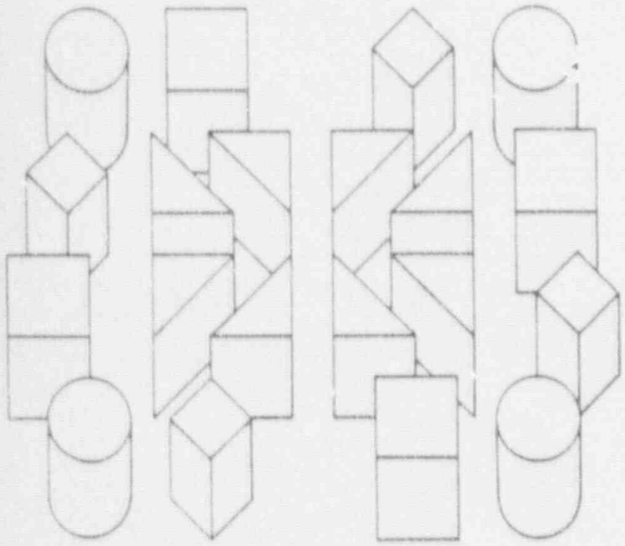
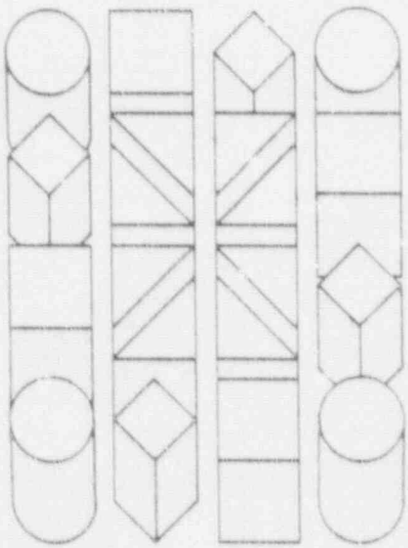
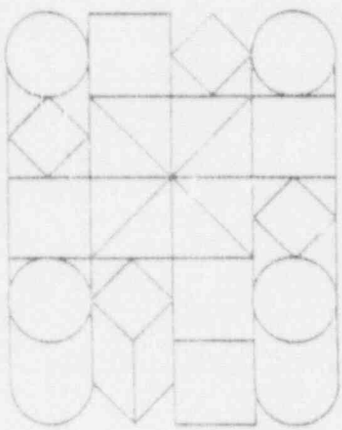
1988 Resource Program







Bonneville
POWER ADMINISTRATION

1988 RESOURCE PROGRAM

BONNEVILLE POWER ADMINISTRATION

July 1988

1988 RESOURCE PROGRAM
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SUMMARY

The 1988 Resource Program provides guidance for Bonneville Power Administration's (Bonneville/BPA) resource-related actions for Fiscal Years (FY) 1990 and 1991 and their costs. The Draft 1988 Resource Program, issued in February, presented an overview of Bonneville's resource issues. This document is not intended to be a replacement for the Draft 1988 Resource Program. Only the final program package and new information to reflect current conditions is presented. It is suggested that the Draft be retained to provide further details of some of the information contained here.

Resource Program Levels

The Resource Program levels for FYs 1990 and 1991 are budget-constrained, and excluding non-discretionary payments, are approximately at the FYs 1988 and 1989 budget levels. The resource programs total approximately $92 million per year in direct costs and are summarized below. The costs for large thermal projects are not included in these totals.

Residential Conservation--The budget for this sector, while reduced from the level in FYs 1988 and 1989, continues to be a large share of the total overall budget. Developing the residential model conservation standards (MCS) resource will be slightly accelerated through continuation of consumer payments, and through marketing, and code enforcement support.

The existing residential sector programs will be maintained at a level intended to keep utility weatherization in place and a small weatherization industry in operation regionwide.

Commercial Conservation--The total budget for commercial conservation has increased in comparison with the FY 1988 and 1989 budget levels. Emphasis will be placed on commercial MCS and capturing lost opportunity resources.

Industrial Conservation--This component of the resource program budget has also increased relative to the budget for FYs 1988 and 1989. The increase is due primarily to the contractual commitments of the Conservation/Modernization (Con/Mod) program. Industrial programs are primarily designed to pursue lost opportunities and capability building. The Partnership consumer marketing efforts will also continue.

Generation--Emphasis will be placed on evaluating the options process, engineering support for Bonneville's acquisition process, and continuing RD&D programs. The hydro system efficiency program will explore the feasibility and cost of improving hydro turbine efficiency on Federal hydroelectric projects.

Because of necessary trade-offs with other objectives, especially financial targets, these program levels exclude some actions that, in the long term, are on the least-cost path of resource development. However, Bonneville believes these programs balance objectives, and position Bonneville to convert quickly

to the least-cost path, when necessary, by maintaining programs in all sectors. There is also some financial risk entailed in these program levels, since higher-than-expected load growth would require higher annual outlays to catch up on the backlog of cost-effective conservation. Bonneville recognizes there is an economic risk in not being on the least-cost path, and that getting back to the least-cost path may result in higher costs to ratepayers in the future.

However, these risks are judged to be acceptable, in view of the importance of the financial targets. The risks are also mitigated by the proposed program levels that position Bonneville to convert quickly to the least-cost path. As much as possible within budget constraints, these program activities are designed to maintain Bonneville's commitments, encourage load stability, and create the flexibility to respond to high loads.

Other Issues

1. Hanford Generating Project (HGP) Study

Bonneville has concluded that the HGP should be preserved through December 1988. Inadequate data exists regarding conversion, so an economic analysis of long-term preservation is not possible at this time. From a risk management perspective it would be imprudent to discard this potential resource until an adequate economic analysis can be done. Also, covenants given by the Supply System to secure the bonds warrant that the Supply System will preserve and keep HGP in good repair. Preservation through December 1988 will permit further investigation of costs of conversion compared to other resource options and further examination of contractual requirements.

2. WNP-1 and -3 Update

All comments received on the need for a new WNP-1 and -3 study supported Bonneville's position that a new study is not necessary at the present time. Commenters stressed the need to resolve legal and refinancing uncertainties before undertaking a study. Bonneville will continue to monitor these issues and undertake a study when appropriate.

As promised in the 1987 WNP-1 and -3 Study, Bonneville completed a review of termination costs at other partially-completed U.S. nuclear plants. Results are reported in Chapter IV of this document.

3. Cost-Effectiveness Methodology

Most commenters supported using a regional perspective for determining resource cost effectiveness. Bonneville agrees with the majority of comment received that a formal process to review its cost-effectiveness procedure is not warranted now. By working with the Pacific Northwest Electric Power and Conservation Planning Council (Northwest Power Planning Council) on its Power Plan Technical Update, and on revising supply curve estimates, Bonneville intends to resolve the issues raised in the Draft 1988 Resource Program (p. 40). In addition, Bonneville proposes to ensure that resource economic analyses be conducted using a broad range of discount rates. Where appropriate, the internal rate of return on potential resource investments will be calculated.

4. Surplus/Deficit Forecast

Preliminary results obtained for the 1988 draft load forecast indicate minor load increases in the near term compared to the 1986 forecast. The new forecast is expected to show average annual load growth rates slightly higher than those forecast in 1986, but the growth takes nearly 10 years to cause an appreciable reduction in the firm energy surplus. Because the draft 1988 load forecast is incomplete, it is too early to discern its implications for the 1988 Resource Program. Upon its completion, the new load forecast will be used in future Resource Programs.

5. Contingency Plan

Bonneville's Contingency Plan will describe how Bonneville will respond to an actual situation in which more resources are needed quickly. The Contingency Plan comprises the following three components: 1) a description of the situations that may arise that would create near-term deficits, and the size of potential deficits, 2) an analysis of the possible resource options to meet such deficits to determine their availability, feasibility, and cost effectiveness, and 3) a description of which of these options Bonneville would use, and in what order, if such a near-term deficit situation occurred. In addition, steps Bonneville might take to make the resource options more reliable, or to shorten their lead times, will be identified.

Bonneville staff is designing a study plan for developing the Contingency Plan. Interested parties will be given an opportunity to participate in and to review the proposed Contingency Plan.

6. Next Steps

In the next 6 months, Bonneville's focus will be on many resource issues. The Northwest Power Planning Council will be providing guidance with a Technical Update of its 1986 Power Plan. Work will continue on Bonneville's Contingency Plan, firming non-firm energy, and joint Bonneville-Northwest Power Planning Council supply curves. Bonneville and the Northwest Power Planning Council have developed a joint decision analysis model to use in resource analysis. The scope and timing of the next Resource Program has not been determined at this time. As plans for the next Resource Program become available, Bonneville will invite public participation.

I. INTRODUCTION

A. Purpose of the 1988 Resource Program

In its Resource Program, Bonneville looks at the future need for resources and alternative ways of meeting that need, using the Northwest Power Planning Council's Power Plan as guidance. The Draft 1988 Resource Program, issued in February 1988, explained alternative resource actions Bonneville could take in FYs 1990 and 1991, to meet projected electric power needs, and recommended an overall program level. This final document reflects the 25 comment letters received on the Draft and describes the decisions made in Bonneville's budget-making process for FYs 1990-1991.

The resource-related actions discussed in this document include the acquisition of conservation and generation resources except for debt service on large thermal plants; the development of programs that can be used eventually to acquire resources; and other Bonneville activities related to the acquisition of cost-effective resources, such as planning and developing information about resources.

The decision process for actions in the 1988 Resource Program considered the financial implications of BPA's resource actions, while acknowledging that resource actions cannot be driven by cost considerations alone. The 1988 Resource Program reflects a balancing of competing demands: BPA's important service obligations and the financial health of the agency.

This document is not intended to be a replacement for the Draft 1988 Resource Program. Only the final program package and new information to reflect current conditions are presented. This final document is a companion piece to the Draft, therefore it is suggested that the Draft 1988 Resource Program be retained to provide further details.

B. The 1988 Resource Program in Relation to Other Processes

This year, the Draft 1988 Resource Program provided guidance for BPA's program activities and was used in formulating preliminary budget proposals. In the budget process, resource programs were balanced against other programs and overall constraints on expenditures. In this process, decisions were made on the final 1988 Resource Program and other agency expenditures.

In August and September, a series of meetings will be conducted in a process called "Programs in Perspective." Programs in Perspective will look at program levels and issues not only for resource development, but also for fish and wildlife, operation and maintenance, fiscal concerns, and transmission. During this process, trade-offs among programs and objectives will be examined.

The Resource Program and Programs in Perspective constitute milestones in a series of program and budget decisions for FYs 1990 and 1991. These decisions are forwarded to the U.S. Department of Energy (DOE) where they may be modified for the President's proposed budget. Only after Congressional approval and Executive ratification many months later is the budget process completed.

C. Bonneville and Northwest Power Planning Council Coordination

Bonneville will continue working with the Northwest Power Planning Council to develop load forecasts, resource supply forecasts, and power system models. Bonneville intends to play a more active role in developing the Northwest Power Planning Council's Power Plans. In particular, Bonneville staff will be working with the Northwest Power Planning Council in preparing the Power Plan Technical Update which is scheduled for release in September 1988. Both Bonneville and the Northwest Power Planning Council will work to ensure that opportunities for public involvement in forecasting and resource planning are not diminished by this increased cooperation. See Chapter II (p. 7) of the Draft for further details concerning Bonneville's coordination with the Northwest Power Planning Council.

II. TARGETS OF THE 1988 RESOURCE PROGRAM

In the Draft 1988 Resource Program, Bonneville identified eight key targets to guide its resource program levels for FYs 1990 and 1991 (p. 42). Ideally, the actions proposed through the Resource Program would meet all of these targets. However, meeting all eight targets simultaneously is not possible. Therefore the challenge for the Resource Program was to determine the set of program levels that came as close as possible to meeting these targets. The Draft 1988 Resource Program solicited public comment for making the difficult trade-offs among these targets. The targets are described below with a brief summary of the comments Bonneville received on them.

Target 1
Minimize Present Value of Total System Costs

Description of Target. Minimizing net present value of system costs means finding the most economically efficient means of providing energy over the planning horizon. System costs include the electrical power costs faced by electricity consumers (e.g., costs to operate the power system, including debt service for new generating, conservation, and transmission investments; operating costs; consumer costs incurred for conservation measures; and quantifiable environmental costs).

Comments on Target. A large number of commenters supported this target as a key one for Bonneville decisionmaking. Considerable concern was expressed about failing to fully meet this target. Commenters cited the importance of long-term rate and cost stability and the fact that the Pacific Northwest Electric Power Planning and Conservation Act includes a requirement of minimizing total system costs. Some concern was expressed that Bonneville was implying that this target was of reduced importance by making it one of eight targets. This is not Bonneville's intent. Minimizing system costs is a fundamental goal of resource planning.

Target 2
Create Sufficient Resource Flexibility to Cost-Effectively Meet High Loads in 1992-2000, If Necessary

Description of Target. Bonneville faces much uncertainty about what its future resource needs will be. One way to ensure having enough resources to meet loads is to develop new resources to meet the highest possible future need. But this would clearly be too expensive. The alternative recommended by the Northwest Power Planning Council, and agreed to by Bonneville, is to create the flexibility to respond quickly and efficiently to higher-than-expected resource needs.

The target for 1990-1991 is to enhance resource flexibility so that Bonneville is in a position (by the end of 1991) to develop enough resources to meet high loads (committed loads), should those loads occur. Ideally, the costs of these potential new resources should not exceed the costs of new coal plants.

Comments on Target. One commenter felt this target was the key one in Bonneville's list. Another felt it to be an inappropriate target, while another believed the target should not be limited to the 1992-2000 time period. Others pointed out that actions taken to meet this target would also aid in meeting Target 1.

Target 3
Maintain Resource-Delivery Infrastructure and Business Relationships

Description of Target. The entire electric utility industry is in an increasingly competitive environment. Bonneville is facing stiffer competition which necessitates reconsidering past business practices that may not now serve Bonneville's customers well.

Compromises must be made between maintaining consistency in programs, rates, and policies and responding to a rapidly changing environment. Some constituents have said they are receiving mixed messages from Bonneville. They have expressed concern that Bonneville is unpredictable, is moving too quickly, or is unresponsive to their particular interests. For example, utilities and government agencies that implement BPA conservation programs have seen funding for these programs grow rapidly, then quickly decline in a few years.

Through the conservation programs it has operated over the past several years, Bonneville has helped create a valuable infrastructure for the delivery of conservation programs. This infrastructure consists of trained utility staff, skilled contractors, material suppliers, and other elements of the delivery system. It is important to preserve this infrastructure so that, should the need arise to aggressively develop this conservation resource, it can be done quickly and efficiently.

Comments on Target. Four commenters cited this target as being of key importance in Bonneville's decisionmaking, while one commenter felt it to be inappropriate. As with Targets 2 and 4, two commenters pointed out that actions aimed at meeting this target could be useful in achieving Target 1.

Target 4
Help Stabilize Regional Utility Loads Without Adding Significantly to Long-Term Need to Acquire New Resources

Description of Target. This target focuses on Bonneville's continuing efforts to stabilize its loads. Achieving this target would provide many benefits for both Bonneville and the region. Bonneville's loads, and therefore revenues, are subject to large swings due to fluctuations in oil and gas prices, availability of water to the hydro system, aluminum price and production, general economic performance in the region, and other variables. Stabilizing Bonneville's firm load means stabilizing Bonneville's revenues, which in turn, helps stabilize rates.

However, the target also includes the desire to create a more stable load without significantly increasing Bonneville's risk of having to acquire new, more expensive resources in the future.

