

March 1989

# NUCLEAR SCIENCE

## Effect of Conversion of Washington Nuclear Plant No.1 on Debt and Electric Rates



544801



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

Resources, Community, and  
Economic Development Division

B-231142

March 9, 1989

The Honorable George Miller  
Chairman, Subcommittee on Water, Power  
and Offshore Energy Resources  
Committee on Interior and Insular Affairs  
House of Representatives

The Honorable Peter A. DeFazio  
House of Representatives

On October 20, 1988, you requested that we examine several issues involving the Department of Energy's (DOE) possible acquisition and conversion of a partially completed commercial nuclear power plant to a nuclear materials production facility. The Washington Nuclear Plant #1 (WNP-1)--owned by the Washington Public Power Supply System (Supply System)--is located on DOE's Hanford Reservation near Richland, Washington. The Supply System financed construction of the plant with approximately \$2.16 billion in tax-exempt, long-term revenue bonds. The Bonneville Power Administration, in exchange for the rights to the plant's electric power, agreed (as part of a Net Billing Agreement) to pay the total annual costs of maintaining WNP-1, including debt service (principal and interest) on the WNP-1 bonds. If DOE acquires WNP-1, it will most likely complete the power-generating capability of the plant, thus making it a dual-purpose--production and power--reactor.

Subsequently, we agreed with your office to provide you with answers to the following questions:

- Is it possible that DOE's acquisition of WNP-1 through condemnation could lead to the default of WNP-1 bonds? How much of the Supply System's debt would be relieved by DOE's acquisition and conversion of WNP-1, and what effect would acquisition and conversion have on the liability of the Bonneville Power Administration for the WNP-1 debt?

- What rate would DOE charge for electricity from the converted reactor? How would the costs of this electricity compare with other possible sources of electricity?

A second report, which will be issued at a later date, will discuss the DOE Richland Office's role in the proposal to acquire and convert WNP-1.

In summary, we found that:

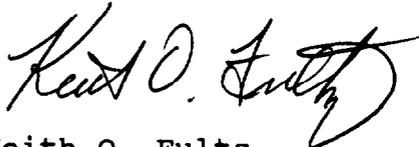
- DOE can acquire WNP-1 through voluntary sale or condemnation. However, the Supply System's sale of WNP-1 for less than the amount of the outstanding bonds (approximately \$2.1 billion) may cause a default. Condemnation, however, would not lead to default under the terms of the WNP-1 Bond Resolution nor make the bonds immediately due and payable because condemnation would be considered a transfer of the reactor "through the operation of law."
- Any condemnation price that DOE pays the Supply System for WNP-1 would most likely be used to retire an equal amount of bonded debt. The Supply System would continue to be liable to WNP-1 bondholders for the remaining outstanding bonded debt. Bonneville would remain obligated to pay these bond costs and other costs associated with WNP-1, which Bonneville, in turn, passes onto its customers through its rate structure.
- Although many factors can be expected to influence the rate charged for WNP-1 electricity, the cost of WNP-1 electricity would likely be lower than the cost of producing electricity from its least-cost power-generating alternative: a coal-fired plant in the Pacific Northwest. The cost for WNP-1 electricity is expected to be between 3 and 36 mills per kilowatt hour (kWh), and the corresponding coal-fired plant cost is expected to be about 40 mills/kWh, according to Bonneville and DOE estimates (escalated to 1988 dollars).

Sections 1 and 2 of this fact sheet provide more detailed answers to your questions.

To respond to your questions, we interviewed officials at DOE headquarters, its Richland Operations Office, DOE contractors, the Supply System, and Bonneville. We also reviewed pertinent DOE, Supply System, Bonneville, and

Northwest Power Planning Council reports and studies and used the results of previous reports concerning WNP-1 (Nuclear Science: Questions Associated With Completing WNP-1 as a Defense Materials Production Reactor (GAO/RCED-88-221), and Nuclear Science: Issues Associated With Completing WNP-1 as a Defense Materials Production Reactor (GAO/RCED-88-222)). In addition, we employed the services of a consulting economist familiar with electric power issues in the Pacific Northwest. We performed the work for this fact sheet between November 1988 and February 1989 and discussed the facts presented with cognizant DOE officials.

