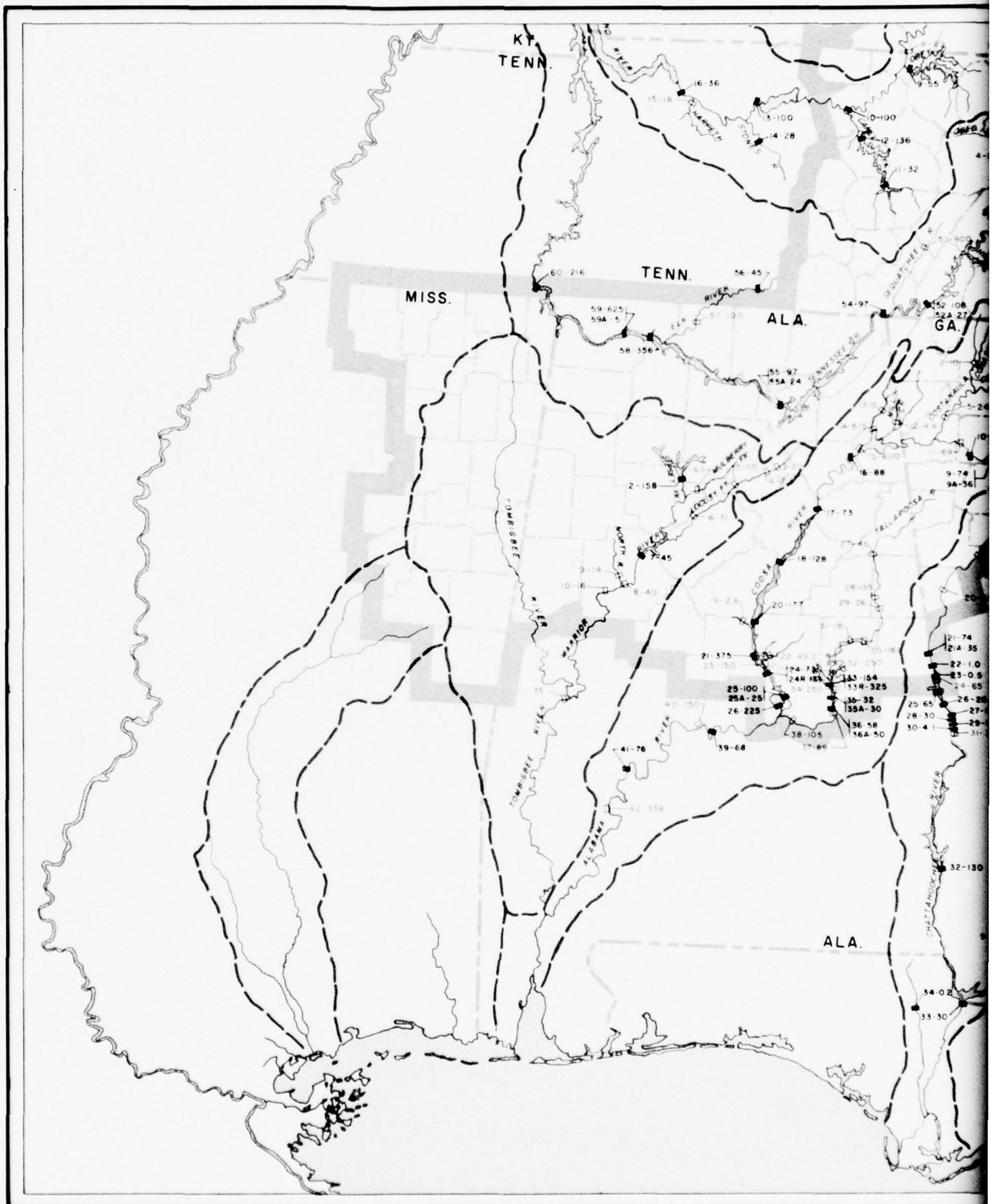
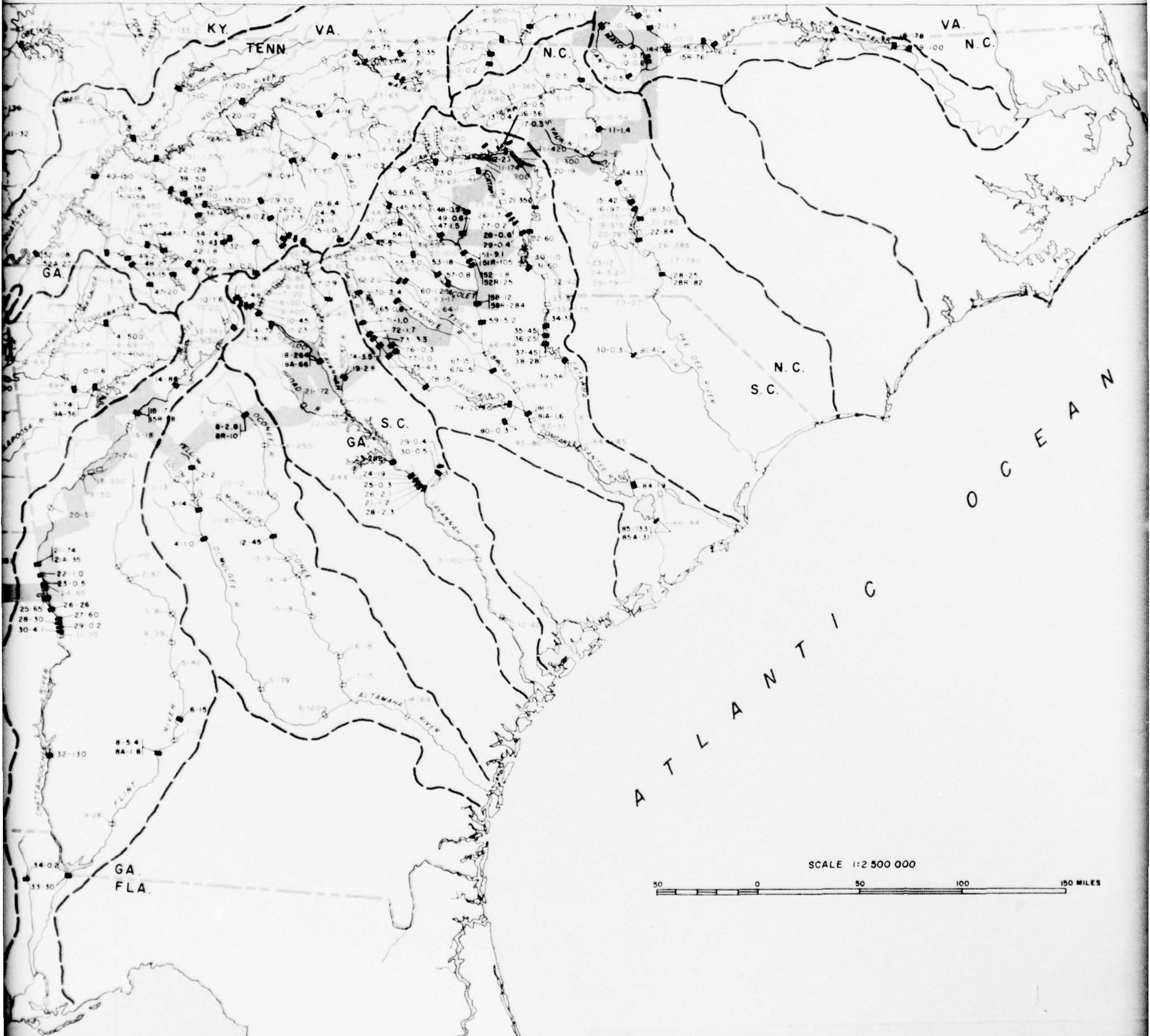
