Tennessee Valley Authority

Annual Environmental Report 2000

"The quality of the reservoir planning performed by TVA's Watershed Teams is a direct indication of management sensitivity to watershed protection. The river basin is treated holistically—the only way to promote balanced, sustainable use of the river's resources. TVA clearly understands this."

—Ann Coulter, Executive Vice President, RiverValley Partners

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Hikers take in the impressive view from North Carolina's Fontana Dam.

This report follows established Public Environmental Reporting Initiative guidelines for corporate environmental reporting. The report is printed on 100% post-consumer recycled paper and uses soy-based inks.

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management Commitment

The members of TVA's Board of Directors answer key questions about the agency's environmental scorecard

CRAVEN CROWELL

SKILA HARRIS

GLENN L. MCCULLOUGH, JR.

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For a complete list of TVA's environmental policy and principles that will help guide the agency's work, go to **www.tva.gov/environment**.

Q: Why report on TVA's environmental performance?

A: Craven Crowell—*TVA exists not to create wealth for stockholders, but to create value for stakeholders. Those stakeholders are the people of the Tennessee Valley, the people who live here and receive the benefits of TVA's integrated power and river system. TVA's mission is fundamentally different from that of investor-owned utilities. Certainly we're driven by some of the same factors, and that will continue to be true in the future, when there's open competition. But Valley residents hold TVA to a higher standard of accountability, especially where the environment is concerned. So it's important for us to give our stakeholders regular reports about how we're doing in the area of environmental performance—the good things we've achieved as well as the actions we're taking to address what hasn't been done well in the past.*

Q: How does TVA deliver value for the Tennessee Valley?

A: Glenn McCullough—*By being good stewards of our environment (which means optimally managing the Tennessee River system), TVA delivers the value of cleaner air and water and effective land use. By delivering affordable, reliable electric power, TVA brings the value of a low-cost of living, along with a high quality-of-life, to the people of the Valley. Partnerships with regional, state, and local leaders enable TVA to succeed in economic development, providing the value of a strong economy that brings new and better jobs. By demonstrating corporate excellence in environmental stewardship, generation and transmission of electric power, and economic development as the nation's largest public power company, TVA will continue to deliver value to the people of the Valley.*

Q: What were some of TVA's most notable environmental successes in 2000?

A: Skila Harris—*The agency's voluntary $50 million investment in its first selective catalytic reduction system, which reduces nitrogen oxide (NO_x) emissions at coal-fired power plants, was a major accomplishment for the year 2000. We also continued to make systemwide reductions in both NO_x and sulfur dioxide (SO_2) emissions from our coal-fired power plants. In fact, as this report shows, our total emissions in 2000 were below 1999 levels. Even though our fossil-fuel system generated 6 percent more electricity in 2000, our SO_2 emissions decreased by 6 percent and our NO_x emissions were down 20 percent from the previous year's amounts. For 2000, the Environmental Protection Agency required a 19 percent reduction in our coal-system NO_x rate; TVA achieved a 24 percent emission rate reduction. Another major success was the rollout of TVA's Green Power Switch initiative, which offers consumers the opportunity to purchase power made from renewable resources.*

Q: What are some areas where improvement is still needed?

A: Skila Harris—*While we're certainly very proud of the remarkable NO_x emissions reductions we achieved in 2000, we had actually set the bar higher and failed to meet our own reduction goals for SO_2 emissions. We anticipated a 12 percent reduction in SO_2 emissions but achieved only partial success due to timing and delays related to planned low-sulfur fuel switches and the increase in power generation. Naturally, it's important for us to meet that goal and we are working toward doing so. On a larger scale, we need to better understand the environmental impact of coal-plant emissions, both in the Valley and elsewhere, and we need to develop affordable ways to continue to reduce that impact. We need to work more effectively with all stakeholders in the region to find methods of reducing any*

environmental effects of TVA's operations while continuing to provide reliable, low-cost power. Two other concerns that quickly come to mind are the need to strengthen our demand-side management—the effort to curb power demands—and to heighten people's awareness of the damage done by garbage dumping in the Valley's reservoirs. We need to work together in order to protect this great natural resource.

Q: TVA revised its environmental policy and principles last year. Why, and what's the result?

A: Craven Crowell—*The revisions began with improved alignment of TVA's corporate environmental management functions in 1999. During that year, an Environmental Policy and Planning group was initiated under the management of our Environmental Executive, Kathryn Jackson. Then throughout 2000, as TVA refocused its business practices, we revised and strengthened our environmental policy statement and principles to guide the agency's work. Those six principles—management commitment, environmental compliance, environmental protection and stewardship, pollution prevention and control, partnerships and public involvement, and innovation and technology development—form the foundation of this year's report. And they follow Public Environmental Reporting Initiative guidelines, which were developed by a cross section of industries to provide a standardized format that companies can use in their environmental reporting.*

A: Glenn McCullough—*One result of this realignment was that TVA enhanced its Environmental Management System (EMS), the agency's process-based way of managing environmental performance. We analyzed the best industry practices and determined that the International Standards Organization's 14000 standard was the best model for TVA to use in updating its EMS, and so we adopted that approach. Setting and formulating measurable environmental objectives that are consistent throughout all TVA organizations is a key component of the EMS. The system requires that we establish objectives and targets, then operate the agency in such a way that we achieve them. The environmental objectives we developed throughout 2000 are currently being integrated into TVA's overall business-planning process. Next year we'll begin tracking and reporting our environmental performance against them.*

Q: How will TVA implement the new EMS internally?

A: Skila Harris—*We've set out TVA's environmental commitment in language that everyone can relate to, and we've defined the responsibility to fulfill the agency's stewardship mission that we all have as TVA employees. In addition, an important element of the new EMS is an internal employee-recognition program, which we launched in the final quarter of 2000. It's designed to complement employees' environmental training by promoting and rewarding exceptional environmental performance on the job, whether by individual workers or by employee teams. The program recognizes excellence, but more important, it helps to facilitate the crucial process of knowledge-sharing among TVA's 13,000-plus employees.*

Q: What is TVA management's fundamental commitment to environmental performance?

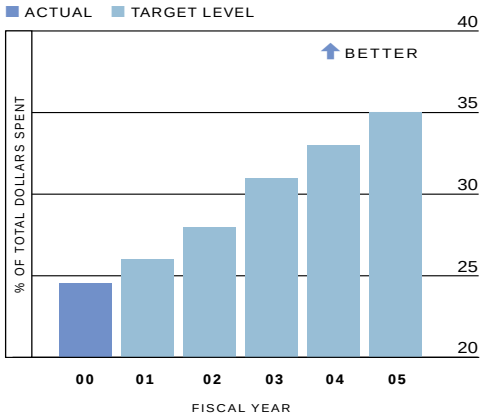
A: Glenn McCullough—*Our management is committed to the integration of responsible environmental practices into the very fabric of how we work at TVA, so that good environmental performance is seen not as an option or add-on but simply as the way TVA does business. The updated EMS will improve all of TVA's operations; we'll be fully prepared to factor environmental considerations into every business decision we make. We'll ensure that our environmental training reaches all our employees, and we'll hold them accountable and responsible for putting that knowledge into action. The way we work each day will result in a cleaner environment for all the people of the Valley and the nation. As we transform our workplace, we'll track our performance and report on it in a clear, consistent manner. This annual report is an important expression of that commitment.*

SMART PURCHASING ADDS UP

If a company's bottom-line decisions tend to reveal its core values, then TVA's procurement strategy clearly reflects the agency's environmental principles. In 2000, TVA bought $1.3 million worth of the recycled-content materials specified under the affirmative-procurement provisions of the Resource Conservation and Recovery Act. It spent another $2 million on other recycled-content materials, and it donated goods valued at more than $1 million to schools and nonprofit organizations throughout the Tennessee Valley. TVA's commitment to the responsible use of supplies and materials extends beyond its purchasing practices to the actions of individual workers, too. At Paradise Fossil Plant, for example, a group of TVA employees took an environmentally sensitive approach to the task of cleaning an area where scrap wood and old pallets were stored. Working with the plant's Environmental Compliance Team, the employees used a wood chipper to transform some of the material into decorative mulch, which was spread on the facility's grounds. TVA also hired a wood-recycling company to remove part of the scrap and turn it into mulch for sale to the public.

Recycled-Content Items Purchased

EPA-Designated Items with Recycled Content



environmental Protection & Stewardship

The Valley's waters show impressive signs of life

When TVA joined wildlife workers in slipping 2,000 yearling lake sturgeon into the French Broad River below Douglas Dam last year, the release marked a milestone for aquatic life in the Tennessee River system. The reintroduction of these once-plentiful fish exemplifies TVA's commitment to nurturing clean, oxygen-rich waterways in which lake sturgeon and other imperiled species can thrive and multiply.