Comments on Target. One commenter felt load stability is an important focus for Bonneville; another commenter disagreed. While meeting this target with certain activities, Bonneville could also be meeting Target 1, according to two commenters. One commenter stated that all funding for activities focused on load stability should be eliminated.

Target 5
Avoid Contribution on the Part of Resource Programs to Any Increase in Priority Firm (PF) Rate in 1990-1991

Description of Target. Resource actions require funding that must be recovered through revenues from rates charged to Bonneville's customers. Bonneville consistently hears from its customers and other interested parties that avoiding rate increases is of great importance. Bonneville agrees it is important to keep its rates as low as possible to maintain a competitive edge in the energy market to make a clear contribution to the health of the regional economy.

Comments on Target. Four commenters stated that assuring no rate increase should be a key focus in Bonneville's decisions and efforts. Two others thought it was an inappropriate perspective. Another commenter felt that Targets 5, 6, and 7 were all self-imposed, temporary constraints. One commenter pointed out that it is more important to keep the total cost of energy services down.

Target 6
Avoid Nominal Increase in Resource Program Budgets for 1990-1991 Over 1988-1989

Description of Target. Adopting the same budget levels for FYs 1990-1991 that were used for FYs 1988-1989 would assist in stabilizing total BPA costs and address Target 5 of the Resource Program, avoiding a contribution to increases in the PF rate in 1990-1991.

Comments on Target. One commenter supported Bonneville avoiding increases in resource program budgets. Other commenters questioned how Bonneville would decide to impose a budget constraint on resource programs without first assessing trade-offs between resource programs and other BPA programs.

Target 7
Avoid Nominal Increase in Borrowing for Resources in 1990-1991 Over 1988-1989

Description of Target. There are increasing concerns over Bonneville's large long-term financial obligations. Having large amounts of long-term debt results in fixed amounts of debt service, and this reduces Bonneville's flexibility to respond to large, unpredictable swings in its revenues. This target can affect resource programs because these programs tend to be ones for which Bonneville borrows capital.

Last year, in Phase I of its Programs in Perspective process, Bonneville examined several options for limiting future borrowing levels for capital investments. For example, capital programs could be constrained to the amount of debt scheduled to be amortized in any given year. Or, Bonneville could elect to make capital investments only when current revenues are available to pay for them, or restrict borrowing for new capital investments to that which is necessary to maintain the current level of service and reliability of Bonneville's transmission system.

Comments on Target. One commenter suggested that Bonneville should repay more of its debt than it borrows each year.

Target 8
Avoid Significant Environmental Impacts from Resource Programs for 1990-1991

Description of Target. This target includes all Bonneville resource actions considered for implementation in FYs 1990 and 1991 and provides assurance that Bonneville strives to uphold its environmental responsibilities. To meet this target, Bonneville would not propose actions in FYs 1990-1991 that would have significant adverse environmental impacts that could not be mitigated.

Comments on Target. Three commenters supported minimizing environmental impact and/or pointed out the importance of meeting this target in meeting Target 1 as well.

Discussion of Comments. The fact that each target received some support from at least one commenter confirms Bonneville's notion that they are important targets to be considered in resource decisionmaking. It also highlights why making trade-offs in determining the optimal resource program mix continues to be such a difficult job.

III. PROGRAM PACKAGE SELECTED

A. Overall Resource Program Level

Given the fiscal realities facing the agency, Bonneville has chosen to keep firm constraints on its resource budget through FYs 1990 and 1991.

The resulting total budget level for Resource Programs is $91.8 million, or excluding non-discretionary payments, about the same as the FYs 1988-1989 level. For FYs 1988-1989, the resource program is about 3 percent of Bonneville's total program budget; for FYs 1990-1991, it is the same percentage. Bonneville attempted to strike the best balance between conflicting targets in arriving at this overall program level.

In improving such a budget constraint on its Resource Program, Bonneville had to consider the risks. The greatest concerns are with deviation from the long-term least-cost path of resource development, and with the financial implications of building up a backlog of resource development. This backlog has the potential to require significant increases in Bonneville resource expenditures after the FYs 1990-1991 period. While Bonneville has concluded that these risks are acceptable, it is important to recognize them.

B. Risk Associated with Choosing Budget-Constrained Resource Package

Bonneville is concerned about the risk that could be associated with choosing a budget-constrained package. Several commenters also expressed this concern. Bonneville has historically developed comprehensive resource acquisition strategies to acquire the lowest cost resources for Bonneville's contractually committed loads. This authority stems from the Northwest Power Act, which directs that these resources should be acquired "to meet or reduce the electric power demand" at the "least incremental system cost." The measure of cost used for Bonneville's cost-effectiveness analysis incorporates both utility and consumer expenses for development and operation of all resources, including conservation, over the next 20 years.

Studies done for the 1986 and 1987 Resource Strategies indicated that cost-effective resources deliver the greatest benefit if developed in the near term. Relatively expensive resources impose cost penalties on Bonneville's customers and are best delayed until Bonneville is closer to deficit. Hence, there is a risk associated with delaying the acquisition of cost-effective resources to pursue a budget-constrained package of resource acquisitions. The differences between a budget-constrained and a long-term economic package are presented below and the economic risks are discussed.

1. Acquisitions: Long-term Economic Package vs. Budget-Constrained Package

Bonneville's conservation program budgets were constrained in FYs 1988 and 1989. The budget levels for FYs 1990 and 1991 are also constrained because of near-term revenue problems. A constrained program necessarily means not adhering to Bonneville's least-cost acquisition path.

A comparison of the unconstrained least-cost resource acquisition path Bonneville expected to follow beginning in 1986 and the 1987 and 1988 budget-constrained paths appears in Table III-1.

Table III-1--COMPARISON OF ACQUISITION STRATEGIES
(Incremental aMW)

	1988	1989	1990	1991	1992	1993	1994	1995	TOTAL
Least-Cost Path	20	20	20	20	20	25	30	36	191
1987 Budget Path	12	12	12	12	20	25	30	36	159
1988 Budgeted Path	8	9	9	8	11	16	25	36	122

Note: The amounts for 1992-1994 represent an estimate of the megawatt growth needed to move to the Least-Cost Path by 1995.

Table III-1 indicates a 69 aMW difference in cost-effective resource acquisition between the least-cost path and the budgeted path after 4 years of constraint, (1988-1991). That amount will affect the cost and timing of future resource acquisitions. This impact is discussed further in the following section.

The conservation acquisition programs have been flexible, and it still appears possible for Bonneville to achieve its goal to acquire 36 megawatts of cost-effective resources during 1995. However, if load growth is higher than expected, Bonneville could be forced to attempt to quickly recapture the aMW backlog of savings. This would require more rapid, and potentially less efficient, growth in programs.

2. Economic Risks of Not Choosing the Long-term Economic Package

Deviating from the least-cost path may expose ratepayers to economic risks. The risks occur because departure from the least-cost path implies either the permanent loss of some low-cost conservation resources or the near-term unavailability of these resources.

Permanent resource loss can occur because some resources, called "lost opportunity" resources, present themselves for acquisition only during a limited time period. Some energy-saving structural enhancements in buildings, for instance, may be economical only during construction.

If conservation acquisition programs are not able to maintain the infrastructure necessary for implementation, acquisition may be delayed or may be more costly. In the event of miscalculating any planning variable, such as an unanticipated resource outage or sustained high loads, a delay in the availability of a conservation resource may require commitment to a more expensive or higher risk alternative.

Quantitative analysis indicates that cost-effective conservation resources acquired in the near term benefit the Pacific Northwest by lowering the long-term costs of serving Bonneville's committed loads. Studies indicate that the goal of minimizing long-term costs is best served by acquiring conservation resources that cost less than about 25 mills. Higher costs are justified for lost opportunity resources. Acquiring such resources in the near term would generate benefits to the region of approximately $50 million (discounted net present value). By delaying the implementation of cost-effective programs, these benefits could potentially be lost and regional costs would increase over the long term.

3. Financial Risk of Program Deferrals

In addition to the resource economic risks, deviating from the least-cost path also poses some financial risks. The financial risk is that, by deferring resource programs, Bonneville is likely to need to increase future annual resource investment levels to "catch up" on the backlog of cost-effective resource development. How big the backlog will be depends on future Bonneville loads and resource opportunities. But the backlog and the financial pressures associated with "catching up" could be substantial. However, Bonneville believes that these risks are acceptable in view of the importance of keeping costs and rates low in the near term.

C. Specific Program Levels

Table III-2 s[illegible] the mix of programs included in the program levels proposed for FYs 1990-1991. These result in an average program costs of $91.8 million per year. The average program cost, including overhead, is $102.9 million per year.

The proposed program levels are not dramatic departures from the budgets for FY 1988. The most noticeable shift is a decrease in the residential sector, principally to allow more attention to be given to the commercial sector, the fastest growing sector in the region.

The following sections describe the principal programs by sector, the funding levels proposed for FYs 1989-1991, and the rationale for their selection, in light of Bonneville's targets for its resource programs. Table III-3 provides a summary guide to the contribution of individual programs to three of the resource program targets. Since most of the programs are not aimed at immediate resource acquisition, the program categories on Table III-3 have not similarly been rated according to contribution to minimization of long-term system costs. However, in the following detailed program descriptions, such information is noted where appropriate. Funding levels are reported in millions of nominal dollars and include both capital and expensed items.

The following descriptions include the resource program target each program supports and by what action (for example, Positio[illegible] for High Loads - build capability).

Table III-2--FYs 1990-1991 LEVELS FOR CONSERVATION AND GENERATION PROGRAMS
(Annual Average)

	$ (millions)	% of Direct Program
RESIDENTIAL CONSERVATION		
Direct Program Costs		
Model Conservation Standards	20.5	
Weatherization	14.9	
Appliances	.5	
Manufactured Housing	.6	
State & Local Government	2.6	
Subtotal	39.1	43%
Overhead	2.9	
Total	42.0	
COMMERCIAL CONSERVATION		
Direct Program Costs		
New Commercial	8.7	
Existing Commercial	7.0	
Subtotal	15.7	17%
Overhead	1.3	
Total	17.0	
INDUSTRIAL & AGRICULTURAL CONSERVATION		
Direct Program Costs		
Industrial Acquisition	2.2	
Aluminum Smelter Conservation/Modernization	9.2	
Irrigated Agriculture	.6	
Other*/	2.5	
Subtotal	14.5	16%
Overhead	1.3	
Total	15.8	
GENERATION PROGRAMS		
Direct Program Costs	7.5	8%
Overhead	.6	
Total	8.1	
HYDRO SYSTEM EFFICIENCIES	1.9	2%

Table III-2--FYs 1990-1991 LEVELS (Continued)
(Annual Average)

Resource Program	$ (millions)	% of Budget
LOAD & RESOURCE PLANNING		
Direct Program Costs	13.1	14%
Overhead	5.0	
Total	18.1	
TOTAL DIRECT PROGRAM COSTS	91.8	100%
TOTAL WITH OVERHEAD	102.9	

*/ Includes Partnership consumer ma keting programs, R&D, Forecasting

TABLE III-3--RESOURCE PROGRAMS IN RELATION TO STRATEGIC TARGETS

Resource Program	Position For High Loads	Maintain BPA Commitments	Load Stability
RESIDENTIAL			
Weatherization	HI	HI	MED
Model Conservation Standards (MCS)	HI	HI	HI
Appliances	MED	LO	MED
Manufactured Housing	MED	LO	HI
State & Local Government	LO	HI	LO
COMMERCIAL			
Commercial Incentive Pilot	HI	HI	LO
Energy Smart Design	HI	MED	HI
INDUSTRIAL			
Energy $avings Plan	HI	LO	LO
Aluminum Smelter Con/Mod	MED	HI	HI
Irrigated Agriculture	LO	HI	LO
Partnership	LO	LO	HI
GENERATION			
Hydro Efficiencies	HI	LO	MED

Key: HI = Provides significant contribution toward meeting targets
MED = Provides moderate contribution toward meeting targets
LO = Provides little or no contribution toward meeting targets

Program actions can be sorted into four basic categories:build capability, maintaining capability, lost opportunity acquisitions, and revenue stability.

Programs which build capability are those that collect information or test designs, for example, RD&D, pilots, and experimental programs. The purpose of building capability is to be ready with proven ideas or information when resources need to be acquired. These actions support the target of positioning Bonneville to serve high loads.

Programs that maintain capability are those which have proven their worth, have the necessary delivery systems in place, can be maintained at a low level of activity, and can be accelerated when needed. These programs have been developed over time with customers and often support the target of maintaining Bonneville's commitments.

Lost opportunity acquisitions are those actions which, if not acted upon, would be lost or would be too expensive in the future. These programs support the target of being on the least-cost path.

Load stability programs help insulate Bonneville from load and revenue fluctuations, or actually increase Bonneville revenues.

Because the region still has surplus power, Bonneville's acquisition programs are only those designed to acquire lost opportunities. The other programs are undertaken for the purpose of stabilizing revenues or building and/or maintaining capability. In some cases an incidental benefit of these programs may be that they also save some energy.

Programs which are starred (*) are Northwest Power Planning Council action items. Dollars are expressed in millions.

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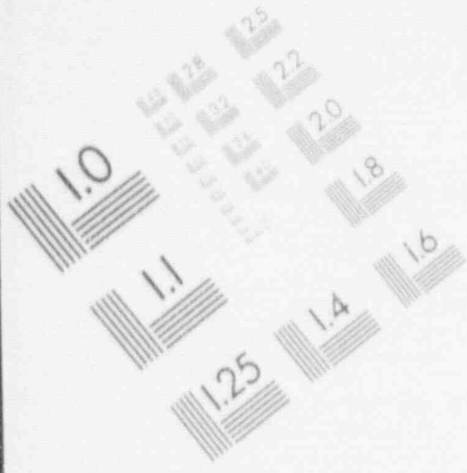
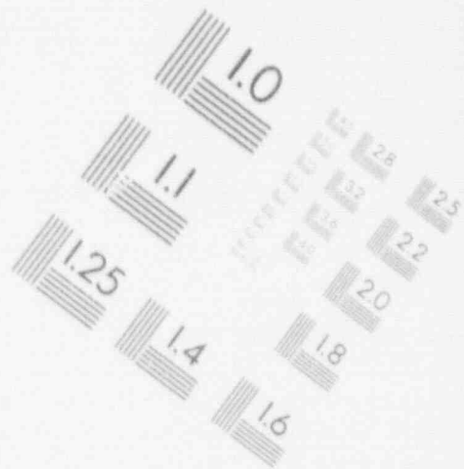
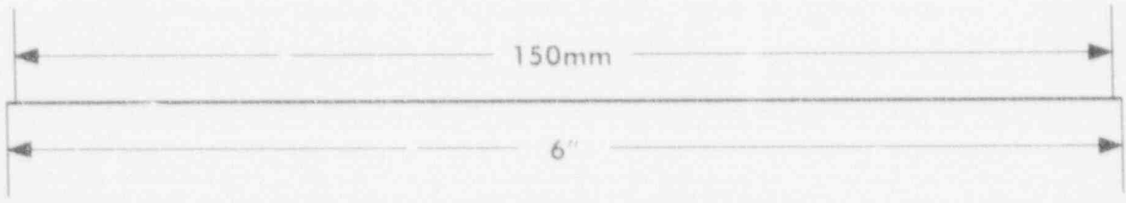
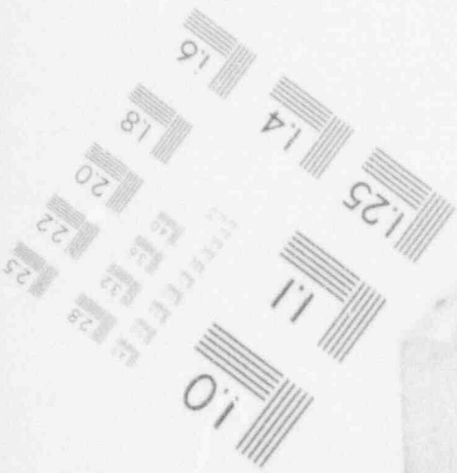
IMAGE EVALUATION
TEST TARGET (MT-3)









