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Sequoyah License Renewal
Comment
NRC-2013-0037

From:
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Articles to be considered in the environmental review

1) NRC, Industry say reactor life longer than 40 years.
2) GAO Report GAO-12-107 – Tennessee Valley Authority, Full Consideration of Energy Efficiency and Better Capital Expenditures Planning Are Needed.
3) Global Energy Partners' Study Identifies Significant Energy Savings Potential for TVA Customers.

published Wednesday, June 29th, 2011

NRC, industry say reactor life longer than 40 years

AP by Associated Press
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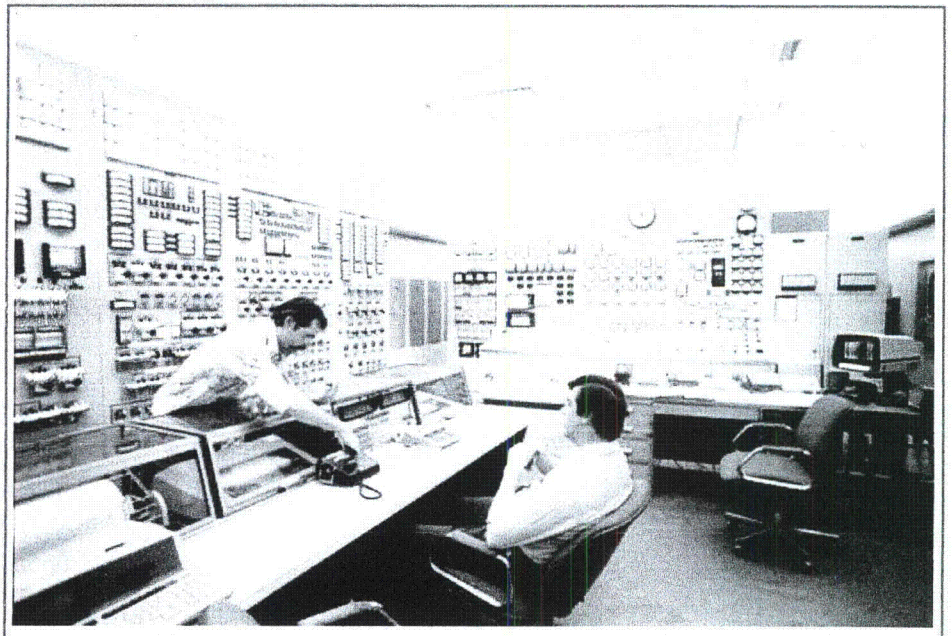

People work in 1983 in the control room of the Indian Point nuclear power plant in Buchanan, N.Y. Commercial nuclear reactors in the United States were designed and licensed for 40 years. When the first ones were being built in the 1960s and 1970s, it was expected that they would be replaced with improved models long before those licenses expired. Instead, 66 of the 104 operating units have been relicensed for 20 more years, mostly with scant public attention. As of 2011, renewal applications are under review for 16 other reactors. Applications to extend the lives of pressurized water units 2 and 3 at Indian Point, each more than 34 years old, are under review by the NRC. (AP File Photo)

ROCKVILLE, Md. When commercial nuclear power was getting its start in the 1960s and 1970s, industry and regulators stated unequivocally that reactors were designed only to operate for 40 years. Now they tell another story insisting that the units were built with no inherent life span, and can run for up to a century, an Associated Press investigation shows.

By rewriting history, plant owners are making it easier to extend the lives of dozens of reactors in a relicensing process that resembles nothing more than an elaborate rubber stamp.

EXTRA LIFE FOR TVA PLANTS

* At the Browns Ferry Nuclear Plant in Alabama, the U.S. Nuclear Regulatory Commission has granted 20-year license extensions for all three units, extending the life of the plant until 2037.

* At the Sequoyah Nuclear Plant near Soddy-Daisy, TVA has prepared a final environmental review in its application to extend that plant s operating license through 2041.

* At Watts Bar Unit 1, which began operating in 1996, a license extenion could keep that reactor running until 2056.

