Committee on Resources

Witness Testimony

Testimony of
VICTOR S. REZENDES
Director
Energy, Resources, and Science Issues
Resources, Community, and Economic Development Division
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Mr. Chairman and Members of the Subcommittee:

Thank you for the opportunity to report today on the results of our work on issues surrounding the production and marketing of power from federal hydroelectric plants in the Southeast. Over a major portion of the nation, the U.S. Army Corps of Engineers (Corps) and the Department of the Interior's Bureau of Reclamation operate hydroelectric power plants at federal water projects to produce energy, and the Department of Energy's five power marketing administrations market the electricity generated. Concerned about the maintenance and repair of the power plants operated by the Corps in the Southeast, you asked us to examine the extent to which (1) these power plants are experiencing outages and (2) the current planning and budgeting processes allow the Corps to perform timely and effective repairs and rehabilitations of its hydroelectric assets. Separately, we will also report in the next several months on the accounting and ratemaking practices of the power marketing administrations.

In our review, we focused on 11 of the Corps' 23 hydroelectric power plants that generate the power marketed by the Southeastern Power Administration (Southeastern). These 11 plants provided about 71 percent of Southeastern's revenues in fiscal year 1995. We also performed more detailed case-study analyses of 2 of the 11 plants that had experienced lengthy outages stemming from design and technical problems; the results of these case studies are presented in appendixes III and IV.

In summary, Mr. Chairman, our principal points are the following:

- Federal hydroelectric power plants in the Southeast have experienced significant outages, ranging from a few days to several years in duration and degrading the reliability of the Corps' hydroelectric system. The availability of these plants to generate electricity declined from about 95 percent in 1987 to 87 percent in 1995--a trend that is paralleled in the Corps' hydroelectric power plants nationwide. According to Corps officials, these outages occur because of the way the power plants are operated and because the plants are aging. Also, these officials said, a few of the plants suffer problems with the way the equipment is designed and installed. As a result of these outages, Southeastern has lost revenues and raised the wholesale electric rates it charges its customers.

- Although the Corps recognizes that long-term, comprehensive planning and budgeting systems are needed to identify and fund key repairs and rehabilitation at its hydroelectric power plants, especially in the current environment of static or declining budgets, its funding decisions are not based on such systems. The Corps gives priority to routine, ongoing maintenance. When the power plants experience unplanned outages, the Corps frequently performs repairs that are reactive and short-term. For the extensive repairs and rehabilitation that eventually become essential, the Corps budgeting process requires extensive justifications that can take a year or longer to complete. The Corps has taken some actions to address its planning and budgeting needs, but these measures are still ongoing. Finally, although Southeastern markets all of the power generated by the Corps projects we examined, the Corps does not consult with Southeastern for planning and budgeting purposes at a corporate level. At the divisional level in Atlanta, the Corps meets with Southeastern and power customers to discuss planned capital improvements and scheduled maintenance. Because the Corps is in the process of addressing its planning and budgeting requirements, we are not making recommendations at this time for it to improve its planning and budgeting systems.

BACKGROUND

As the nation's largest supplier of hydroelectric power, the Corps generates about 25 percent of all the hydropower in the United States. The Corps operates hydroelectric power plants at 75 dams with a total capacity of about 21,000 megawatts (MW). The total capital investment in these facilities over the years has exceeded $7.9 billion.

Southeastern markets power for 23 hydroelectric power plants owned and operated by the Corps to 294 wholesale customers in all or parts of 10 southeastern states and Illinois. Southeastern also coordinates with the Corps on the availability of the power to be generated by the Corps' plants. Unlike other power marketing administrations, Southeastern owns no transmission assets. Regional public and investor-owned utilities transmit the power to Southeastern's wholesale customers.

The Corps and Southeastern receive congressional appropriations through the Department of Defense - Civil account and the Department of Energy, respectively, to finance their operations. In fiscal year 1996, the Corps received appropriations for its civil works activities totaling about $3.2 billion. Southeastern is responsible for repaying, with interest, its appropriations as well as the portion of the Corps' construction and operation and maintenance appropriations that are allocated to power.

