WNP-1 and -3 Study
Administrator's Record of Decision

May 1994

Index

WNP-1 & -3
RECORD OF DECISION

I. Background

A. Description of WNP-1 and -3

WNP-1 is a 1250 MW nuclear project located on land leased from the US Department of Energy on the Federal Hanford Nuclear Reservation about ten miles north of Richland, Washington. The plant's nuclear steam supply system includes a pressurized water reactor made by Babcock and Wilcox (B&W 205). Westinghouse designed the turbine generator.

WNP-3 is a 1240 MW nuclear project near Satsop, Washington, sixteen miles east of Aberdeen in Grays Harbor County. It is a pressurized water reactor called a System 80, produced by Combustion Engineering, Inc. Westinghouse designed and built the turbine generator.

WNP-1 and WNP-3 are two of five nuclear projects undertaken by the Washington Public Power Supply System (Supply System) in the 1970s to help meet growing Northwest loads then projected for the 1980s and beyond. In 1978-1981, the Supply System was actively building all five nuclear projects. Two projects were terminated in the early 1980's. One project, WNP-2, began commercial operation in December 1984.

WNP-1 and -3 are partially complete. They have been preserved for future completion since 1982 and 1983, respectively. Some $2.45 billion (all values are in 1993 dollars) has been spent on WNP-1 so far, and physical construction is 65 percent complete. WNP-1 completion would cost another $1.78 billion as estimated in the 1987 WNP-1 and -3 Study performed by BPA. WNP-3 is 74 percent complete with investments of approximately $2.6 billion, including the 30 percent share of four IOUs. It is estimated that completion of WNP-3 would cost another $1.55 billion.

B. BPA's relationship to WNP-1 and -3

The Supply System issued revenue bonds to finance 100 percent of WNP-1 and 70 percent of WNP-3. Through contracts called Net-Billing Agreements, Bonneville pays for the costs of principal and interest on these bonds, as well as all other project costs. Under the Net-Billing Agreements, participating publicly owned utilities and cooperatives ("Participants") acquired capability shares in the projects from the Supply System, which they then assigned to BPA. In consideration of this assignment, Bonneville credits the Participants' wholesale power bills in amounts equal to their shares of the projects' costs. Shares in the capability of WNP-1 are owned by one hundred and four Participants and 70 percent of WNP-3 is net-billed to Bonneville by one hundred and three Participants.

The remaining 30 percent of WNP-3 is owned by four Northwest investor-owned utilities. In 1985, through a settlement agreement Bonneville acquired an irrevocable option to acquire the remaining 30 percent share of WNP-3 from these IOUs. The IOUs had sued

BPA regarding the decision to suspend construction and mothball WNP-3. BPA now pays 100 percent of the project costs for WNP-3.

C. Decision to preserve

In 1984, a Bonneville study concluded that the projects should be preserved at least through July 1987 when the question of preservation would be revisited. In 1987, Bonneville conducted a full-scale study of whether to: 1) continue preservation; 2) terminate both projects; or 3) complete both projects on a fixed schedule. The study found that there was a 34 percent chance of needing one project by the year 2005, and about a 16 percent chance of needing both projects to meet Bonneville's contractual commitments. Although Bonneville found that there was not a compelling reason for or against continued preservation of the plants on a net present value basis, Bonneville concluded that preserving the partially completed nuclear plants was the prudent choice given certain contractual risks associated with termination, financing uncertainty, and the availability of the resources as an insurance policy against future load growth.

At that time it was unclear whether a termination of the projects could constitute an event of default on WNP-1 and -3 bonds. In an event of default, bondholders may have had the ability to demand accelerated payment of the principal of the bonds, making the $3.7 billion of outstanding principal immediately due and payable. Bonneville believed that even a small risk of an event of default outweighed any preservation cost savings gained by terminating before the contract issues were resolved and decided to revisit the decision

to continue preserving the plants once progress had been made in resolving the contractual uncertainties.