Unless you publicly announce its contents earlier, we plan no further distribution of this fact sheet until 30 days from the date of this letter. At that time, we will send copies to the Secretary of Energy and other interested parties. Copies will also be made available to others upon request. Major contributors to this fact sheet are listed in appendix I.



Keith O. Fultz  
Director, Energy Issues

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### ABBREVIATIONS

BPA	Bonneville Power Administration
DOE	Department of Energy
GAO	General Accounting Office
kWh	kilowatt hour
WNP	Washington Nuclear Plant

## SECTION 1

### POSSIBLE EFFECT OF DOE ACQUISITION OF WNP-1 ON THE SUPPLY SYSTEM BONDED INDEBTEDNESS

To avoid the risk of default under the terms of the Washington Nuclear Plant #1 (WNP-1) Bond Resolution, the Department of Energy (DOE) could acquire the plant by purchasing it for the full amount of the outstanding bond debt or by condemning the plant.<sup>1</sup> In either case, DOE would pay some amount of compensation to the Washington Public Power Supply System (Supply System); the WNP-1 debt would most likely be reduced by the same amount; and the Supply System would remain liable to the bondholders for any outstanding WNP-1 debt. However, the Bonneville Power Administration (BPA) would remain liable to the Supply System through Net Billing Agreements for costs associated with WNP-1,<sup>2</sup> including debt service (principal and interest) on the plant's bonded indebtedness.

#### THE EFFECT OF ACQUISITION ON BONDED INDEBTEDNESS AND RISK OF DEFAULT

The amount of Supply System debt relief that may be realized through DOE's acquisition of WNP-1 depends on the circumstances surrounding the acquisition. DOE can obtain WNP-1 by one of two methods--through purchase or "through the operation of law" (i.e., condemnation). Under Section 10.8(1) of Bond Resolution No. 769, the Supply System is permitted to sell WNP-1 (in its entirety) only if the Supply System receives a sufficient amount of money--approximately \$2.1 billion--to pay all of the principal and accrued

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<sup>1</sup>Bond Resolution No. 769 was adopted by the Supply System Board of Directors to govern the issuance of revenue bonds to finance the construction of WNP-1.

<sup>2</sup>This agreement involves the Supply System, BPA, and 104 WNP-1 participants--public- and cooperative-owned utility companies (BPA's wholesale customers).

interest on the outstanding bonds.<sup>3</sup> If the Supply System sell (or otherwise voluntarily conveys) WNP-1 for less than that a such action may constitute an "event of default" under Section 12.1 of the Bond Resolution and all bond principal could be declared immediately due and payable. However, Section 10.8 of the Bond Resolution provides that the transfer of WNP-1 or a portion thereof through the operation of law is permissible and does not constitute a default. If a transfer through operation of law occurs, any money received by the Supply System would most likely be paid into the bond retirement account, but since such transfer is not a default, the entire balance due on the bonds would not become immediately due and payable.

Since purchase at the amount of the outstanding bonds (approximately \$2.1 billion) is, according to DOE officials, more than DOE is willing to pay, condemnation appears to be the most feasible method for DOE to acquire WNP-1. The court (in this case the U.S. District Court for the Eastern District of Washington) would determine the compensation that DOE must pay to the Supply System for taking its property. DOE expects that the compensation will be much less than the outstanding bond debt. While the Supply System will probably contest such a condemnation in order to avoid allegations that a voluntary conveyance of WNP-1 were actually taking place, such a condemnation would not constitute a default and would not cause the outstanding bond principal to become immediately due and payable, even if compensation is much less than the bonded WNP-1 debt.

