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Report to the Chairman, Environment, Energy, and Natural Resources Subcommittee, Committee on Government Operations, House of Representatives

July 1988

NUCLEAR REGULATION

NRC's Decommissioning Cost Estimates Appear Low

GAO/RCED-88-184

GAO

United States
General Accounting Office
Washington, D.C. 20548

Resources, Community, and
Economic Development Division

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July 29, 1988

The Honorable Mike Synar
Chairman, Environment, Energy,
and Natural Resources Subcommittee
Committee on Government Operations
House of Representatives

Dear Mr. Chairman:

On July 22, 1987, you requested that we determine the mechanisms that the Nuclear Regulatory Commission (NRC) uses to ensure that commercial nuclear facility operators appropriately plan and set aside funds to decommission their plants. According to NRC, the operators must decommission the facilities at the end of their useful lives by removing the radioactivity so that the property can safely be used for other purposes.

Prior to May 1988, when the Commission approved publication of new regulations on decommissioning, NRC's regulations did not fully address the costs or methods to decommission nuclear power plants and fuel cycle facilities.[1] In late 1987 NRC staff submitted a proposed final rule to the Commission providing more specific requirements on the types and costs of actions to be taken. The rule was approved by the Commission on May 12, 1988, and takes effect on July 27, 1988.

As agreed to with your office, this report discusses the adequacy of NRC's decommissioning cost estimates for nuclear power plants and fuel cycle facilities and the methods the utilities and/or operators can use to ensure that funds would be available to decommission them. We will provide you with a report on other decommissioning issues later.

Results in Brief

No large commercial nuclear power plant has been decommissioned in this country. As a result, little actual cost data exist, and decommissioning estimates range from the tens of millions to $3 billion for a plant. Under NRC's regulations, utilities with (1) pressurized water reactors are required to set aside at least $105 million and (2) boiling water reactors

[1]Fuel cycle facilities include various plants that convert uranium ore into fuel for commercial and military reactors.

are required to set aside $135 million for decommissioning activities.[2] The regulations also require fuel cycle facility operators to set aside at least $750,000.

Most experts we contacted believe that NRC's estimates are too low. For example, decommissioning cost estimates prepared by a private consulting firm for 25 nuclear power plants showed that NRC's estimates averaged 29 percent, or $45 million, lower than those prepared by the firm. Although a staff member from the Federal Energy Regulatory Commission and an official from Battelle Pacific Northwest Laboratory who developed NRC's estimates believe the firm's estimates are too high, others we talked to agreed with the consulting firm that NRC's estimates are too low. In addition, two fuel cycle operators, who are decommissioning part of their plants, estimate that costs could range from $6.8 million to $20 million depending on the type of facility and the extent of cleanup required. The effect of low estimates is that nuclear facility operators may not have sufficient funds available for decommissioning activities when the plants' useful lives end.

NRC's rule also sets out three methods (prepayment, external sinking fund, and surety bonds/insurance) that utilities and fuel cycle operators can use to reasonably ensure that funds will be available to decommission the plants. Each method provides assurance that funds would be available, but each could increase ratepayers' monthly electricity costs by an estimated 1 to 2 percent. Although all three methods are available to utilities, the regulations provide that an external sinking fund is only available to fuel cycle operators if coupled with surety bonds or insurance.

Background

Under the Atomic Energy Act of 1954, as amended, NRC regulates the possession and use of radioactive material and ensures that the public is protected from the hazards of the material. To carry out its responsibilities, NRC sets standards and makes rules, conducts or contracts for technical reviews and studies, issues licenses, and conducts inspections. Within NRC, the Office of Nuclear Reactor Regulation regulates utilities with nuclear power plants; the Office of Nuclear Material Safety and Safeguards regulates fuel cycle operators.

[2]Pressurized water reactors are those cooled by water that is kept at a high pressure to prevent it from boiling. The water passes through the core to a secondary coolant system where steam is produced. Boiling water reactors are cooled by water that is allowed to boil as it passes through the core. The water is used directly to produce the steam that generates electricity.