Repairs to and maintenance of the power plants are funded from the Corps' "construction, general" account or "operations and maintenance, general" account, depending on their scope. Funds from the "construction, general" account are used for major rehabilitation projects that exceed $5 million, including work pertaining to the design, plans, and specifications for such projects. Major rehabilitation projects are identified at the Corps' projects and districts, and the ensuing budget proposals are justified, examined, and ranked in the Corps' field offices and headquarters. The Department of the Army's Assistant Secretary for Civil Works and the Office of Management and Budget then examine and approve the requests for funding for the individual projects. Funds from the "operation and maintenance, general" account are used for routine repairs and maintenance and for emergency repairs of hydroelectric and other facilities.

The 11 facilities we examined account for about 63 percent of Southeastern's generating capacity. These hydroelectric power plants, located on six river systems, range in generating capacity from 30 to 500 MW.

OUTAGES AT PLANTS IN THE SOUTHEAST HAVE REDUCED SYSTEM'S RELIABILITY

The Corps' hydroelectric power plants in the Southeast have experienced lengthy outages, resulting in declines in reliability and availability. For example, from 1987 to 1995 the availability of the plants in the Corps' South Atlantic Division dropped from 95.4 percent to 87.2 percent. Nationwide during this same period, the availability of the Corps' hydroelectric power plants dropped from 92.9 percent to 87.9 percent (see app. V). According to Corps officials, the outages have occurred because of the ways in which the units are operated and because they are aging. In a few cases, Corps officials said, the units were also poorly designed and installed by the manufacturers. According to Southeastern officials, the outages contributed to revenue losses for Southeastern and led to increases in its wholesale electric rates.

From 1986 through 1995, al

Many of the Corps' hydroelectric power plants in the Southeast are aging. The average age is about 30 years, and four have been in service for over 35 years. According to Southeastern officials and studies by the Corps, key components of the hydroelectric units are designed to last about 35 years and can be expected to need repair or replacement. However, according to the Corps, the need to repair or replace a component is based not solely on age, but also on test results and operational performance. For example, in 1984 the responsible Corps district office requested approval to perform a scheduled repair of a generator component at Allatoona--the oldest of the power plants that we examined, which has been in service since 1949. The generator component had reached 35 years--the anticipated end of its useful life--and the unit's performance had declined in the late 1970s and early 1980s, after a failure in 1967. Corps headquarters did not approve the request because it did not believe that the district had submitted adequate justification. After the unit failed again in 1990, the Corps continued to operate the unit by bypassing the damaged component. In 1991, the Corps district office again requested approval to repair the affected generator as well as

another unit of similar age. Both units were repaired in 1993 and 1994, at a cost of about $8 million.

Also, according to Corps officials, some units are poorly designed by the manufacturer and not properly installed by the contractor, and other units are adversely affected by the way in which they are operated. For instance, the Jim Woodruff power plant has experienced operational problems because its turbines are poorly designed. Specifically, the turbines, intended to function under conditions of changing water flow, experienced severe vibrations and had to be welded in place, leading to decreased efficiency in the power plant when water conditions changed (see app. IV). In addition, according to Corps officials, the conventional hydroelectric generating units at Carters, which are used to start the pumpback units, were not designed to consistently handle startups. Operating the conventional units for startups over the years damaged the insulation in the generators, causing the units to fail. According to a Corps report on the rehabilitation of the Hartwell power plant, Hartwell's turbines are significantly oversized in comparison with the generators. According to the Corps' analysis, with the larger turbines and thus greater horsepower available, the generators failed because they were consistently operated at 125 percent of their rated capacity. Southeastern officials added that, in their view, the units failed because they were 30 years old and thus approaching the end of their useful lives. Also, four units at the Robert F. Henry power plant required major repairs within 6 years of beginning operation because, according to Corps officials, major components of the generators were not properly manufactured and installed. The components became loose during operations, causing severe vibrations and deterioration of the generators' insulation.