Acquisition Which Includes Completion of the WNP-1 Power Plant May Provide Other Relief to the Supply System, BPA, and Ratepayers

WNP-1 is currently in its 7th year of an extended construction delay, and uncertainty exists as to whether it will be completed. Construction of the plant was halted in April 1982 because of uncertainties in the future demand for electric power and financing difficulties. All facilities and equipment are being

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<sup>3</sup>According to the authors of a DOE-commissioned study--Analysis of Legal and Institutional Issues in Acquiring the Washington Public Power Supply System's Partially Completed Light Water Reactor (WNP-1) for a Department of Energy Production Reactor (Sept. 17, 1987)--if WNP-1 is voluntarily sold, enough cash must be deposited not only into the WNP-1 Bond Fund but also into the Hanford Project Revenue Fund (another fund having a smaller lien on WNP-1) to pay all outstanding WNP-1 and Hanford bonds. Accordingly, Supply System officials told us that outstanding WNP-1 bonds amounted to approximately \$2.08 billion on June 30, 1988, while Hanford bonds were about \$20 million, and outstanding indebtedness on WNP-1 is approximately \$2.1 billion (less cash and liquid assets of approximately \$0.2 billion).

maintained, however, at an annual cost of about \$5 million while awaiting restart of construction. BPA, however, remains liable under the Net Billing Agreement to pay all annual costs associated with WNP-1, whether it is completed or not. BPA passes these costs onto its customers through its rate base.

Although major liabilities may remain, a DOE acquisition that includes completion of WNP-1's power-generating capability may relieve the Supply System and BPA and its ratepayers of some current and potential costs.<sup>4</sup> These benefits would be attributable to a completed and profitable electricity-generating WNP-1.

The Supply System is likely to benefit if WNP-1 becomes operable because, if electricity sales are profitable, Supply System bonds may become more attractive to investors. In addition, although acquisition and completion of WNP-1 will not release BPA from its liability to the Supply System under the Net Billing Agreement to pay any outstanding WNP-1 bond debt, required payments on the remaining debt may be lower. Furthermore, completion and operation of WNP-1 may lead to an increase in the number of BPA customers and ratepayers. Thus, acquisition and completion of WNP-1 may provide some relief to BPA's current customers and ratepayers who are now paying WNP-1's bonded indebtedness. In addition, some current costs, such as those being paid to preserve WNP-1, and potential costs, such as those for site restoration if WNP-1 is abandoned, would be avoided.

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<sup>4</sup>According to DOE, if it acquires WNP-1, it will most likely complete the power-generating capability of WNP-1, thus making it a dual-purpose--production and power--reactor.

## SECTION 2

### PROJECTED WNP-1 RATES AND COST OF ALTERNATIVE POWER

At this point, it is too early to determine what rate DOE may charge for WNP-1 electricity if it acquires and completes the plant. We can only estimate the range within which we believe the rate is likely to lie. The actual rate within that range will depend upon resolving several issues. Nonetheless, the projected cost to complete and operate WNP-1 appears to be less expensive than its least-cost power-generating alternative: a coal-fired plant in the Pacific Northwest. However, potential cost trade-offs between a nuclear power plant and a coal-fired plant would have to be considered.

#### RATE LIKELY TO BE WITHIN A SPECIFIC RANGE

According to BPA and DOE estimates, the rate DOE would charge for WNP-1 electricity is likely to fall in the range of 3 to 36 mills per kilowatt hour (kWh).<sup>1</sup> The lower limit of this range reflects WNP-1 recovery of only the costs to complete and operate the electricity-generating portion of the plant.<sup>2</sup> The cost to complete the electricity-generating turbines and associated equipment is estimated by DOE to be \$206 million, with annual operating costs of about \$6 million. This represents an estimated rate charge of at least 3 mills/kWh in 1988 dollars.<sup>3</sup>

Although DOE would not operate the facility only for generating electric power, it is possible that BPA ratepayers may be requested to pay a rate equivalent to the total costs that would be incurred if WNP-1 were completed and operated as a single-purpose power plant. According to the 1987 BPA "WNP-1 and -3 Study," these include capital costs of approximately \$1.4 billion, plus operation and maintenance costs after an assumed WNP-1 completion date of 2005. The total 1986 dollar cost levelized over the life of the project to complete and operate WNP-1 would be 33.5

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<sup>1</sup>We used recent BPA and DOE cost estimates as a base from which to escalate costs to 1988 dollars.

