

APPENDIXES

| | |
|--|-----|
| A. Statement of the Georgia Power Company | 117 |
| B. Statement of the Corp of Engineers | 119 |
| C. Report of Resources Advisory Board | 120 |
| D. Federal Power Commission Statement | 137 |
| E. Federal Power Commission Letter | 146 |
| F. Recreation Use Saturation Level | 148 |
| G. Development and Operation Costs | 159 |
| H. Existing Facilities Near River | 162 |
| I. Recreation Development Plan | 163 |
| J. Hiking Trail Construction | 165 |
| K. List of Campgrounds Near River | 166 |
| L. Proposed Multiple Use Management Requirements | 167 |
| M. Comments on Report | 172 |

Note: Other Appendix Material on file in the office of:

Forest Supervisor
Chattahoochee-Oconee National Forests
P. O. Box 1437
Gainesville, Georgia 30501

APPENDIX A

STATEMENT OF GEORGIA POWER COMPANY TO THE PUBLIC HEARING REGARDING THE
STUDY OF THE CHATTOOGA RIVER IN THE NATIONAL WILD AND SCENIC RIVER SYSTEM

HIGHLANDS, NORTH CAROLINA

DECEMBER 5, 1969

My name is Charles R. Minors. I am Assistant to the President of Georgia Power Company and a member of a policy group of our Company specifically charged with planning the orderly development of land and water resources under our control so as to provide the optimum use by the public consistent with the power supply responsibilities of the Company.

Georgia Power Company is aware, of course, of local interest as well as that of groups such as the Georgia Conservancy in the future of the Chattooga River. During the pendency and since the enactment of the Scenic and Wild Rivers Act, in which the Chattooga is included for study, we have several times advised interested parties that the Company would be cooperative with regard to plans which might be developed in the study. We here restate that intention. Additionally, we have discontinued timber harvest in the area.

Georgia Power Company's Chattooga ownership of land in the area amounts to a total of about 10,000 acres, in South Carolina and Georgia, and includes a large part of the land which would be necessary to establish a wild or scenic river under the present terms of the Act.

These lands were originally acquired for possible use for water impoundments in the development of the hydro-electric potential of the Chattooga River. From time to time, the Company has reviewed the feasibility of such development. Generally our reviews have followed the development pattern described in the report of the U. S. Study Commission, Southeast River Basins (Senate Document No. 51, 88th Congress.) Portions of that report pertaining to the

Chattooga have been summarized by the Resources Advisory Board Southeastern River Basins staff in a memorandum dated November 14, 1969.

The method of development outlined in the report would provide four dams (Camp Creek, Rogues Ford, Sand Bottom and Warwoman), utilizing approximately 750 feet of river head, and flooding a total of about 3,700 acres.

The total capability proposed is 366,000 kilowatts. In the opinion of Georgia Power Company, the development of these projects is presently marginal from the economic viewpoint. That this is the present case is emphasized because of several factors. Hydro-electric projects now under construction and those for which Federal Power Commission licenses are pending will bring on line substantial peaking capability during the 1970's. Other proposed Federal projects, authorized by Congress but as yet not scheduled or funded, might be accorded higher priority than Chattooga development. A feasibility analysis of the Chattooga projects in the context of costs which might prevail and the energy requirements of the area at some future indeterminate date would be highly conjectural.

The staff memorandum of November 14, 1969 suggests that an alternative to the previously studied projects on the Chattooga might be a plan for more comprehensive development embracing pumped storage as well as conventional hydro-electric installations and the siting of fuel-steam plants. Georgia Power Company has not made such a study and can offer no comment on this point at this time.

Georgia Power Company concurs in the suggestions of the staff memorandum that consideration of the several possible uses of the Chattooga resources be placed on a coincident time basis and that the matter be considered from the viewpoint of the overall most beneficial development of the Savannah River Basin.

APPENDIX B

DEPARTMENT OF THE ARMY
SAVANNAH DISTRICT, CORPS OF ENGINEERS
P. O. BOX 889
SAVANNAH, GEORGIA 31402

17 March 1970

Statement of Colonel John S. Egbert
District Engineer, US Army Engineer District
Savannah, Georgia

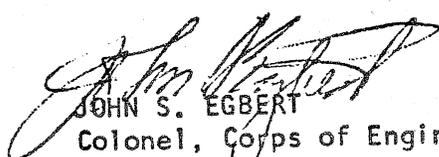
REPLY REFER TO

This statement relates to the proposal to include the entire Chattooga River in the National Wild & Scenic Rivers System.