When hydroelectric power plants experience unexpected outages at the same time and/or these outages are extended, utilities generally have to buy replacement power at higher prices. For example, from 1990 through early 1992, two or more of the four units at the Carters power plant were out of service at the same time for periods ranging from about 3 months to almost 1 year. An official of Southeastern estimated that Southeastern's utility customers purchased replacement electricity costing about $15 million more than they would have paid for electricity marketed by Southeastern.

Extended outages, Southeastern officials estimated, have resulted in lost revenues of about $13 million to Southeastern since fiscal year 1986. The impact was most acute when units at the Carters power plant were out of service. Moreover, according to Southeastern officials, because of the unplanned outages, a severe drought in the late 1980s, and increases in operation and maintenance costs, Southeastern increased its wholesale power rates. For example, customers on the Georgia-Alabama-South Carolina system paid 22 percent more in 1990 than they had in the previous year. According to Southeastern, reductions in the amount of hydroelectric power available because of the drought, combined with the inefficient operation of the Jim Woodruff project, contributed to an increase in the wholesale rates charged to customers of the Jim Woodruff system of nearly 100 percent, phased in from January 1991 to September 1993.

CORPS' CAPITAL PLANNING AND BUDGETING PROCESSES DO NOT FACILITATE TIMELY AND EFFECTIVE REPAIRS

Although the Corps recognizes that long-term, comprehensive planning and budgeting systems are needed to identify and fund key repair and rehabilitation projects, especially in the current environment of static or declining budgets, its funding decisions for the power plants are not based on such systems. The Corps gives priority to routine, ongoing maintenance. However, when the power plants experience unplanned outages, the Corps frequently performs repairs that are reactive and short-term. For the extensive repairs and rehabilitation that eventually become essential, the Corps budgeting process requires extensive justifications that can take a year or longer to complete. The Corps has taken some actions to address its planning and budgeting needs and recognizes that these efforts should be continued.

Corps Faces Difficult Funding Decisions in Current Budget Environment

The Corps' budget has been declining in real terms over the last 10 years--by about 18 percent between fiscal years 1986 and 1996, from about $3.8 billion to $3.1 billion. According to a report prepared for the Corps, because of the need to address the federal budget deficit, this funding trend is expected to continue. In such a budget environment, finding adequate funding to properly maintain, rehabilitate, and repair the aging hydroelectric power plants will be increasingly difficult.

Furthermore, the capital investment to maintain and repair the Corps' power plants is expected to increase by about $1 billion. For example, the Corps stated that from 1993 through 2004, it would spend about $410.3 million to rehabilitate hydroelectric units at eight power plants nationwide. Moreover, the Corps projected that it would need to spend $558 million through the year 2004 to repair and rehabilitate other hydroelectric power plants.

The need to spend more to maintain and repair the Corps' aging hydroelectric power plants will compete with the need to maintain and repair other Corps facilities, such as those related to commercial navigation, flood damage reduction, hurricane and storm damage reduction, and the restoration and protection of environmental resources (including fish and wildlife habitat). For example, with its budget submissions to the Congress, the Corps includes a "capabilities list" that identifies additional funds for necessary repairs and rehabilitations for the power plants, as well as for other purposes--such as dredging, recreation, and navigation--not included in the initial target budget request. For the fiscal year 1996 budget proposal, the list contained repair and rehabilitation projects totaling $72 million--including $8 million for hydroelectric power plants. However, the list does not rank the proposed repair and rehabilitation projects by importance or need.

Moreover, according to Southeastern's Administrator, although Southeastern markets the power generated at the Corps' power plants, the Corps does not consult Southeastern at the corporate level for budgeting and planning purposes. However, according to Corps and Southeastern officials, the Corps' South Atlantic Division consults with Southeastern in preparing major rehabilitation proposals and in long- and medium-range planning for maintenance. Moreover, according to Corps and Southeastern officials, the Corps meets with a group of Southeastern's wholesale customers and with Southeastern at least twice a year to discuss scheduled maintenance and capital projects planned for the next 10 years. According to Southeastern officials, this group is not an advisory group on capital planning and budgetary matters; it only meets to share information.