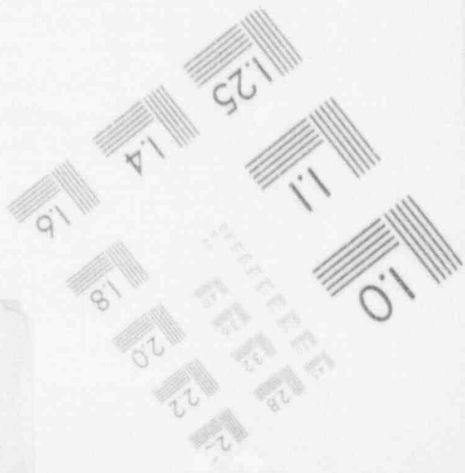


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IMAGE EVALUATION TEST TARGET (MT-3)

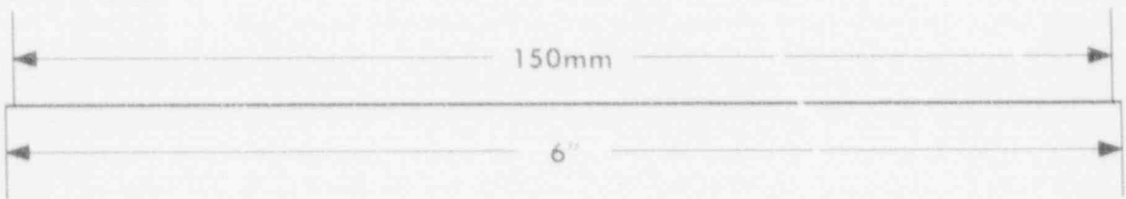

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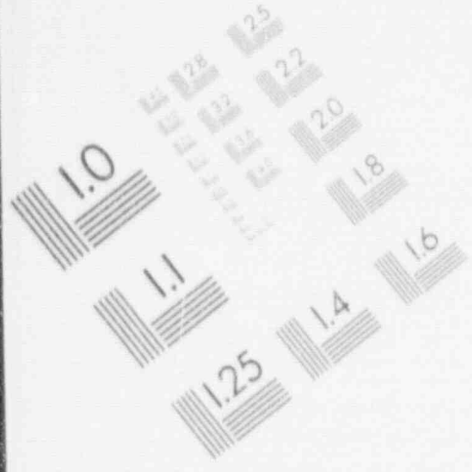
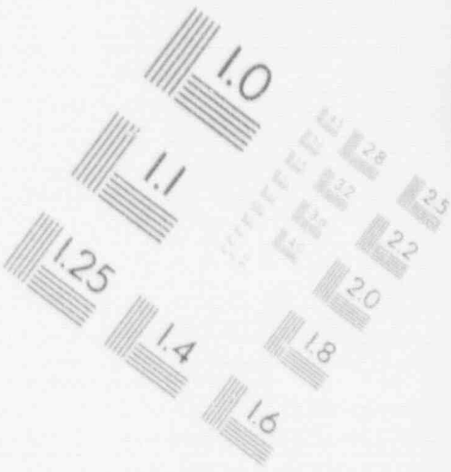
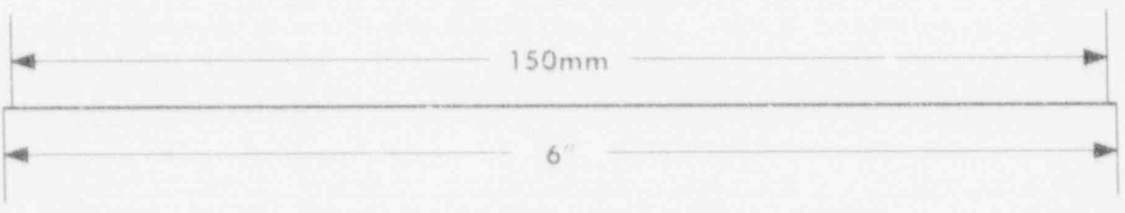
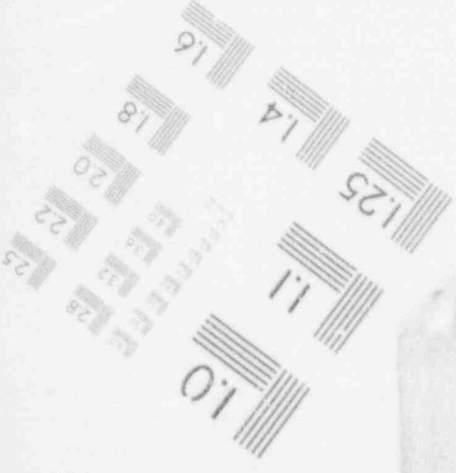
IMAGE EVALUATION
TEST TARGET (MT-3)









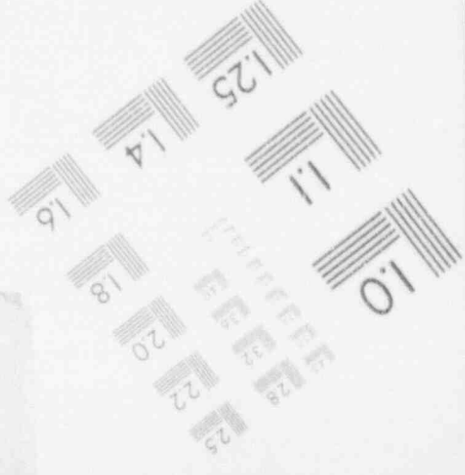


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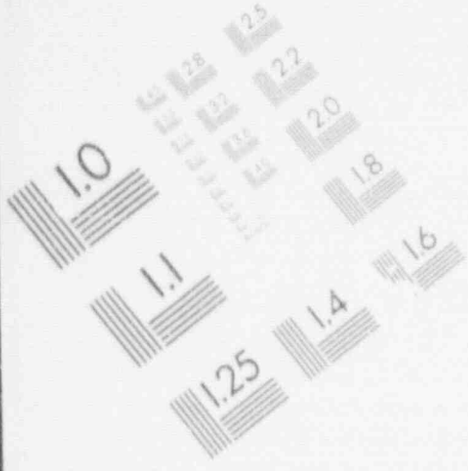
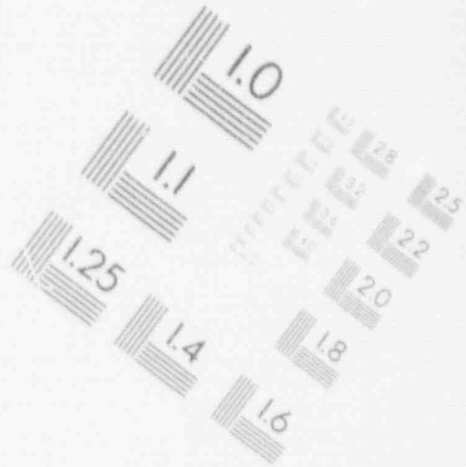
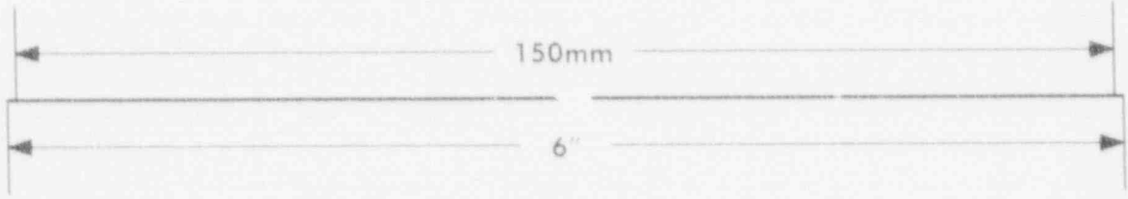
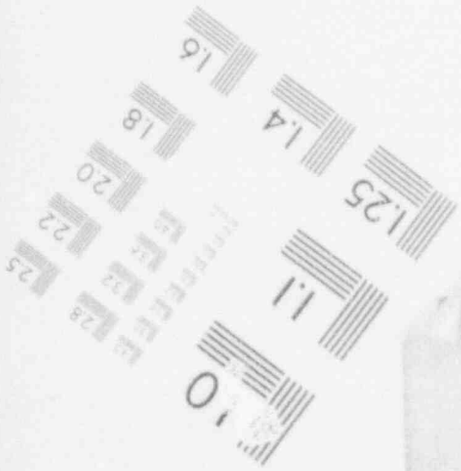
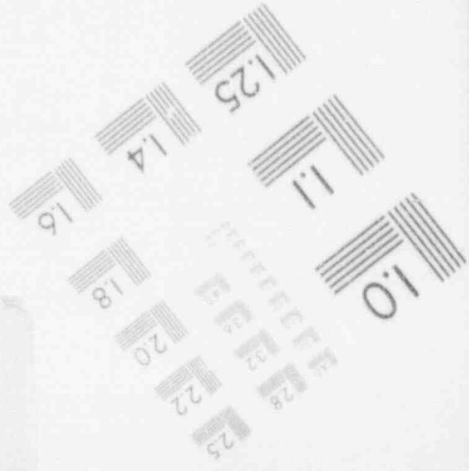
IMAGE EVALUATION TEST TARGET (MT-3)











1. Residential Conservation

Funding for residential programs is reduced from the level in FYs 1988-1989. The largest programs in this sector are Weatherization and Model Conservation Standards.

- WEATHERIZATION*. (Maintain Commitments - maintain capability) This program provides incentives to consumers or homeowners for the energy savings resulting from weatherizing electrically-heated homes in the region. Some debt service also is included. The program currently expected by Bonneville for FY 1991 and beyond, should cost 18-20 mills/kWh. The proposed funding level is intended to maintain the infrastructure (utility staff and a low-level installer presence) for program delivery. Maintaining the program infrastructure will ensure flexibility should the load/resource balance require acceleration of resource acquisition. It also provides utilities with staff trained in the residential sector end-use and consumer services.

FY	89	90	91
$	16.8	15.5	14.2

- THE NORTHWEST ENERGY CODE PROGRAM*. (Least-Cost Path - lost-opportunity acquisition) This program provides support for enforcing MCS-level codes, payments for homes built to the standards within adopting jurisdictions, and technical assistance to builders, suppliers, and others in the shelter industry. The funding level reflects the recent Bonneville decision to continue consumer payments beyond 1988. Payments, which will be cost-shared with generating utilities, will decrease in FY 1990 and beyond as the penetration rate approaches the maximum expected. MCS is a lost opportunity resource and Bonneville has concluded that adequate funding in this area contributes significantly to minimizing system costs, stabilizing loads, maintaining infrastructure, and preparing to meet potential high loads.

FY	89	90	91
$	9.8	9.7	10.3

- SUPER GOOD CENTS PROGRAM*. (Least-Cost Path - lost-opportunity acquisition) This program involves promotion, marketing, and builder or buyer payments. Payments are cost-shared with generating utilities. Funding for promotion, including consumer payments, is included in the Super GOOD CENTS program. The rationale for continuing this program at these levels is the same as for the Northwest Energy Code Program for MCS.

FY	89	90	91
$	9.4	9.4	9.7

- DEMONSTRATION AND RESEARCH. (Position for High Loads - build capability) Demonstration projects are designed to test innovative building features and/or techniques for the purpose of advancing the state-of-the-art in and reducing the first cost of new home

construction. Research is planned to find energy efficiency opportunities in new areas. While this work is expected to better equip Bonneville to minimize future system costs and meet high load growth, it did not make as significant a contribution to maintaining infrastructure and commitments, or load stability. This made a funding decrease for FYs 1990-1991 acceptable.

FY	89	90	91
$	2.3	1.2	1.9

- APPLIANCES*. (Position for High Loads - build capability) This program promotes the installation of high efficiency electric water heaters and promotes the installation of high efficiency appliances. These constrained budgets are intended to slowly create awareness of efficiency improvements in water heating, the second largest residential end-use and new major appliances, which generally have operating lives of over 20 years.

FY	89	90	91
$	.5	.3	.3

- REFRIGERATORS AND FREEZERS (BLUE CLUE). (Maintain Commitments - maintain capability) This program promotes the installation of high efficiency appliances. There is an established program delivery system of 265 retailers. The reduced funding level reflects fiscal constraints.

FY	89	90	91
$	.4	.2	.3

- STATE TECHNICAL ASSISTANCE*. (Maintain Commitments - maintain capability) This program provides financial support for States to carry out education, training, and technical assistance on the efficient use of energy in all sectors. Several programs (e.g., Super GOOD CENTS) are dependent on support from this program. The funding level for this program has already been reduced steadily in both FYs 1988-1989 and in this cycle. Proposed level is considered essential for stability and predictability.

FY	89	90	91
$	2.7	2.6	2.5

2. Commercial Conservation

The total funding for the commercial sector, the fastest growing sector in the region, has increased relative to FYs 1988-1989 both in absolute dollars and percent share of the total. The principal reasons are the start-up of the Commercial MCS program and an increased emphasis on acquiring lost opportunities. Commercial conservation programs are categorized as applicable to existing or new buildings.

The following programs and proposed budgets are for existing commercial building activities:

TECHNICAL ASSESSMENTS. (Position for High Loads - build capability) Three technical assessment activities are planned. The first one, the Commercial Retrofit End-Use Study (CREUS), is an end-use metering program designed to show actual reductions in energy use resulting from installation of measures; to evaluate accuracy of energy savings estimates; and track changes in usage from various modifications in building operation, equipment, structure, and maintenance procedures. Previous budget cuts have reduced the metered sample to 22 buildings. Further reduction in sample size would make the sample too small to be statistically valid.

The second activity, ventilation air tempering for commercial and institution buildings, will determine the amount of energy that could be saved through tempering ventilation air. Preliminary estimates are that 50 MW of space conditioning energy could be saved. A demonstration project to substantiate savings estimate is planned. Further reduction of funding would not allow completion of research, making it impossible to assess a potential lost opportunity resources.

The third activity, evaluation of energy management systems (EMS) will assess selected, installed EMS's and determine criteria for installation in current and future programs. Phase I (data collection) has been completed. Proposed funding for Phase II would evaluate data, the final step in this multi-year project.

FY	89	90	91
$	.5	.4	.4

- PURCHASE OF ENERGY SAVINGS (PES). (Position for High Loads - build capability) The PES field test installed regionally cost-effective measures in five buildings using private sector funding. Installed measures saved an estimated .63 MW.

  The PES Pilot Program refined the private sector financing approaches established in the Field Test . Forty buildings in this program will acquire 1.38 MW of energy at an estimated 18 mills/kWh. No up front capital was provided by Bonneville. Funding for both the field test and pilot program is for contract payments.

FY	89	90	91
$	1.1	1.1	1.0

- COMMERCIAL ACQUISITIONS. (Position for High Loads - build capability/Least-Cost Path - lost-opportunity acquisition) The Commercial Incentive Pilot Program (CIPP) will operate through FY 1990. In FY 1991, a new acquisition program will be designed based in part on the experience gained from the CIPP pilot. The pilot is a 4-year project to test the response of selected commercial customers to financial payments and to build the technical and administrative capability which would be needed to plan and implement a full-scale commercial sector acquisition program. There are contracts with 6 utilities with payments passing through the utilities to the building owners.

The average cost for measures under CIPP is 20 mills/kWh. CIPP funding is for contract payments. FY 1991 funding is to begin ramping up the acquisition of the potential commercial sector lost-opportunity savings of 200-300 MW in preparation for being on the least-cost path by FY 1995.