D. Original construction bonds refinancing

In the late 1980s interest rates dropped to the point where it was advantageous to refinance the WNP-1, -2 and -3 construction bonds. Also, specific legislation in late 1988 cleared the legal obstacles previously precluding a refinancing of outstanding Supply System construction bonds. The original bonds were issued at tax-exempt interest rates ranging between 5 - 15 percent. With the right environment in place, in 1989, the Supply System and Bonneville began refinancing the then outstanding principal of approximately $5.9 billion, including WNP-2 bonds. The last of the original WNP-1 and -3 bonds were refinanced in December 1993. The net present value savings from the refinancings has amounted to over $1 billion for all three projects.

In 1989, the Supply System covenanted to all bondholders of then outstanding Project 1 and 3 bonds that before it would terminate the Projects and sell assets, it would either seek a declaratory judgment from a court, or amend the bond resolutions, to clarify that a termination and sale of assets prior to defeasance of all such outstanding bonds would not constitute a default under the bond resolutions. However, certain amendments to the Project 1 Bond Resolutions and the Project 3 Bond Resolutions permit the sale of Project assets following termination without making provision for the payment of all outstanding bonds for the particular Project. Such amendments (the "Springing Amendments")

became effective when all of the bonds issued prior to the adoption of such amendments were refunded in December 1993.

Because the amendments have been triggered, the Supply System may proceed with termination without risk of default and in compliance with the above described covenants.

E. Decision to revisit study

On April 9, 1993, the Supply System Executive Board sent a letter informing Bonneville of the Executive Board's wish to begin a joint study to revisit the future of WNP-1 and -3. It appeared that much of the uncertainty surrounding contractual issues identified in the 1987 Study had been resolved and that the decision to continue preserving the nuclear plants could be revisited.

In June 1993, Bonneville, coordinating with the Supply System, began studying the question of whether to continue preserving the sites for completion as nuclear plants. Bonneville concluded that continuing to preserve the projects for completion under the terms of the existing agreements is not in the best interests of our customers or the region's ratepayers. Bonneville's conclusions were presented to the Supply System Executive Board on November 18, 1993, and to the Board of Directors on January 7, 1994.

II. Bonneville's Analysis

A. Decision Factors

Bonneville directed its analysis to answer four questions:

1) How would completing WNP-1 and -3 affect Bonneville's competitiveness?

2) What is Bonneville's need for additional resources?

3) How do WNP-1 and -3 compare to Bonneville's resource alternatives?

4) What are the advantages and risks of WNP-1 and -3 and their alternatives?

Bonneville focused its analysis on WNP-3 because WNP-3 has a slightly lower cost to complete estimate than WNP-1 and is, therefore, cheaper. A conclusion that WNP-3 was not cost-effective would, therefore, apply to WNP-1.

B. Competitiveness

Bonneville's current position as the low-cost provider of power is threatened if it cannot reduce its program expenditures. A decision to continue preserving the WNP-1 and -3

nuclear option needs to be measured in part against the effect that completing the plants would have on Bonneville's rates. This is particularly important because Bonneville's customers are uncertain about Bonneville's future costs and attractiveness as a business partner and are considering acquiring their own power supplies. Bonneville customers have also indicated that they would be willing to pay a premium for independence from Bonneville. If Bonneville's rates continue to increase and intersect the threshold prices of customer alternatives, sizable load losses for Bonneville may be triggered. Bonneville has determined that the timing and amount of capital required for completing WNP-1 and -3 would place unnecessary and unacceptable upward pressure on Bonneville rates when compared to the capital requirements of Bonneville's alternative resource, a combined-cycle combustion turbine (CCCT). The capital required for completing WNP-1 and -3 would substantially impair BPA's competitive situation. Likewise, the size of WNP-1 and -3 would create years of power surpluses after their completion, a problem that would likely not exist with a CCCT, which is typically one-fourth the size of WNP-3.

C. Need for additional resources

The 1992 Resource Program found that the most likely range of resource need fell between the Medium-High and Medium-Low load forecasts. Bonneville assessed the ranges of resource need and concluded it would be cost-effective to acquire resources to cover the most likely range of resource need (up to Medium-High) and that enough options should be included to accommodate the High load forecast. The 1992 Resource Program also found that there was a 2 percent chance of needing either WNP-1 or WNP-3 by 2005, and a 1 percent chance of needing both projects by 2005.