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As part of a yearlong investigation of aging issues at the nation s nuclear power plants, the AP found that the relicensing process often lacks fully independent safety reviews. Records show that paperwork of the U.S. Nuclear Regulatory Commission sometimes matches word-for-word the language used in a plant operator s application.

Source: Tennessee Valley Authority

Also, the relicensing process relies heavily on such paperwork, with very little onsite inspection and verification.

And under relicensing rules, tighter standards are not required to compensate for decades of wear and tear.

So far, 66 of 104 reactors have been granted license renewals. Most of the 20-year extensions have been granted with scant public attention. And the NRC has yet to reject a single application to extend an original license. The process has been so routine that many in the industry are already planning for additional license extensions, which could push the plants to operate for 80 years, and then 100.

Regulators and industry now contend that the 40-year limit was chosen for economic reasons and to satisfy antitrust concerns, not for safety issues. They contend that a nuclear plant has no technical limit on its life.

But an AP review of historical records, along with interviews with engineers who helped develop nuclear power, shows just the opposite: Reactors were made to last only 40 years.

Period.

The record also shows that a design limitation on operating life was an accepted truism.

In 1982, D. Clark Gibbs, chairman of the licensing and safety committee of an early industry group, wrote to the NRC that "most nuclear power plants, including those operating, under construction or planned for the future, are designed for a duty cycle which corresponds to a 40-year life."

And three years later, when Illinois Power Co. sought a license for its Clinton station, utility official D.W. Wilson told the NRC on behalf of his company s nuclear licensing department that "all safety margins were established with the understanding of the limitations that are imposed by a 40-year design life."

One person who should know the real story is engineering professor Richard T. Lahey Jr., at Rensselaer Polytechnic Institute in Troy, N.Y. Lahey once served in the nuclear Navy. Later, in the early 1970s, he helped design reactors for General Electric Co.; he oversaw safety research and development.

Lahey dismisses claims that reactors were made with no particular life span. "These reactors were really designed for a certain lifetime," he said. "What they re saying is really a fabrication."

NUCLEAR LIFE RENEWED

Relicensing is a lucrative deal for operators. By the end of their original licenses, reactors are largely paid for. When they re operating, they re producing profits. They generate a fifth of the country s electricity.

New ones would each cost billions of dollars and take many years for approval, construction and testing. Local opposition may be strong.

Already there is controversy about the safety of a next-generation design. Even before the nuclear crisis at the Fukushima Dai-ichi complex in Japan, only a handful of proposed new reactors in the U.S. had taken the first steps toward construction.

Solar and wind power are projected to make very limited contributions as electrical demand rises about 30 percent by 2035. So keeping old plants operating makes good business sense.

But it s challenging to keep existing plants safe and up to date.

The NRC has indicated that safety improvements are likely in the aftermath of melted fuel in the Japanese reactors in March. NRC inspectors have found some problems with U.S. equipment and procedures. But the agency says all sites are ready to deal with earthquakes and flooding. The NRC also has formed a task force to investigate further and report back in July. Both the task force and the NRC chairman have already suggested that changes will be needed.

Meanwhile, license renewals, which began in 2000, continue. The process essentially requires a government-approved plan to manage wear. These plans entail more inspection, testing and maintenance by the operator, but only of certain equipment viewed as subject to deterioration over time.

The plans focus on large systems like reactor vessels. It is assumed that existing maintenance is good enough to keep critical smaller parts cables, controls, pumps, motors in good working order for decades more.

Some modernization has been put in place upgrades on fire-prevention measures and electronic controls, for example. But many potential improvements are limited by the government s so-called backfit rule." The provision exempts existing units from safety improvements unless such upgrades bring a substantial increase" in public protection.

Even with required maintenance, aging problems keep popping up.

During its Aging Nukes investigation, the AP conducted scores of interviews and analyzed thousands of pages of industry and government records, reports and data.