Prior to the new regulations, utilities and fuel cycle operators merely had to certify to NRC that sufficient financial resources would be available to decommission the plants. The new regulations are more specific. They require the licensees to (1) provide decommissioning plans, cost estimates, or a written certification stating they will meet NRC's specified amounts and (2) set aside funds for decommissioning activities using NRC's approved funding methods.

As of November 1987, NRC had issued operating licenses for 109 nuclear plants. However, only two small plants in this country have been totally or partially decommissioned—the 22-megawatt Elk River, Minnesota, plant and the 72-megawatt Shippingport, Pennsylvania, plant. The Elk River plant was decommissioned in the early 1970s at a cost of about $6.2 million. The Shippingport plant is currently being decommissioned by the Department of Energy. The Department expects to complete this effort by January 1990 at an estimated cost of $98.3 million.

Further, five other commercial-scale nuclear power plants in the United States are awaiting decommissioning. The utilities that own the plants do not expect to begin decommissioning activities until a repository or some other spent (used) fuel storage facility is available. Further, numerous other nuclear facilities, such as research reactors, enrichment plants, reprocessing plants, medical treatment facilities, and low-level waste sites, will have to be decommissioned at some time in the future. However, the costs and activities to decommission these other facilities were outside the scope of this review.

NRC's Cost Estimates Appear Low

NRC's rule requires utilities and fuel cycle operators to set aside a minimum of funds for decommissioning as follows:

- $105 million for a 1,100-megawatt pressurized water reactor.
- $135 million for a 1,100-megawatt boiling water reactor.
- $750,000 for a fuel cycle facility.

For smaller facilities, NRC developed a formula that lowers the prescribed amounts. The estimates include costs for engineering and planning, contractors, labor, waste transportation, and power consumption. The estimates do not include costs to ship spent fuel and demolish nonradioactive structures; NRC does not consider these as decommissioning activities.

Although NRC has established the various cost estimates, NRC recognizes that they may not represent the actual funds needed for decommissioning. The regulations state that utilities should use the estimates to set aside funds but also requires that, about 5 years before the utility expects to stop plant operations, it must submit to NRC a plan and specific decommissioning cost estimates. On the other hand, fuel cycle operators can only use the estimates until they renew their licenses, which generally occurs every 5 years. At the time of renewal, the operators must submit a funding plan specifically showing the amount of funds that will be needed for decommissioning.

Decommissioning Cost Estimates Vary

Technology exists to decommission nuclear power plants. However, the full extent of the costs is not known—the estimates we obtained from a variety of sources ranged from the tens of millions to $3 billion per nuclear power plant.

Our comparison of NRC's cost estimates, contained in the May 1988 approved rule, showed that they are lower than those prepared between 1985 and 1987 by TLG Engineering, Inc. (TLG)[3] for 25 nuclear power plants. Of the 25 plants, 18 are pressurized water reactors and 7 are boiling water reactors. To conduct this comparison, we adjusted TLG's data to 1986 dollars to make them comparable to NRC's estimates. To make the adjustment, we inflated the estimates prepared in 1985 and deflated the estimates prepared in 1987 using the consumer price index, which averaged about 3 percent between 1985 and 1987, and a 10-percent and 15-percent rate because these rates had been used in hearings before the California and Arizona public utility commissions, respectively. With only one exception, NRC's estimates were lower than those we calculated using TLG data. (App. II shows the results of our analysis.) As a means of further analysis, we reduced TLG's estimates by 25 percent to see how close they might compare with NRC's estimates. In most cases, NRC's estimates were still lower. (App. III shows the results of this analysis.)

In addition, TLG's president told us that the company has prepared 20 other published estimates for large reactors (around 1,100 megawatts) using guidelines developed in 1986 by the Atomic Industrial Forum, now the Nuclear Management and Resources Council. According to TLG's

[3]TLG Engineering, Inc., a private consulting firm, is one of several organizations that develops decommissioning cost estimates. Although higher estimates exist, TLG segregated its estimated costs by various categories thereby enabling us to more readily compare them with NRC's.

president, the guidelines represent the most detailed cost breakdowns for various decommissioning activities. He also said that NRC's estimates would be higher if NRC used the guidelines.