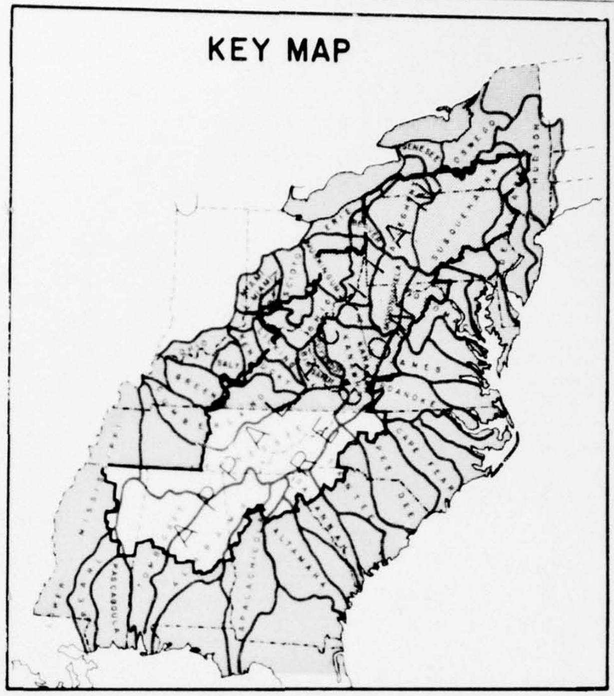