Priority Is Given to Routine, Ongoing Maintenance Work, and Gaining Approvals for Extensive Repairs Is Often a Lengthy Process

The Corps gives priority to routine, ongoing work, such as the operation of power plants and recreation facilities, or maintenance work that is needed to keep the projects operating through the fiscal year. Nonroutine work or work that can be deferred to the next year has been given lower funding priority. After the Office of Management and Budget informs Corps headquarters of its budget ceiling, headquarters sets budget targets for the Corps' divisions, which in turn set budget targets for the Corps' districts. The districts decide how to allocate the amounts to various projects within the funding levels established annually by Corps headquarters. The baseline level of funding represents the annual fixed, nondiscretionary costs required to operate and maintain the projects. When major repairs are needed, the Corps must follow a system of approvals and justifications in order to comply with budgeting procedures and explain the repairs to such parties as the Department of the Army's Assistant Secretary for Civil Works and the Office of Management and Budget. Satisfying these requirements delays funding the expensive repairs and rehabilitation needed to keep the hydroelectric system operating effectively. Because of these approvals and justifications, after the need to repair or rehabilitate a plant is identified at the project or district level, it has taken from about 10 months to almost 5 years to begin the needed repairs.

Given the emphasis on routine and ongoing maintenance and repair work and the lengthy justification processes that must be followed for extensive repairs when units break down unexpectedly, the Corps frequently performs repairs that are short-term and reactive. However, such actions only postpone the need to make more extensive repairs. For example, after a failure of the Hartwell power plant's unit 1 in November 1989, the Corps bypassed the damaged part and brought the unit back into service at a reduced operating capacity. Three months later, the unit was taken out of service for 59 days while a contractor replaced the damaged part. Then, in May 1990, the same kind of problem put unit 2 out of service for 54 days. The Corps repaired the unit, but it failed again in January 1992. The Corps bypassed the damaged part and returned the unit to service. The unit continues to operate at a reduced capacity, along with the other three units. As a result of these reductions, Southeastern has lost about 40 MW of capacity. The Corps estimates that it will need about $17.7 million to repair the four units.

Before extensive and costly repairs or rehabilitation can begin, in order to justify capital investments, the relevant field location must perform a lengthy study to document the problem. The study can take 18 months to complete, and then

another year or longer may be needed for the proposal to clear the review levels within the Corps and receive funding. According to a Corps official, the process is lengthy because (1) the documentation and analysis submitted by field staff do not always satisfy the requirements of Corps headquarters and (2) lengthy examinations and reexaminations of a proposal are required within the field structure, headquarters, the Department of the Army's Assistant Secretary for Civil Works, and the Office of Management and Budget. A Corps headquarters official explained that this lengthy analysis and documentation process is applied even if a hydroelectric unit is out of service and needs immediate repair because the Corps needs to show the need for costly capital investments in hydroelectric power plants to the Department of the Army's Assistant Secretary for Civil Works and the Office of Management and Budget.

For example, at the three-unit Millers Ferry power plant, one unit failed in 1987 because the insulation in the unit's generator had deteriorated. The unit was repaired and returned to service within 30 days. After a second unit failed in 1992 for the same reason, the responsible Corps district office requested approval from the Corps division in 1993 to repair all three units. The district office believed that all three units suffered from the same problems and would need repairs in the future. However, Corps headquarters interceded and requested additional analysis and justification to support repairing all three units. During 1993 to 1995, while the Corps district office complied with the certain requests from Corps headquarters and completed design specifications and the request for proposal, the remaining two units also failed. These units were temporarily repaired and returned to service but operated at a reduced capacity. As a result, Southeastern lost about 31 MW of capacity. More extensive repairs, according to Corps officials, will not be completed until 1998, at an estimated cost of $7 million.