Since the 1992 Resource Program, load growth estimates have been revised downward. It now appears that Bonneville's load growth may have shifted downward by as much as 1800 aMW from the Medium-High forecast to the Medium-Low forecast. Based on estimates from the Draft Strategic Marketing Plan, Bonneville believes that much of any load growth that occurs in the region may be met by others unless Bonneville's rates are contained. In response to the Draft Strategic Marketing Plan estimates, Bonneville canceled its 1993 round of Billing Credits which amounted to an acquisition target of 200 aMW of energy.

In addition, Bonneville has been examining the future operations of the Federal hydro system. Preliminary results from the System Operation Review suggest strongly that the future operation of the hydro system will be very different from current operations due to constraints from the Endangered Species Act. Regardless of what path is chosen for river operations, any resources that Bonneville considers in the future must have sufficient operating flexibility to meet the potentially extreme swings in monthly hydro system generation. WNP-1 and -3 do not offer that operating flexibility.

D. Comparison with Alternative Resources

Bonneville compared the cost of completing and operating WNP-3 with the cost of building and operating Bonneville's alternative resource, a natural gas-fired CCCT. In developing the Base Case estimates for completing and operating WNP-3, Bonneville relied on the costs presented in the 1987 WNP-1 and -3 Study, and adjusted them to

1993 dollars. Bonneville also adjusted the estimated operating costs for WNP-3 to reflect the same rate of real escalation for the different cost categories experienced by WNP-2 between 1986 and the FY 1994 Budget forecast. Bonneville then developed High and Low Case estimates based on what it felt were reasonable assumptions for costs of completion and operations. (See Exhibit A.) The Supply System also developed a set of assumptions for WNP-3 (Best Case) which Bonneville included in its assessment of the cost-effectiveness of continuing to preserve WNP-1 and -3. (See Exhibit B.)

The assumptions for the natural gas CCCT were based on Bonneville's latest supply curve estimates. The study used Bonneville's medium forecast for firm delivered gas as presented in the 1992 Resource Program. Bonneville assumed that the CCCT was displaced 50 percent of the time. (See Exhibit C.)

Bonneville compared the nominal annual cash flows of the WNP-3 scenarios with that of the CCCT. Bonneville found that the CCCT was cheaper than both the Base and High WNP-3 cases. Bonneville found the Low WNP-3 case was comparable in cost on a life-cycle basis to the CCCT. On an annual cash flow basis, the CCCT has lower up front costs in the early years until 2010 when the Low WNP-3 case becomes cheaper. Under the Low case, WNP-3 would have to operate until 2016, however, in order to break even with the CCCT on a net present value basis. (See Exhibit D.)

In addition to the Base, High, Low, and Supply System Case estimates for WNP-3, Bonneville did a series of analyses to determine how sensitive WNP-3 and the CCCT were to changes in assumptions. (See Exhibit E.) Bonneville found that in only two cases,

High Gas and Low WNP-3, was completing and operating WNP-3 cost-effective on a life-cycle cost basis.

Bonneville found that the result of the Supply System's Best Case assumptions for WNP-3 was very similar to those of BPA's Low WNP-3 scenario. Bonneville found that the break-even point between the Best Case and a combined cycle on a net present basis shifted forward by only one year to 2015. (See Exhibit F.)

Bonneville also considered the capital investment exposure it would have if WNP-3 were built compared to the capital investment exposure Bonneville would have if it built an equivalent amount of energy (800 aMW) with CCCTs. (See Exhibit G). Bonneville determined that under WNP-3 Base Case assumptions Bonneville would have nearly three times the amount of capital investment at risk with WNP-3 than with 800 aMW of CCCTs if the plants were terminated early. Under WNP-3 Low Case assumptions Bonneville would have double the amount of capital investment at risk.

Bonneville concluded that although under certain scenarios completing and operating WNP-3 is competitive on a life-cycle cost basis with a CCCT, the potential benefit was not significant enough to outweigh the capital investment at risk if the WNP-3 were terminated early compared to the capital investment at risk with a CCCT resource.