The Chattooga River is a tributary in the Savannah River Basin System. The comprehensive water resources plan of development prepared by the Corps of Engineers and approved by Congress in the Flood Control Act of December, 1944 identified four sites on the Chattooga River for eventual construction as a part of the development of the Savannah Basin. These four sites are located at Camp Creek, mile 4.9, Rogues Ford, mile 11.0, Sand Bottom, mile 17.7 and Warwoman, mile 20.4. All would provide hydro^{electric} power and recreational benefits.

The Savannah District is presently engaged in a comprehensive review of the water resources of the Savannah River Basin to update the 1944 approved plan as required, to reflect present water resources needs and priorities. In connection with this study, and of specific relevance to the present proposal, we are placing greater emphasis on a more comprehensive planning approach including technological, sociological and environmental studies.

Our studies to date indicate that the environmental implications of this proposal are positive, since the Chattooga in its present state contributes a great deal to the scenic and aesthetic value of the region, generally possesses high water quality and would preserve under the conditions of the proposal one of the longest and free flowing rivers in the Southeast in its relative primitive and undeveloped state, and thus preserve a unique national environmental resource. Therefore, I support the proposal to preserve the Chattooga River as a "wild and scenic river." Management and development as set forth in the proposal would contribute to the overall water resources development and preserve the positive environmental impact of the Chattooga River on the entire Savannah Basin.


JOHN S. EGBERT

Colonel, Corps of Engineers
District Engineer

APPENDIX C

November 14, 1969

PROPOSED CHATTOOGA RESERVOIR PROJECTS
AND ELECTRIC POWER POTENTIAL

Prepared by Resources Advisory Board,
Southeast River Basins Staff

Background—Pursuant to Public Law 85-850, the U. S. Study Commission, Southeast River Basins prepared and submitted to the President and the Congress in September 1963 a Report On A Plan For Development Of The Land and Water Resources Of The Southeast River Basins, Senate Document No. 51, 88th Congress. The Study Commission was deactivated in December 1963.

Possibilities of hydroelectric power within the eight river basins in the Southeast River Basins area (map attached) was one of the functions considered in preparing the Study Commission comprehensive plan of development. The Chattooga River, a tributary of the Savannah Basin was included in the geographical area for which the plan was developed.

Role of the Resources Advisory Board—Pursuant to a proposal contained in the Study Commission Main Report (pp. 4-68, 69) the Resources Advisory Board, Southeast River Basins was established in 1964—"to encourage continued coordination among the Federal and State Governments in the field of land and water resources; to review programs and projects needed in the near and distant future; and to encourage the proper development of programs and facilities to obtain the desired results,"—within the Southeast River Basins area.

At a meeting of representatives of the Georgia Power Company, U. S. Forest Service, Bureau of Outdoor Recreation, Corps of Engineers, Federal Power Commission, and the Resources Advisory Board on October 24, 1969, in Atlanta, it was agreed that the Resources Advisory Board staff would prepare a resume of the U.S. Study Commission, Southeast River Basins proposal for the Chattooga Project. Copies of the resume would be distributed by the Board no later than November 18, 1969, to the private power company and Federal agencies identified above for their comment.

The resume has been prepared by the Resources Advisory Board staff substantially in consonance with the Study Commission plan for the Chattooga Project; also pursuant with a letter dated October 7, 1969, from Mr. Roy K. Wood, Regional Director, Bureau of Outdoor Recreation, and an outline entitled, "Chattooga Hydro-Electric Potential," distributed by the Bureau of Outdoor Recreation to the representatives at the indicated meeting on October 24; and in accordance with a letter dated October 28, 1969, from H. Van Dyke, Assistant Regional Director, Bureau of Outdoor Recreation, to Horace Morgan.

The resume follows:

Proposed Chattooga River Reservoir Projects

The Study Commission proposes construction of four dam and reservoir projects—Warwoman, Sand Bottom, Rogues Ford, and Camp Creek—on the

Chattooga River to help meet electric power needs and as a part of development of the basin. The power generated would be for meeting peak loads. Operation of the four potential projects would involve integration and coordination of the water supply, power, and related purposes since all units involve releasing of water from one reservoir down to another. Accordingly, they have been analyzed as one project, (maps attached).

FEASIBLE HYDROELECTRIC POWERPLANTS—CHATTOOGA PROJECT

| | Reservoir | | | Drainage area (sq. mi.) | Gross power head (ft.) | |
|-------------|------------------------------|-------------|-----------------|-------------------------|------------------------|---------------------|
| | Normal pool elevation* (ft.) | Area (acre) | Draw-down (ft.) | | | Capacity (acre-ft.) |
| Warwoman | 1,640 | 3,110 | 35 | 147,500 | 163 | 182 |
| Sand Bottom | 1,458 | 115 | 1 | 5,040 | 178 | 141 |
| Rogues Ford | 1,317 | 253 | 25 | 11,300 | 193 | 246 |
| Camp Creek | 1,071 | <u>260</u> | 20 | <u>15,000</u> | 258 | <u>180</u> |
| | | 3,738** | | 178,840 | | 749 |

*Operating elevation, feet, mean sea level

**Area flooded

Location—The proposed four units in the Chattooga Projects would be located on the lower Chattooga River in Oconee County, South Carolina, and Rabun County, Georgia.