In 2000, as in previous years, TVA gained ground in a number of projects aimed at improving water quality, including its large-scale effort to stabilize shorelines. Rainwater runoff and waves created by boat wakes can erode river banks and reservoir shorelines, threatening aquatic life and damaging recreation areas. Through its six-year-old shoreline-stabilization program, TVA continues to stem erosion with bioengineering techniques like the use of retaining walls and conservation buffers planted with

Biologists, wildlife workers, and volunteers release lake sturgeon into the French Broad River below Douglas Dam.

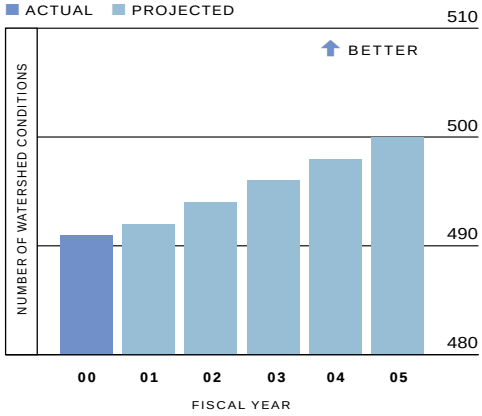
Before-and-after shoreline stabilization efforts at Warrior Path State Park, near Kingsport, Tennessee.

native vegetation that holds the soil along shorelines in place. The agency has strengthened its implementation of the Shoreline Management Policy, which was established in 1999 to provide greater protection for crucial resources while allowing reasonable public access to the water. In 2000 TVA streamlined the permit-application and appeals process and added rules governing such issues as fuel-storage tanks, wastewater-treatment systems, and flood-zone development.

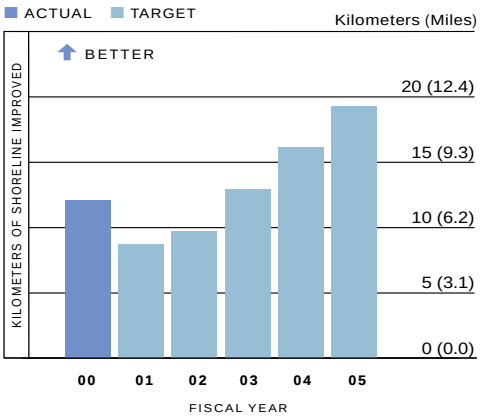
The Shoreline Management Policy's success depends on the active involvement of local landowners. In partnership with residents throughout the Tennessee Valley, TVA stabilized and planted approximately 35.5 kilometers (22 miles) of shoreline last year. Along Blue Creek in Humphries County, Tennessee, for example, TVA's Kentucky Watershed Team joined local conservation groups to stabilize 175 meters (575 feet) of eroding shoreline. The crews constructed rock jetties, among other methods, to firm up the stream banks and preserve the creek's flow.

Besides reducing erosion, TVA works hard to limit pesticide runoff from farms. Illegal pesticide disposal and accidental spills threaten water quality, so the agency is part of a collaborative effort to collect and safely

Watershed Conditions Rated Fair or Good



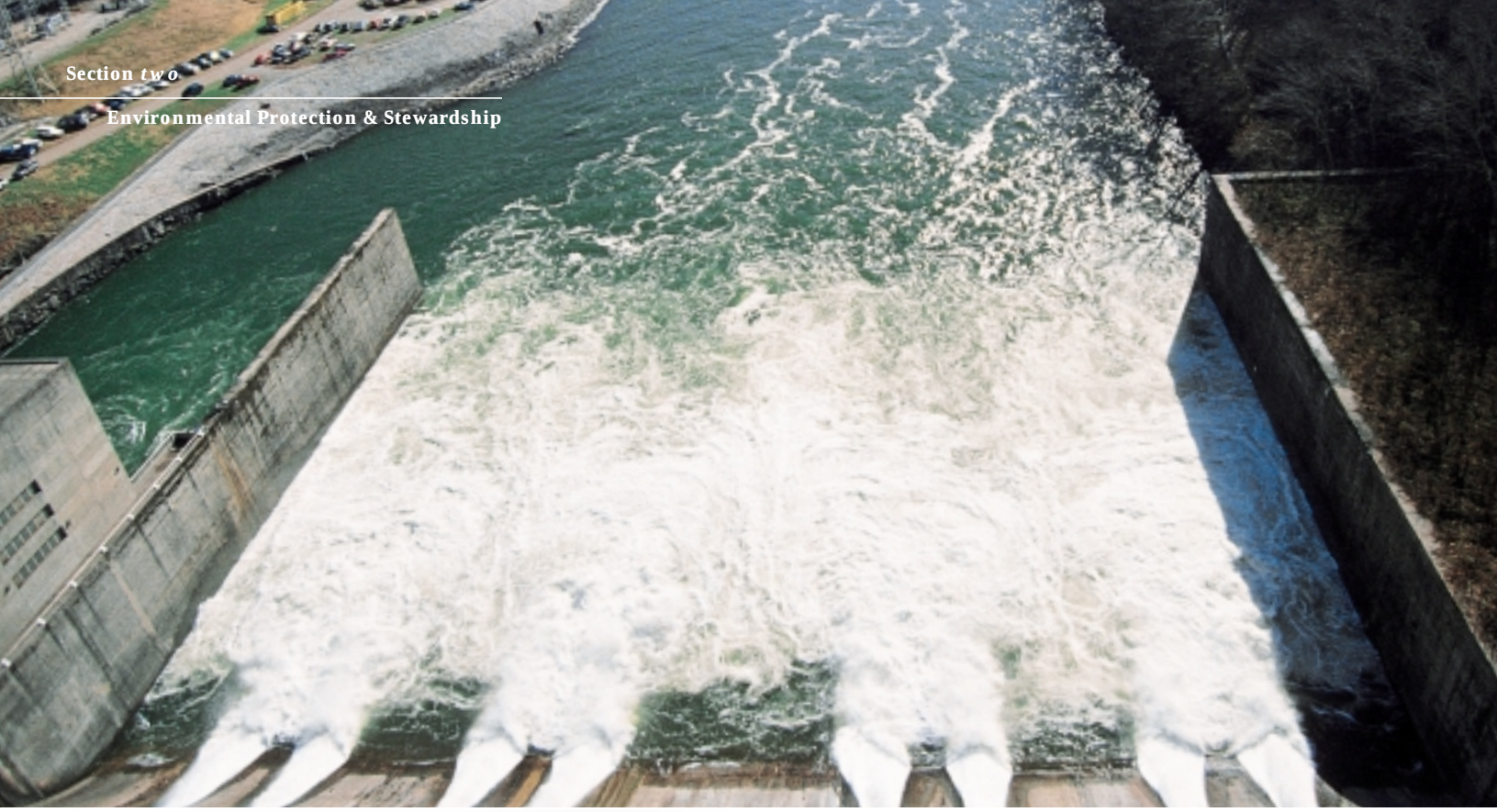
Critically Impaired Shoreline Improved



2001– 2002 focus will be primarily on critically eroding archaeological sites on TVA land.

WORKING TO MANAGE LITTER AND NATURAL DEBRIS

Debris and refuse that floats downstream through the reservoir system has a tendency to accumulate at dams. During flood control operations, which require TVA to quickly pass large volumes of water over a dam's spillways, this trash flows downstream. To help mitigate this problem, TVA has an experimental program that uses booms to help prevent garbage from entering the reservoir system and skimmers to remove it from dam forebays once it has collected. In addition, the agency's Watershed Teams participate in hundreds of cleanups, which remove tons of garbage before it enters the main river each year. But, says Janet Herrin, Senior Vice President of River Operations, removal is only a part of the solution. "Prevention is the real key. We need to reduce the amount of litter and debris that enters the reservoir system." Through the National Clean Boating Campaign and other educational programs, TVA Watershed Teams are working to heighten people's awareness of the damage done by garbage dumping. However, Herrin concedes, there is much work to be done. "Ultimately, it will take everyone working together to keep our waterways litter-free."



A TVA-sponsored pesticide collection and disposal event.

dispose of unused chemicals from agricultural sources before they can seep into the groundwater or the river system. In cooperation with federal and state agencies and industry trade associations, TVA has helped properly dispose of almost 181 metric tons (200 tons) of pesticide waste from Valley farms since 1998.