E. Advantages and Risks

Using the same kind of criteria Bonneville would apply to any resource submitted in a competitive acquisition, Bonneville considered some of the other advantages and risks of completing and operating WNP-3 as compared to the advantages and risks associated with a combined cycle resource.

The primary advantages associated with WNP-3 include the fact that it is a substantially completed resource which has obtained all required siting permits. And, unlike some other non-renewable resources, nuclear plants face no risk of future governmental regulations for carbon dioxide (CO2) or sulfur dioxide emissions.

However, offsetting these advantages are tremendous financial and other business risks which Bonneville is not willing to accept. These risks include: 1) the enormous capital risk associated with the additional $2.3 billion investment (including interest during construction) Bonneville would have in WNP-3 if the plant were terminated before the end of its projected operating life; 2) the potential for nuclear decommissioning and waste disposal costs to increase dramatically; 3) the unpredictability of the nuclear regulatory environment, with the potential for new regulations to increase costs; 4) the major financial exposure for Bonneville under the existing capability contracts between the Supply System and Bonneville, under which Bonneville is obligated to pay for all costs associated with the project, whether or not it produces any power; 5) the fact that Bonneville's authorities under the existing contractual arrangements are not commensurate with the total financial risk it assumes; 6) WNP-3 does not give Bonneville the flexibility

to respond to current load and operational uncertainties; 7) the 1240 MW which WNP-3 would produce, and which Bonneville would be obligated to pay to have produced, would create an estimated 600 aMW surplus for Bonneville even under its current high-load projections, which translates into a $200 million per year deficit even if all the surplus power was sold at the Priority Firm rate; and 8) public opposition to nuclear power which presents the recurring risk of a forced temporary or permanent shut-down of the plant through voter initiative.

Additionally, there are several advantages associated with a CCCT resource, many of which are directly opposite of the risks associated with the completion and operation of WNP-3. These include: 1) the flexibility in dispatching and otherwise shaping a CCCT allows Bonneville to effectively deal with the current and possible future constraints to the operation of the Federal Columbia River Power System; 2) any CCCT resource which Bonneville may acquire will likely be under an output type contract, significantly limiting Bonneville's financial risk associated with this resource; 3) significantly lower capital investment as compared to WNP-3; 4) a higher proportion of the costs associated with a CCCT are variable and, therefore, avoidable if the CCCT is not producing power, as opposed to the high proportion of fixed costs associated with WNP-3, which Bonneville must pay regardless of actual production; and 5) CCCT resources can be built in smaller increments which allows Bonneville to better match load growth and to lower its reserve requirement.

Bonneville has concluded that the risks associated with CCCT resources, primarily the financial risks associated with a possible rise in gas prices or the imposition of a CO2 tax,

are outweighed by the combination of the advantages associated with the CCCT option, and the avoidance of risks associated with the completion and operation of WNP-3.

In addition to the above considerations, some of the factors regarding the prudency of completing and operating WNP-1 and -3 which Bonneville has considered include: the uncertainty regarding the cost to complete the construction of the plants; the number of years the plants have remained in preservation status and the costs of upgrading the plants to current NRC specifications; the risk that there may be unforeseen capital expenditures during the operations of the plants, if completed; the uncertainty surrounding expected capacity factors; the uncertainty surrounding forecasted operation and maintenance expenses; the cost and availability of alternative resources; the administrative cost to Bonneville, in terms of dollars and time required of management, associated with WNP-1 and -3; and other relevant business considerations.

F. Alternate Uses of WNP-1 and -3

Bonneville also considered the alternative of repowering WNP-3 to a natural gas-fired combined cycle combustion turbine. Bonneville concluded that repowering WNP-3 would not be in the best interest of Bonneville and the region's ratepayers because of: 1) the large size of the plant (480 MW minimum); 2) the lack of near term need for the power; 3) no clear economic advantage of a repowered plant over a new combined cycle unit; 4) the uncertainty surrounding future costs because of the uniqueness of the repowered plant; and 5) the fuel price risk associated with the lower efficiency of the plant.

Bonneville also considered converting WNP-1 and WNP-3 to burn plutonium. Bonneville concluded that, although Bonneville is not interested in funding completion of the plants for future use as plutonium burners, terminating the sites does not prevent third parties from converting the plants to burn plutonium.