The documents show that for decades compromises have been made repeatedly in safety margins, regulations and emergency planning to keep the aging units operating within the rules. The AP has reported that nuclear plants have sustained repeated equipment failures, leading critics to fear that the U.S. industry is one failure away from a disaster.

INDUSTRY, U.S. AS PARTNERS

Despite the aging problems, relicensing rules prohibits any overall safety review of the entire operation. More conservative safety margins are not required in anticipation of higher failure rates in old plants, regulators acknowledge.

The approach has turned relicensing reviews into routine approvals.

Everything I ve seen is rubber-stamped," said Joe Hopenfeld, an engineer who worked on aging-related issues at the NRC before retiring in 2008. He has since worked for groups challenging relicensing.

Numerous reports from the NRC s Office of Inspector General offer disturbing corroboration of his view.

For example, in 2002 the inspector general wrote: Senior NRC officials confirmed that the agency is highly reliant on information from licensee risk assessments." Essentially that means the industry tells the NRC how likely an accident is and the NRC accepts the analysis.

Five years later, in a relicensing audit, the inspector general complained of frequent instances of identical or nearly identical word-for-word repetition" of the plant applications in NRC reviews. The inspector general worried that the repetition indicated superficial reviews that went through the motions, instead of thorough and independent examinations.

The problems went beyond paperwork. The inspector general found that the NRC reviews usually relied on the plants to report on their operating experience, but the agency didn t independently verify the information.

NRC spokesman Eliot Brenner said staffers have now agreed to use their own words in their reviews of relicensing applications.

Christopher Grimes, former director of license renewal at the NRC, acknowledges that the agency has to rely much more on the contents of the applications ... over direct inspection."

He blames budget constraints, but others view relicensing as a charade. Clean Ocean Action unsuccessfully challenged relicensing at the Oyster Creek plant in New Jersey, but chief scientist Jennifer Sampson said, We really knew it was a waste of time."

United States Government Accountability Office

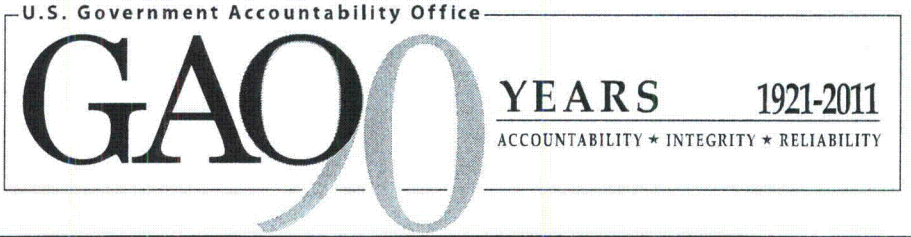
GAO

Report to the Chairman, Committee on Environment and Public Works, U.S. Senate

October 2011

TENNESSEE VALLEY AUTHORITY

Full Consideration of Energy Efficiency and Better Capital Expenditures Planning Are Needed



GAO-12-107

October 2011

GAO
Accountability • Integrity • Reliability
Highlights

Highlights of GAO-12-107, a report to the Chairman, Committee on Environment and Public Works, U.S. Senate

TENNESSEE VALLEY AUTHORITY

Full Consideration of Energy Efficiency and Better Capital Expenditures Planning Are Needed

Why GAO Did This Study

The Tennessee Valley Authority (TVA), the nation's largest public power provider, is a self-financing, federal electric utility with annual revenues of about $11 billion. TVA has financed large capital investments mostly by issuing debt and is subject to a $30 billion debt ceiling imposed by the TVA Act. TVA is governed by a 9-member Board. Within an affirmation requirement for the TVA Board, the TVA Act recognizes that TVA's broad missions and objectives include being a national leader in technological innovation, low-cost power, and environmental stewardship. GAO was asked to examine (1) how TVA plans to meet future demand for electricity and how TVA's resource planning and forecasts compare to those from other sources, (2) TVA's efforts to use energy efficiency to meet demand for electricity, and (3) TVA's financial condition and how it affects TVA's ability to meet its operational and financial goals. GAO analyzed data from TVA and third parties, reviewed agency documents, and interviewed federal and state officials and industry stakeholders.