Further, a scientist from the Energy Systems Research Group (a group that represents consumers before public utility commission rate hearings) told us that the group has testified before state public utility commissions concerning the Palo Verde (three units) and Diablo Canyon (two units) plants. The group estimates that it would cost about $792 million (1986 dollars) to decommission Palo Verde's three units and about $628 million (1985 dollars) for Diablo Canyon's two units. In addition, the state power authority for Long Island Lighting Company, which owns the Shoreham, New York, plant, recently released information showing that decommissioning activities could cost between $400 million and $500 million.

We also discussed nuclear power plant decommissioning costs with 12 other government officials or organizations, such as the Edison Electric Institute and the National Association of Regulatory Utility Commissioners. Generally, all of those contacted said that NRC's estimates were low. For example:

- The former Director, Shippingport Decommissioning Project, said that decommissioning costs for most 1,000 megawatt plants would range from $100 million to $200 million. Further, boiling water reactors would cost more than pressurized water reactors because their primary systems are more radioactively contaminated, thereby requiring greater decontamination.
- An official with the National Association of Regulatory Utility Commissioners said that $130 million is the lowest conceivable amount that a utility should use to estimate decommissioning costs.

On the other hand, a staff member from the Federal Energy Regulatory Commission believed that TLG's estimates are too high. The Commission is gathering decommissioning cost information for an August 1988 electric wholesale rate hearing for the Northern States Power Company in Minnesota. As part of the information-gathering process, the staff member has identified instances where he believes TLG has overstated the expected decommissioning costs. He asked that we not cite the differences because the information will be germane to the rate-setting hearing.

Further, at NRC's request, Battelle Pacific Northwest Laboratory prepared a site-specific decommissioning estimate for the Washington Public Power Supply System unit 2 plant, a 1,150-megawatt boiling water reactor located at Richland, Washington. The laboratory estimated it could cost about $116.3 million to decommission the plant, $47.8 million less than TLG estimated for the plant. According to the laboratory official who prepared the estimate, the primary difference occurred in labor costs. The official stated that TLG's estimate included more staff and time to do the work. According to its president, TLG discussed staff needs with several utilities to determine the number of supervisory, security, quality assurance, and health and safety people that would be needed during decommissioning. TLG used this information along with visits to a number of plants as the basis for its estimate. At the time of our review, NRC had not resolved the differences between the two estimates.

NRC's Cost Estimates for Fuel Cycle Facilities

Officials from two companies—Kerr-McGee and Westinghouse—that operate fuel cycle facilities pointed out that NRC's $750,000 minimum cost estimate to decommission these plants is very low in light of their experience. Kerr-McGee officials expect it will cost about $6.8 million to decommission a building that had been used to fabricate fuel for the fast flux test reactor program in Hanford, Washington. The $6.8 million includes costs to remove all equipment and dispose of radioactive wastes generated during the decommissioning process but excludes costs to demolish the building.

Kerr-McGee is also decommissioning a building that had been used to fabricate fuel for commercial and military reactors. Company officials estimate that it will cost about $7.8 million to remove all equipment and radioactive waste that were buried at the site. However, the $7.8 million does not include costs to clean up sanitary lagoons and piping contaminated with radioactive material; company officials estimate an additional $3 million would be required to do so.

Further, Westinghouse officials told us it could cost about $16 million (1986 dollars) to decontaminate a laboratory that had been used for research using plutonium, remove equipment, and ship waste from it. Company officials explained that costs could increase an additional $4 million if radioactive waste buried on the site had to be removed.

NRC's Funding Methods Provide Reasonable Assurance That Funds Will Be Available

NRC's new regulations require utilities and fuel cycle operators to accumulate funds to meet decommissioning costs and set out three methods that can be used. These methods are (1) prepayment, (2) external sinking fund, and (3) surety bonds/insurance. Each provides reasonable assurance that funds would be available for decommissioning, but adopting any one of the methods could increase ratepayers' monthly costs by 1 to 2 percent. Further, although NRC allows utilities to use the external sinking funding method, it does not allow fuel cycle operators to do so unless coupled with surety bonds/insurance. (App. IV provides a brief description of the three funding methods).