FY	89	90	91
$	4.8	4.8	6.2

Below are proposed budgets for new commercial buildings activities. Descriptions of the principal new commercial programs are also provided.

- ENERGY SMART DESIGN ASSISTANCE PROGRAM*. (Least-Cost Path - lost-opportunity acquisition) This program started in FY 1987 as part of the strategy for commercial MCS. Based on experience, it has been determined that the most effective way to influence new building construction is by working with the design community. The program encourages pre-design planning for new buildings so that efficiency opportunities, which would otherwise be lost, are included as a design criteria. Funding at the proposed level is seen as crucial to acquire otherwise lost opportunities in new building construction.

FY	89	90	91
$	3.9	5.6	5.7

- LIGHTING MOCK-UP FACILITY. (Position for High Loads - build capability) This program provides a facility in which energy-efficient lighting solutions can be tested and demonstrated. There are an estimated 300 MW of achievable energy savings available at 30 mills/kWh in new commercial lighting. More than 30 percent of facility's initial costs have been obtained from co-sponsors. By 1991, a higher percentage of cost-sharing will be sought. The center will be open to utilities, commercial building designers, and others throughout the region. Reduced or terminated funding would not allow the facility to continue.

FY	89	90	91
$	.3	.3	.3

- ENERGY EDGE*. (Position for High Loads - build capability/Least-Cost Path - lost-opportunity acquisition) This program is designed to provide information about the costs and benefits of very energy-efficient new commercial buildings. Four sponsors have selected 29 buildings to participate. The buildings have been designed to use at least 30 percent less energy than if built to MCS Code. The buildings are being monitored and actual savings will be compared to estimated savings. This program has received national and international attention from the commercial buildings design community. Funding needs are for data analysis and evaluation. Funding is based on contracts which expire in FY 1992.

FY	89	90	91
$	1.1	1.1	.9

- RESEARCH. (Position for High Loads - build capability) Research efforts are planned to discover energy efficiency opportunities in five areas: 1) modeling improvements to lower design costs and increase the number of energy-efficient new buildings constructed in the region; 2) analysis of the interrelationships of lighting, heating, ventilation, air conditioning, equipment performance, etc., in order to refine estimates of reliability, costs and savings; 3) assess and evaluate occupant/user satisfaction with lighting design methods to demonstrate effectiveness to building designers; 4) demonstration of new equipment and materials that have been designed, researched, and developed; and 5) assessment of the nature, trends, and impacts of plug loads on kWh consumption, building codes, internal heat gain, etc. Reduced or terminated funding in any of these areas will hamper future savings efforts.

FY	89	90	91
$	.3	.3	.3

- MODEL CONSERVATION STANDARDS SUPPORT*. (Least-Cost Path - lost-opportunity acquisition) This effort revises the MCS for new commercial buildings to reflect DOE requirements and implements the standards through financial, educational, and/or technical assistance. An education and training component is included. January 1, 1991 is the deadline set by the Northwest Power Planning Council for adoption and enforcement of the new MCS. A funding reduction would adversely affect Bonneville's ability to get the code in place by the deadline to capture lost opportunity savings from new buildings.

FY	89	90	91
$	.3	1.3	1.6

3. Industrial Conservation

The total program level for industrial programs in FYs 1990-1991 has increased relative to FYs 1988-1989 both in absolute dollars and percent share of the total. Most of the growth occurs in the non-discretionary contractual commitments of the Conservation/Modernization program.

- ALUMINUM SMELTER CONSERVATION/MODERNIZATION. (Load Stability - revenue stability) To help keep regional smelters from being operated as swing plants, which cause instability in Bonneville revenues, this program offers regional smelters 5 mills/kWh saved through energy efficiency improvements undertaken by the smelters. Payments are expected to rise to approximately $10 million by 1991, then increase at the rate of inflation. The program is expected to save 173 MW at 5 mills/kWh, while stabilizing this load. Proposed funding levels meet contract terms.

FY	89	90	91
$	6.1	8.4	9.9

- INDUSTRIAL ACQUISITION PROGRAM. (Position for High Loads - build capability/Least-Cost Path - lost-opportunity acquisition) The Energy $avings Plan (E$P) will operate as a pilot program in FYs 1988-1990. In FY 1991, a new acquisition program focused on lost opportunities will be designed in part based on the experience gained from the E$P pilot.

  The pilot program provides payments for retrofit electrical energy-efficient improvements and is open to all manufacturers, processors, and refiners in the region, except for the aluminum smelters which are covered in another program. Cost effectiveness of the pilot program will be determined when the projects are completed. An evaluation of the pilot is planned before FY 1990.

  Maintaining funding of the pilot at the announced program level is considered important to have information for the acquisition phase. FY 1991 funding is for ramping up the acquisition of the potential industrial sector savings in preparation for being on the least-cost path by FY 1995.

FY	89	90	91
$	2.5	2.4	2.1

- SPONSOR-DESIGNED CONSERVATION. (Position for High Loads - build capability) This program's objective is to acquire knowledge of ways in which conservation savings could be achieved in the industrial sector. Eight contracts were awarded in 1986. Evaluation of the program is scheduled for FY 1989. The expected savings are 4.15 aMW at an expected average cost of 6.7 mills/kWh. Proposed funding levels meet contract terms.

FY	89	90	91
$	1.6	.9	.1

- THE PARTNERSHIP. (Load Stability - revenue stability/Position for High Loads - build capability) This program is made up of a number of subprograms which use surplus power to support customer marketing and regional economic health objectives. The program is designed to assure Bonneville of net revenue gains. An overall program evaluation is planned for FY 1989. Successful subprograms will be considered for wider regional application. Funding levels reflect a minimum viable level for the subprograms which were recommended by a public involvement process on the Partnership.

FY	89	90	91
$	1.1	1.0	1.0

- IRRIGATED AGRICULTURE. (Maintain Commitments - maintain capability) This program promotes cost-effective savings through the installation and management of energy-efficient and water-saving devices in irrigation facilities. Savings from these systems average 1.8 MW annually at a cost of 4 mills/kWh saved. Proposed funding levels are considered the minimum needed to maintain program capability.

FY	89	90	91
$	.6	.6	.6

- RESEARCH. (Position for High Loads - build capability) Research and demonstration efforts are planned to identify and test energy efficiency opportunities in new areas. Reduced or terminated funding will hamper future marketing and efficiency acquisition efforts.

FY	89	90	91
$	.5	.5	.5

4. Generation Programs

Activities in the generation sector focus on oversight of existing projects, development and implementation of generation-related programs, and technical support and analyses.

- GENERATING RESOURCES R&D. (Position for High Loads - build capability) Basic research and development (R&D) functions regarding generation technologies are accomplished through this activity. Generation technologies evaluated include geothermal, hydropower, power electronics, and biomass as well as more conventional technologies. Reduced funding could delay the availability or increase the costs of future resources.

FY	89	90	91
$	1.7	1.5	1.5

- HYDRO SYSTEM EFFICIENCY. (Revenue stability) Projected efficiency gains from the Region's existing hydropower system are estimated to be very cost-effective, resulting in low-cost generation of additional energy and improved Bonneville revenues. The scope of this activity includes technical and economic analyses as well as program development.

  The funding level includes staff, contractor support, and contributions toward actual equipment purchases and installations. This funding is in preparation for being on the least-cost path by FY 1995. It is also believed that this program has the potential to return incremental revenues in excess of costs in the near term.

FY	89	90	91
$	1.8	1.9	1.9

  IDAHO FALLS HYDROELECTRIC POWER PURCHASE. (Power Purchase) Under an agreement with the City of Idaho Falls, Idaho, BPA acquires the output of the Idaho Falls Hydroelectric projects, and pays the associated debt service, annual O&M costs and a margin based upon power production.

FY	89	90	91
$	4.8	5.2	5.2

- NON-SUPPLY SYSTEM OVERSIGHT. (Maintain capability) This activity implements the oversight of generation and generation-related activities (excluding the Supply System projects and the Trojan nuclear project) that affect BPA's budgets. This includes the Idaho Falls Hydroelectic projects, Corps of Engineers and Bureau of Reclamation Projects, and other acquired projects. The proposed level is required to accomplish enough oversight to protect regional resource interests.

FY	89	90	91
$	0.1	0.1	0.1

- RESOURCE ACQUISITIONS AND OPTIONS. (Position for High Loads - build capability) The objectives of this activity are to develop procedures and programs to acquire resources when needed. Near-term expenditures include maintaining of two resource options contracts and the developing an acquisition process.

FY	89	90	91
$	0.3	0.3	0.2

D. Trade-offs Among Bonneville Programs

Several commenters on the Draft believed it was unreasonable to set a firm budget target for resource development programs without first trading off resource programs against other major Bonneville program areas such as transmission and fish and wildlife. Minor changes were made during Bonneville's internal budget process after assessing resource programs against Bonneville's overall financial situation and program priorities. During this summer, Bonneville's Programs in Perspective process will provide more opportunity for public discussion of agency-wide program trade-offs.

IV. RESOURCE ISSUES

Several elements must be considered in developing Bonneville's 1988 Resource Program. These include the duration and magnitude of surplus, Bonneville's current revenue situation, its marketing efforts, and the agency's ability to acquire new resources. New information on these elements is included in this chapter. Also included in this chapter are a brief summary of the report Bonneville prepared on the Hanford Generating Project and an update on the status of the WNP-1 and -3 projects.

A. Duration and Magnitude of Bonneville's Surplus

Preliminary results obtained for the 1988 draft load forecast indicate minor load increases in the near term compared to the 1986 forecast. These preliminary results are subject to change, but they do show the current surplus ending 2 years earlier than shown in Table IV-1 under the medium load forecast. The new forecast is expected to show average annual load growth rates slightly higher than those forecast in 1986, but the growth would take nearly a decade to cause an appreciable reduction in the firm energy surplus.

Because the draft 1988 load forecast is incomplete, it is too early to specify its implications for Bonneville's 1988 Resource Program though the implications would appear not to be major given the magnitude of the change in the forecast. The new load forecast will be used in future Resource Programs. The draft 1988 load forecast will be published separately and will be available for public review and comment. The load/resource balance shown in Table IV-1 incorporates forecast loads and resources as of the Draft 1988 Resource Program.

1. IOU Load/Resource Activity

Bonneville has not changed the decision, made last year, that it is not prudent to prepare to meet IOU loads until IOUs commit to power purchases from Bonneville. However, the IOUs still have the right to meet their deficits by buying from Bonneville, subject to notice provisions. This means that Bonneville could ultimately face the range of regional deficits shown in Figure 1. Therefore, it is prudent for Bonneville to monitor IOU load and resource activities.

Furthermore, current market trends indicate that ample resources will be available to meet IOU loads for at least the remainder of this century under the medium load growth scenario. Utilities increasingly are turning their attention to independent power producers, PURPA resources, demand-side management activities, and purchases from other utilities within the region, as well as from those in California and elsewhere in the Southwest. Such purchases might involve exchanges, firm purchases, or option contracts. Seeing themselves in a buyer's market, the IOUs are expected to search for the most attractive resource alternatives, contracting for them only when necessary and only after a determination that no better price can be found. Whether Bonneville would be the power supplier of choice depends largely on the level and perceived stability and predictability of the New Resources Rate.

Table IV-1--RECENT DEVELOPMENTS AFFECTING SURPLUS/DEFICIT FORECAST
Federal System, Medium Loads
(Energy in aMW)

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Before Adjustments	1537	1442	1366	1190	1061	828	700	620	959*/	909
1/1988 DSI Load Adjustments	-403	-348	-261	-139	-56	29	85	98	16	-21
HGP Shutdown	-288	-288	-288	-288	-288	0	0	0	0	0
Adjusted Surplus(+)/Deficit(-)	846	806	817	763	717	857	785	718	975	888

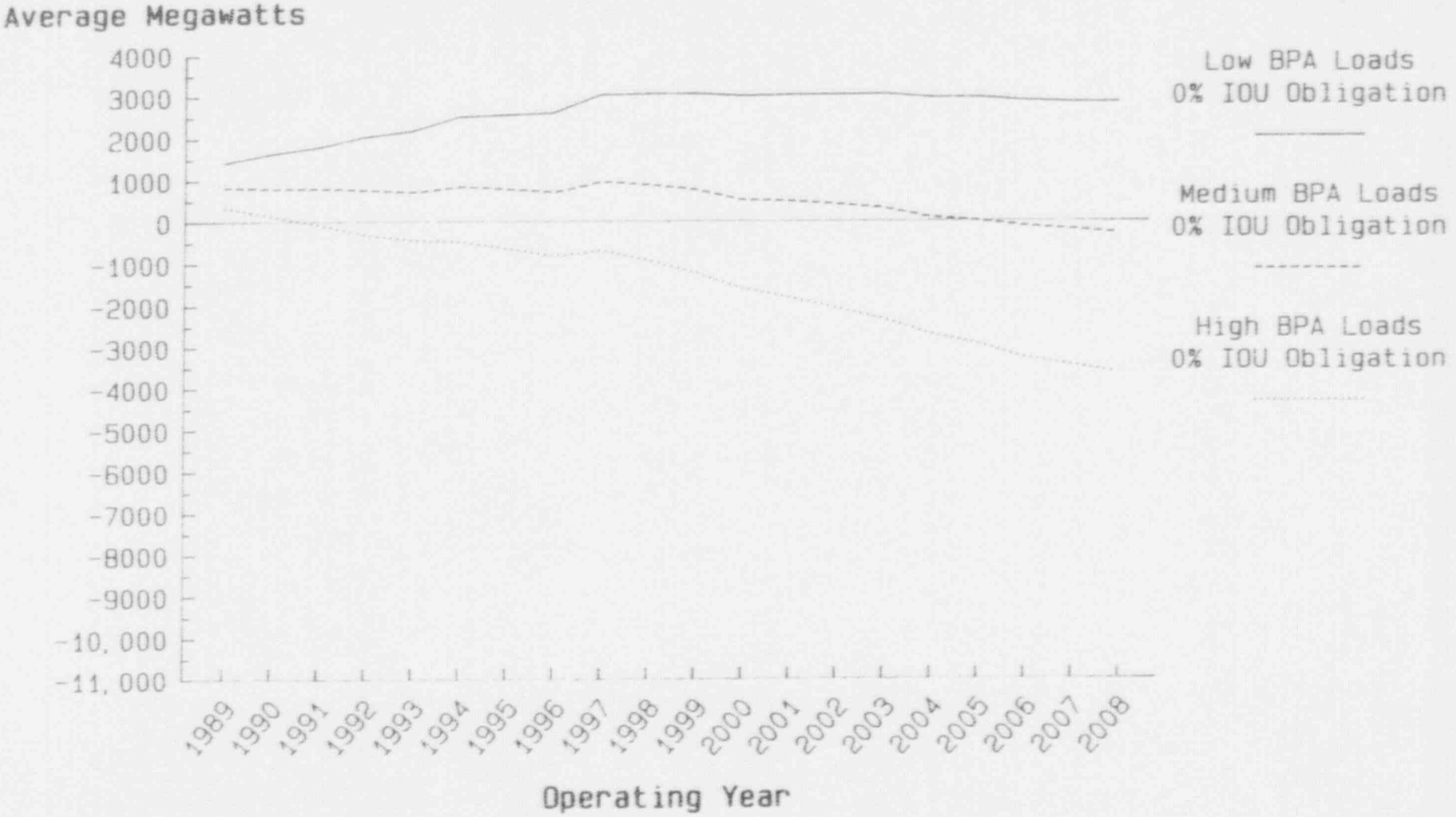
	1999	2000	2001	2002	2003	2004	2005	2006	2007
Before Adjustments	797	564	523	429	324	109	37	-108	-195
1/1988 DSI Load Adjustments	-24	-48	-41	-27	-11	-23	-42	-23	-11
HGP Shutdown	0	0	0	0	0	0	0	0	0
Adjusted Surplus(+)/Deficit(-)	773	516	482	402	313	86	-5	-131	-206

*/ A contract expires June 30, 1996 between Bonneville and five Northwest IOUs for a total of 400 MW capacity and 325 aMW energy. Termination of this obligation recovers the above energy to serve other Bonneville loads.