KY
TENN.
TENN.
MISS.
ALA.
GA.
ALA.
TOMBIGBEE RIVER
WARRIOR
COOSA RIVER
TALLAPOOSA R.
ALABAMA RIVER
CHATTAHOOCHEE RIVER
ELK RIVER
MULBERRY
LOCUST FK.
NORTH R.
SEQUATCHIE R.
60-216
56-45
54-97
59-625
59A-5
58-356
55-97
45A-24
16-36
15-18
13-100
14-28
10-100
12-136
11-32
2-158
7-45
9-14
10-16
8-40
16-88
17-73
18-128
20-177
21-375
23-150
25-100
25A-25
26 225
39-88
38-105
41-76
42-338
33-154
33R-325
35-32
35A-30
36 58
36A-50
21-74
21A 35
22-1.0
23-0.5
24 65
25 65
28-30
30-4.1
32-130
34-0.2
33-30
9-74
9A-36
9-55

2


KY.
TENN.
VA.
N.C.
VA.
N.C.
GA.
S.C.
GA.
N.C.
S.C.
GA.
FLA.
ATLANTIC OCEAN
ALTAMAHA RIVER
SCALE 1:2 500 000
50 0 50 100 150 MILES

KEY MAP



LEGEND

- Appalachian Boundary
- River Basin Boundary
- County Line in Region
- Existing Project (first figure indicates order of project from source of stream and second figure indicates installed capacity in mw) — 2-50
- Potential Project — 1-100
- Existing Project With Potential Additional Unit or Units indicated By The Letter Suffix "A" — 3-100, 3A-20
- Existing Project With Potential Redevelopment Indicated By The Letter Suffix "R" — 4-50, 4R-200

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CHAPTER VII - WATER REQUIREMENTS FOR HYDROELECTRIC AND THERMAL-ELECTRIC POWER GENERATION

Hydroelectric Power Generation

The hydroelectric plants listed in Table 14 in the previous section on Hydroelectric Power Resources show various operating heads ranging from about eight to 1,207 feet. The lower head projects require larger, heavier, slower operating, and bulkier units per kilowatt of capacity than the higher head units. Also, they require a considerably greater quantity of water to be passed through their water wheels to produce a kilowatt-hour of energy.

Assuming an over-all water wheel-generator efficiency of about 86 percent, a kilowatt-hour produced will equal about 0.073QH, where Q is the quantity of water required in cubic feet per second flow and H is the head in feet. In Table 16 is shown a range of water wheel requirements of flow in cubic feet per second per 1,000 kilowatts of power produced for various selected heads.