TVA operates its reservoir system to assist its fossil and nuclear plants in complying with temperature-permit requirements. Cooling-water discharges from the agency's power plants (as well as other industrial facilities) must fall within established temperature ranges to avoid causing ecological problems. Despite warmer-than-normal weather and lower-than-normal flows in many parts of the reservoir system during the summer of 2000, TVA's discharges complied fully with the water-temperature limits required by environmental and nuclear-safety regulations.

Good stewardship is an ongoing responsibility, and TVA continues to set ambitious goals for the protection of the Valley's environment. But the agency also takes pride in the fact that others have noticed and

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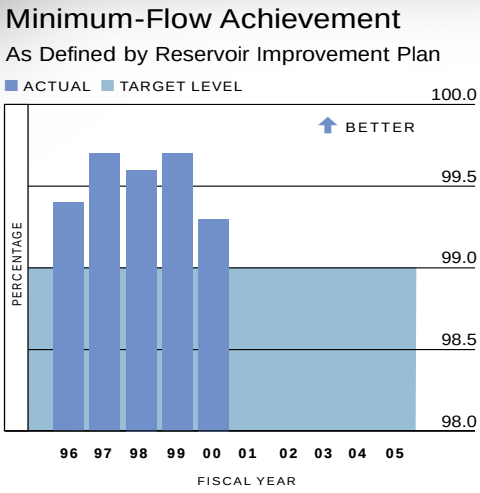
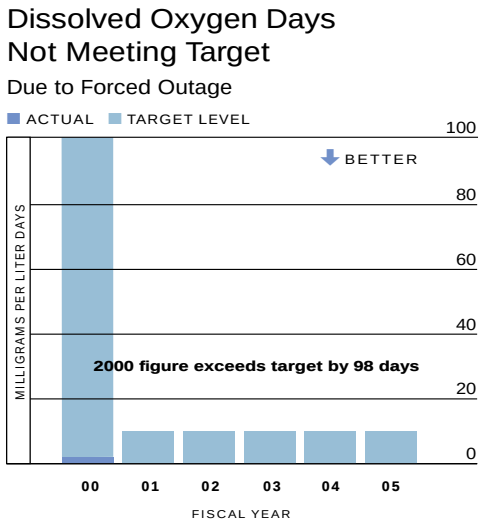
Find out about the ecological risks posed by unregulated dumping from boats, and learn what TVA is doing to help solve the problem at www.tva.gov/environment.

applauded its achievements. The National Hydropower Association (NHA), for instance, recognized two TVA facilities—Tennessee's South Holston and Norris hydropower plants—in its "Outstanding Stewardship of America's Rivers" report for 2000. South Holston received praise as part of a release-improvement program that used aeration techniques and increased flow levels below TVA dams to restore more than 291 kilometers (180 miles) of aquatic habitat. Aeration equipment now keeps the oxygen content between 4 and 6 milligrams per liter systemwide. The NHA also noted the marked improvement in aquatic life below Norris Dam, thanks to TVA's success in raising the level of life-sustaining oxygen in the dam's tailwaters.

These are just a few of the steps TVA has taken to improve water quality around the region. They're the kinds of efforts that help explain why another river resident, the once-imperiled snail darter, is joining the lake sturgeon in a strong comeback.





PLANTING RIGHTS-OF-WAY THE RIGHT WAY

One of the many inventive methods TVA uses to protect natural habitat and promote biodiversity is that of working with property owners to plant transmission-line rights-of-way (ROWs) with low-growing native greenery. The Valley's ROWs, the 27,400 kilometers (17,000 miles) of corridors where utility lines run, must be kept clear of tall trees and shrubs whose branches could snap during storms, damaging the lines or blocking access in emergencies. But that doesn't mean ROWs can't teem with foliage that beautifies the corridors and provides vital shelter and food for wildlife. The Valley's richly diverse topography—from the Appalachian Mountains to low interior plateaus—includes a wide variety of soil types and native plant species. TVA is helping to naturalize sections of ROWs that cross ecologically sensitive areas with selective plantings of Oneflower Hawthorn, a species ideally suited to thickets and woodlands; deciduous holly, a food source for wildlife; Silky Willow, a sinewy-branched plant that grows particularly well in wetlands; or Highbush Blueberry, a hardy and adaptable fruit-bearer. These low-growing native species minimize the need for maintenance in ROWs, thereby limiting human intrusion and allowing wildlife to flourish.

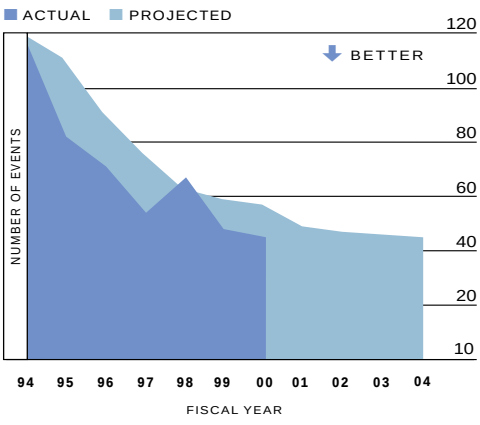
"TVA has undergone some earthshaking business changes throughout the past decade. The Tennessee Aquarium and the Southeast Aquatic Research Institute have repeatedly found TVA to be a solid conservation partner within the region. TVA routinely manages water releases in the Tennessee River system so that they contribute to, rather than inhibit, the system's ability to support life."

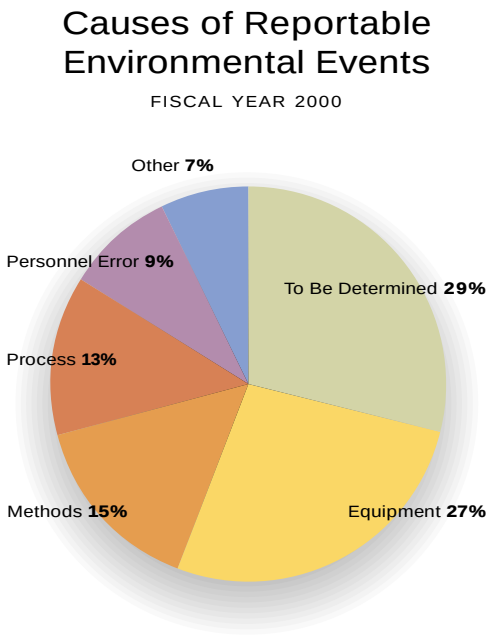
—George Benz, Director, Southeast Aquatic Research Institute

environmental Compliance

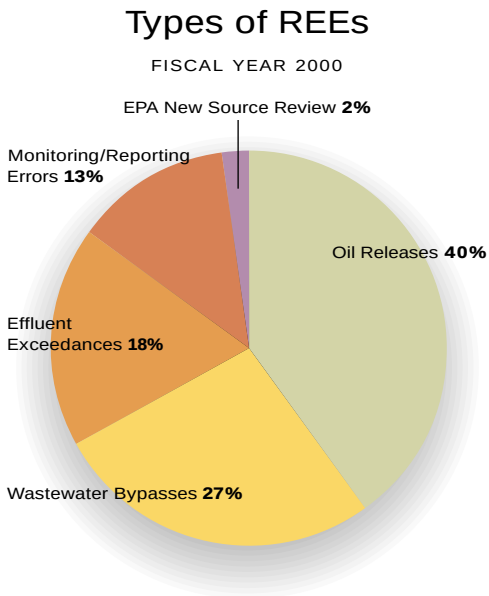
Obeying rules and regulations is always a top priority at TVA

In 2000 TVA experienced 45 Reportable Environmental Events (REEs), a number down slightly from the previous year's 48. REEs, which may include overflows or small releases of oil (in quantities that can produce a sheen on water), are serious enough to trigger notifications to federal or state agencies or notices of violation from regulators. Of the 45 reported events, 38 (85 percent) involved oil releases, effluent exceedances, and wastewater bypasses—the majority of which occurred at TVA's power generation facilities. The three REEs that had the greatest potential effect on the environment are described in detail here.





1] In the first, a transformer failure at the Wilson substation in Tennessee caused several thousand liters of mineral oil to spill inside the facility. Approximately 7,600 liters (2,000 gallons) of oil was captured by the oil-spill containment pond, but the bay placed around the transformer when it was built did not prevent another 49,000 liters (13,000 gallons) of oil from seeping into the fractured limestone beneath the transformer. TVA workers and contractors recovered the accessible oil and removed the contaminated soil according to Environmental Protection Agency (EPA) guidelines, coordinating their efforts with those of the Tennessee Department of Environment and Conservation and the EPA. As a result of this event, TVA will place larger, more effective containment bays around its major power transformers to control fluid leaks and prevent similar mishaps in the future.