Figure 4.26 diagrammatically indicates the location of the Chattooga Development.

The uppermost unit—Warwoman would be constructed first to provide streamflow regulation for the downstream power sites at Sand Bottom, Rogues Ford, and Camp Creek.

Sand Bottom unit would be located below Warwoman site. The power-plant would be located about a mile below the dam at the headwaters of the Rogues Ford reservoir site. Water from Sand Bottom reservoir would be diverted through a 1,600 foot long pressure tunnel which would cut through a bend in the Chattooga River.

Rogues Ford unit would be located 6.4 miles below the Sand Bottom unit, just north of U. S. Highway No. 76. By increasing the height of Camp Creek reservoir from an operating level of 1,021 feet to 1,071 feet, a loss of 50' in power head in Rogues Ford would occur, but it would be gained downstream in Camp Creek site. This would induce a total saving in construction costs, thereby improving the entire system.

Camp Creek unit would be 6.2 miles below the Rogues Ford site and about 5 miles northeast of Tallulah Falls, Georgia.

The Camp Creek powerplant would discharge into existing Tugaloo Reservoir at elevation 892 feet, while providing a gross power head of 180 feet. Part of this gross head would be obtained by utilizing a tunnel and penstock to gain the head in the river between Camp Creek and Tugaloo Reservoir. Thus, this plant would complete the continuous chain of four integrated units from Warwoman downward to Sand Bottom, Rogues Ford, Camp Creek; then into the existing Tugaloo and Yonah developments of the Georgia Power Company; and thence into Hartwell Reservoir.

PRINCIPLE BENEFITS OF EACH PROPOSED UNIT IN THE CHATTOOGA PROJECT

Hydroelectric Power Potentials

| Unit | Installed capacity (kw.) | Output average annual generation (million kw.-hr.) |
|-------------|--------------------------|--|
| Warwoman | 80,000 | 50.3 |
| Sand Bottom | 66,000 | 42.8 |
| Rogues Ford | 120,000 | 77.5 |
| Camp Creek | <u>100,000</u> | <u>75.0</u> |
| | 366,000 | 245.6 |

Annual equivalent primary tangible benefits for the four Chattooga power units would be \$9,228,000

Recreation benefits—Recreation facilities such as access roads, boat docks, trails, camping and parking areas, water supply, sanitary facilities, and related works would be provided.

| Unit | Recreation increase (user-day)* | Fish and wildlife increase (user-day)* |
|-------------|---------------------------------|--|
| Warwoman | 100,000 | 100 |
| Sand Bottom | 45,000 | -660 |
| Rogues Ford | 60,000 | -970 |
| Camp Creek | <u>55,000</u> | <u>3,300</u> |
| | 260,000 | 1,770 |

*User days annually by the year 2000.

Annual equivalent primary tangible benefits for recreation would be \$369,000; for fish and wildlife minus \$21,000.

Warwoman and Camp Creek Projects would provide power, recreation, and fish and wildlife usage. Sand Bottom and Rogues Ford Projects might adversely affect some types of fish and wildlife developments in the area because of the change from open stream to reservoir conditions. The reservoirs themselves, together with associated improved access, generally create fishing values greater than those of the stream reaches they replace. Facilities for access to fishermen and others would be provided. Eighteen water access areas would be located as follows: Warwoman—6, Sand Bottom—5, Rogues Ford—2, and Camp Creek—5. The water access areas would provide a wide distribution of facilities, at low cost, to make the reservoirs available to visitors from all over the region. They would be located at suitable sites for sportsmen and other and where construction work and land acquisition could be held to a minimum.

A main objective of the access sites would be to provide convenient points to reach the reservoirs for fish and wildlife management, reservoir gaging, sampling, and measurements, and other purposes outside the fields of recreation and fishing.

Ten recreation areas totaling 260 acres would be located as follows: Warwoman—2, Sand Bottom—2, Rogues Ford—2, and Camp Creek—4.

The total annual equivalent primary tangible benefits for power, recreation, fish and wildlife would be \$9,576,000.

Other Benefits—The four units in the Chattooga Project would provide benefits of primary and secondary nature attributable primarily to recreation and hydropower. Basinwide coordinated multiple-use operation of the four potential Chattooga River units with other units in the Savannah Basin with the relatively large storage regulation would decrease drawdowns and increase stability of operations and would greatly enhance power, recreation, fish and wildlife, navigation, and other uses beyond monetary values credited in the Study Commission plan.