TABLE 16

WATER WHEEL REQUIREMENTS
HYDROELECTRIC GENERATING PLANTS

Head (feet)	Water Flow (cfs/1,000 kw)
10	1,370
25	548
50	274
75	183
100	137
150	91
200	69
300	46
500	28
750	18
1,000	14

Thermal-Electric Power Generation

Electric energy for the added electric power requirements of the future will be supplied mostly by large and modern steam-electric generating plants which will be constructed as the use of electricity increases. Some undoubtly, will be fossil-fuel fired and others atomic-fuel fired. For either or both, large quantities of heat will be rejected as waste in the thermal-cycle. This waste must be removed from the cycle as rapidly as it occurs in order to obtain full and efficient use of the thermal-mechanical conversion equipment. The best and cheapest method of dissipating and removing this heat from the plants is accomplished by pumping large quantities of water through surface condensers where the exchange is made from the nearly spent steam to the flow-through waters.

Modern steam-electric plants of several hundred thousand to several million kilowatts are being built with over-all efficiencies of around 40 percent for fossil-fuel fired boilers and from 32 to 34 percent for atomic-fuel fired boilers. These efficiencies may improve some as the state of the art progresses, but improvement beyond 40 percent will be slow and slight.

Water needs for condensing and cooling purposes at modern, large steam-electric generating plants for selected plant efficiencies and temperature exchanges are shown in Table 17. As an example of the use of the data in the table, the column with the 40 percent over-all efficiency plant is adopted for explanation and discussion. Convenient references of conversion factors are given in the Glossary.

One kilowatt-hour of electric energy contains the equivalent of 3,413 British thermal units of heat. Therefore, a plant operating at 40 percent efficiency would require an input of 8,533 British thermal units per kilowatt-hour.

TABLE 17

ENERGY CONVERSION AND COOLING WATER REQUIREMENTS
FOR MODERN, LARGE STEAM-ELECTRIC GENERATING PLANTS

Over-all plant efficiency	%	30	32	34	36	38	40	42	44	46
Plant total input energy requirement	Btu/kwh	11,377	10,666	10,038	9,481	8,982	8,533	8,126	7,757	7,420
Plant heat loss - 10% assumed to air	Btu/kwh	1,138	1,067	1,004	948	898	853	813	776	742
Energy input to turbine	Btu/kwh	10,239	9,599	9,034	8,533	8,084	7,680	7,313	6,981	6,678
Generator output	Btu/kwh	3,413	3,413	3,413	3,413	3,413	3,413	3,413	3,413	3,413
Heat rejected and wasted to water	Btu/kwh	6,826	6,186	5,621	5,120	4,671	4,267	3,900	3,568	3,265
Cooling water required for 10° temperature rise	gal/kwh	81.9	74.3	67.5	61.5	56.1	51.2	46.8	42.8	39.2
Cooling water required for 1,000,000 kilowatts										
For 10° temperature rise	cfs	3,040	2,760	2,510	2,280	2,080	1,900	1,740	1,590	1,450
For 12° temperature rise	cfs	2,530	2,300	2,090	1,900	1,730	1,580	1,450	1,330	1,210
For 14° temperature rise	cfs	2,170	1,970	1,790	1,630	1,490	1,360	1,240	1,140	1,040
For 16° temperature rise	cfs	1,900	1,720	1,570	1,430	1,300	1,190	1,090	990	910
For 18° temperature rise	cfs	1,690	1,530	1,390	1,270	1,160	1,060	970	880	810
For 20° temperature rise	cfs	1,520	1,380	1,250	1,140	1,040	950	870	800	730
Cooling water required for 1,000,000 kilowatt-hours										
For 10° temperature rise	acre-ft.	251	228	207	188	172	157	144	131	120
For 12° temperature rise	acre-ft.	209	190	173	157	143	131	120	109	100
For 14° temperature rise	acre-ft.	179	163	148	134	123	112	103	94	86
For 16° temperature rise	acre-ft.	157	143	129	118	108	98	90	82	75
For 18° temperature rise	acre-ft.	139	127	115	104	96	87	80	73	67
For 20° temperature rise	acre-ft.	126	114	104	94	86	79	72	66	60
Evaporation for 1,000,000 kilowatts 1/	cfs	29.2	26.5	24.1	21.9	20.0	18.3	16.7	15.3	14.0
Evaporation for 1,000,000 kilowatt-hours 1/	acre-ft.	2.41	2.19	1.99	1.81	1.65	1.51	1.38	1.26	1.16

Note: See Glossary of Equivalents, page B-60, for conversion quantities.