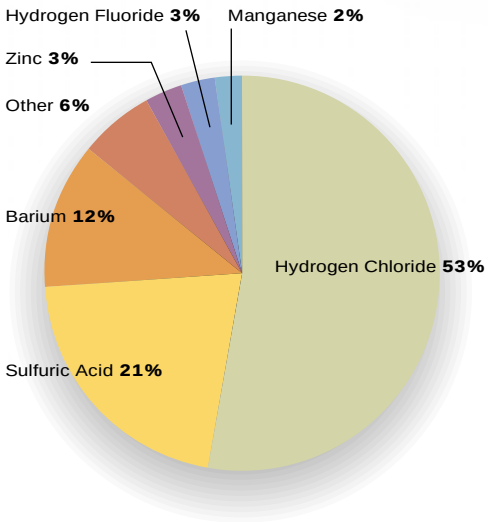
2] The second REE involved an oil sheen produced by a release of insulating oil that occurred when a main transformer at TVA's Colbert Plant in Alabama overheated. About 3,800 liters (1,000 gallons) of oil was released through the pressure-relief valve. The oil entered the transformer's storm-drainage system and its oil-water separator, but a small quantity of oil (approximately 760 liters, or 200 gallons) was discharged into Cane Creek. The vegetation in the storm-drainage ditches absorbed most of the released oil, and the site was cleaned up in compliance with regulatory standards. To reduce the risk of a recurrence, TVA has increased the number of equipment inspections performed at its facilities.

3] In the third REE, which occurred at TVA's Hiwassee Hydropower Plant, a fuel tank slid off a forklift and overturned while being transported, spilling about 280 liters (75 gallons) of diesel fuel onto Hiwassee Dam Road and into the highway drain. Cleanup efforts kept the fuel from reaching the waterway, and an investigation resulted in a revised fueling procedure.

Last year TVA also discovered an event that wasn't a 2000 REE: a previously unreported spill of polychlorinated biphenyl (PCB) that occurred at the agency's Guntersville Hydro Plant in 1986. An electrical bushing in the switchyard failed that year and released approximately 57 liters (15 gallons) of PCB in a 1,400-square-meter (15,400-square-foot) area. TVA discovered this oversight in 2000,

Toxics Release Inventory

CALENDAR YEAR 1999



Stay Connected

For a complete plant-by-plant listing of TRI releases, plus risk-assessment study information, visit www.tva.gov/power/tri.

JUST THE FACTS ABOUT TRI

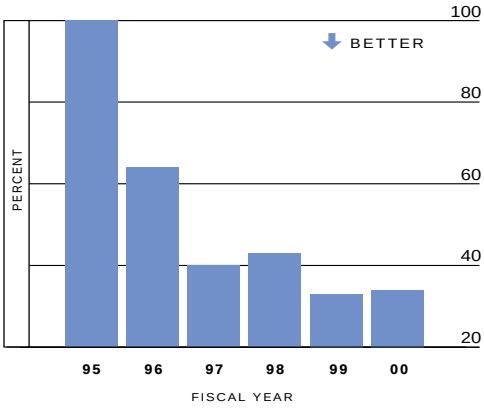
The regulations governing the Environmental Protection Agency's Toxics Release Inventory (TRI) require about 31,000 U.S. facilities, including coal- or oil-burning plants that generate electricity, to report the release of any of approximately 650 chemicals defined by the EPA as potentially hazardous to human health. Under the guidance of its TRI Team, TVA complies with these requirements by submitting data on TRI emissions at its facilities to the EPA and to state agencies. Currently only 21 of the chemicals on the EPA's list are released in sufficient quantities to require that TVA file TRI reports. Those chemicals and their percentages are shown in the chart at left. In 2000, TVA's releases of EPA-listed chemicals rose by 20 percent over the previous year's totals—a change caused by increased fossil generation and a more accurate measurement technique.

"Compliance with state and federal regulations is the standard yardstick by which entities like TVA are measured. TVA has gone beyond requirements in communicating its compliance plans by publicly pledging to reduce NO_x emissions throughout its system, to make these reductions early, and to routinely report its progress to the Tennessee Air Pollution Control Board. This speaks volumes about the agency's commitment to providing power reliably and responsibly."

—Richard A. Bolton, Vice Chair, Tennessee Air Pollution Control Board

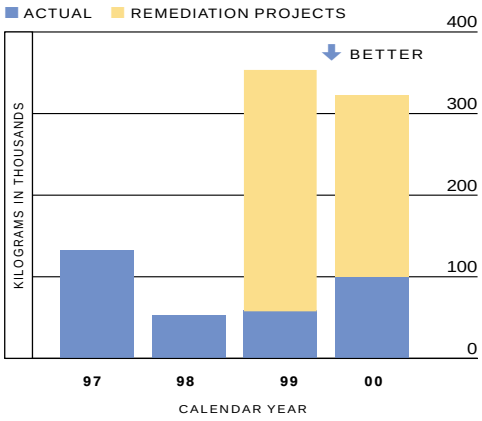
TVA employees process materials at the agency's EPA-permitted hazardous waste storage and disposal facility in Muscle Shoals, Alabama.

Percent of Audit Findings Compared to 1995 Baseline



Hazardous Waste Generated

Includes Direct Shipments



Increases resulted from the following large-scale remediation projects: Power Service Center (1999); Tellico Battery Project and Environmental Research Center (2000).

reported the event to the EPA, and cleaned up the old spill. A review of maintenance records indicated that the agency had replaced the faulty bushing and revised its operating-equipment checklist and monitoring procedures to lessen the chance of a recurrence.

TVA is working to curtail REEs in several ways. The agency maintains an internal REE indicator that tracks individual occurrences. Employees at plants and other facilities conduct quarterly assessments of the events; annual audits are done by a central staff of Environmental Specialists. The audits monitor environmental processes at TVA facilities and promote compliance with local, state, and federal regulations. Since 1995, these audit findings have decreased steadily. By taking a hard look at each REE, TVA can identify opportunities to improve compliance and can take corrective action to prevent a recurrence—at the site of the incident and throughout TVA facilities in the seven-state power service area.

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Two recent lawsuits, one brought by the National Parks Conservation Association and the other arising out of an administrative order issued by the Environmental Protection Agency, bear close watching throughout the coming year. Read the latest online at www.tva.gov/environment.

COMING CLEAN ON WASTE

TVA's generation of low-level radioactive waste fluctuates as a result of individual facilities' needs, but the agency remains committed to the goal of decreasing its overall production of such waste. Like many other entities, TVA is hampered in its disposal of radioactive waste by a lack of economical, licensed and permitted disposal facilities. The agency has Nuclear Regulatory Commission approval to store some levels of radioactive waste onsite until a better disposal solution is available. For small amounts of hazardous waste—lead paint, solvents, and certain heavy metals, for example—TVA maintains its own storage and disposal facility. Larger quantities of hazardous waste are shipped directly to approved contractors when possible.

TVA lacks a standardized, agencywide removal plan for materials like polychlorinated biphenyl (PCB). Most high-risk PCB equipment has been removed or retrofilled, but a recent shift in the EPA's definition of what constitutes PCB materials has intensified the need for a systematic phase-out plan. Another area in which a removal plan is needed centers on such substances as ozone-depleting refrigerants. To comply with U.S. Presidential Executive Order 13148, some TVA business units are already phasing out the procurement of these materials; the agency will have a comprehensive phase-out plan in place before the 2010 deadline set by the order.