Construction activities would provide a temporary impetus to the local economy. A substantial part of the construction costs would be spent locally for wages, services, and materials. Following completion of the project, home construction in the immediate vicinity of the reservoir should further benefit the construction trades and local economy.

Business, present and potential, would benefit from the increased recreational activity in the area. There would be increased sales of gasoline, food, lodging, beverages, and recreational supplies and equipment.

The hydropower development and regulated water would enhance the industrial development potential of the area and also facilitate the economic growth in general.

There would be an increase in land values in the vicinity of the reservoirs as a result of increased utility of the area and the improvements. This would broaden the tax base of the counties involved and result in increased tax revenues.

Flood control benefits--Benefits accruing to flood control from development of the Chattooga Project would not be significant.

Other influences--The four proposed reservoirs would inundate more than 3,700 acres of the lower Chattooga Valley that are now valuable for timber production and other uses and would also inundate a few fishing streams of good quality. But, they would, in addition to their specific uses, improve land values around their borders. The reservoirs themselves, together with associated access, generally create fishing values greater than those of the stream reaches they replace.

The initial impact from construction of the reservoirs would accrue to North Carolina, South Carolina, and Georgia. The benefits from the regulation that the reservoir system would provide would accrue to the Nation generally, but Georgia and South Carolina would receive the greater share of the benefits and costs.

The valley now has limited development, except for small areas of agricultural land, principally in the Warwoman site and some highways and roads. This series of units would be comparable to the developments on the Tugaloo and Tallulah Rivers which have created substantial recreation and fishing uses, even though development was expressly for hydro-electric power. However, available data indicate some damages could occur to fish and wildlife and to recreation by development of the 4 Chattooga River units.

The limited data on the Chattooga Project needs review in light of what has occurred as a result of quite similar developments on the Tallulah River.

The system of four reservoirs proposed would have both physical and economic effects on each unit in the system. This does not mean that the proposed system could not be improved by more thorough study or could not be developed in stages over a number of years. Further investigation may result in desirable adjustments in the proposed plan. Such studies should be made before any major segment of the plan is constructed. For example, pump storage multiplies the amount of peaking power that can be obtained from a limited stream flow--thus, pump storage as an alternative or supplemental means of power generation should be analyzed.

Chattooga Project Costs Related to Benefits
(\$1,000)

Investment*

| | |
|-----------------------|--------------|
| Joint Costs | 45,410** |
| Power facilities | 91,720 |
| Recreation facilities | <u>1,170</u> |
| Total | 138,300** |

*Investment costs are based on January 1, 1960 prices.

**Includes \$60,000 for fish and wildlife facilities to mitigate fish and wildlife losses.

Annual equivalent

| | |
|--|--------------|
| Investment | 4,979 |
| Operation, maintenance, and replacement | <u>944</u> |
| Subtotal | 5,923 |
| Total | <u>8,961</u> |

Allocation of Costs (\$1,000)

| | Investment | Annual equivalent | OM & R at year 2000 |
|------------|--------------|----------------------|------------------------|
| Power | 136,900 | *8,829 | 873 |
| Recreation | <u>1,400</u> | <u>122</u> | <u>71</u> |
| | 138,300 | *8,961 | 944 |

*Includes \$3,038,000 for taxes foregone

Hydroelectric Power Costs—Chattooga Project

| Project | Costs (\$) | | | Investment |
|-----------------|------------|---|------------------------|-------------|
| | Total | Annual equivalent | | |
| | | Operation maintenance, & replacements | Taxes fore- gone | |
| Chattooga Units | 8,839,000* | 873,000 | 3,038,000 | 136,900,000 |

*Includes \$3,038,000 for taxes foregone

Recreation Costs—Chattooga Project

| Project | Costs (\$)* | | |
|-----------------|-------------|---|------------|
| | Total | Annual Equivalent | |
| | | Operation maintenance, & replacements | Investment |
| Chattooga Units | 122,000 | 71,000 | 1,400,000 |

*Allocated costs only

Cost sharing—Chattooga Project

| Project | Investment costs non-Federal | Annual operation, maintenance, and replacement costs at year 2000, non-Federal |
|-------------------|---------------------------------|--|
| Chattooga Project | \$138,300,000 | \$947,000 |

Cost sharing data shown above are only suggestive. Further study may result in different costs and cost-sharing arrangements.

Investment costs—include all of the costs of project construction including lands and rights-of-way, estimated for the period of development through the year 2000.

Operation, maintenance, and replacement costs—shown as an annual cost, and estimated on the basis of development at year 2000.