In September 1984, NRC published a study (Utility Financial Stability and the Availability of Funds for Decommissioning (NUREG/CR-3899)) by a consultant from the Wharton School, University of Pennsylvania, which discussed the advantages and disadvantages of each of the funding methods. NRC contracted for the study to determine whether the funding methods were acceptable since some utilities, such as the Washington Public Power Supply System, had experienced financial difficulties. In summary, the study found that the

- market value of utilities' assets, even those involved in the most extreme financial crises (bankruptcy), far exceeded the funds projected for decommissioning and
- all three funding methods were acceptable, and each provided some measure of assurance that funds would be available.

The study ranked the funding methods and concluded that the prepayment method provided the greatest assurance that funds would be available for decommissioning. The study ranked the funding methods in descending order of assurance as follows: (1) prepayment with periodic review to ensure the adequacy of the reserve, (2) external sinking fund held by a trustee, and (3) the surety bonds/insurance funding method. However, an economist with the Office of the Chief Economist, State of Wisconsin, estimated that these methods could increase ratepayers' monthly electricity bills by 1.2 to 2 percent. The economist concluded that the increase to the ratepayer was insignificant compared with the added assurance the state would have that funds would be available.

In addition, a director of Salomon Brothers, an investment firm, told us that 1 to 2 percent was a good ballpark figure nationwide to determine the additional cost requirements. Further, two studies conducted for NRC—one by Temple, Barker, and Sloan, a management consulting firm, and one by NRC—concluded that costs to fund alternatives varied, but

the increase to the ratepayers of the most expensive methods (prepayment and external sinking fund) would be less than 1 percent.[4]

NRC's regulations only apply to providing assurance that funds will be available to decommission the facilities at the end of their useful lives. They do not include requirements to clean up either on-site or off-site damage in the event of an accident. Other legislative and/or regulatory requirements exist for these activities. For example, NRC's regulation 10 CFR 50.54(w) requires utilities to carry on-site property damage insurance, and the Price-Anderson Act requires utilities to carry insurance to cover off-site damages. Therefore, utilities should have funds available to conduct cleanup and/or decommissioning activities following an accident.

Conclusions

Both the government and private sector have started to decommission various nuclear facilities around the country, and an ever-increasing number of such facilities will have to be decommissioned in the future. By implementing its new regulations, NRC has taken a positive step to ensure that its licensees plan, and set aside funds, for decommissioning activities.

Although only minimal data exist on the actual costs to conduct these activities, most experts we contacted believe that NRC's estimates are too low. Also, public utility commissions may use NRC's estimates in conjunction with other information in setting utility rates. Therefore, we believe that NRC's estimates should reflect the most current information while recognizing that the estimates can change as NRC and the industry gain experience and obtain better data on decommissioning activities and their associated costs.

In addition, the information we reviewed indicated that NRC's required funding methods would provide reasonable assurance that decommissioning funds would be available. Although each method could increase ratepayers' costs, the impact of licensees' setting aside funds throughout the time the plants operate is much less than allowing the bill to go

[4]See Financing Strategies for Nuclear Power Plant Decommissioning (NUREG/CR-1481, July 1980) and Assuring the Availability of Funds for Decommissioning Nuclear Facilities (NUREG/CR-0584, Rev. 3, Mar. 1983).

unpaid until decommissioning occurs. Further, since 1977 we have supported the concept that decommissioning costs should be paid by the current beneficiaries of the service received.[5]

Recommendation

Because NRC's decommissioning cost estimates are lower than the majority of estimates we reviewed, and public utility commissions may use NRC's estimates in setting utilities' rates, we recommend that the Chairman, NRC, reexamine NRC's estimates to determine whether they appropriately reflect all the costs that utilities and fuel cycle operators believe are needed to decommission their facilities. As part of the reexamination, NRC should use information being developed to decommission Shippingport and the information gained in resolving the differences between the Battelle Pacific Northwest Laboratory and TLG's estimates for the Washington Public Power Supply System unit 2 plant.