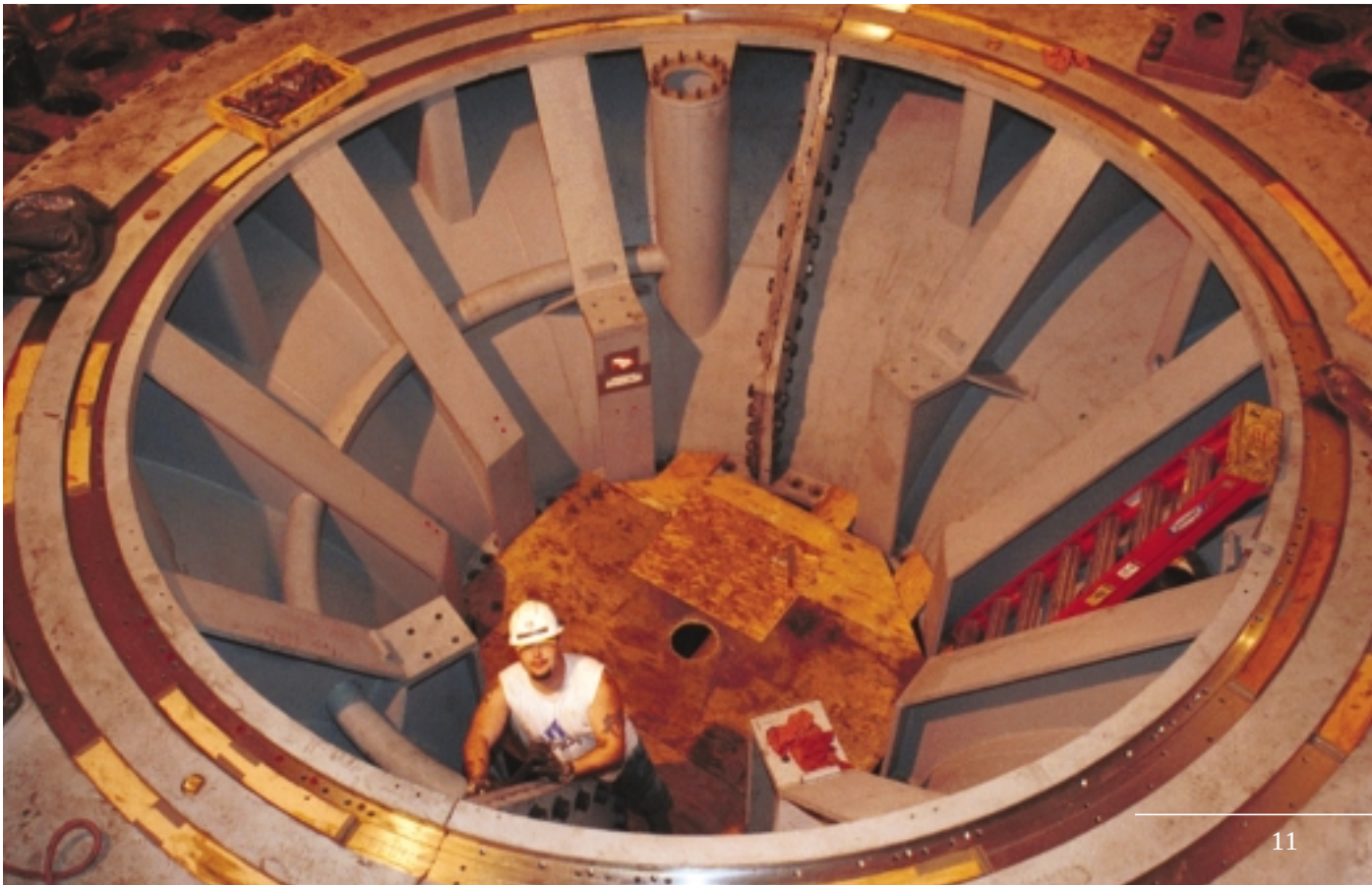
pollution Prevention

Responsibility guides TVA's production of reliable power

As part of TVA's hydro modernization process, an employee replaces a faulty bushing in a turbine at the agency's Guntersville Hydropower Plant.

Power production is something many people take for granted: flip a switch and the lights come on. But behind every electric outlet lies a complex system of power production facilities and the ecosystems in which they operate. These may seem like two very different systems, but in fact they're not. In generating electric power, TVA treats them as a balanced, integrated whole.

TVA derives power from an array of sources: hydropower dams, nuclear plants, combustion turbines, fossil plants, purchases from nearby utilities, and renewable resources like wind and sunlight. Of those, hydropower provided the Tennessee Valley with only about 9 billion kilowatt-hours of electricity last year. TVA is working to increase the efficiency of its hydro units, some of which still use equipment originally installed in the 1930s and 1940s. In the early 1990s, the agency embarked on a massive modernization project that has produced a number of improvements in its facilities' operation. During the past few years, for instance, TVA upgraded some of the dams' complex mechanical controls by replacing bushings that required regular applications of lubricating grease with greaseless ones. Unfortunately, the new bushings proved unsatisfactory (they repeatedly caused fric-



WARMING UP TO GREEN POWER

Last October TVA finished the construction of the Southeast's first wind-turbine farm, in Anderson County, Tennessee, and the 23-meter-long (75-foot) blades began to spin. Together the three turbines will produce some 6 million kilowatt-hours of pollutant-free electricity each year—enough to supply more than 400 typical Valley households. The wind farm is one of several facilities generating electricity for TVA's Green Power Switch, the renewable-energy initiative that started as a market test in 2000. Besides using wind as a source of power, Green Power Switch produces cleaner, greener energy from sunlight and will add landfill gas to its list of energy sources in the future. Between April and December of last year, nearly 2,000 Valley consumers made the Green Power Switch, which adds a minimal surcharge to their utility bills. "Signing up just seemed like such a natural thing to do," said Gibson County, Tennessee, commissioner Sandy Moss, who was among the first residential customers in her area to enroll. The Associated Press called the initiative's inception one of the top Tennessee business stories of 2000. But the really big news about this innovative program is that businesses accounted for more than 55 percent of all Green Power Switch sales, a figure that far exceeded TVA's first-year goal of 10 percent.

Stay Connected

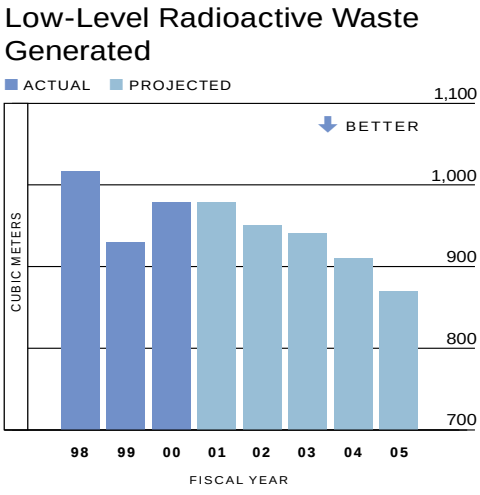
Check out the solar power array at Gibson County High School in Dyer, Tennessee, and see how students and teachers are learning firsthand about photovoltaic modules and the energy they produce. It's all online at www.tva.gov/environment.

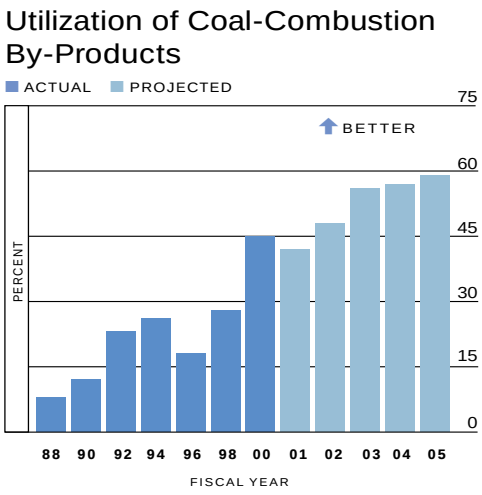
TVA's first wind turbine goes up atop Buffalo Mountain in Tennessee; students monitor an in-school solar power system.

tion and overheating, with subsequent outages), but they are being replaced with low-volume greased bushings that drastically reduce releases of grease into the river.

Nuclear power furnishes a solid base of available energy—more than 46 billion kilowatt-hours in 2000—and TVA's nuclear operations routinely set industry records for safety and performance. Last year, in fact, nuclear units run by TVA were ranked among the top 25 performers in the U.S. by *Nucleonics Week*, an industry trade publication. And although nuclear power has always aroused controversy, it helps to reduce the emissions caused by fossil-fuel combustion. In the U.S. alone, according to the Nuclear Energy Institute, nuclear power generation keeps 1.11 million metric tons (1.22 million tons) of nitrogen oxide and 2.16 million metric tons (2.38 million tons) of sulfur dioxide out of the air each year.

Coal-burning power plants provide most of the electricity generated by TVA—more than 95 billion kilowatt-hours in 2000, or 63 percent of the agency's total power production. TVA knows its emissions contribute to the region's air quality issues through the release of relatively large quantities of sulfur dioxide (SO_2) and nitrogen oxide (NO_x). That's why the agency has taken a number of steps—some exceeding those required by law—to improve the performance of its fossil plants and to lower emissions. January 1, 2000, marked the beginning of Phase II of the Environmental Protection Agency's acid-rain program, which is designed to reduce





Tennessee Valley Authority

Stay Connected

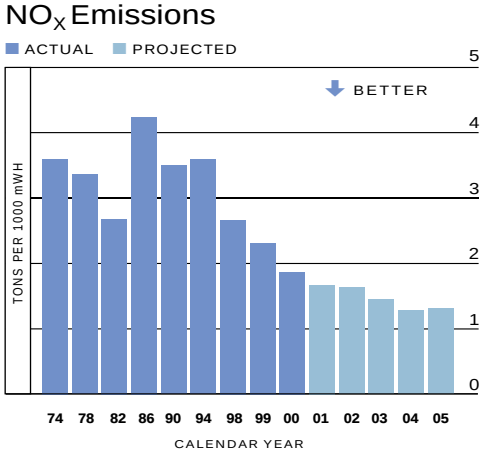
TVA continues to find new ways to put the by-products of its fossil power generation to good use. Find out how gypsum, boiler slag, fly ash, and ammoniated wastewater can be transformed into environmentally friendly products by visiting www.tva.gov/environment.