III. The Decision to Cease Preservation of WNP-1 and -3

On balance, it is my determination that based on the totality of the factors, on the assumptions regarding the future of the plants, and on other circumstances, neither the long-term continued preservation of WNP-1 and -3 or the ultimate completion of the projects under the terms of the existing agreements is in the best interest of Bonneville and the region's ratepayers. Consistent with this determination, I find that the plants are not capable of producing energy consistent with prudent utility practice.

Dated this 13th day of MAY, 1994.

Randall W. Hardy

Administrator

WNP-3 Base Case Assumptions

Cost to Complete

Base Case:	$1.55 Billion (per 1987 Study; 1993$)
Low:	$1.0 Billion
High:	$2.0 Billion

Finance

70% Public/30% Private
Interest rate--7.3% tax-exempt/9.7% taxable
3% real discount rate
4% inflation

BPA

WNP-3 Base Case Assumptions

Operations

Base Case:

1240 MW
Begin construction in 1998 (5 yr lead time)
On-line in 2003
40 year operating life
65% equivalent availability factor
Plant efficiencies of 75% for O&M and 25% for A&G (per 1987 Study)
Estimates for O&M, A&G, capital additions, fuel, waste, contingency, and decommissioning developed from FY94 Budget for WNP-2.

Low Case:

70% equivalent availability factor

High Case:

Plant efficiencies of 85% for O&M and 35% for A&G

55% equivalent availability factor*

*WNP-2 historical average capacity factor = 58.6% (thru 12/30/93)

BPA

WNP-3 Base Case Assumptions

Real Escalation

Base Case:
Capital = 0.85%
O&M/Capital Additions/A&G = 0.69%
Fuel/Waste = 0%
per 1992 DRI Forecast (Capital yrs 1998-2003; O&M yrs 2003-2012)

Low Case:
O&M/Capital Additions/A&G = 0%

High Case:
Capital = 1.2%

O&M/Capital Additions/A&G = 2%

BPA

Supply System Assumptions for WNP-3

- 1300 MW capacity
- $1.55 billion cost to complete
- 6% tax-exempt financing
- 75% equivalent availability factor
- 0% real escalation for construction capital, O&M, A&G, capital additions, fuel, and waste