<sup>2</sup>The completed dual-purpose WNP-1 would produce steam as a by-product of reactor operation. The lower limit assumes that steam would be provided by DOE at no cost to drive electric generators.

<sup>3</sup>On the basis of the variability of DOE estimates for the cost of capital and for capital upgrade costs, the estimated rate would be at least 3 to as much as 5.5 mills/kWh.

mills/kWh.<sup>4</sup> We escalated this BPA figure to 1988 dollars, bringing the cost to 36 mills/kWh.<sup>5</sup> This is the upper limit of the range. DOE officials recently told us that they believe the actual rate to be charged for WNP-1 electricity may be determined through a legislatively mandated agreement between the interested parties.

In our examination of potential WNP-1 electric rates, we used DOE and BPA estimates as our base figures for calculating the cost of completing and operating WNP-1. DOE's and BPA's estimates are consistent with our consulting economist's own methodology and have been generally accepted as accurate after thorough critique by such diverse entities as the Northwest Power Planning Council, the Supply System, public and private utilities, and environmental groups. The DOE and BPA figures also reflect actual operating experience with the Supply System's WNP-2 power plant. Nevertheless, there may be uncertainties in the DOE and BPA figures that warrant viewing any future rate projections with caution. In addition, any proposed BPA rates have to receive Federal Energy Regulatory Commission approval.

Some Issues Need to Be Resolved to Determine Rate

The actual rate that will be charged will depend upon resolving several uncertainties. As a result, we can only estimate a likely range for the rate at this point. The following is a partial list (in no particular order) of items that need to be addressed:

- The amount of compensation DOE would have to pay the Supply System for WNP-1.
- Agreement on responsibilities and sharing of costs to complete and operate WNP-1. The WNP-1 reactor produces steam as a by-product of reactor operations. The steam can then be used in the electric turbines to generate electricity. A cost-sharing agreement on who should complete and operate the steam-generating versus electricity-generating facilities would directly influence the rate charged for WNP-1 electricity.
- Various plant operation and electricity demand questions, such as

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<sup>4</sup>Levelized cost is defined as the present value of the resource cost (including capital, finance, and operating costs) converted into a series of equal annual payments.

<sup>5</sup>This assumes completion and operation of WNP-1 in conjunction with other power plants within the Supply System.

- the projected demand for and resulting value of electricity produced by WNP-1 in the Pacific Northwest and California and
- reaching operating agreements that ensure plant operation during periods of high demand, for example, in fall and winter (especially in dry years) when hydroelectric production is low but demand is high.

WNP-1 ELECTRICITY EXPECTED TO  
COST LESS THAN ALTERNATIVE

The Pacific Northwest currently enjoys an electric energy surplus. However, power-planning officials in the Northwest believe that a new power-generating plant will be needed to meet future demand if medium or high electricity demand growth occurs. The least expensive power-generating alternative to WNP-1 is a coal-fired plant. In its 1987 study (mentioned earlier), BPA estimated in 1986 dollars that the levelized cost to complete and operate such a plant in 2005 would be 37.1 mills/kWh (the Northwest Power Planning Council has recently produced an even higher cost estimate). We escalated the BPA figure to 1988 dollars in the same manner described earlier. This brought the cost equal to 40 mills/kWh. Using the same methodology, the comparable cost for the WNP-1 would be 36 mills/kWh. Thus, WNP-1 electricity is estimated to be cheaper.

There are some differences in cost characteristics between the two types of plants. Fixed costs are much higher and fuel costs much lower for the nuclear plant than for the coal-fired plant. In addition, during conditions of reduced electric power demand, a larger fraction of a nuclear plant's costs (i.e., fixed costs) cannot be avoided by shutting the nuclear plant down. Thus, during periods when a region experiences reduced demand for power, nuclear plants would most likely continue production, even at prices far below fixed costs. Coal-fired plants, however, can be shut down during periods of reduced demand to save variable costs, but are vulnerable to fuel price increases.

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