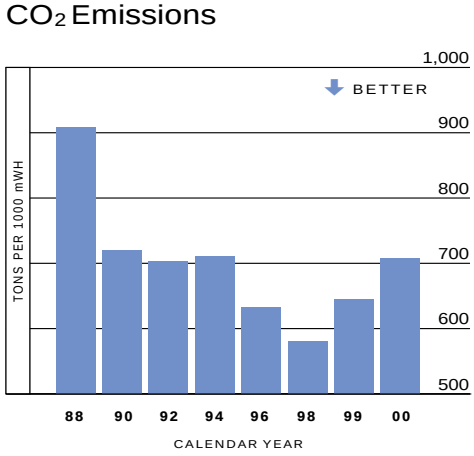
Gypsum from TVA's Cumberland Fossil Plant is being made into environmentally friendly wallboard.

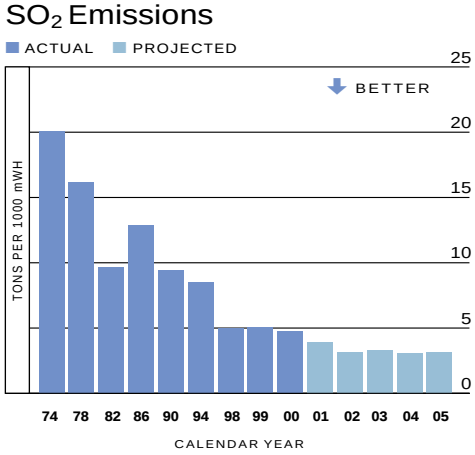
SO_2 and NO_x emissions nationwide by 9 million metric tons and 1.8 million metric tons (10 million tons and 2 million tons) from 1980 levels, respectively. Although TVA's fossil plants generated 6 percent more electricity in 2000 than in 1999, the agency succeeded in reducing its SO_2 emissions by more than 6 percent and its NO_x emissions by 20 percent. The SO_2 reduction figure, however, did not meet TVA's target due to timing and delays related to planned low-sulfur fuel switches, which underscores the need to continue to improve performance in this area.

TVA's most significant effort to reduce fossil-plant emissions in 2000 was its installation of its first selective catalytic reduction (SCR) system at Paradise Fossil Plant in Kentucky. An SCR system removes NO_x by directing a plant's flue gas into an ammonia-injection reactor. In the presence of a catalyst, the ammonia reacts with the NO_x in the gas to form harmless nitrogen gas and water vapor. TVA did have to overcome several start-up and operational problems with its first SCR, one of which was an improper sizing for an ammonia vaporizing system. Using the experience it gained at Paradise, the agency is now set to spend an estimated $850 million on the installation of 17 more SCRs by the spring of 2005, with the goal of reducing NO_x emissions during the summer ozone season by 70 to 75 percent. This step comes in addition to TVA's introduction of low-NO_x burners, overfire air controls, and boiler-optimization

Cleaner gas combustion turbines at Johnsonville Fossil Plant.





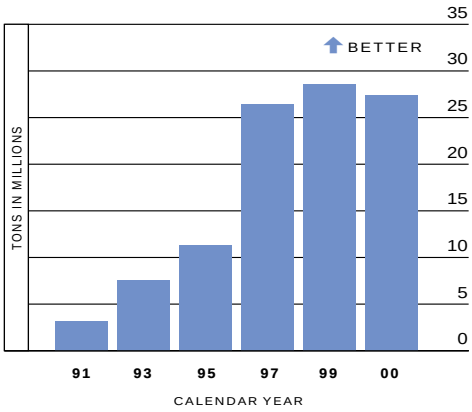


1999 and 2000 figures reflect increases in fossil-power and combustion-turbine generation.

TVA employees review the performance of Paradise Fossil Plant's new selective catalytic reduction system.

CO_2 Emissions Avoided

As Reported in Global Climate Challenge



controls, which are decreasing NO_x emissions at other fossil plants across the Valley.

In addition to installing limestone scrubbers at three plants, TVA continued to reduce SO_2 emissions by burning low-sulfur coal. Occasionally the coal was co-fired, or burned simultaneously, with natural biomass materials to lower SO_2 emissions even farther. Eight new oil- or natural-gas-fired combustion turbines were installed last year, and 20 others were modified to burn natural gas, which improves efficiency, reduces SO_2 and other emissions, and plays an important part in meeting the Valley's growing demand for power. TVA will install eight additional turbines by the summer of 2001 to ensure that it can continue to supply the power needed during peak periods while working toward its SO_2-reduction goals.

Unfortunately, the release of CO_2, a substance that is considered to contribute to global warming, remains relatively unchecked. There are currently no commercially viable retrofit technologies available to lessen the release of CO_2, and TVA anticipates that its CO_2 emissions will continue to rise in coming years as demand for power increases.

Power production is a big job. But TVA makes a concerted effort to ensure that the environmental impact of its operations remains as small as possible.

"Cormetech is pleased to play a role in helping TVA improve the Tennessee Valley's bigger environmental picture—a picture in which the power needed to keep our communities and our businesses humming is generated in an environmentally sensitive manner. The catalysts we produce for TVA's selective catalytic reduction systems not only help provide high-quality jobs in the Valley but also contribute to a cleaner environment here."

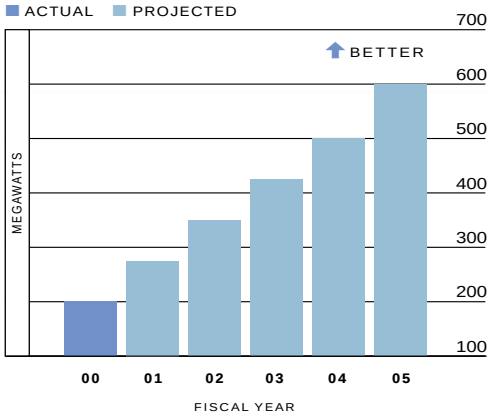
—Fred Maurer, President and CEO, Cormetech

Homebuilders reap energy and cost savings rewards through TVA's *energy right*® program, which promotes the use of energy-efficient insulation and heat pumps.

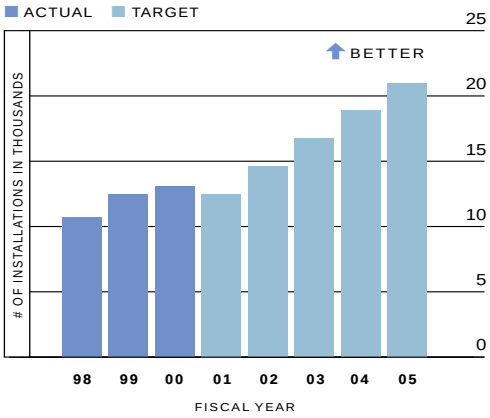
KEEPING CLEAN THROUGH ENERGY CONSERVATION

In recent years, the Tennessee Valley's demand for electric power has risen sharply. From 1999 to 2000, TVA's all-time peak demand increased by almost 1,000 megawatts (enough electricity to power both Knoxville, Tennessee, and Huntsville, Alabama, on an average day). To help manage this demand, TVA and its distributor partners have developed and implemented several programs that encourage wise energy use. For residential markets, the *energy right*® program furnishes information and incentives designed to promote energy-efficient construction techniques and appliances. Similar programs and special pricing structures are available for large industrial consumers. These programs—along with others, like TVA's in-school geothermal heating and cooling units and its energy-use curtailment in its own buildings—not only save consumers money but also help TVA supply all the power the Valley needs. By encouraging consumers to reduce their energy use during periods of high demand, the agency can avoid the costly operation of peak-production generating units and can ensure that an adequate supply of power will be available to its customers. However, TVA isn't on target to achieve the demand-side management goal established in Energy Vision 2020, the agency's official plan for meeting future energy requirements in the Valley. That goal is a peak-load reduction of 600 megawatts by 2002; currently the reduction totals about 220 megawatts, achieved through energy-efficiency initiatives and the control of residential water-heating units.