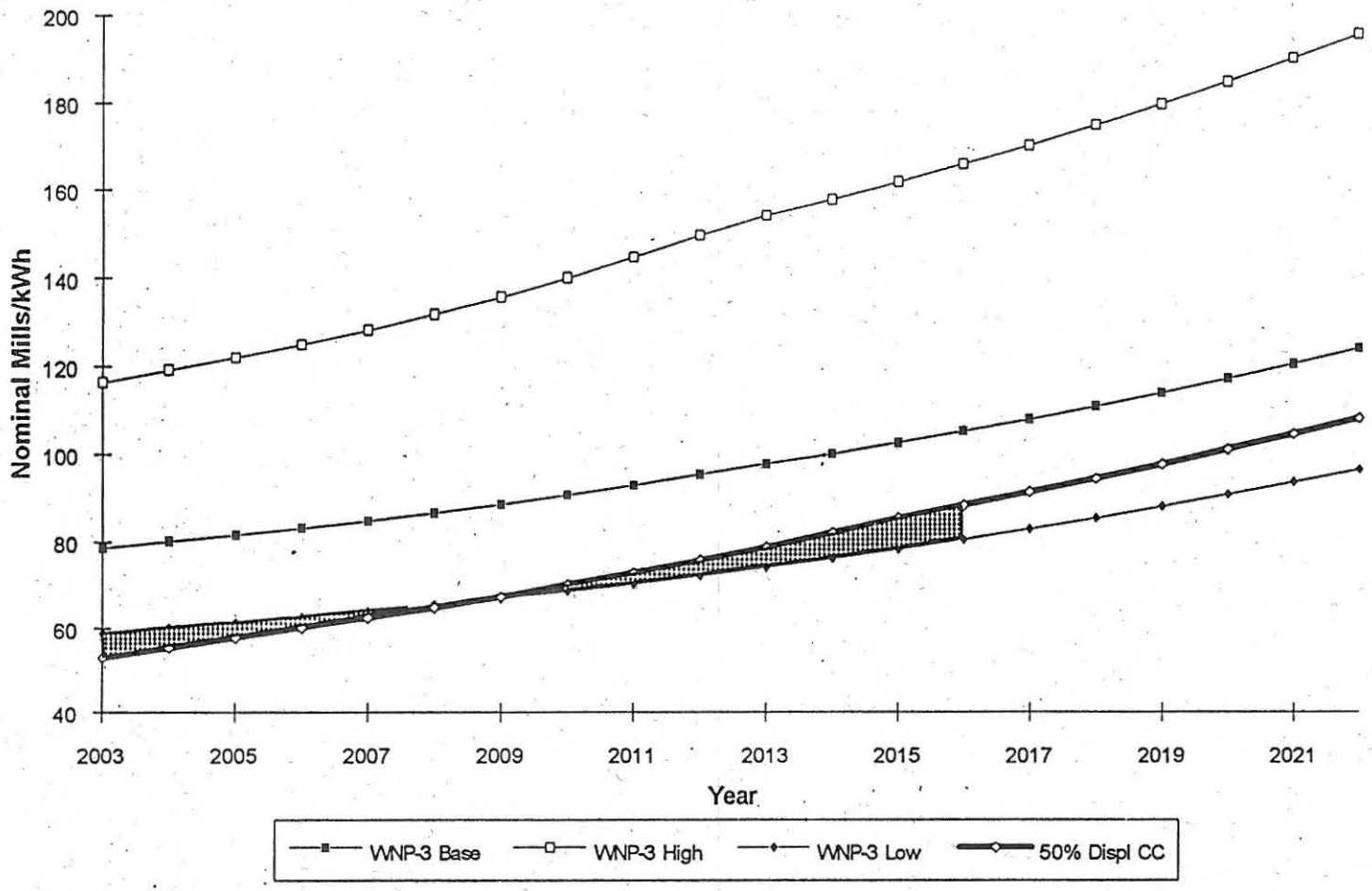
BPA

Combined Cycle Assumptions

Operations	240 MW Begin construction in 2000 (3 yr lead time) On-line in 2003 30 year operating life + 10 years of replacement combined cycle 90.5% equivalent availability factor 7475 Btu/kWh heat rate Overnight capital cost = $647/kW Fixed O&M = $5.43/kw-yr Variable O&M = 2.39 mills/kWh
Gas price	BPA medium forecast for firm delivered gas
Real Escalation	Capital = 1.45% O&M = 0.42% per 1992 DRI Forecast (Capital yrs 1998-2003; O&M yrs 2003-2012)
Finance	100% Public Debt interest rate--7.3% tax-exempt 3% real discount rate 4% inflation