1/ Assuming complete dissipation of heat by evaporation.

Between the heat input and the energy output there are numerous and varying losses. These may be conveniently divided into two categories: those lost to the air or atmosphere, and those lost or dissipated to the water exchange. The first category includes boiler, flue, stack, and other heat losses to the air. For a modern steam-electric plant burning fossil fuel, losses to the atmosphere are about 10 percent of the plant heat input; 8,533 times 0.10 equals 853 British thermal units per kilowatt-hour. Losses to the atmosphere for a nuclear-fired plant are a lesser percentage and amount.

The second category of losses includes all other losses and dissipation of heat. It is 8,533 minus 3,413 and 853, or 4,267 British thermal units per kilowatt-hour. One U. S. gallon of water weighs 8.33 pounds. Therefore, to dissipate the 4,267 British thermal units per kilowatt-hour of heat lost or rejected would require 4,267 divided by 8.33, or 512.2 gallons of water with an exchange of one degree Fahrenheit (1° F.) temperature rise to the water. If 10° F. per pound are exchanged, the quantity of water required would be 51.2 gallons per kilowatt-hour.

A 1,000,000-kilowatt generating unit would produce 1,000,000 kilowatt-hours of energy for each hour of full unit operation. The heat loss or rejection for 1,000,000 kilowatt-hours would be 4,267 million British thermal units and this would require 51.2 million gallons of water for a heat exchange of 10° F.

Quantities of water required for the heat exchange from large generating units or plants are usually expressed either as flow in cubic feet per second or as volume in acre-feet. The water flow required to operate 1,000,000 kilowatts of capacity with a 1° F. temperature rise would be

$$\frac{4,267 \times 1,000,000}{3,600 \times 62.425}\text{, or 19,000 cubic feet per second.}$$

The water volume or quantity required in the production of 1,000,000 kilowatt-hours of electric energy with a 1° F. temperature rise would be

$$\frac{4,267 \times 1,000,000}{62.425 \times 43,560}\text{, or 1,570 acre-feet.}$$

For a 10° F. heat exchange the flow and quantity required with a 40 percent plant efficiency would be 1,900 cubic feet per second and 157 acre-feet, respectively.

Cooling for heat exchange may be accomplished also by evaporation. This requires a substantially smaller quantity of water, but it results in consumptive use as the water is evaporated and lost to the atmosphere. The quantity of water evaporated will vary over the seasons and from time-to-time depending on temperature, wind, humidity, vapor pressure, etc. The greatest demand-use for water will occur during the hottest and muggiest weather, usually in July or August, and generally at the same time the electric suppliers are experiencing system peak loads. The heat exchange per unit of water at such times will be the smallest quantity. For 95° F. weather the exchange will be about

1,040 British thermal units for each pound of water evaporated. The evaporation losses of water for 1,000,000 kilowatts, assuming complete dissipation by evaporation, amount to

$$\frac{4{,}267 \times 1{,}000{,}000}{3{,}600 \times 62.425 \times 1{,}040}, \text{ or 18.3 cubic feet per second.}$$

The quantity of water required as evaporation losses for 1,000,000 kilowatt-hours will be

$$\frac{4{,}267 \times 1{,}000{,}000}{62.425 \times 43{,}560 \times 1{,}040}, \text{ or 1.51 acre feet.}$$

CHAPTER VIII - CONCLUSIONS

Requirements for electric power in the Appalachian region and in the adjacent area are doubling about every 11 to 12 years. They will continue to increase at this rate, under normally expected growth conditions, until about 1980. Power requirements are expected to double about every 14 to 16 years between 1980 and 2000, and then double again from 2000 to 2020. Under "developmental benchmarks" conditions the requirements for the Appalachian region after 1980 may double about every 13 to 14 years until 2020.