Figure 1

FEDERAL FIRM ENERGY SURPLUS/DEFICIT

Assuming No New Resource Acquisitions



December 1987 White Book with January DSI
Load Forecast and Without Hanford

2. What is the "Right" Amount of Surplus?

The recent concern about the reduction of power surpluses has rekindled interest in whether Bonneville should continue to plan to load/resource balance. The options presented in the Draft 1988 Resource Program were:

a. Plan resources so that a firm surplus of a certain number of megawatts is maintained permanently,

b. plan resources so that firm resources just equal firm loads (load/resource balance), or

c. plan resources so that firm resources fall short of firm loads.

With regard to the amount of firm surplus to be maintained to ensure acceptable reliability, commenters on the Draft 1988 Resource Program supported the current critical-water reliability standard. This question may be addressed by the Northwest Power Planning Council in its Technical Update. Bonneville expects to participate in that analysis, but does not plan to re-evaluate the standard independently. However, Bonneville will remain open to discussion of redefining the standard if future conditions warrant.

B. Hanford Generating Project

The Draft 1988 Resource Program (p.24), discussed the preservation of Hanford Generating Project (HGP) and its potential conversion to a combustion turbine. During the time between the Draft and this document, Bonneville studied the options for preservation and conversion. The full draft study is in the Appendix. A summary of the findings and conclusion are as follows:

1. Technical Feasibility

There appears to be no technical reason for rejecting the conversion concept. This conclusion is based on a review of the conceptual design proposals produced by Fluor Daniel for the Supply System, as well as on Bonneville's knowledge of the condition of the turbines and maintenance records. However, a substantial amount of uncertainty is associated with the actual configuration, performance, and cost of a converted HGP. More engineering work is required to define the best configuration.

2. Contractual and Legal Issues

The contractual history of HGP, along with the numerous supplemental agreements, results in a complex and interrelated set of relationships and rights that are difficult to sort out based on a preliminary review. Although resolving these issues would require substantial effort, the legal and institutional constraints do not pose a barrier to conversion. There is concern, however, that termination must be analyzed in light of covenants to buyers of the bonds sold to finance construction of HGP.

3. Environmental Requirements and Issues

From an environmental perspective, conversion of HGP would be treated as any new resource. There are no known environmental issues associated with HGP or an HGP conversion that would prohibit conversion. If conversion were pursued, Bonneville would be responsible for insuring that the National Environmental Policy Act (NEPA) environmental review requirements were met. In coordination with other groups Bonneville would prepare the appropriate NEPA document, likely an environmental impact statement (EIS).

4. Economic Analysis

There is inadequate data to make an economic analysis regarding conversion of HGP. An engineering study is required to define the best configuration and its associated capital and operating costs.

HGP should be preserved at least through December 1988. This conclusion is based on two factors:

a. Inadequate data exists regarding conversion of HGP. An engineering study is required to define the best configuration. Such a study, and subsequent economic analysis of capital and operating costs, can be completed by the end of 1988.

b. Risk management dictates that it would be imprudent to discard this potential resource unless there was a substantial indication that it had no value as a power resource. Termination at this time would preclude the option of converting at a later time should conditions warrant.

Preservation through December 1988 will permit the completion of: (1) an engineering study which addresses the cost of conversion and capital replacements, (2) a refined estimate of the cost to operate and maintain HGP, (3) a comparable estimate of the cost of a new combined cycle combustion facility, (4) a definitive economic evaluation, (5) a better assessment of the feasibility of contracting for power from existing combustion turbines instead of building a new facility, (6) completion of a firming nonfirm study, and (7) a more thorough evaluation of critical institutional and legal issues.

It is possible to complete this additional work by December 1988, at which time a decision on whether to preserve beyond December 1988 can be made.

C. WNP-1 and -3 Update

The Draft 1988 Resource Program (p. 34) reported the current status of the WNP-1 and -3 plants and the issues surrounding them. The following section presents the results of a national survey on termination costs for partially completed nuclear projects such as WNP-1 and -3.

1. Termination Cost Survey

In response to questions raised by commenters on WNP-1 and -3 termination costs in the 1987 WNP-1 and -3 Study, BPA agreed to review Supply System cost estimates of site restoration.

Termination costs and site restoration costs are one factor in the economic comparison of preservation vs. termination for WNP-1 and -3. BPA has completed a survey of other terminated, partially completed plants in the U.S. to verify the reasonableness of the termination cost estimates used in the 1987 Study.

a. Termination cost issues

The Supply System developed cost estimates of bringing the two plants to four different levels of site restoration for the 1987 WNP-1 and -3 Study. The four levels were identified as performance standards that might be required by Washington's Energy Facility Site Evaluation Council (EFSEC) under terms of the site permits granted for construction of each pair of plants, WNP-1 and -4, and WNP-3 and -5. The Supply System then estimated the costs for achieving each of the levels.

b. Comparison with other utility experience

The cost estimates developed by the Supply System rely on extensive and detailed engineering analysis of the site restoration work. To validate the cost estimates developed by the Supply System, Bonneville surveyed utilities that have terminated plants. If their independent engineering estimates or actual experience confirmed the costs projected by the Supply System, Bonneville would have a useful verification at a reasonable cost.

To gather data for this comparison, staff selected plants that had designs comparable to WNP-1 and -3 and which had been cancelled at least 8 years after being ordered. When those plants were owned by members of the Electric Utility Cost Group, an association of utilities that share experience and research on power plant construction and operation, staff contacted the utility Bonneville believed that members of this group would be most cooperative in providing data and experiences on termination and restoration. Bonneville staff contacted ten utilities regarding 17 plants that were cancelled before 1986. Table IV-2 lists the possible plants for comparison.

Table IV-2

TABLE 1: NUCLEAR PLANTS ORDERED 1967-1986

PLANT	UTILITY	ORDERED	CANCELLED	AGE	EUCG? _a/	TYPE _b/
MIDLAND	CONSUMERS POWER CO.	1968	1986	18	YES	B-W
HOPE CREEK 2	PUBLIC SERVICE E&G	1969	1981	12	YES	GE
SHEARON HARRIS 2	CAROLINA POWER	1971	1983	12	YES	W
HARTSVILLE A1,A2	TVA	1972	1984	12	YES	GE
NORTH ANNA 3,4	VIRGINIA POWER	1971	1982	11	YES	B-W
MARBLE HILLS 1,2	PUBLIC SERV. INDIANA	1974	1985	11	YES	W
FORKED RIVER	GPU NUCLEAR	1969	1980	11	YES	C-E
RIVER BEND 2	GULF STATES UTIL	1973	1984	11	YES	GE
CHEROKEE 1,2,3	DUKE POWER	1973	1983	10	YES	C-E
CLINTON 2	ILLINOIS POWER	1973	1983	10	YES	GE
YELLOW CREEK 1,2	TVA	1974	1984	10	YES	C-E
PERKINS 1,2,3	DUKE POWER	1973	1982	9	YES	C-E
PILGRIM 2	BOSTON EDISON	1972	1981	9	YES	C-E
CALLAWAY 2	UNION ELECTRIC	1973	1981	8	YES	W
PHIPPS BEND 1,2	TVA	1974	1982	8	YES	GE
DAVIS BESSE 2,3	TOLEDO EDISON	1973	1980	7	YES	B&W
STERLING	ROCHESTER G&E	1973	1980	7	YES	W
VANDALIA	ILLINOIS POWER CO	1975	1982	7	YES	B-W
ATLANTIC 1,2	PUBLIC SERVICE E&G	1972	1978	6	YES	W
BARTON 1,2	ARKANSAS P&L	1972	1977	5	YES	GE
HAVEN 1,2	WISCONSIN ELECTRIC	1973	1978	5	YES	W
BLUE HILLS	GULF STATES UTIL	1973	1978	5	YES	GE
ATLANTIC 3,4	PUBLIC SERVICE E&G	1973	1978	5	YES	W
SURRY 3,4	VIRGINIA POWER	1972	1977	5	YES	B&W
BLUE HILLS 2	GULF STATES UTIL	1974	1978	4	YES	C-E
SUMMIT 1,2	DELMARVA	1971	1975	4	YES	(HTGR)
SOUTH DADE 1,2	FLORIDA POWER CO	197	1977	3	YES	W
ALLENS CREEK	HOUSTON L&P	1973	1976	3	YES	GE
CRYSTAL RIVER	FLORIDA POWER CO.	1970	1972	2	YES	W
VIDAL 1,2	SO CAL EDISON	1972	1974	2	YES	GA
BARTON 3,4	ARKANSAS L&P	1974	1975	1	YES	GE
VOGTLE 3,4	GEORGIA POWER	1973	1974	1	YES	W
ZIMMER 1	CINCINNATI G&E	1969	1984	15	NO	GE
BAILLY	NO. INDIANA P.S.	1967	1981	14	NO	GE
BLACK FOX 1,2	PUBLIC SERVICE,OKLA	1973	1982	9	NO	GE
GREENWOOD 2,3	DETROIT EDISON	1972	1980	8	NO	B-W
MONTAGUE 1,2	NORTHEAST UTIL	1974	1980	6	NO	GE
DOUGLAS POINT 1,2	POTOMAC EDISON	1973	1977	5	NO	GE
GREENE COUNTY	POWER AUTHORITY, NY	1974	1979	5	NO	B-W
ZIMMER 2	CINCINNATI G&E	1974	1978	4	NO	GE
SUN DESERT 1,2	SAN DIEGO G&E	1974	1978	4	NO	W
PALO VERDE	ARIZONA PUBLIC SERV	1975	1979	4	NO	C-E
FULTON 1,2	PHILADELPHIA ED.	1971	1975	4	NO	(HTGR)
FORT CALHOUN 2	OMAHA PUBLIC POWER	1974	1977	3	NO	W
SEARS ISLE	CENTRAL MAINE	1974	1977	3	NO	W
FERMI 3	DETROIT EDISON	1972	1974	2	NO	GE
ST. ROSALIE 1,2	LOUISIANA P&L	1974	1975	1	NO	(HTGR)
SOMERSET 1,2	NEW YORK STATE E&G	1974	1975	1	NO	GE
TYRONE 2	NORTH STATES POWER	1973	1974	1	NO	W

_a/ Electric Utility Cost Group

_b/ Reactor Type: B-W, Babcock and Wilcox Co.; GE, General Electric Co.; W, Westinghouse; C-E, Combustion engineering Inc.; HTGR, High Temperature Gas Cooled Reactor by General Atomic Co.

Source: Energy Information Administration,"Commercial Nuclear Power 1987"

The utilities were asked about the extent of work completed at the site, extent of demolition and site restoration, duration of restoration work, costs of demolition and restoration, and amount of revenues from equipment resale and salvage. They were also asked if they were aware of any other utilities with experience in demolishing plants near completion and site restoration. Table IV-3 summarizes the results of this survey.

Termination decisions are extremely sensitive areas to the affected utilities because of a number of legal issues surrounding terminated plants. This limits the amount of cost data these utilities are willing to disclose for comparisons.

Completed, permanent structures have not been demolished as part of plant termination and site restoration. The usual decision has been to maintain sites with fencing and other security measures (Tennessee Valley Authority at Hartsville and Phipps Bend, Tennessee, Public Service of Indiana at Marble Hills). TVA spent roughly $4 million per plant in terminating three plants and stabilizing the sites. This compares with the Supply System's estimate of $5 to $6 million each for WNP-1 and -3 for the same level of restoration. One utility developed very informal cost estimates of $40-50 million in 1981 dollars to demolish cooling towers and containment structures. These costs were considered higher than could be justified by any future use of the site so a decision was made to forgo more detailed study of that option and bring the site to a lesser level of restoration. This range of costs compares fairly closely with the estimates the Supply System developed for the same level of restoration of each of the WNP plant sites, although there is no detailed analysis to allow direct comparison.

The engineering projects anticipated if WNP-1 and -3 were terminated may be unique in the nation. Bonneville found no other terminated plants faced with the extent of licensing oversight exercised by Washington's EFSEC. In most cases, the level of site restoration is regulated only to protect public health in such matters as waste disposal and water source protection. Beyond this, power plant sites tend to be regulated the same as other privately held industrial sites with minimal State or local control.

c. Conclusions

Bonneville found that utilities terminating plants have not demolished completed permanent structures. Rather, utilities with completed structures manage corporate liability by reducing hazards to trespassers on the sites. For utilities without completed permanent structures, the objective was to remove any visible reminder that a plant had been planned and then cancelled. When cost data or estimates for site restoration were available, they reasonably approximated the Supply System figures.

Table IV-3

TABLE 2: SURVEY RESULTS

UTILITY AND PLANT	ORDERED	CANCELLED	% COMPLETE	PERMANENT BLDGS	EXTENT OF RESTORATION	USE OF SITE
DUKE POWER CO. Cherokee 1,2,3	1973	1982,1983	~20	none	Sold site with temporary buildings and other facilities	movie set
CONSUMERS POWER CO. Midlands 1,2	1968	1986	~70	Containment, Cooling, Generator, Admin.	Converted to gas fueled plant.	power plant
BOSTON EDISON Pilgrim 2	1972	1981	<10	none	Removed temporary structures.	power plant
GULF STATES UTILITY CO. River Bend 2	1973	1984	<10	none	Filled excavation removed water pipe.	power plant
PUBLIC SERVICE OF INDIANA Marble Hill 1,2	1974	1985	60-70	Containment, Cooling, Generator, Admin.	Maintain at approx. Level I condition while assets salvaged.	Salvage plant equipment and hold for future use.
VIRGINIA POWER North Anna 3,4	1971	1980,1982	~10-15	none	Filled excavation, removed temporary buildings,demolished partial structures.	power plant
TVA Hartsville Plant A Units 1 and 2	1972	1984	44	Partial containment, cooling tower,pump station.	Maintain at approx. Level 2.	Leased for industrial use
TVA Phipps Bend 1,2	1974	1982	65	Containment, Cooling Towers.	Maintain at approx. Level 2.	Leased for industrial use.
PUBLIC SERVICE ELECT. AND GAS, NEW JERSEY Hope Creek 2	1969	1981	30	none complete	Capped partially complete structures, removed temporary structures.	power plant
ILLINOIS POWER Clinton 2	1973	1983	<10	none	Filled excavation, removed temporary buildings.	power plant
TVA Yellow Creek 1,2	1974	1984	50-60	none complete	Maintain at approx. Level 2.	Retained for future use as power plant
DUKE POWER Perkins 1,2,3	1973	1982	no construction	na	na	na
UNION ELECTRIC Callaway 2	1973	1981	excavation only	na	none	power plant

2. Update on Need for WNP-1 and -3

In the Draft 1988 Resource Program, activities that could affect the need for WNP-1 and -3 were discussed. These included higher DSI loads, extraregional sales, independent resource development, B. C. Hydro Coordination, imports from B. C. Hydro, Columbia River Treaty Canadian Entitlement, changes in conservation supply curves, Nuclear Regulatory Commission (NRC) fees, Price-Anderson Act proposed changes, and preservation costs changes. Only new information since the draft was released is included here.

a. HGP conversion proposal

The Supply System has recently considered other repowering alternatives for HGP, including three gas-fired combustion turbine options for firming nonfirm energy, and one baseload coal-fired option. An analysis of these options is presented in the draft HGP Study in the Appendix.