BPA

WNP-3 Scenarios Versus Combined Cycle Alternative



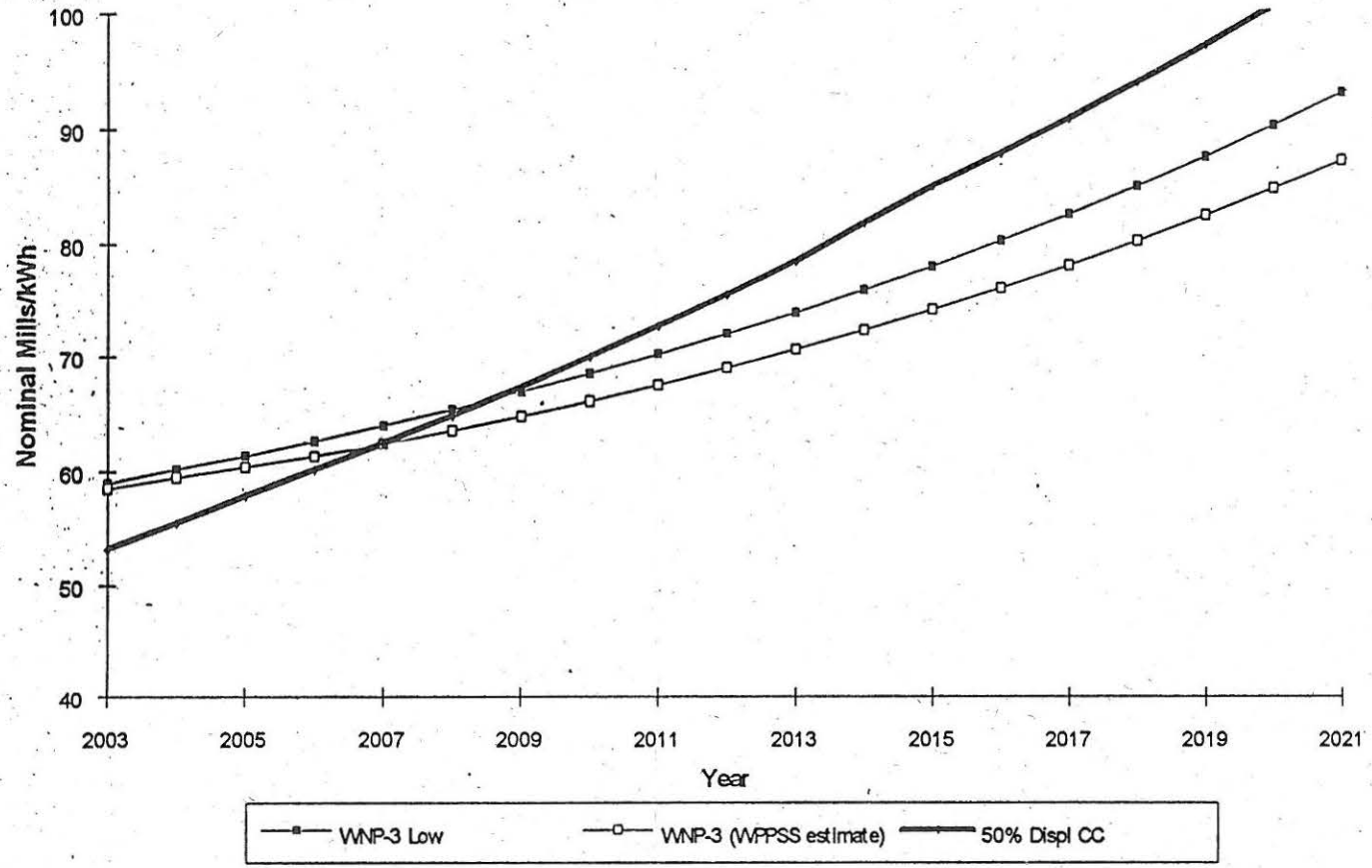
BPA

WNP-3 Sensitivities

	System Cost (1993 mills/kWh)	Net Benefit Over Base Case CCCT (1993 mills/kWh)
WNP-3		
Base Case	40.2	(7.7)
Low	31.1	1.4
High	63.3	(30.8)
Capacity Factor		
55%	46.7	(14.2)
60%	43.2	(10.7)
70%	37.6	(5.1)
75%	35.4	(2.9)
O&M/A&G/CapAdds Real Escalation		
0%	37.3	(4.8)
1.5%	44.0	(11.5)
2%	46.6	(14.1)
3%	52.6	(20.1)
Real Discount Rate		
5%	41.8	(9.3)
7%	43.3	(10.8)
10%	45.6	(13.1)
Financing		
100% Public	39.9	(7.4)
6% Tax-Exempt	38.6	(6.1)
Operating Life		
20 Yrs 1/	46.5	(17.9)
Gas-Fired CCCT		
Base Case	32.5	
Low Gas	19.6	
High Gas	48.2	
Operating Life		
20 Yrs	28.6	

1/ Compared with a 20 year operating life for a CC.

Alternative WNP-3 Scenarios Versus Combined Cycle



BPA

Remaining Capital Investment ($ Millions)

	1st Year	5th Year	10th Year	20th Year
Combined Cycle*	871	821	734	436
WNP-3 Base	2,346	2,280	2,043	1,584
WNP-3 Low	1,515	1,433	1,319	1,023

* Overstates the capital commitment for combined cycles because BPA would not build 800 aMW of combined cycles in a single block.

BPA