We conducted our review at NRC headquarters in Rockville, Maryland; Westinghouse Electric Corporation, Cheswick, Pennsylvania; and Kerr-McGee Corporation, Crescent, Oklahoma. Our objectives, scope, and methodology are discussed in more detail in appendix I.

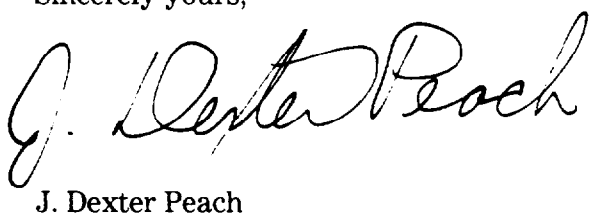
We discussed the facts in this report with NRC staff and incorporated their views where appropriate. As requested, we did not ask NRC to review and comment officially on this report. Our review was conducted between July 1987 and May 1988 in accordance with generally accepted government auditing standards.

Unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from the date of issuance. At that time we will send copies to the appropriate congressional committees; the Chairman of NRC; and the Director, Office of Management and Budget. We will also make copies available to others upon request.

[5]See Cleaning Up the Remains of Nuclear Facilities—A Multi-Billion Dollar Problem (EMD-77-46, June 16, 1977).

This work was performed under the direction of Keith O. Fultz, Senior Associate Director. Other major contributors are listed in appendix V.

Sincerely yours,



J. Dexter Peach
Assistant Comptroller General

Contents

Abbreviations

BWR	boiling water reactor
GAO	General Accounting Office
PWR	pressurized water reactor
NRC	Nuclear Regulatory Commission
TLG	TLG Engineering, Inc.

Objectives, Scope, and Methodology

On July 22, 1987, the Chairman, Environment, Energy, and Natural Resources Subcommittee, House Committee on Government Operations, asked us to determine the mechanisms the Nuclear Regulatory Commission (NRC) uses to ensure that commercial nuclear operators appropriately provide for the eventual decommissioning of their facilities. On the basis of subsequent discussions with the Chairman's office, this report addresses the adequacy of NRC's proposed cost estimates and funding methods to decommission nuclear power plants and fuel cycle facilities. We expect to provide a report on other decommissioning issues later.

To obtain the information needed, we reviewed the Atomic Energy Act and NRC's regulations and guidelines. In addition, we reviewed NRC's 1987 proposed final decommissioning rule and the regulations approved by the Commission on May 12, 1988, which were published in the Federal Register on June 27, 1988. The regulations take effect on July 27, 1988. We also reviewed studies prepared by (1) Battelle Pacific Northwest Laboratories at NRC's request, (2) Edison Electric Institute, (3) United Nuclear Corporation Nuclear Industries in conjunction with Pennsylvania State University, (4) TLG Engineering, Inc. (TLG) on specific plants, and (5) testimony presented before the Subcommittees on Investigations and Oversight and Energy Research and Production, House Committee on Science and Technology; the Subcommittee on Energy and the Environment, House Committee on Interior and Insular Affairs; and state public service commissions of Arizona, California, and Wisconsin. In addition, we reviewed technical articles prepared for the 1987 International Decommissioning Symposium, the 1988 Nuclear Decommissioning Costs and Funding Mechanisms' seminar, and the Atomic Industrial Forum's (now the Nuclear Management and Resources Council) decommissioning cost estimate guidelines.

Further, we met with NRC staff in the Offices of Nuclear Material Safety and Safeguards, Nuclear Regulatory Research, Nuclear Reactor Regulation, and General Counsel; Department of Energy officials in the Office of Radiation Programs; the former Director, Shippingport Decommissioning project; and officials from Westinghouse Electric Corporation, Cheswick, Pennsylvania, and Kerr-McGee Corporation, Crescent, Oklahoma. We also discussed decommissioning issues with a wide spectrum of knowledgeable experts, such as the Edison Electric Institute; National Association of Regulatory Utility Commissioners; TLG; Federal Energy Regulatory Commission; Energy Systems Research Group, Inc.; Worldwatch Institute; Nuclear Management and Resources Council; Salomon Brothers, Inc.; and an economist with the Office of the Chief Economist, state of Wisconsin.