Were any of the combustion turbine options for HGP conversion to prove viable, they would probably not affect the need for WNP-1 and -3, because these options would be used to firm nonfirm energy, not to meet base load needs. Bonneville presently assumes 600 aMW of firming nonfirm potential and HGP would simply be used as the firming resource.

An HGP coal-fired configuration would not affect the need for the projects unless it proved to be cheaper than WNP-1 and -3. Given the rough estimates provided by the Supply System and Fluor Daniel, this does not look likely.

b. New generating supply curves

Preliminary indications show there could be more cost-effective cogeneration available than previously shown. At the present time, the exact dimensions of this potential are being determined.

c. NRC fees

Congress has recently proposed changes in funding requirements for the NRC. Currently, the nuclear industry funds 33 percent of NRC requirements. In the final Federal budget reconciliation package, Congress and the President agreed to raise the NRC user fee to 45 percent for FYs 1988 and 1989 only, after which user fees would return to 33 percent. Under this arrangement, these temporary changes in NRC user fees will have no impact on the cost effectiveness of completing the projects. Pressure continues in Congress to raise NRC user fees.

d. Long-term load forecast

A joint BPA/Northwest Power Planning Council revised draft long-term load forecast was issued in June 1988. This revised draft medium forecast of regional load in 2005 is up slightly from Bonneville's 1986 long-term forecast. The revised draft high forecast is slightly lower than the 1986

high forecast, and the revised draft low forecast is higher than the 1986 low forecast. This draft forecast is currently receiving comment throughout the region. Revisions to this forecast are likely.

e. Summary update on need for WNP-1 and-3

While there have been several areas where activity has occurred that would affect the need for WNP-1 and -3, none appear to have the potential for a large impact. Information on resource potential and loads is not yet final, and therefore, Bonneville's assessment of the need for the projects remains essentially the same as in the 1987 Study.

3. Need for a New Study

As promised in the 1987 Study, Bonneville solicited the views of interested parties about whether a new study is warranted concerning the future of WNP-1 and -3. Bonneville's assessment is that a new study is probably not appropriate now because conditions have not changed enough to justify one. Of importance at the present time is the resolution of legal and refinancing issues. Until the impact of termination on these issues is clearer, an economic study would not likely provide significant new insight.

All comments received on the need for a new study supported Bonneville's position that a study is not needed at the present time. Commenters stressed the need to resolve legal and refinancing uncertainties before undertaking a study. Bonneville will monitor these issues and undertake a new study when appropriate.

D. Cost Effectiveness Methodology

In the Draft 1988 Resource Program, Bonneville solicited comment on the perspective question and on other aspects of resource cost-effectiveness determinations. Bonneville also asked what level of effort should be devoted to completing the methodology and whether a formal process to complete it would be desirable.

Most commenters agreed that a regional perspective is the most appropriate perspective for determining resource cost effectiveness. One commenter stated that a ratepayer perspective would be more appropriate. A possible resolution of those views is being explored by Bonneville and the Northwest Power Planning Council. That resolution would be a two-part test: (1) the resource's cost effectiveness is measured on a regional basis, and (2) the amount that Bonneville would actually pay for a resource (or the incentive payment Bonneville would make) would depend on its value to Bonneville's customers and ratepayers.

Three commenters expressed interest in a process to review and revise the cost-effectiveness methodology. One of those commenters requests that such a process focus on using internal rates of return as the primary economic measure of cost effectiveness instead of net present value of system costs. The commenter also asserted that Bonneville's discount rate should reflect the opportunity cost of capital, and that Bonneville's real discount rate should be approximately 7 percent, not the current 3 percent rate.

Bonneville agrees with the majority of commenters that a formal process to review its cost-effectiveness procedure is not warranted now. By working with the Northwest Power Planning Council in its Technical Update, and in the process of revising supply curve estimates, Bonneville intends to resolve the issues raised in the Draft 1988 Resource Program (p. 40). In addition, Bonneville proposes to ensure that resource economic analyses be conducted using a broad range of discount rates. Such a range would cover the higher discount rates for which some commenters have argued. Also, when appropriate, Bonneville would calculate the internal rate of return on potential resource investments. This additional information should help Bonneville and its customers evaluate the agency's resource decisions.

Bonneville believes that the cost-effectiveness methodology is dynamic and may require revisions as new and different resource types and resource programs are evaluated. In the economic analyses of those resources, Bonneville will continue to provide a full accounting of its analyses and to display openly the assumptions and procedures used in those analyses. By developing these procedures in an public process, Bonneville seeks to ensure that equitable and consistent resource economic valuations are performed for all resource decisions.

E. Firming Nonfirm

In the next 3-4 months, Bonneville will pursue a new set of economic studies of the impacts of firming nonfirm resources. Firming studies will likely compare firming options against generic coal plant additions. Results from this study will answer the following questions:

1. What amount of installed capacity of combustion turbine units is cost competitive with coal plants given various fuel price forecasts?

2. How do air quality, reservoir refill, and spring streamflow impacts of firming options compare with those of coal plant operations?

3. How do firming options affect variability of net revenues over ranges of water conditions, fuel prices, and load growths?

4. How do firming options compare with coal plant additions under prolonged periods of low water?

5. What circumstances are especially disadvantageous for coal and firming strategies, and could these risks be mitigated?

The proposed analysis will provide a better understanding of the issues involved in firming nonfirm energy, the general magnitude and direction of quantitative results, and the kinds of "futures" under which firming options may be desirable. Also, it appears that firming strategies could be a major component of the Contingency Plan. In developing the Contingency Plan (see Chapter V), Bonneville will further examine firming strategies.

F. Acquisition Process

Bonneville is continuing its effort to develop, test, and implement a generation resource acquisition process. A draft process including a summary of acquisition techniques, bidding processes, and ranking criteria is planned to be released for public comment in FY 1989. The process is expected to be completed before FY 1990. Bonneville is continuing to work with the States in developing its acquisition process to assure that State regulatory and planning requirements are accommodated in the process.

G. Environmental Analysis of the Resource Program

In late 1986, Bonneville issued a Notice of Intent to prepare an environmental impact statement (EIS) on its 1988 Resource Strategy. Since that time, many changes have occurred which affect the Resource Program process. Because of these changes, Bonneville is reassessing its NEPA strategy for the Resource Program. A decision will be made later this year.

V. CONTINGENCY PLAN

What would Bonneville do if it suddenly found itself facing a deficit situation in the FYs 1990-1991 timeframe? There have been recent expressions of concern throughout the region about the actual size and duration of the surplus and how potential deficits will be met. Bonneville used the Draft 1988 Resource Program to advance the development of a contingency plan for such a situation. A summary of Bonneville's current thinking on this subject is provided here.

Bonneville's Contingency Plan will describe specific steps Bonneville will take if faced with a power emergency when more resources are needed quickly. The Contingency Plan will describe what Bonneville will do if extraordinary circumstances arise.

The Contingency Plan will have three components. First, it will describe the unexpected situations that might arise. This part will outline the possible scenarios that might cause Bonneville to need more resources quickly, the size of the potential deficits, and the signals that could trigger implementing a contingency plan.

Second, the plan will assess the pros and cons of the options available to BPA to meet an unexpected deficit, including their availability, lead-times, cost, and other factors. Options include extraregional purchases, acquisition of fast-track resources, load management techniques, or other means. These were described in the Draft 1988 Resource Program (p. 68).

Third, based on this assessment of the options, the plan will specify which of the options BPA may implement, and in what order, if an unexpected deficit were to occur. Estimates of the additional costs Bonneville would face in 1990 and 1991 will be key results of this analysis.

The Contingency Plan will also identify steps Bonneville could take before such a deficit occurs to make the options more certain to reduce their lead times, or to reduce their costs.

Long-term options will not be addressed as part of the Contingency Plan. Long-term options are those that would require more than 5 years to produce or save energy. Consistent with comments received on the Draft 1988 Resource Program, Bonneville has determined that long-term options are more appropriately a part of its annual Resource Program process, rather than part of a contingency plan. By its nature, a contingency plan is intended to address near-term emergency situations. Long-term resources would not be able to provide relief in the short term. By excluding the long-term options at the outset, Bonneville will be able to devote more time and attention to how it may respond to meet an emergency situation.

Although no long-term resources will be included in the Contingency Plan, they will be considered when determining which contingency options are best. That is, the Contingency Plan will be considered in the context of the most likely long-term resource decisions to assure the compatibility of the plan with the long-term resource decisions.

The Contingency Plan will be developed over the next several months after Bonneville staff has designed a study plan. Interested parties will be provided the opportunity to participate in and to review the proposed Contingency Plan.

VI. RESOURCE ENVIRONMENT

A. Resource Potential

1. Supply Curves

Bonneville has a wide range of resources from which to choose to meet its future power requirements. Bonneville and the Northwest Power Planning Council produce forecasts of potential resource supply that are used in planning and program analyses. These are generally referred to as supply curves. These supply curves forecast resource amounts expected to be available over the next 20 years and their associated costs. The supply curves are not a prediction of program performance, but a pool of resources that could be used to meet future power needs.

The Northwest Power Planning Council and Bonneville are cooperatively revising resource supply curves, with an intent to jointly adopt them. There are opportunities for public involvement in the process to develop the supply curves. A technical advisory committee comprised of representative regions' interests is making recommendations on how program evaluation results and data from metering projects should affect the 20 year forecasts of conservation potential. A similar committee is assisting in the estimation of generation supply curves. The revised supply curves will be available for use in future Resource Programs; they are being used in the Northwest Power Planning Council's Technical Update.

2. New Areas of Emphasis

Increasingly, attention is given to methods other than acquiring new resources to meet power needs, such as extraction of more firm power from the existing system. One possibility is to increase the efficiency of existing hydro and thermal generation. Increased coordination by U.S. and Canadian operators of the Columbia River hydro system could also produce significant additional firm power without requiring new physical plants. Strategies for backing up nonfirm energy with standby firm resources could also yield inexpensive firm power.

Still other economic possibilities to meet load growth may be new power exchanges with out-of-region power systems or the purchase of off-peak firm energy from other systems. These sources could be shaped to the region's needs by using the flexibility of the Federal hydro system.

B. Revenue Situation and Cost Controls

Bonneville's revenues are subject to the uncertainties affecting loads and resources in the region. For example, when aluminum prices declined, Bonneville experienced revenue shortfalls of $65 million in FY 1986 and $213 million in FY 1987. Bonneville revenues began to increase following implementation of the Variable Industrial Rate for aluminum smelters, and a world wide increase in aluminum prices. The economic recovery of the aluminum industry in the Northwest should contribute to additional revenues in FYs 1988 and 1989. However, recent forecasts indicate that aluminum prices have peaked and will decline over the remainder of the 1988-1989 rate period.

Bonneville revenues are also influenced by natural gas and oil prices and water conditions. The higher revenues from the aluminum industry in 1988 and 1989 are being offset by decreased revenues from power sales outside the region as a result of low water, underperformance of thermal resources, and lower prices for remaining sales because of depressed oil and gas prices.

Although the drought of 1987 has continued into 1988 and reservoir levels are low, Bonneville can meet its obligations to serve all firm loads. However, it is unlikely that Bonneville will sell much surplus power south this summer. Instead, surplus power will be used to serve the aluminum industry, and meet Bonneville's WNP-3 settlement obligations. Thus, reduced ability to make firm and nonfirm surplus sales results in substantially reduced revenues.

Bonneville places great importance on the agency's financial condition and on cost controls. One commenter on the Draft 1988 Resource Program asked that Bonneville expand the issue of cost controls and indicate a willingness to reexamine all options, including cancellation or postponement of programs and staff reductions.

Bonneville continually examines the pace and direction of its programs in light of current financial concerns. When revenues began to decline, Bonneville responded by reducing the scope and diversity of its conservation programs. The agency slowed the pace of its residential weatherization program and other conservation programs, and reduced planned expenditures for generating resources. Staff reductions have also occurred during the past year through early retirements, attrition, and increased emphasis on position management.

Bonneville has and will continue to reduce costs within its control. Cost controls are an important element in establishing financial stability. However, other factors beyond Bonneville's control have substantial impact on Bonneville's revenue stability. Attention to cost control better positions Bonneville to respond to the revenue effects of factors beyond Bonneville's control.

C. Power Marketing Situation

Bonneville is seeking to diversify the arrangements under which it markets surplus firm power. To achieve this, Bonneville is attempting to sell a portion of its surplus firm power through long-term contractual arrangements, including bilateral (direct) sales of surplus power, joint ventures with other suppliers, and sales to regional IOUs for their own use or for resale to others. Revenues from long-term sales of surplus firm power will strengthen Bonneville's financial position by providing a stable and predictable revenue stream at prices greater than those expected for short-term sales.

Bonneville has made some progress in its long-term marketing effort. Three long-term surplus sales to the cities of Burbank and Glendale were recently completed. Bonneville has recently signed a Memorandum of Understanding and is proceeding to negotiate a power sale contract with Los Angeles Department of Water and Power. In addition, a Memorandum of Understanding has been signed with the California cities of Modesto and Santa Clara and the Redding Public Power Agency for a future surplus firm power sale

if and when the Third AC Transmission Line to California is completed and if Bonneville still has surplus firm power available for long-term sale. Bonneville also made a 2-year sale to the Northern California Power Authority during 1988 and 1989.

Bonneville has established a program called The Partnership that uses surplus power to support customer marketing and regional economic health objectives. This program is intended to stabilize Bonneville's loads in the near term and help ensure efficiency in new loads while contributing to the health of the Pacific Northwest region.

In the 1987 rate case, Bonneville adopted the SL-87 rate which gave Bonneville flexibility to tailor the rate for each individual long-term arrangement. On March 30, 1988, the Federal Energy Regulatory Commission issued a decision rejecting the SL-87 rate. This order introduces an element of uncertainty into Bonneville's ability to market its surplus firm power to California. Even though the order raises some questions about Bonneville's marketing efforts, options remain to achieve a diversified market for Bonneville's surplus firm power.

Bonneville actively sought the views of its customers in selecting the preferred option or combination of options for marketing surplus firm power. Commenters to the Draft 1988 Resource Program expressed their support of Bonneville's efforts to market its surplus firm power--both inside and outside the region--under contract commitments containing appropriate call-back provisions. One commenter emphasized that Bonneville must balance the goals of achieving reasonable revenues and insuring resource availability for regional customers.

Bonneville's resource planning and power sales staffs will continue to coordinate their efforts to ensure consistency between marketing and resource decisions.

VII. NEXT STEPS

In the next 6 months, Bonneville will be focusing on many resource issues. The Northwest Power Planning Council will be providing guidance with a Technical Update. Work will continue on Bonneville's Contingency Plan, firming nonfirm energy, and BPA-Northwest Power Planning Council joint supply curves. Bonneville will continue its long-term marketing efforts. Bonneville and the Northwest Power Planning Council will be using a jointly-developed decision analysis computer model to use in resource analysis. The scope and timing of the next Resource Program has not been determined at this time. As plans for the next process become available, Bonneville will invite public participation.

APPENDIX
HANFORD GENERATING PROJECT STUDY

DRAFT HANFORD GENERATING PROJECT (HGP) STUDY

July 1988

I. SUMMARY

Hanford Generating Project (HGP), owned by the Washington Public Power Supply System (Supply System), is the steam turbine and generator facility that has historically generated power from steam supplied by the Department of Energy's (DOE) N-Reactor. In January 1987, the N-Reactor was shut down for safety improvements. On February 16, 1988, DOE decided to keep N-Reactor in a cold stand-down condition for an undetermined length of time. Considering these events, the Supply System reviewed alternative steam sources. Fluor Daniel then evaluated the most feasible alternatives: three combined-cycle combustion turbine and one coal-fired boiler configurations. Since conversion appeared to be an attractive option, Bonneville initiated a study to determine if the conversion concept had enough validity to warrant preservation of HGP.