Operation, maintenance, and replacements costs for use in cost-sharing arrangements are based on full use of the facilities that are specifically proposed. Since the ultimate need during the period studied will not normally develop until the year 2000, the full operation, maintenance, and replacement costs for the Chattooga facilities are shown as "OM & R at year 2000." The plan is designed to meet needs to the year 2000, so additional needs, costs, and benefits that may develop after that year have not been evaluated. This does not ignore or preclude the possibility of adding facilities after the year 2000, if the Chattooga project then exists and additional needs should be met.

Costs of Chattooga Development Related to Benefits by States
(thousands of dollars)

| Project | Georgia | | | South Carolina | | |
|-------------|----------------------------|------------------------------------|-----------------|----------------------------|------------------------------------|-----------------|
| | Benefits | Costs | | Benefits | Costs | |
| | Annual equiv- alent* | Total annual equiv- alent | Invest- ment | Annual equiv- alent* | Total annual equiv- alent | Invest- ment |
| Chattooga** | 9,576 | 8,961 | 138,300 | 9,576 | 8,961 | 138,300 |

*Primary tangible only; intangible and secondary benefits and impacts considered are presented in narrative.

**The project would be located in two States; total costs and benefits are shown in each State.

REGIONAL NEED FOR DAMS

Present and future needs for electric power—The per capita use of electricity in the SERB area in 1959 amounted to about 3,000 kilowatt-hours, which was below the average for the Southeastern region, which in turn, was below the national average.

Energy requirements in the SERB area in 1959 totaled about 15 billion kilowatt-hours with a demand of about 2.9 million kilowatts. Hydroelectric plants generated about 3 billion kilowatt-hours that year and had a peak capacity of nearly 900,000 kilowatts.

(In FY 1968, Clark Hill with 280,000 kilowatts capacity generated about 660,365,000 kilowatt-hours. Hartwell with 264,000 kilowatts capacity generated 486,000,000 kilowatt-hours in FY 1968. Since power was put on the line in 1954, Clark Hill has sold \$46,810,000 of power; since operation began in 1962 Hartwell has had revenue from power sales amounting to \$16,293,000.)

Within the Savannah basin, the Georgia Power Company at four electric powerplants on the Tallulah River and two plants on the Tugaloo River has installed capacity of 166,420 kilowatts. The Georgia Power Company and the City of Augusta in 1966 applied to FPC for a joint license to build a hydroelectric plant with 12,000 kw. capacity on the Augusta Canal.

Five other electric power plants in the Savannah Basin have an installed capacity of 26,100 kilowatts. In March 1967, Duke Power Company began construction of the Keowee-Toxaway power complex which will ultimately provide 10,408,000 kilowatts.

By 1975, the projected per capita use of about 7,600 kilowatt-hours per year will closely approach both the projected market area and national averages.

By 1975, electrical energy requirements in the SERB area are projected to 49 billion kilowatt-hours with a demand of about 9.1 million kilowatts. By 2000, total electrical requirements in the SERB area are expected to reach at least 119 billion kilowatt-hours with a demand for about 22 million kilowatts of capacity. Per capita use is expected to be at least 11,700 kilowatt-hours annually.

Facilities are included in 27 proposed projects in the Study Commission plan for the SERB area to provide additional installed hydroelectric power capacity of 2.5 million kilowatts and provide an additional production of 3.6 billion kilowatt-hours.

Area served from proposed Chattooga projects—The Savannah Basin exports power to market areas which include South Carolina, most of North Carolina, and most of Georgia.

The large interconnected power regions of the United States are subdivided into power supply areas embracing interconnected and coordinated electric facilities. The Southeast River Basins (SERB) are part of four power supply areas—21 through 24, as designated by the Federal Power Commission. The SERB area is connected to generating sources in adjacent areas through transmission lines ranging from 34,000 to 230,000 volts. Most of the Savannah Basin is in power supply areas 21 and 23.

Development of the units in the Chattooga Project would require construction of high-voltage transmission lines from the generating sources to load centers and ties to existing transmission grids. As the electric load grows, additional transmission and distribution lines would be constructed; substations would be enlarged; and new stations built to meet the shifting load patterns. Transmission and distribution of energy from source to user will pose no unusual problems.

The area served by the proposed Chattooga Project substantially depends upon whether public or private interests develop the project and would be contingent upon the marketing arrangement for the electric power generated.

Other potential damsites in the Savannah basin. Other potential projects including hydroelectric power as a purpose which are included in the Commission plan for development in the basin are:

| Project | Normal pool elevation (ft.) | Power storage (acre-feet) | Gross head (ft.) | Installed capacity (kw.) | Average annual generation (million kilowatt-hour) |
|-------------------------------------|-----------------------------|---------------------------|------------------|--------------------------|---|
| Horsepasture | 2,960 | 11,400 | 1,860 | 58,000 | 89 |
| Tallow Hill | 610 | 560,000 | 190 | 172,000 | 113 |
| Anthony Shoals | 410 | 113,000 | 70 | 100,000 | 61.5 |
| Trotter Shoals* | 475 | 63,000 | 145 | 310,000 | 471.4 |
| Lower Savannah: Burton's Landing | 103 | 90,000 | 48 | 100,000 | 345 |
| Stokes Bluff | 55 | <u>110,000</u> | <u>35</u> | <u>60,000</u> | <u>197</u> |
| | | 947,400 | 2,348 | 800,000 | 1,276.9 |

*Authorized, planning underway, construction not funded.