Reduction of Peak-Energy Demand

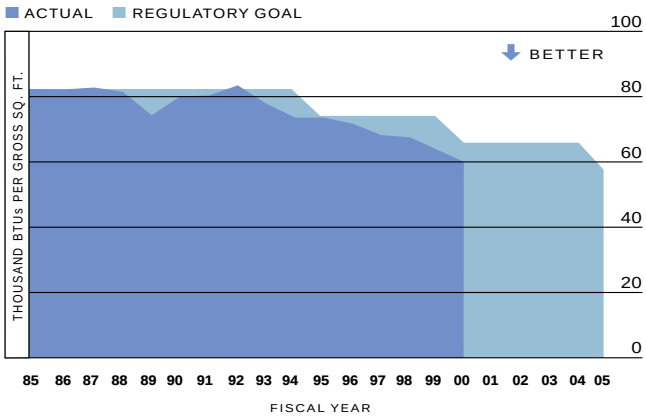


Number of Energy-Efficient New-Home Installations through *energy right*® Program



2001 drop reflects decrease in economic forecast for new housing starts.

TVA Buildings' Energy Consumption



partnerships & Public Involvement

Powerful partnership resources help TVA protect the Valley's natural resources

Children participate in TVA's Kids in the Creek program.

TVA's collaborations with a variety of partners continue to yield knowledge and progress in the area of air-quality improvement, an issue of major concern throughout the Valley and the nation.

The key to understanding any problem is careful research, and the problem of air pollution is no exception. To help provide qualitative and quantitative data on air quality, TVA has made a significant investment in research: the agency funds or co-funds 37 monitoring stations across the Valley, which measure fine particulate matter, acid deposition, sulfur dioxide, nitrogen oxide, and ozone. Because the ecologically delicate Great Smoky Mountains National Park is often at the center of concerns about regional air quality, it serves as a specific focus of TVA's research. During the summer of 2000, the agency collaborated on a number of intensive air-quality studies there.

In an ozone-sampling project spearheaded by the National Park Service and conducted in August, TVA interns and Public Power Institute personnel measured the presence of ground-level ozone during typical summer weeks, using filters placed on six-foot poles throughout the park. The study's results will combine the factors of ozone exposure, elevation, topography, and vegetation type to determine ozone patterns across the park's complex terrain. An understanding of these patterns is crucial to the goals of protecting public health and safeguarding the park's diverse plant life.

Another effort, co-funded by TVA, the U.S. Department of Energy, and the Electric Power Research Institute, was conducted at the Smokies' Look Rock Supersite. It measured the impact of sulfur dioxide, nitrogen oxide, carbon monoxide, and fine particles on air quality. The findings will help determine the extent to which TVA's operations affect air quality in the Great Smoky Mountains. Steve Mueller, a Senior Specialist with TVA's Air, Land & Water Sciences department, called the

"Air-quality issues are too large for any one entity to tackle alone. That's why the work being done with the Southern Appalachian Mountains Initiative by various stakeholders is critical. Pooling resources—even among stakeholders with differing policy objectives—and working cooperatively is the only way to achieve the common goal of understanding and addressing regional air-quality issues."

—Paul Muller, Regional Air Quality Supervisor, North Carolina Department of Environment and Natural Resources

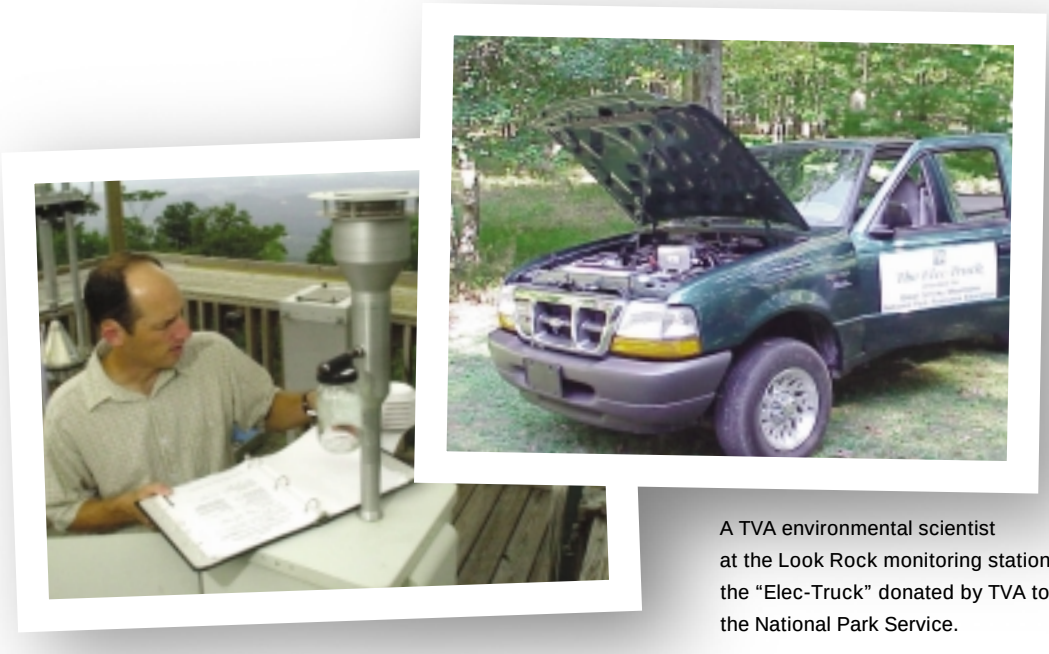
A TVA intern checks ozone monitors on the Lead Cove Trail in the Great Smoky Mountains National Park.

COLLABORATION LEADS TO CONSERVATION

To demonstrate how power production and wildlife conservation can work together, TVA signed a Memorandum of Understanding with the Raccoon Mountain Nature Preserve in September 2000. The agreement creates a public-private partnership aimed at protecting approximately 5,000 hectares (12,000 acres) of land around Raccoon Mountain along the Tennessee River northwest of Chattanooga, Tennessee. It's an area that is home to many animal species, including bald eagles, wild turkeys, and deer. TVA also operates an innovative underground pumped-storage power plant on Raccoon Mountain that produces 1.6 million kilowatt-hours of peak-load generating capacity each year. "TVA's great support in joining with other property owners in the creation of the Raccoon Mountain Nature Preserve has already resulted in making this a more friendly environmental area," says Robert Caldwell, its Director. The habitat-improvement work currently under way at Raccoon Mountain includes landscaping with native plants, installing bluebird and bat houses, erecting eagle perches, and providing salt licks for deer.

Stay Connected

TVA's partnership efforts extend into other areas, too. Twelve multidisciplinary Watershed Teams marshal volunteer resources at the grassroots level to help communities throughout the Valley improve their water resources. Read about some of what the teams have accomplished at **www.tva.gov/environment**.



A TVA environmental scientist at the Look Rock monitoring station; the "Elec-Truck" donated by TVA to the National Park Service.

ADVISORY COUNCIL BEGINS WORK

As the "Stewardship" in its name would suggest, the Regional Resource Stewardship Council (RRSC) is doing its part to ensure that the natural gifts of the Tennessee Valley are preserved for future generations. TVA convened the first meeting of the RRSC in 2000 to provide a forum for public input concerning the agency's decision-making processes in the area of natural-resource management. An advisory group made up of 20 members who represent a wide variety of interests, the council helps TVA set priorities in managing the Tennessee River and its watershed. The RRSC's subcommittees spent much of last year studying such issues as integrated river management, navigation infrastructure, public-lands management, and water quality. Recently they began reporting their recommendations to the full council. RRSC meetings are open to the public, and all documents related to them are published on the TVA Web site at www.tva.gov/environment/rrsc.

effort "a scientific way of playing out day-to-day conditions that occur in the Smokies" and noted that some of the measurement instruments used in the study are more advanced than those required by the Environmental Protection Agency.

Data from both of these studies are being processed and computer-modeled to ensure accuracy. The data will yield information that can provide a wealth of knowledge for use by TVA and by interested stakeholders like the Southern Appalachian Mountains Initiative, which is scheduled to complete an integrated assessment of factors affecting air quality in the Southern Appalachians in December 2001.

TVA also supports action aimed at decreasing the threat to the Smokies' ecology posed by automotive emissions, especially the nitrogen oxide that's a major contributor to ozone formation. In September of last year, TVA loaned an electric-powered Ford Ranger pickup truck to the National Park Service to help it study the use of electric vehicles. The truck has the reliability, safety, and durability of a conventional vehicle, and between recharges it can operate for 80 to 120 kilometers (50 to 75 miles) at speeds of up to 120 kilometers per hour (75 mph), depending on the terrain. Friends of the Smokies, a nonprofit group organized to support the park, will buy enough renewable Green Power Switch electricity from the Sevier County Electric System to keep the truck's batteries charged for at least a year. This electric vehicle could even be a forerunner of change in the way visitors explore America's most heavily used national park.