What GAO Recommends

GAO recommends that TVA (1) use information from the energy efficiency study it commissioned to inform its future resource planning process and (2) develop a written capital expenditure plan that includes the full costs of the assets TVA plans to acquire and the sources of funding for acquiring those assets. TVA agreed with GAO's first recommendation and generally agreed with the second recommendation.

View GAO-12-107 or key components.
For more information, contact Frank Rusco at (202) 512-3841 or ruscof@gao.gov, or Susan Ragland at (202) 512-9095 or raglands@gao.gov.

What GAO Found

According to its 2010 power supply plan, by 2029 TVA plans to meet electricity demand primarily by expanding natural gas-fired generating capacity, adding three nuclear reactors, and expanding energy efficiency programs. TVA also plans to retire some coal-fired capacity. These plans are informed by TVA's resource planning forecasts, which GAO determined were largely in line with plans and forecasts for the southeastern United States from other sources. For example, TVA forecasts that peak demand will grow at an average annual rate of about 1 percent for about the next 20 years, which is within the range of long-term forecasts for the Southeast from other sources, including the Department of Energy and a GAO nonprobability sample of five investor-owned utilities. TVA also plans to increase its generating capacity and total electricity generation by about 1 percent per year on average, both of which are within the range of plans and forecasts from other sources.

While TVA plans to expand its energy efficiency efforts to meet future demand for electricity, TVA may not be fully considering this alternative. For example, TVA's plans may not reflect the full energy efficiency potential of its service area, since it has not yet completed a study of that potential. As a result, TVA cannot be sure that its current resource plans reflect the full scope and possible extent of energy efficiency programs or that the plans are realistic. In March 2011, TVA commissioned a study on the energy efficiency potential of its service area, which is scheduled to be completed by October 2011. In addition, TVA's use of energy efficiency is constrained by several factors, including TVA's planning approach, which did not allow for potentially more cost-effective levels of energy efficiency in its planning model. In addition, TVA is not subject to certain key mandates and incentives that apply to some other utilities, such as the requirement in California for utilities to consider energy efficiency before other resources.

TVA's financial condition may hamper its ability to fund capital improvements. As of September 30, 2010, TVA's statutory debt was $23.6 billion, and TVA plans to spend almost $10 billion by fiscal year 2013 for various capital investment projects. Given the significant delays and cost overruns that TVA has historically experienced, these projects could potentially face similar issues. In addition, under a settlement with the Environmental Protection Agency, TVA agreed to invest $3 billion to $5 billion in the next 10 years on new and upgraded pollution controls on existing power plants. TVA also anticipates increases in operating costs. All of these factors could reduce the available funds TVA could use for its planned capital investments. TVA's financial condition leaves it with difficult decisions to make in order to meet electricity demand while keeping its debt within the statutory limit. TVA does not have a formal capital expenditure management plan that identifies assets to be acquired, their costs, and funding sources. The lack of such a plan may impede TVA's long range financial planning.

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Global Energy Partners' Study Identifies Significant Energy Savings Potential for TVA Customers

The Tennessee Valley Authority (TVA) retained Global Energy Partners (Global) an EnerNOC, Inc. Company, to determine the potential for energy efficiency (EE) and demand response (DR) as a resource to help meet the Valley's future energy needs. TVA has an aspirational goal to lead the Southeast in energy efficiency, and believes this leadership can be accomplished through the development and implementation of action plans for EE and DR.

This study used state-of-the-art modeling to provide an analytical framework for estimating the achievable potential of EE and DR programs in the TVA service territory over the next 20 years.

ENERGY EFFICIENCY

Global simulated the effect of deploying a wide range of energy efficiency measures to all homes and businesses across TVA's 9-million-strong customer base. Examples include: compact fluorescent and LED lighting, high-efficiency heat pumps, programmable thermostats, motor control systems and variable speed drives, heat pump water heaters, secondary refrigerator recycling, and other new and emerging technologies.