((The Secretary of the Interior in June 1966 filed a petition for intervention in Duke Power Company application to the Federal Power Company for license to build the Keowee-Toxaway Project (FPC Project No. 2503) and said in part—"The next step in the comprehensive plan for development of the Savannah Basin is the Trotters Shoals Project"—

—"Subsequently, power may be made available to applicant from the four Chattooga River plants (meaning—Warwoman, Sand Bottom, Rogues Ford, and Camp Creek), which comprise the next step in the comprehensive plan after Trotters Shoals."))

The more significant alternative unit considered but not included in the Study Commission plan was the upper Chattooga River project, a high head plant upstream from Warwoman reservoir. Data on that potential hydroelectric facility follows:

Upper Chattooga Project

| Project | Normal pool elevation (ft.) | Power storage (acre-ft.) | Gross head (ft.) | Installed capacity (kw.) | Average annual generation (million kilowatt-hour) |
|-----------------|-----------------------------|--------------------------|------------------|--------------------------|---|
| Upper Chattooga | 2,600 | 12,000 | 960 | 38,000 | 45.3 |

Other potential projects including hydroelectric power as a purpose which were considered and not included in the Commission plan for the Savannah basin are:

Other Potential Hydroelectric Powerplants

| Project | Normal pool elevation (ft.) | Power storage (acre-feet) | Gross head (ft.) | Installed capacity (kw.) | Average annual generation (million kilowatt-hour) |
|------------------|-----------------------------|-------------------------------|----------------------------|--------------------------------|---|
| Upper Whitewater | 2,800 | 5,000 | 800 | 12,000 | 19.6 |
| Lower Whitewater | 2,000 | <u>5,800</u> <u>10,800</u> | <u>900</u> <u>1,700</u> | <u>22,000</u> <u>34,000</u> | <u>28.2</u> <u>47.8</u> |

(It is not contended that the above cited power possibilities constitutes the total potential in the basin. Concerned power interests who operate in the Savannah basin may have under consideration other locations and other sources of electric power.)

SERB area, Savannah basin, and Chattooga River power production—present and future—The electric load of the SERB area and in the general southeastern electric power market area, at the time the study Commission performed its studies, had expanded beyond the ability of hydroelectric capabilities. Most of the energy requirements of the SERB area in the early 1960's were met from fuel-electric generating sources—70 percent, or 2,043,500 kilowatts; whereas 30 percent or 867,200 kilowatts were installed in hydroelectric plants. Thus, in the SERB area the installed capacity on December 31, 1960, exclusive of capacity not contributing to the public supply, totaled 2,910,700 kilowatts.

The Study Commission envisioned in its plan that by the year 2000, the SERB area would have a demand of approximately 22 million kilowatts. The 2.9 million kilowatts of installed capacity from 29 projects listed in the Study Commission Report would provide only about 13 percent of the total demand.

The following table indicates the location of the 29 projects within the SERB area.

Hydroelectric Power Supply Projects Under Construction
and Selected Potential Projects

| Basin and project | Installed capacity (thous.kw.) | Average annual energy (thousand kilowatt-hours) |
|--|-----------------------------------|---|
| Savannah basin: | | |
| Horsepasture | 58 | 88,500 |
| Jocassee | 150 | 77,100 |
| Newry-Old Pickens (Keowee) | 150 | 93,800 |
| Warwoman | 80 | 50,300 |
| Sand Bottom | 66 | 42,800 |
| Rogues Ford | 120 | 77,500 |
| Camp Creek | 100 | 75,000 |
| Hartwell | 330 | 450,000 |
| Trotters Shoals | 310 | 471,400 |
| Tallow Hill | 172 | 113,000 |
| Anthony Shoals | 100 | 61,500 |
| Burtens Landing | 100 | 345,000 |
| Stokes Bluff | <u>60</u> | <u>197,000</u> |
| Sub-total | 1,796 | 2,142,000 |
| Altamaha basin: | | |
| 5 projects | 388 | 670,000 |
| Apalachicola- Chattahoochee- Flint Basins: | | |
| 10 projects | 728 | 1,625,900 |
| Choctawhatchee- Perdido basins: | | |
| 1 project | <u>47</u> | <u>53,000</u> |
| Total | 2,959 | 4,492,600 |

(Of the 29 projects listed in the preceding table, the Corps of Engineers has since completed two of the projects and a third project under construction, as follows):

| Basin and project | Installed capacity (kilowatt) | Average annual energy (kilowatt-hour) |
|--|---------------------------------------|--|
| Savannah basin | | |
| Hartwell | 264,000 | 453,000,000 |
| Apalachicola- Chattahoochee- Flint basin | | |
| Walter F. George* | 130,000 | 494,093,000 (1968 FY) |
| West Point** | 73,375 (initial) | 191,000,000 |
| | 109,000 (ultimate installation) | 191,000,000 |

*Hartwell became operational in 1962, Walter F. George in 1963.