About 124 million kilowatts more than the currently existing and committed supply will be needed by 1980 for the power requirements of the 15 power supply areas in which the Appalachian region is located. About 20 percent, or 25 million kilowatts, can be supplied from new hydroelectric projects consisting of some conventional and some pumped-storage developments. The remaining 99 million kilowatts can be from new fuel-electric capacity of the fossil- or nuclear-fuel fired types. The new supply needed beyond 1980 can be furnished at a ratio of about 20 percent hydroelectric to 80 percent fuel-electric as long as there are suitable sites remaining for economical development of sufficient hydroelectric power.

A large part of the tremendous amount of new supply needed for use in subsequent years, both hydroelectric and fuel-electric, may be physically located in the Appalachian region and the electric power transmitted to other areas both within and adjacent to the Appalachian region for ultimate consumption.

GLOSSARY

OF

ABBREVIATIONS, EQUIVALENTS, AND TERMS

As Used in this Appendix

ABBREVIATIONS

Btu	British thermal unit
cfs	Cubic feet per second
cu ft	Cubic feet
$(^{o})$-F	Degrees - Fahrenheit
ft	Foot, or feet
gal	Gallon
gal/kwh	Gallons per kilowatt-hour
gw	Gigawatt
gwh	Gigawatt-hour
kw	Kilowatt
kwh	Kilowatt-hour
mw	Megawatt
mwh	Megawatt-hour
10^3mwh	Thousand megawatt-hours
%	Percent
#	Pound

EQUIVALENTS

Energy

1 British thermal unit = 1 pound water changed 1 degree Fahrenheit temperature.
= 1/1,040.1 pound water evaporated to atmosphere at $95^{o}F$ ambient temperature.

1 kilowatt-hour = 1 kilowatt x 1 hour.
= 3,413 British thermal units.

1 megawatt-hour = 1,000 kilowatt-hours.

1 gigawatt-hour = 1,000 megawatt-hours.
= 10^3 megawatt-hours.
= 1,000,000 kilowatt-hours.

Power

1 kilowatt = Basic electric unit.

1 megawatt = 1,000 kilowatts.

1 gigawatt = 1,000 megawatts.
= 1,000,000 kilowatts.

Volumes

1 cubic foot water = 7.48 U. S. gallons.

1 acre-foot = 1 acre x 1 foot.
= 43,560 cubic feet.
= 43,560 square feet x 1 foot.
= 325,851 gallons.
= 2,719,233 pounds water.
= .5042 cubic feet per second flow.

Miscellaneous Quantities

1 U. S. gallon water = 8.33 pounds.

1 cubic foot per second = 1.98 acre-feet per day.
= 62.425 pounds water per second.
= 224,730 pounds water per hour.
= 5,393,500 pounds water per day.

TERMS

At-market value - see power value

Base load - see generating plant

Capacity - the load, expressed in kilowatts, which an electrical unit, facility, or system is rated to carry.

Capacity value - see power value

Conventional plant - see generating plant

Coordinated operation - the operation of two or more electric facilities or systems as a single facility or system.

Demand - the rate, expressed in kilowatts, at which electric energy is delivered or used.

Duration diagram - a curve of quantities plotted in descending order of magnitude against time intervals for a specified period. The coordinates may be in quantities or percentages.

Electric energy - a measure of work, expressed in kilowatt-hours.

Electric market - see power requirements

Electric power - a term used to express capacity and energy.

Electric system - physically connected electrical facilities operated as a unit under one control.

Energy value - see power value

Fossil-fuel plant - see generating plant

Fuel-electric plant - see generating plant

Generating plant - where electric capacity is used to produce electric energy.

Base load plant - one normally operated near constant capacity and high plant factor to carry base load.

Conventional plant - one conforming substantially to past and present conventional design and operating procedures.

TERMS (Cont'd)

Fossil-fuel plant - one using fossil fuel (coal, gas, or oil) as its source of energy.

Hydroelectric plant - one using falling water as its motive force.

Nuclear-fuel plant - one using a nuclear reactor to provide its source of energy.