Corps Has Taken Some Actions to Address Planning and Budgeting Needs

The Corps has recognized that when budgetary resources are relatively scarce, it cannot continue to fund all of the activities it performed in the past, such as operating some recreation sites. Corps officials have also said that in times of budget shortfalls, it becomes increasingly important to implement long-term, systematic, and comprehensive capital planning and budgeting systems. Such systems allow agencies to anticipate projects that need to be funded in the future and to consider the tradeoffs that are inherent in assigning funding to different purposes. Given that obtaining additional funds for hydroelectric investments will be difficult, the Corps began, in the early and mid-1990s, to take steps to improve its corporate planning and budgeting processes. However, these measures are still ongoing.

The Corps commissioned a study by its Institute for Water Resources on its capital planning process for hydroelectric power plants. In its 1994 working draft report, the Institute concluded that in light of the power plants' aging and the continued prospects for budget constraints, the Corps should develop a 10-year plan for future capital investments for its hydroelectric program and develop, in coordination with the power marketing administrations and their customers, procedures for ranking hydroelectric investment needs on the basis of such criteria as economic, environmental, and engineering factors. According to a Corps headquarters official, in response to these recommendations, Corps headquarters directed all of its field locations, including those in the Southeast, to compile lists of proposed, nonroutine hydroelectric capital improvement projects that had to be accomplished within 10 years. Although these lists were compiled on a national level during fiscal years 1993 and 1994, no lists were compiled in fiscal year 1995. The fiscal year 1994 list shows a projected need through 2004 of over $900 million to repair and rehabilitate the Corps 75 hydroelectric power plants nationwide. However, the criteria for ranking the proposed repair and rehabilitation projects have not been established. The responsible Corps headquarters official explained that in fiscal year 1995, the effort was suspended because of higher priorities. He said he intends to direct the field locations to undertake the effort again during the summer of 1996, in time to be considered for the fiscal year 1998 budget. Currently, Corps headquarters does not use this list for the agency's annual budget process but rather encourages its use at the district level for long-range planning. Corps officials said they recognize the need to pursue formal use of the list for planning and budgeting nationwide.

In addition, according to a Corps official, the Corps recognized in the early 1990s that the outages at its power plants were reducing the reliability of its hydroelectric power system. Consequently, from fiscal year 1993 through fiscal year 1997, the Corps requested appropriations for major rehabilitations of eight hydroelectric plants, four of which are in the Southeast. In March 1996, the Corps estimated that from 1993 through 2004, it would spend about $410 million to rehabilitate these eight power plants. According to the Corps, as of the end of fiscal year 1996, the Corps had obtained appropriations of about $22 million for this purpose.

We provided a draft of this statement to and discussed its contents with Corps officials, including the Chief, Operations, Construction and Readiness (headquarters); Hydropower Coordinator (headquarters); Chief, Construction and Operations Division (South Atlantic Division); and the Chief, Hydropower Operations (South Atlantic Division). We also discussed the statement and its contents with Southeastern officials, including the Administrator; Assistant Administrator for Finance and Marketing; and the Chief, Operations. These officials generally agreed with the facts presented in our statement and said that we had fairly represented the condition of the federal hydroelectric power plants in the Southeast. Corps officials agreed that historically the agency's planning and budgeting systems did not expedite planning and budgeting for multiple-year capital improvement projects for the Corps' hydroelectric power plants. Corps officials said, however, that they have taken steps to improve their planning and budgeting systems for these plants. Corps and Southeastern officials also discussed efforts under way within the Corps' South Atlantic Division to consult with Southeastern and with power customers about the maintenance of the hydroelectric power plants in the region. These officials also suggested several technical revisions to our statement, which we have incorporated as appropriate. We conducted our review from January through June 1996 in accordance with generally accepted government auditing standards.

This concludes our prepared statement. It also concludes our work on this issue for the Subcommittee. Details of our objectives, scope, and methodology are presented in appendix VIII. We would be glad to answer any questions you may have at this time.

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