**West Point under construction, scheduled for completion in 1973.

Also, Trotters Shoals has been authorized, with an anticipated installed capacity of 310,000 kilowatts.

In addition, Duke Power Company has under construction the Keowee-Toxaway electric power complex, consisting of:

| <u>Facility</u> | <u>Kilowatts</u> |
|---|------------------|
| Lake Keowee-Toxaway hydroelectric (Newry-Old Pickens) | 140,000 |
| Jocassee pump storage (reversible pump turbines) | 305,000 |
| Oconee nuclear (3 units) | <u>2,658,900</u> |
| Total | 3,103,900 |

Eventually, Duke Power Company plans to install 7 million kilowatts of generating capacity in steam stations on the shores of Lake Keowee. Up to 3,000 mw. of steam electric power is in the immediate offing at that location. Two additional reversible pump turbines which will generate 305,000 kw. will be added to Jocassee at a later date.

Also, in 1966, the Congress authorized Duke Power Company to build a small coffer dam in the 1970's across the Savannah River at Middleton Shoals between Anderson County, South Carolina, and Elbert County, Georgia to provide cooling waters for a 2 million kilowatt steam plant.)

The electric energy requirements within the Savannah basin, excluding the Savannah River plant of the Atomic Energy Commission, are estimated to increase from 2.6 billion kilowatt-hours in 1959 to at least 6.5 billion kilowatt-hours by 1975 and to 16.4 billion kilowatt-hours by 2000. The demands, based on load factors of 59.6 percent for 1960, 62.4 percent for 1975, and 62.7 percent for 2000, are 504,500 kilowatts, 1,180,000 kilowatts, and 2,983,000 kilowatts, respectively.

Of the preceding indicated electric energy requirements of the basin, the 4 units in the Chattooga Project would generate an average annual output of 245.6 million kilowatt-hours, with an installed capacity of 366,000 kilowatts, if constructed according to the Study Commission plan. Thus, the hydropower potentials in the Chattooga Projects could meet only a portion of the power supply requirements.

The projected demands for electricity in the Southeast River Basins far exceed any potential which the area has for hydroelectric power development.

(The Chairman of the Federal Power Commission on November 7, 1969, in testimony before the Joint Committee on Atomic Energy said, "The projected growth of the electric utility industry during the next two decades may possibly require the construction of about 40 new hydroelectric installations of 100 megawatts or more, approximately 50 new pumped storage hydroelectric installations of 300 megawatts or more and about 90 fossil and 165 nuclear steam-electric plants on new sites. To meet these needs, the electric utility industry will need to install 1,000,000 megawatts of new capacity between 1970 and 1990."

The power official did not indicate where within the Nation the installations might be installed.)

Possibilities of potential impoundments on other rivers to satisfy power needs—

("The Nation's Water Resources," Water Resources Council, 1968, for the South-Atlantic Gulf Region, 24 distinct river systems extending from the Roanoke River Basin in Virginia to the Pearl River Basin in Mississippi, stated that—

"Federal hydroelectric projects currently under construction will provide 715,000 kw. of installed capacity, non-Federal projects about one million kw. Four other federally authorized projects on which construction has not been initiated but likely to be completed before 1980 will provide 580,000 kw. of hydropower. Non-Federal hydroelectric facilities may be developed that will provide 800,000 kw." The foregoing additional sources would total 3,095,000 kw.—if constructed. Thus, within the next

10 years in an area three times larger than the SERB area, only about 3 billion kilowatts of additional capacity would be provided from impoundments.

The South Atlantic-Gulf Region totals 276,000 square miles, the Southeast River Basins area includes 88,000 square miles.

Unless a significantly larger amount of TVA electric power sources are wheeled into the SERB area, the only additional probabilities of potential impoundments on other rivers to satisfy immediate power needs would be provided by the sources mentioned in the Nation's Water Resources quoted above.)

Alternative means of meeting electric power needs—

(one alternative would be to expand and improve the design for projects in the Study Commission Report as has been done by Duke Power Company at its Keowee-Toxaway power complex.