The study projects that without utility efficiency programs to encourage the adoption of these measures, energy used by residential, commercial, and industrial customers in the valley will grow by about 1% annually, reaching nearly 180,959 GWh by 2030. However, energy efficiency programs have the potential to offset at least half of that growth.

The study developed high and low estimates of achievable savings. In 2015, the range of savings is 3,256 to 7,494 GWh, or 2.2 to 5.0% of the baseline forecast without EE programs. The high end of this range is roughly equivalent to the annual amount of energy produced by an average-sized (1000 MW) coal power plant. In 2030, savings in the low case are 19,093 MWh, equivalent to 10.6% of the baseline forecast, while in the high case they are 35,781 MWh or 19.8% of the baseline.

Energy efficiency measures also reduce system peak demand. In 2015, potential savings are between 687 MW and 1,590 MW or 2.1 – 5.0% of the baseline absent EE programs.

What is a Potential Study?

A potential study identifies future opportunities to save energy through efficiency programs.

The study begins with a thorough analysis to understand how homes and businesses currently use energy; for example, how much electricity is used for lighting, heating, cooling, and appliances.

Next, a baseline forecast is developed to project how customers would be expected to use energy in the future, in the absence of utility energy efficiency programs. This forecast assumes no intervention by utilities but does include savings expected from building codes and appliance standards that are already scheduled to be enacted.

Finally, equipment upgrades and other efficiency measures are applied to the forecast. The difference between the baseline forecast and the new, efficient forecast in each year is the potential for savings.

This study evaluated three levels of potential: 1) Technical Potential, a theoretical upper limit where all of the efficiency measures are phased in regardless of cost; 2) Economic Potential, which only applies the measures that will eventually pay for themselves with saved energy; and 3) Achievable potential, which further narrows the estimate by accounting for how quickly programs can be implemented, as well as customer adoption rates. Because this final step is a projection of customer and market behavior, the inherent uncertainties are sometimes accounted for by expressing Achievable Potential as a range.

DEMAND RESPONSE

Global also identified a broad set of Demand Response options, to help reduce peak demand, building upon TVA's strong base of existing DR programs currently available to large commercial and industrial customers. DR programs provide customers financial incentives to reduce their energy use at times of peak usage, so that TVA can avoid running additional generating units or purchasing energy on the spot market. This ensures lower system-wide costs and better grid reliability, to the benefit of all customers. TVA only enacts these programs a few hours each year during certain peak times.

DR programs in the analysis include options for all customer classes such as: dynamic pricing programs, where customers can choose to pay higher rates during peak usage hours in exchange for lower prices at all other times; direct air conditioner load control or communicating thermostats that allow TVA to partially reduce air conditioner use during peak load hours; and demand and capacity reduction programs, in which customers agree to reduce their use, for example by dimming lights, when TVA calls upon them to do so.

With the DR options presented in this report, TVA has the potential to reduce peak demand by 1,782 to 2,301 MW in 2015, or 6 to 7% of peak load. The achievable potential increases to a range of 3,199 MW to 4,579 MW in 2030, which equates to 8 to 12% of peak load. These impacts are equivalent to the capacity of several average-sized coal power plants.

OVERALL RESULTS

The results of the potential assessment reveal that TVA has significant potential for energy efficiency and demand response resources over the next two decades. TVA's programs are off to a strong start, with a comprehensive suite of programs currently moving from the planning phase to the implementation phase. With this report, Global provides a number of recommendations to preserve and augment that momentum, as well as an analytical basis to map the achievable path forward.

COMPARISON WITH OTHER STUDIES

Global also compared the results of this study to existing potential studies that were conducted in the Southeast region, as well as national studies. The comparison focuses on methodology, assumptions, approaches, estimated baselines, technical performance, adoption, and program/regulatory context. Direct comparison from study to study is often difficult due to the unique situation surrounding each new study and the complexity of each of the outlined issues. Nonetheless, Global's EE and DR savings estimates are generally in line with the other studies, as discussed in more detail in the final report.