Evaluation of the preservation option for the HGP required examining several topic areas. A summary of the results and findings are reported below.

A. Preliminary Findings

1. Technical Feasibility

There appears to be no technical reason for rejecting the conversion concept. This conclusion is based on a review of the conceptual design proposals produced by Fluor Daniel for the Supply System, as well as on Bonneville's knowledge of the condition of the turbines and maintenance records. However, a substantial amount of uncertainty is associated with the actual configuration, performance, and cost of a converted HGP. Extensive engineering work is required in order to define the best configuration.

2. Contractual and Legal Issues

The contractual history of HGP, along with the numerous supplemental agreements, results in a complex and interrelated set of relationships and rights that are difficult to sort out based on a preliminary review. Although resolving these issues would require substantial effort, the legal and institutional constraints do not pose a barrier to conversion. There is concern, however, that termination must be analyzed in light of covenants to buyers of the bonds sold to finance construction of HGP.

3. Environmental Requirements and Issues

From an environmental perspective, conversion of HGP would be treated as any new resource. There are no known environmental issues associated with HGP or an HGP conversion that would prohibit conversion. If conversion were pursued, Bonneville would be responsible for insuring that the National Environmental Policy Act (NEPA) environmental review requirements were met. In coordination with other groups Bonneville would prepare the appropriate NEPA document, likely an environmental impact statement.

4. Economic Analysis

There is inadequate data to make an economic analysis regarding conversion of HGP. An engineering study is required in order to define the best configuration and its associated capital and operating costs.

B. Preliminary Conclusion

HGP should be preserved at least through December 1988. This conclusion is based on two factors:

1. Inadequate data exists regarding conversion of HGP. An engineering study is required to define the best technical configuration. Such a study, and subsequent economic analysis of capital and operating costs, can be completed by the end of 1988.

2. Risk management dictates that it would be imprudent to discard this potential resource unless there was a substantial indication that it had no value as a power resource. Termination at this time would preclude the option of converting at a later time should conditions warrant.

It is possible to complete an engineering study and economic evaluation by December 1988, at which time a decision on whether to preserve beyond December 1988 can be made.

C. Comments Sought

Bonneville encourages oral or written comment on the draft HGP study. Send written comments to:

Public Involvement Office
Bonneville Power Administration
P.O. Box 12999
Portland, OR 97212

Or, if you prefer, you may telephone comments to Bonneville's Public Involvement Office. The numbers are: (503) 230-3478 in Portland; toll free (800) 452-8429 for Oregon outside of Portland; (800) 547-6048 for Washington, Idaho, Montana, Utah, Nevada, Wyoming, and California.

Comments must be received by COB August 31, 1988, for consideration during completion of the draft Study. To assist us in processing your comments, please refer to specific sections of this draft.

II. BACKGROUND AND PURPOSE OF STUDY

HGP, owned by the Supply System, is the steam turbine and generator facility that has historically generated power from steam supplied by DOE's N-Reactor. HGP is physically separated from N-Reactor. Pipelines carry steam from N-Reactor to HGP and return condensate to N-Reactor.

In January 1987, the N-Reactor was shut down for safety improvements. On February 16, 1988, DOE decided not to restart the N-Reactor but keep it in a cold stand-down condition for an undetermined length of time. Bonneville's planning had reflected HGP as going out of service during 1993.

Considering these events surrounding N-Reactor, it seemed appropriate to examine the possible consequences and affect on HGP of the decision to place N-Reactor in cold stand-down.

The Supply System initiated a conceptual study to determine if there were cost-effective steam sources available to warrant preserving HGP. After evaluating a number of alternatives, the Supply System worked with Fluor Daniel to analyze the most feasible steam sources -- three combined cycle combustion turbine configurations and one pulverized coal-fired boiler.

Based on information provided by the Supply System and by Fluor Daniel, Bonneville concluded that conversion to an alternate fuel source and repowering the HGP steam turbine warranted additional study. It also concluded that the facility should be preserved through the end of calendar year 1988, while further study was undertaken. The purpose of this draft study is to determine if the conversion concept has enough technical, economic, contractual/legal, and environmental validity to warrant preservation of HGP.

Several areas need to be examined in determining the feasibility of converting HGP to an alternate steam source. These areas are:

(1) Technical feasibility,

(2) Contractual and legal issues,

(3) Environmental requirements and issues, and

(4) Economic feasibility.

Bonneville consulted with the Supply System and the Northwest Power Planning Council (Council) Staff while conducting this analysis. The results of this study are detailed in the sections that follow.

The study is being distributed as part of the Resource Program to achieve a broad circulation. Comments on the HGP conversion study are solicited by August 31. Bonneville expects to make a final recommendation regarding preservation by December 1988.

III. TECHNICAL FEASIBILITY

A. Description of HGP Conversion Options

The HGP power plant currently consists of two condensing steam turbines configured to operate at 135 psia. Each turbine is connected to a 430 MW electrical generator. The Supply System completed a conceptual study of a range of possible scenarios to determine if there were cost-effective options available to warrant the retention of ownership and preservation of HGP for an alternative use as a future resource should the N-Reactor be shut down permanently.

After evaluating a number of alternatives, the Supply System focused on the two most feasible steam sources: (1) pulverized coal-fired boilers or (2) combined-cycle gas turbine generators. The Supply System contacted Fluor Daniel to review the alternatives and aid in the evaluation process. Because of budget restrictions, it was necessary to limit Fluor's work to a very preliminary analysis. Fluor Daniel is a leading company in the U.S. in designing and constructing combustion turbine generation and is presently under contract to modify the Midland nuclear project to a natural gas-fired combined-cycle combustion turbine generation plant.

Fluor Daniel, in their February 25, 1988 report, reduced the alternatives to four specific configurations, one coal-fired option and three combustion turbine options with heat recovery steam generators. Three options (Options 2-4) use natural gas-fired turbine generators (GTG) and assume the use of Brown Boveri Model BBC 11N gas turbine generators. At 59°F ambient temperature and 440 feet elevation, each of these GTGs will produce about 81 MWs of electrical power. In conjunction with tandem unfired heat recovery steam generators (HRSG), each unit will produce 467,000 pounds per hour of 135 psia steam or 436,000 pounds per hour of 500 psia steam.

The following descriptions are a brief extract from that report.

Option 1 - Pulverized Coal-fired Boiler (PCFB)

The pulverized coal-fired boiler option would generate steam in a high pressure boiler at a rate of 6,000,000 pounds per hour. This steam would be expanded through a back pressure turbine from 2,100 psia (940°F) to 135 psia and provide 4,903,000 pounds per hour of saturated steam to one of the existing steam turbine generators. This configuration would produce about 430 MWs from the new high pressure turbine and approximately 335 MWs from the existing turbine for a total gross output of 765 MWs.

This option includes the necessary modifications to the existing facilities, coal and limestone storage and handling, local ash handling, flue gas desulfurization, demineralized water treatment, and wastewater treatment--in essence, everything for the on-site requirements. It would be necessary to investigate further the access of railcar delivery of coal and the disposal of ash and scrubbing sludge at some off-site location (permanent disposal) if this option were to be considered viable.

Option 2 - Gas Turbine Generator/Heat Recovery Steam Generator (GTG/HRSG)
Seven Units, Unfired, 135 Psia

This option uses seven gas turbine generators in tandem with seven unfired heat recovery steam generators to provide 135 psia steam to drive one of the existing turbine generators. The new gas turbine generators will generate about 565 MWs and the steam generators will provide about 3,274,000 pounds per hour of 135 psia steam to one of the existing turbines. This, in turn, will generate about 211 MWs for a combined total gross output of 777 MWs.

Option 3 - Gas Turbine Generator/Heat Recovery Steam Generator (GTG/HRSG)
Seven Units, Unfired, 500 psia

The configuration for Option 3 is similar to Option 2, with seven GTG/HRSGs, but designed for 500 psia steam. This option would require significant mechanical modifications to the existing steam turbine for utilizing this higher pressure steam. The seven HRSGs will produce about 3,057,000 pounds per hour of 500 psia steam and the modified steam turbine generator will produce approximately 244 MWs. In combination with the GTGs, the total gross output would be about 809 MWs.

Option 4 - Gas Turbine Generator/Heat Recovery Steam Generator (GTG/HRSG)
Four Units, Duct-Fired, 135 psia

Option 4 was selected to provide a "reduced capital cost" option. The configuration for this option is similar to Option 2, but only four GTGs are installed and the heat recovery steam generator is duct-fired. This provides about 3,867,000 pounds per hour of 135 psia steam to the steam turbine and results in about 255 MWs. The four GTGs produce about 323 MWs for a total gross output of 578 MWs.

B. Bonneville Site Review

Bonneville staff has been involved with HGP since the initial design phase which began in the 1960s. To supplement the background knowledge obtained through this involvement, Bonneville staff reviewed the HGP site and site records to make a preliminary assessment of the compatibility of the existing facilities with each of the four proposed repowering options. This review was cursory, given the timeframe of the overall study, and does not substitute for additional site inspections and facility assessments that would have to occur prior to a decision to proceed with any repowering option.

While major items require additional study before a decision to construct could be made, Bonneville's assessment is that there is not any immediate cause to dismiss the concept of repowering the HGP facility. A brief synopsis of the conclusions is given below.

1. Steam Turbine

A review of the maintenance records indicates that each of the steam turbines has been properly maintained for the past 22 years of its service life. The turbines have less than 10 years operating time on them to date. Although historically operated at low pressure (i.e., 135 psia), the units are designed to be reconfigured to operate at a higher pressure (i.e., 500 psia). This low pressure operation has not stressed the steam turbines to the design limits. Although additional inspection and analysis would be required to estimate, with reasonable certainty, the life expectancy of the steam turbines, it is reasonable, for the purposes of this study, to assume that the turbines could continue to operate for many more years at 135 psia steam pressure (Options 1, 2, & 4).

Successful long-term operation at 500 psia (Option 3) requires the reblading of the existing steam generator. The original design specification for HGP required operation at 135 psia and 500 psia, thus the engineering associated with 500 psia operation is complete and the unit is built to accommodate this higher pressure. This concept was further reviewed and found acceptable in a 1971 Supply System study done by United Engineers and Constructors (UE&C).

2. Cooling System

The existing "once through" cooling system is well-maintained and could suffice for any of the four repowering options.

3. Electrical Integration

The switchyard and transmission system integrating the HGP facility to Bonneville's main grid are adequate for any of the four repowering options.

4. General Site Considerations

(a) Site size

There is sufficient land area available to install the additional equipment required under any of the four repowering options. Selection of gas fired turbine generators (GTG) for the repowering of HGP would require the least amount of physical disruption to the existing site. However, the site presently does not have a natural gas source.

(b) Waste disposal

The implementation of Option 1, using a coal-fired steam plant, would require a waste disposal area for ash and scrubber sludge. No investigation of this requirement has been made.

5. Fuel Importation

(a) Unit train coal transport (Option 1)

No investigation of rail transportation to the site has been performed.

(b) Gas pipeline (Options 2, 3, 4)

A 40-mile gas pipeline with one river crossing is anticipated. While the technical aspects of bringing a natural gas pipeline to the site present no insurmountable obstacles, the location of this fuel source adjacent to the N-Reactor would have to be coordinated with DOE.

IV. CONTRACTUAL AND LEGAL ISSUES

Because of the complexities of the numerous contracts relating to HGP, the conclusions reached in this analysis are preliminary and may change as warranted by further analysis.

A. Preservation Issues

1. Would the Investor-Owned Utilities (IOUs) be entitled to energy made available by HGP operation if HGP were converted to use a steam source other than the N-reactor?

If the existing facilities are connected to a steam source other than the N-Reactor there is no longer an "HGP", as all the current agreements describe the "HGP" as power generating facilities operated in cooperation with the N-reactor.

The original statute authorizing the Atomic Energy Commission to sell steam to the Supply System on condition that the Supply System offer up to 50 percent of the output to private utilities refers to the power generated by steam from the N-reactor.

The New Production Reactor Exchange Agreement of 1963 (Exchange Agreement) among the Department of Interior, Bonneville, the Supply System, and all the participants, public and private, is the basic agreement governing disposition of HGP power. This agreement defines the "project" as the "works, plants, and facilities for the generation and transmission of power and energy acquired by purchase, lease, or otherwise constructed by the Supply System in connection with the operation of electric power generating plant to be operated in conjunction with NPR, all as more particularly described in the bond resolution". This agreement also contains a recital that states that the Supply System and the Atomic Energy Commission had executed another agreement regarding the construction and operation of an electric power generating project by the Supply System to be operated in connection with the new production reactor.

In addition, the Hanford Continued Operation Agreement defines the Hanford Generating Project as the works, plant and facilities constructed by the

Supply System for generating and transmitting electric power and energy in conjunction with the DOE new production reactor pursuant to Supply System Resolution No. 178. Section 2.2 of this Bond Resolution describes the "Hanford Project" in significant detail and states that the generating plant and facilities are to "utilize by-product steam energy produced by the new production reactor."

Therefore, power produced by existing generating facilities, when connected to a new steam source, would not be considered to be "HGP" power within the meaning of the relevant contracts, and would not be governed by any of the existing agreements.

2. What are the Rights of the IOUs to Receive Power from HGP?

Under the Exchange Agreement, the publicly-owned and investor-owned utilities agreed to purchase the output of the HGP and to exchange the project output for firm power from Bonneville. In 1974, the Exchange Agreement was amended to account for the relocation of WNP-1. A letter agreement dated May 8, 1974, that accompanied the amendment, states that an amount of energy equal to half of that which becomes available due to the continued operation of HGP will be offered to the IOUs.

Under the letter agreement each IOU has an option to purchase up to one-tenth of the net energy output available due to continued operation of HGP after October 31, 1977. The Hanford Extension Agreement of 1983 continued Bonneville's obligation to offer to make power available pursuant to the letter agreement to each IOU until June 30, 1993, or until termination of the Steam Energy Agreement between the Supply System and DOE.

In response to Bonneville's offering the IOUs half of the energy that becomes available due to continued operation of HGP during the 1983-1993 period, only two IOUs subscribed. The IOUs that did not subscribe have no right to power until after June 30, 1993. Montana Power had previously assigned its share to the other IOUs. Pacific Power & Light and Puget Sound Power & Light each subscribed to 10 percent in their own right and 4 percent of Montana's share. Therefore, collectively the IOUs are receiving an amount of energy from Bonneville equal to 28 percent of that produced by HGP.

After June 30, 1993, if the N-Reactor is operating, another Hanford Extension Agreement would be needed and the IOUs would be given the option to receive energy from Bonneville pursuant to the 1974 letter agreement until the Exchange Agreement terminates in 1996. In Bonneville's view, when the Exchange Agreement expires, Bonneville's right to receive HGP power and Bonneville's obligation to offer energy made available due to HGP operation to the IOUs under the 1974 letter agreement are terminated.

3. If HGP is Preserved, Are the IOUs Obligated to Pay Part of the Preservation Cost?

The Hanford Exchange Energy Agreement (Hanford Extension Agreement) obligates each participant to pay its share of Project Annual Costs, which include all Supply System costs for operation, maintenance and ownership of the project during the year.

The 1974 Letter Agreement obligates each IOU that exercises its option to receive power, to pay its share of the Supply System annual budget (based on the amount of energy each IOU elects to take) for the project during the period of operation and an additional amount for the debt service on the Supply System bonds for relocation of WNP-1.