To determine the reasonableness of NRC's cost estimates, we compared them with 25 plant-specific estimates prepared by TLG. We relied on TLG's estimates because they were current (1985-87), included various sizes of plants (538 megawatts to 1,270 megawatts), had been used in utility rate-setting cases, and were detailed enough so that comparisons could be made with NRC's cost data. Since TLG's estimates included costs to demolish all structures and restore the site to its original condition, and NRC's rule does not consider these costs as decommissioning-type activities, we adjusted TLG's estimates accordingly. We also adjusted NRC's estimates for plants smaller than 1,100 megawatts using the formula cited in NRC's regulations.

In addition, since TLG's estimates for the 25 plants were prepared between 1985 and 1987, we adjusted the data to 1986 dollars to make them comparable to NRC's estimates. In doing so, we inflated the estimates prepared in 1985 and deflated the estimates prepared in 1987 using the consumer price index, which averaged about 3 percent between 1985 and 1987, and a 10- and 15-percent rate because these rates had been used in hearings before the California and Arizona public utility commissions, respectively. Further, since information supporting NRC's rule stated that its estimates represent the bulk of funds that will be needed, we also reduced TLG's estimates by 25 percent to determine if NRC's estimates represented the bulk of funds.

To determine whether NRC's decommissioning funding methods provide reasonable assurance that funds will be available, we relied on two reports prepared for NRC by Mr. J.J. Siegel, a professor of finance, the Wharton School, University of Pennsylvania, entitled Utility Financial Stability and the Availability of Funds for Decommissioning (NUREG/CR-3899, Sept. 1984) and Cost and Availability of Funds for Decommissioning: An Analysis of Internal and External Funding (May 1986). The May 1986 study also included a summary of the 143 letters NRC received on its February 11, 1985, proposed rule. We used these reports because they provided an extensive analysis by an outside expert.

Comparison of TLG Site-Specific Estimates to NRC's Cost Estimates

Dollars in millions

Plant description[a]	Size of plant[b]	Type of plant	Inflation rate assumptions used[c]			NRC's estimates[d]
			Normal	10-percent	15-percent	
1985 Estimates						
Plant A	860	PWR	$120	$130	$136	$98
Plant B	860	PWR	120	130	136	98
Plant C	860	PWR	123	133	139	98
Plant D	1,180	PWR	137	148	155	105
Plant E	1,180	PWR	135	146	152	105
Plant F	1,145	PWR	147	159	166	105
Plant G	1,145	PWR	146	157	164	105
Duane Arnold	538	BWR	127	137	143	118
Perry	1,205	BWR	202	218	228	135
River Bend	936	BWR	154	166	174	129
Crystal River	821	PWR	135	146	152	97
Diablo Canyon	1,131	PWR	164	177	185	105
Diablo Canyon	1,156	PWR	197	213	222	105
1986 Estimates[e]						
Plant H	1,150	PWR	174	•	•	105
Plant I	610	BWR	170	•	•	120
Plant J	1,085	BWR	206	•	•	133
Palo Verde	1,270	PWR	156	•	•	105
Palo Verde	1,270	PWR	146	•	•	105
Palo Verde	1,270	PWR	159	•	•	105
Vogtle	1,157	PWR	162	•	•	105
Vogtle	1,157	PWR	133	•	•	105
1987 Estimates						
Brunswick	821	BWR	150	141	135	126
Brunswick	821	BWR	174	164	157	126
H.B. Robinson	770	PWR	104	98	94	96
Shearon Harris	900	PWR	150	141	135	99

[a]Some plant names could not be used because information is considered proprietary.

[b]Expressed in megawatts of electricity.