"We believe the truck will show visitors that electric vehicles can be used in mountainous terrain and will demonstrate a clean-energy alternative for vehicle use in the park," says Supervisory Park Ranger Steven McCoy.

By working cooperatively to find solutions that promote improved air quality, TVA is continuing to help people breathe easier, here in the Valley and everywhere else.

TVA employees receive environmental training.

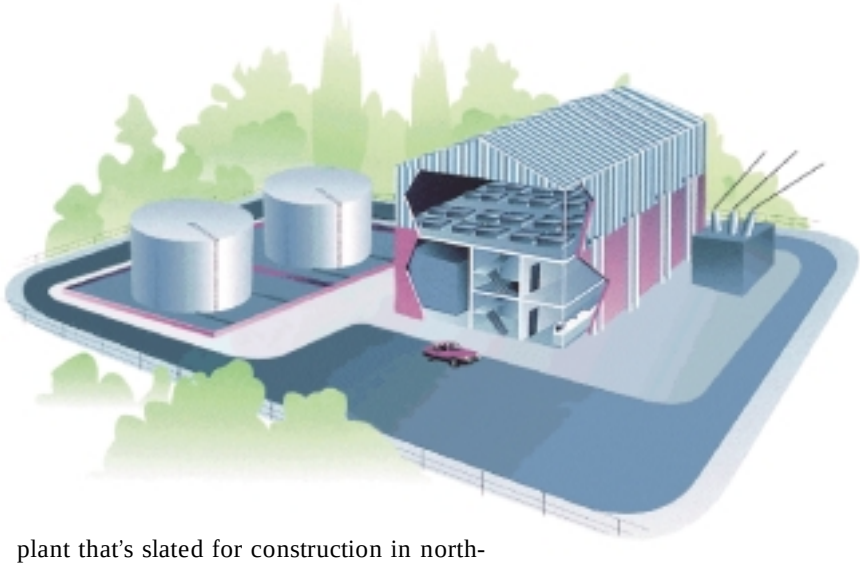
Innovation

TVA research-and-development efforts help deliver value to the Valley

Although it's been in existence only since 1999, TVA's Public Power Institute (PPI) is already filling an important gap between the laboratory and the marketplace.

"There's limited research-and-development money in the U.S., and as those funds become more scarce it's important to take a collaborative approach to technological advancement," says Anda Ray, who directs the institute. "The PPI focuses on research, development, demonstration, and deployment. We take sound science and technologies and move them toward commercialization. We use TVA's facilities and resources as a living laboratory to bring together ideas that improve the way electricity is produced, delivered, and used. And we provide TVA with a policy-centered voice to help build alliances for the promotion of services that differentiate public power from investor-owned utilities."

One of the institute's current projects already has the potential to make dramatic changes in America's electric power industry. In partnership with Innogy Technology Ventures of Great Britain, the PPI is working to employ that company's innovative Regenesys energy-storage method in a new TVA plant that's slated for construction in northeast Mississippi, beginning next spring. The facility will be the first in the U.S. to apply the Regenesys technology, which uses regenerative fuel cells and a chemical process to store large quantities of energy. The plant will function like a gigantic, extremely efficient battery, storing electricity during periods of low demand and providing it when demand is high. Because it helps eliminate momentary supply interruptions and keeps voltage levels constant, the Regenesys technology helps improve power quality. As an energy-storage method, it also reduces the need to build additional generating



An illustration of the remarkable Regenesys energy-storage facility that TVA is scheduled to build in northeast Mississippi.

"As an owner-operator of a large and complex power system, TVA makes effective investments in research and development because their bottom line depends on it. As a public power enterprise, those investments are a public service that protects regional preference for affordable power. It's a winning combination of performance drivers from which distributors and consumers benefit."

—Bill Long, Chairman, Research and Development Committee, Tennessee Valley Public Power Association

WASTEWATER TREATMENT EARNS AWARD

TVA's work in bringing practical innovation to wastewater treatment was recognized this year by the Environmental Protection Agency (EPA), which conferred an Environmental Merit Award on TVA employee Les Behrends. The EPA awards recognize creative and productive efforts to promote environmental stewardship. Behrends, a Team Leader in TVA's Air, Land & Water Sciences department, won in the individual category for his patented subsurface-flow wetland technology, which has made TVA's decentralized wastewater-treatment systems even more efficient and economical for small industries and communities. Instead of hazardous chemicals, the systems use water and alternating levels of oxygen to remove water-borne pollutants from industrial, domestic, and agricultural wastewater. Behrends's improvement allows for the faster and more efficient breakdown of organic materials, as well as the removal of nutrients that could adversely affect water quality. TVA has installed the technology in a north Alabama subdivision, at a central Alabama swine farm, and at a Tennessee-based food-processing company. During the October 2000 honors ceremony, EPA Regional Administrator John H. Hankinson said, "Those honored today have gone above and beyond the call of duty to address public-health and natural-resource-protection issues of concern."

BP Amoco has given a green light to building solar-powered gas stations like this around the Tennessee Valley.

capacity. The system requires less than a single hectare (two acres) of land and can be placed near an existing transmission facility.

In another instance of innovation, the PPI brokered a partnership between TVA and petroleum producer BP Amoco that is promoting the use of cleaner renewable energy in the Valley. To accompany its introduction of a new low-sulfur gasoline, BP Amoco will construct two solar-power-generating gas stations in Tennessee by the end of 2001; another two will be completed within three years.

Another PPI success in 2000 was the installation of ultraviolet air-sterilizing units at the Shelby County Justice Center in Memphis. The PPI's collaborators in the project were the Electric Power Research Institute, the government of Shelby County, and Memphis Light, Gas and Water. The units recycle indoor air and use ultraviolet light to destroy a variety of harmful microbes, including the germs that cause tuberculosis.

On the public-policy front, the PPI maintains a position on the Biomass Research and Development Board, established by last year's Congressional Biomass Research and Development Act. The institute represents the only operating utility on the board, so it can tap TVA's knowledge to provide valuable experience-based input on national biomass energy policy.

The work done by the PPI addresses the full spectrum of power production, delivery, and use and helps to maximize the value of public power. Ray says, "It's our desire that the Public Power Institute stand as a symbol of the vision and purpose that public power enterprises like TVA bring to the energy industry."

Stay Connected

To stay current on research and development news at the Public Power Institute, go to www.publicpowerinstitute.org. The site features discussion boards where visitors can weigh in on issues of importance to electricity consumers.

a look to the future...

KATHRYN J. JACKSON, PH.D.

As this report goes to press, millions of electricity consumers around the country are wondering about the future of their power supply. Media stories are replete with in-depth explanations of how electricity generation and delivery systems operate. All this coverage is a marvelous catalyst, encouraging Americans to consider our dependence on energy and to think about the value of reliable, affordable electricity and all the modern conveniences it powers.

For the first time in a long while, consumers are discussing renewable energy sources and conservation; they're exploring the question of how the nation's appetite for electricity can be satisfied in ways that minimize effects on the environment; as investors, they're giving serious attention to technologies that increase the efficiency of coal-fired generation. Moreover, residents of the Tennessee Valley are looking at the energy resources that fuel the region's economy and asking if TVA is prepared for the competition that lies ahead.

As a regional development agency and public power provider, TVA's commitment to the sustainable development of the Tennessee Valley has never wavered. Current events indicate that TVA is fortunate to have anticipated the need for the investments in planning and operations that enable it to fulfill its obligations. The TVA system has benefited from that foresight, and so have consumers. Last year's dramatic decrease in air emissions, despite a rise in power generation to meet record demand, is one of many recent achievements that we plan to build on as we move forward.

In my estimation, there has never been a more inspiring and challenging time to be in public service at TVA. In these historic moments, the opportunities are greatest for those who are prepared. We will look to our stakeholders for new systems of feedback and accountability, and we will invest in the preparedness that enables us to protect the environment's long-term health. When competition comes, we will be ready.

KATHRYN J. JACKSON, PH.D.

Executive Vice President and Environmental Executive, River System Operations and Environment

A participant in TVA's Kids in the Creek program learns firsthand about river ecology. He is holding a sculpin, a fish that is common to the Valley's waters.

TVA Vision

Generating Prosperity in the Valley

TVA Goals

Supplying Low-Cost, Reliable Power

Supporting a Thriving River System

Stimulating Economic Growth

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