The Hanford Extension Agreement provides that each month Bonneville will send an invoice to the IOUs for the estimated cost associated with the project. The invoice amount will be computed pursuant to section 4(a) of the Hanford Continued Operation Agreement. Section 4(a) provides that the IOUs are to pay each month one-twelfth of the Supply System's total annual operating expenses (less debt service) and the Supply System's estimated steam expense for the coming month. An adjustment is made to account for the difference between actual and estimated steam expenses.

The Hanford Continued Operation Agreement defines operating budget as a budget that provides funding sufficient to meet anticipated Supply System cash flow and total funding requirements for HGP. The cost of preserving the HGP facilities for a possible restart of the N-Reactor would be part of the total annual operating expenses as included in the HGP operating budget during the period of operation.

The Hanford Extension Energy Agreement states that a company will be relieved of its obligation to make payments only to the extent such payments are actually made by another company to whom energy is transferred. Therefore, it would appear that the two IOUs that exercised their option to receive power would be obligated to pay 14 percent each of the HGP preservation costs. They could be relieved of this obligation only if their payments are actually made by another IOU to which the entitlement to HGP energy has been transferred. The IOUs that did not exercise their option to take power would not be obligated to pay preservation costs.

However, if the N-Reactor is permanently shut down, and the Supply System wishes to preserve the power generating facilities for use with a new steam source, this preservation cost would not be part of the "HGP" budget as there is no "HGP" without the N-Reactor.

4. Who Owns HGP After 1996?

Upon termination of the Exchange Agreement, the Supply System continues to own the HGP facilities, as it always has, and would have the right to dispose of power generated by such facilities as it sees fit, subject to Section 9 of the Hanford Exchange Agreement which states:

> "Ownership of the Project shall be and remain in the Supply System at all times during the term of this agreement except that the government, subject to congressional authorization, has the option to acquire the project and all assets associated with it at no cost to the government at the time of termination of this agreement provided all liabilities and obligations of the Supply System connected with the project have been satisfactorily discharged or assumed in writing by the government."

Clearly then, while the Supply System would be the owner of the facilities after 1996, the government has a right to obtain the facilities from the Supply System at no cost.

Since Congress must authorize the government's acquisition of the HGP facilities, Congress would determine the particular agency responsible for the operation of HGP and any changes to existing law necessary to accomplish the acquisition.

5. If the Supply System Elects to Construct an Alternative Source of Steam, Does It Require DOE's Permission?

Article 9 of the Steam Agreement states that any agreement entered into by the Supply System for the construction of modifications and equipment and facilities within the NPR Security Area shall be subject to written approval of the DOE. Therefore, as long as the alternate steam source is constructed outside of the NPR Security Area, it appears that DOE's approval would not be required.

However, the land lease agreement between the Supply System and DOE allows DOE to terminate the lease if the Supply System uses the leased land in a manner not in substantial compliance with the covenants and purposes of the lease. Therefore, to avoid any argument that the Supply System's use of the land for a new steam source was not in substantial compliance with the covenants and purposes of the lease, the Supply System, as a practical matter, ought to conform the land lease agreement with DOE to its new use.

6. If the Steam Energy Agreement Between the Supply System and DOE Were Terminated, Would the Supply System Continue [illegible] Rights Under the Land-lease With DOE?

If DOE decides to terminate the Steam Erergy [illegible] (Steam Agreement) (1) due to DOE's "programmatic reasons," or (2) if [illegible] priations are not provided by Congress, then DOE may terminate the Steam Agreement upon 1 year's minimum notice to the Supply System. DOE may also terminate the Steam Agreement by providing "notice as is reasonably practicable for reasons of safety, national security, or reasons beyond the control of DOE."

If DOE terminates the Steam Agreement, then Articles 3, 6, and 7 of the land lease may come into effect. Article 3 states that the lease "shall continue in effect until all revenue bonds have been paid or retired, and thereafter shall continue so long as the Supply System continues to own and operate the generating plant." Article 6 states that the DOE may terminate the lease only if the Supply System uses the leased land in a manner not in substantial compliance with the covenants and purposes of the lease or discontinues its use of the land for such purposes or if the Supply System shall become insolvent. Article 6 does not mandate that DOE terminate the agreement; it allows DOE to terminate at its discretion if either of these two events occurs. Article 7 provides time and procedures for the Supply System to remove its property from the leased land upon expiration or termination of the lease if DOE does not take possession of the facilities.

B. Termination Issues

1. If the Supply System Constructs an Alternative Source of Steam, Would a 6(c) Process be Required Under the Northwest Power Act Before BPA Could Accept Delivery of Power?

If the existing HGP contracts do not give Bonneville a present right to power produced from existing generating facilities with steam from a source other than an N-Reactor, Bonneville's acquisition of a right to such power would be a resource acquisition under the Northwest Power Act if obtained from an entity other than another agency of the federal government.

2. If HGP is Preserved, is BPA Obligated to Pay Preservation Costs?

If HGP is preserved for possible future restart of the N-Reactor, Bonneville and the Participants would be obligated to pay preservation costs. However, under the 1963 Exchange Agreement, section 5(i), the Administrator can direct the Supply System to discontinue operation of the project in whole or in part if the project, the NPR, or a substantial part of either becomes inoperable. Since the N-Reactor is in cold stand-down condition, it is inoperable and section 5(i) would apply. The Administrator must first review studies prepared by an independent consulting engineer retained by the Administrator and approved by the Supply System, before determining that it is not economically feasible to repair or replace the project, the NPR, or any such substantial part.

The Administrative and Operative Agreement between the Supply System and Bonneville, executed in April, 1963, provides Bonneville with the right to approve the Supply System's HGP budgets for acquisition, construction, operation, maintenance, and administration. Therefore, Bonneville could cause a termination of the HGP Project by refusing to approve a submitted budget which contains costs to preserve the project.

If the HGP were terminated, the Supply System could develop a new project if DOE did not acquire the power generating facilities under § 9 of the Exchange Agreement. If the Supply System could obtain financing, the output of such a new project could be offered to Bonneville or any other utility.

If the N-Reactor was permanently shut down and the Supply System wished to preserve the power generating facilities for use with a new steam source, this preservation cost would not be an "HGP" cost and Bonneville would not be obligated to pay such costs.

3. Would Termination of the HGP Create an Event of Default Under the HGP Bond Resolution?

Section 11.1 of the HGP Bond Resolution lists the specific circumstances that are events of default. Termination of the HGP is not one of them. Therefore, termination of HGP would not be an event of default.

However, one of the covenants given by the Supply System to secure the bonds is that it will maintain, preserve and keep HGP project properties in good repair, condition, and working order. Therefore, if the HGP were terminated,

while the bonds were outstanding, and the Supply System failed to maintain and preserve the project properties, it is possible that an event of default could be declared.

In addition, the Supply System has covenanted not to sell or dispose of any project properties without simultaneously providing for the payment of cash sufficient to retire all outstanding bonds. If the HGP were terminated, and the Supply System wished to dispose of the project properties, the same issues that have caused Bonneville to seek a Declaratory Judgment for WNP-1 and -3 projects would be raised. However, the outstanding HGP bonds will mature in 1996 and may be paid off even sooner. Therefore, if the HGP were terminated the assets could be sold within a reasonable time after termination.

V. ENVIRONMENTAL REQUIREMENTS AND ISSUES

A. NEPA Strategy

This project would require constructing the portion of the power plant to produce the steam to run the existing HGP turbines. It appears that this type of construction would still be a significant undertaking even with the turbines in place. In addition, based on the potential public interest and controversy which could be associated with this proposal, an EIS would likely be the appropriate level of required NEPA review.

B. NEPA Document Timing

For planning purposes, approximately 18-24 months should be used for NEPA document preparation. The time necessary to prepare an EIS varies based on the degree of effects on environmental resources, the controversy surrounding the use of the resources, the time it takes Bonneville and other involved parties to write the documents, and the time needed for Bonneville to respond to comments received from the public, DOE, and internally.

C. Preliminary Assessment of Potential Environmental Effects

Whether the steam generating facility is coal or gas will affect the type of environmental impacts involved in the project. The potential effects related to the transmission for this project are not considered at this time since there is an existing system. Issues regarding the development of resources and energy sales related to the construction of this facility would need to be considered, but are not discussed in this review. The upgrade of the transmission system and the resource development and energy sales issues would need to be assessed for proper discussion in the environmental documents prepared for this project. The construction of the steam supply facility is the principal undertaking for this preliminary review.

There are some general areas of effects that would be relevant to either facility. The following is a listing of the general effects as well as the possible environmental effects associated with the individual components of this proposal. These listings do not represent all of the impacts because such a listing can not be determined until a more in-depth review is conducted.

1. General

Construction of either type of steam generation would require information for the possible construction site alternatives regarding:

Land-use impacts,
water resource impacts,
fish & wildlife impacts, and
visual impacts.

2. Coal Generation

Impacts of coal storage site(s),
stack emissions to the air,
use of water for injection into stack to reduce emissions,
water rights,
disposal of waste stack water,
disposal of solid wastes, and
noise impacts.

3. Gas Combustion

Stack emissions to the air,
use of water for injection into stack to reduce emissions,
water rights,
noise effects, and
pipeline effects (30-40 miles of pipeline).

Archeological sites,
farmlands,
endangered and threatened species and critical habitat,
recreational resources,
floodplains,
wetlands,
permit for crossing river, and
right-of-way concerns.

4. HGP (Steam turbines)

Effects on the river from using the water for cooling and steam,
fish and wildlife effects, and
noise.

HGP already has a National Pollution Discharge Elimination System (NPDES) permit for the "once through cooling". Therefore no possible effects were listed for a cooling tower. Whether or not a cooling tower would be required for a repowered HGP is unclear.

D. External Agency Coordination

The proposal could require several agencies, State and Federal, to become involved in completing the project. Specific agencies that could have a distinct role in the project are:

Bonneville Power Administration

Bonneville would be responsible for insuring that the NEPA environmental review requirements were met. The following groups would assist in preparing the appropriate NEPA document which, at this time appears to be an EIS.

Washington Public Power Supply System (Supply System)

This Supply System has a wealth of information about HGP and the surrounding area. As owner, the Supply System would have a major role in the preparation of any environmental review document required to complete the environmental process. The Supply System will also be required to obtain environmental permits.

Energy Facility Site Evaluation Council (EFSEC)

The EFSEC is usually responsible for the overall acceptance of projects at the State level. This includes siting, water rights, and final permit approvals. The State of Washington has an environmental effects review process which is part of EFSECs responsibility. This responsibility is connected with implementation of the State Environmental Policy Act (SEPA). A preliminary assessment is that EFSEC would be involved in repowering HGP. The Supply System would be required to obtain this acceptance.

This particular project would require State of Washington, Department of Ecology's review, as part of EFSEC's siting function, of environmental information for the NPDES permit, airshed and emission standards, and the SEPA document preparation and clearance. The Department of Energy usually provides the technical expertise for EFSEC to carry out its facility siting function.

Army Corps of Engineers or Department of Transportation

The Supply System would be required, depending on the location and routing of the gas pipeline, to obtain from one of these agencies a permit for the river crossing.

U.S. Soil Conservation Service (SCS)

The classification of the land (e.g., farmland, wetland, floodplain) would be available from the SCS. If such lands were involved in this project, consultation with the SCS would be necessary.

E. Existing Work That May Be Helpful

A considerable amount of environmental and engineering work has been performed on or near HGP. For example, there has been some environmental work done related to nitrogen oxide (NO_x) monitoring by Battelle, Supply System work for the existing HGP NPDES permit, and an archeological report for the nearby area. Whether such information would be useful if the HGP conversion were to proceed would have to be determined during the initial scoping of the project.

VI. ECONOMIC ANALYSIS

A. Methodology

Bonneville's resource supply curves presently identify 600 aMW of firming of nonfirm potential at a cost less than that of building and operating a new coal plant. This is the approximate size of a converted HGP. Bonneville will evaluate whether or not an HGP combustion turbine (CT) conversion option might be a cost effective way of firming this nonfirm power.

To address this question, a comparison of life-cycle present value (PV) of costs among the three HGP combustion turbine (CT) options, generic CTs and existing California thermal resources was used to determine which alternative, if undertaken, would yield the least increase in system costs.

Existing thermal resources were considered because there are already over 20,000 MW of CTs and boilers in California which are operated only 10 to 20 percent of the time. Whether or not Bonneville can gain access to these resources is uncertain, but it would seem appropriate that an analysis involving firming of nonfirm power should consider the potential use of these facilities.

Using preliminary data, a total life-cycle cost stream composed of preservation costs, capital costs, fixed operations and maintenance (O&M), variable O&M, and fuel was developed for each alternative. This total cost stream was discounted at 3 percent real to determine the present value of costs. Separate cost streams were developed for high, medium, and low load growth projections. The expected value was then calculated by weighting the present value for each load growth projection by 25, 50, and 25 percent respectively.

B. Data Needs

For the HGP repowering analysis the following information is required for each of the four options as well as a new combined cycle reference plant:

(1) Net plant output,

(2) net plant heat rate,

(3) construction cost, and

(4) fixed and variable operating costs.

C. Data Sources

1. HGP Coal Configuration (Option 1)

The Fluor Daniel report (dated January 11, 1988) does not contain sufficient detail and supporting documentation regarding Option 1 for Bonneville to make an appraisal of the suitability of the relevant cost and performance information.

2. HGP Combustion Turbine Configurations (Options 2, 3, & 4)

The source for the information about Options 2-4 was preliminary tables prepared by the Supply System, dated April 27, 1988, titled "HGP Alternatives Selected Combustion Turbine Options." These data are based on the Fluor Daniel report dated January 11, 1988.

3. Generic Combustion Turbine

The cost and performance information for the generic combustion turbine facility, operating in a combined cycle mode, was developed jointly by Bonneville and the Northwest Power Planning Council staff. The information is partially based on Seattle City Light studies of General Electric turn-key operations. The methodology, general assumptions, levels of contingencies, and allocation of costs used for the development of this estimate were reviewed by the Council's Generating Resources Advisory Committee (GRAC).

4. Other Resource Data

Information regarding existing California facilities was obtained from Bonneville databases for the capacity and incremental costs of thermal resources located in that State.

D. Comparability Issue

Although a preliminary economic analysis was completed, it was inconclusive due to the incomparability of HGP conversion data and generic combustion turbine data. The Fluor Daniel report uses a Swiss-made Brown Boveri turbine as the initial stage turbine for the HGP conversion. The generic plant uses a General Electric combustion turbine. In order to properly evaluate the HGP conversion, it is necessary that the design configurations be based on the same turbine operated in the same manner. Consequently, it is not possible to perform an economic analysis with the data available. HGP repowering configurations, as well as a reference plant, need to be developed concurrently. This task is not trivial and will require an engineering study.

VII PRELIMINARY CONCLUSION

HGP should be preserved at least through December 1988 to allow completion of an engineering study and an economic analysis. From a risk management standpoint, it would not be prudent to terminate this potential resource unless there was a substantial indication that it had no value as a power resource.

Preservation through December 1988 will permit the completion of: (1) an engineering study which addresses cost of conversion and capital replacements, (2) a refined estimate of the cost to operate and maintain HGP, (3) a comparable estimate of the cost of a new combined cycle combustion facility, (4) a definitive economic evaluation, (5) a better assessment of the feasibility of contracting for power from existing combustion turbines instead of building a new facility, (6) a firming-nonfirm study, and (7) a more thorough evaluation of critical institutional and legal issues.

It is possible to complete an engineering study and economic evaluation by December 1988, at which time a decision on whether to preserve HGP beyond December 1988 can be made.