[c]Different inflation rate assumptions were used to convert 1985 and 1987 TLG estimates to 1986 dollars. The consumer price index rate used averaged 3 percent; the 10-percent rate and the 15-percent rate used were rates presented during testimony before the California and Arizona public utility commissions, respectively. No adjustments were made if TLG's estimates were in 1986 dollars.

[d]Estimates have been adjusted to reflect less than 1,100-megawatt plants. The estimates reflect 1986 dollars.

[e]Figures shown in "Normal" column represent TLG's estimates in 1986 dollars.

Comparison of TLG Site-Specific Estimates (Less 25 Percent) to NRC's Cost Estimates

Dollars in millions

Plant description[a]	Size of plant[b]	Type of plant	Inflation rate assumptions used[c]			NRC's estimates[d]
			Normal	10-percent	15-percent	
1985 Estimates						
Plant A	860	PWR	$90	$98	$102	$98
Plant B	860	PWR	90	98	102	98
Plant C	860	PWR	92	100	104	98
Plant D	1,180	PWR	103	111	116	105
Plant E	1,180	PWR	101	110	114	105
Plant F	1,145	PWR	110	119	124	105
Plant G	1,145	PWR	110	118	123	105
Duane Arnold	538	BWR	95	103	107	118
Perry	1,205	BWR	152	164	171	135
River Bend	936	BWR	116	124	130	129
Crystal River	821	PWR	101	110	114	97
Diablo Canyon	1,131	PWR	123	133	139	105
Diablo Canyon	1,156	PWR	148	160	166	105
1986 Estimates[e]						
Plant H	1,150	PWR	130	•	•	105
Plant I	610	BWR	128	•	•	120
Plant J	1,085	BWR	154	•	•	133
Palo Verde	1,270	PWR	117	•	•	105
Palo Verde	1,270	PWR	110	•	•	105
Palo Verde	1,270	PWR	119	•	•	105
Vogtle	1,157	PWR	122	•	•	105
Vogtle	1,157	PWR	100	•	•	105
1987 Estimates						
Brunswick	821	BWR	112	106	101	126
Brunswick	821	BWR	130	123	118	126
H.B. Robinson	770	PWR	78	74	70	96
Shearon Harris	900	PWR	112	106	101	99

[a]Some plant names could not be used because information is considered proprietary.

[b]Expressed in megawatts of electricity.

[c]Different inflation rate assumptions were used to convert 1985 and 1987 TLG estimates to 1986 dollars. The consumer price index rate used averaged 3 percent; the 10-percent rate and the 15-percent rate used were rates presented during testimoy before the California and Arizona public utility commissions, respectively. No adjustments were made if TLG's estimates were in 1986 dollars.

[d]Estimates have been adjusted to reflect less than 1,100-megawatt plants. The estimates reflect 1986 dollars.

[e]Figures shown in "Normal" column represent TLG's estimates in 1986 dollars.

Description of NRC's Decommissioning Funding Mechanisms

Prepaid Funding

Under this method, the licensee sets aside decommissioning funds at the time it receives an operating license. The funds could come from the operator's internal cash reserve or the sale of utility bonds, and the ratepayers would cover the cost over the operating life of the facility. The funds are segregated from the licensee's assets and are outside the licensee's control. As of April 1987, no licensee had set aside decommissioning funds in this manner. This method is available to utilities and fuel cycle operators.

External Funding

Under this method, the utility generally collects decommissioning funds directly from the ratepayers over the useful life of the facility. The utility periodically places the funds in a trustee type account; the funds are invested externally. An external sinking fund may be in the form of a trust, escrow account, government fund, certificate of deposit, or deposit of government securities. According to an April 1987 survey by the National Association of Regulatory Utility Commissioners, 14 state public utility commissions required an external fund for future decommissioning expenses; 13 commissions did not require utilities to set aside any external funds for decommissioning; and 6 commissions either had not addressed or were considering the issue. This method is available to utilities but not fuel cycle operators unless coupled with a surety method or insurance.

Surety Bonds/ Insurance

These methods are expensive because of the amount of funds required and the lengthy time period the licensee would have to maintain coverage. This method can be used by utilities and fuel cycle operators.

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