For example, the Study Commission plan which included consideration only of hydroelectric potentials estimated that Jocassee and Newry-Old Pickens Projects would have an installed capacity of 300,000 kilowatts and an average annual generation of 170.9 million kilowatt-hours. Within the area covered by those two projects, Duke Power Company has expanded facilities under initial construction or to be added later to include pump storage and steam stations that would provide 10,408,000 kilowatts as follows:

| <u>Facility</u> | <u>Initial construction</u> (kw.) | <u>To be added later</u> (kw.) | <u>Total</u> (kw.) |
|---------------------------------------|--------------------------------------|-----------------------------------|-----------------------|
| Jocassee (pump storage) | 305,000 | 305,000 | 610,000 |
| Newry-Old Pickens (Keowee-Toxaway) | 140,000 | — | 140,000 |
| Oconee Nuclear Station (3 units) | 2,658,000 | — | 2,658,000 |
| Steam stations | 3,000,000 | 4,000,000 | <u>7,000,000</u> |
| | | | 10,408,000 |

Much of the power produced by Duke at Keowee-Toxaway power complex will be transmitted to customers in North Carolina and would be well beyond the SERB area. Only a small portion of the 10,408,000 kilowatts expected from that power complex would be used in the SERB area under present arrangements.)

Preliminary studies by the Study Commission indicated that pump storage would be economically feasible at the Trotters Shoals site at such times as load requirements justify such additions to the project. It is estimated that about 290,000 kilowatts of pump storage capacity could be developed in connection with the Trotters Shoals Project. The Clark Hill Reservoir could act as an afterbay for pump storage units in the Trotters Shoals project.

Pump storage capacity could be installed in the four units of the Chattooga River Project and possibly at other sites.

The feasibility of pump storage depends on the availability of off-peak energy and on the physical advantages of each site. The annual load factor of electric usage is expected to increase in the future. This will tend to decrease the availability of off-peak energy that comes from steam-electric generation, which is in excess of base-load requirements.

In the Piedmont province, there are other potentials for classical pump storage units along the major streams transversing the area.

Part of the additional capacity required to meet the increasing electric load may be in nuclear-fueled plants. Advances in the use of fuel cells, thermal-electric, solar and other types of devices to convert heat to electric energy have been made. With further experimentation, development, and improvement some type of direct conversion unit may become competitive with the present steam-electric central station plant for base load operations. Nuclear-fueled plants have recently become more competitive with conventional steam-electric plants.

Developments in the application of aircraft-type jet engines as prime movers of electric generators indicate that they have a potential for peaking purposes. The initial cost per kilowatt is considerably less than conventional thermal plants, thus reducing fixed charges. The plants can be fully automated reducing operator costs offsetting to some degree the high costs of fuel. These installations have further advantages of site location, cooling water requirements, and load availability. One major disadvantage is the problem of noise suppression.

While not an alternative means of meeting electric power needs, emerging super-transmission grids of the 230/500 kilovolt range would connect major load centers with the major generating center—and thus would facilitate the interchange of power between areas. But, in addition, radial transmission lines to convert new generating sources, nuclear, conventional fuel, or hydroelectric, will be needed. However, transmission is not now and is not expected to be a major problem in meeting future electric requirements.

Direct current transmission may be in the picture by the year 2000.

USE OF THESE DATA

Substantially all of the information contained in the Chattooga River Project is based on data contained in the Report of the U. S. Study Commission, Southeast River Basins, 1963. Much of the information in that Report is based on 1960 conditions—thus is based on conditions of about 10 years ago. The Study Commission Report plus the information contained herein is intended to serve as a guide to resources development.

The Georgia Power Company, the indicated Federal agencies and other interests involved in the Chattooga River should consider providing additional inputs, if the information furnished herein is to reflect current conditions and plans of all entities.

Much of the costs, benefits and other data shown for the Chattooga Development should be construed as extraneous, unless corresponding information is concurrently submitted and considered for the Chattooga River as a Wild or Scenic River. Otherwise, it would be inconsistent to furnish elements of the power and recreation plan indicated above, but not have a comparable wild or scenic river plan--so that the two plans may be equated. Further, if other plans are prepared, identical period of analysis and evaluation procedure should be agreed to at an early date for the two plans--wild (or scenic river) and the Chattooga Development.

Some inconsistencies and inadequacies are likely to occur when selected material is taken out of the context as in this instance when the Chattooga Development has been extracted from a comprehensive plan for the Savannah Basin. It would be more appropriate to consider the Savannah Basin and the Southeast River Basins area in the aggregate rather than disaggregating the Chattooga Development.

The power, recreation and other interests should give consideration to the advisability of or need for rearranging the sequence, content, and format of this resume which has been compiled substantially pursuant to an outline proposed by the Bureau of Outdoor Recreation, Regional Office, Atlanta.