Peak load plant - one which operates, usually at a low plant factor, to supply power during maximum load periods.

Pumped-storage plant - one using an arrangement whereby water is pumped from a lower to a higher elevation during periods of low load for use by reverse flow during system peak-load periods to produce electric energy for load.

Steam-electric plant - one using steam for its motive force - the steam may be produced by a boiler using either fossil or nuclear fuel.

Thermal-electric plant - one using heat as the source of energy for the prime mover.

Generating unit - an electric generator, together with its prime mover and appurtenances.

Head - the difference in elevation of water for use in developing hydroelectric power.

Heat rate - the thermal rating of a thermal-electric generating unit or plant - expressed in British thermal units of heat input per kilowatt-hour of energy output.

Heat rejected or wasted - heat in the thermal cycle, other than for atmospheric and friction losses, that is not converted into electric energy.

Interconnection - a tie permitting the flow of electric power between the facilities of two or more electric systems.

Load center - where load is assumed to be concentrated.

Load factor - the ratio of average load to peak load occurring over a designated period.

TERMS (Cont'd)

Network - a system of connected transmission circuits over which power can flow to and between principal points.

Nuclear power - see generating plant

Outage - a period during which the services of an electric facility are lost from use.

Peak load - maximum electrical demand during a given period.

Peak load plant - see generating plant

Plant factor - the ratio of the average load on a facility over a given period to the capacity or load rating of the facility.

Power pool - two or more interconnected electric systems operated on a coordinated basis to economize and improve service in supplying load.

Power supply - a source of electric power.

Power requirements - the needs of power supply for designated loads, uses, and losses.

Power value - the value measured by the cost of producing and delivering equivalent power at a given point from an alternative source.

At-market value - power delivered to step-down substations at load centers.

Capacity value - that part of the at-market power value assigned to the capacity component of the power.

Energy value - that part of the at-market value assigned to the energy component.

Pumped storage - see generating plant

Rating - a design limit placed on a unit or facility.

Steam-electric - see generating plant

Substation - a facility for switching or changing the voltage of electricity.

TERMS (Cont'd)

Thermal cycle - the complete heat conversions involved in converting fuel to electricity in a thermal-electric generating plant.

Thermal-electric plant - see generating plant

Transmission system - an interconnected group of transmission lines and associated equipment over which bulk power can be supplied to or transmitted between points.

Water for condensing - water used to pull steam out of the generator turbine by condensation.

BIBLIOGRAPHY

1. F.P.C. - Electric Power Statistics. Monthly pamphlets summarizing capacity and energy production by systems and groups of systems.

2. F.P.C. - Statistics of Electric Utilities. Annual information of financial and physical matter of individual utilities.

3. F.P.C. - Hydroelectric Power Resources of the United States, Developed and Undeveloped. Publication contains 13 tables with hydroelectric data.

4. F.P.C. Map - Principal Electric Facilities, 1966. Regional maps with transmission lines of 22 kv and above, and generating plants of 1,000 kw and above.

5. F.P.C. - National Power Survey, 1964. Report covering all aspects of the power industry.

6. F.P.C. - Prevention of Power Failures. Report prepared subsequent to Northeast Power Failure of November 9 and 10, 1965.

7. F.P.C. - Northeast Power Failure. Report on failure of November 9 and 10, 1965, with recommended measures aimed at preventing recurrence of massive blackout.

8. F.P.C. - Power Interruption - Pennsylvania-New Jersey-Maryland Interconnection. Report on failure of June 5, 1967.

9. F.P.C. - Power System Statements. Annual reports with semiannual and monthly supplements by utilities on physical facilities and operating quantities.

10. F.P.C. - Financial Statements. Annual reports with supplements by utilities on financial and physical quantities.

11. F.P.C. - Electric Power Supply and Requirements. Monthly summaries of data reported by major utilities and groups of utilities.

12. Resources for the Future - Water Demand for Steam-Electric Generation. Report on water requirements for condensing and other needs.

13. F.P.C. - Hydroelectric Power Evaluation - 1968.

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