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UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

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ENERGY AND MINERALS
DIVISION

JUNE 8, 1981

B-203501


115645

The Honorable Mike Lowry
House of Representatives

Dear Congressman Lowry:

Subject: Bonneville Power Administration's Efforts to Implement the Conservation Provisions of Public Law 96-501 (EMD-81-99)

Your letter of March 23, 1981, asked us to assess the Bonneville Power Administration's (BPA) fiscal year 1981 conservation program--a first-year effort to meet the conservation requirements of the Pacific Northwest Electric Power Planning and Conservation Act (P.L. 96-501, December 1980). In subsequent discussions with your staff, we agreed to briefly

--examine Bonneville's assessment of electricity conservation potentials in the Pacific Northwest Region,

--analyze Bonneville's criteria for determining cost-effective conservation efforts, and

--consider the pace of Bonneville's conservation efforts to determine whether the program should be accelerated.

Based on our review of Bonneville's revised budget submission for fiscal year 1981 and discussions with knowledgeable BPA officials, we believe that Bonneville has made a good faith first effort to implement the conservation provisions of Public Law 96-501. As explained in greater detail on page 4, this has not been an easy task. BPA's revised budget submission includes over $400 million to be invested in conservation efforts over the next 5 years which are designed to save about 300 megawatts (MW) (see enclosure I). This first-year target of 300 MW is moderately ambitious. It approximates 30 percent of the total conservation savings (980 MW) which Bonneville officials currently estimate their programs can save by 1990.

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GAO believes, and Bonneville officials agree, that much more can be done in future years to fully capitalize on the region's conservation potentials--especially in the commercial and industrial sectors. Bonneville's staff is now designing additional conservation efforts to be implemented in future years. They are also working to resolve important policy questions regarding criteria for assessing the cost-effectiveness of conservation measures and for granting billing credits to customers who successfully implement conservation efforts on their own. Bonneville needs to resolve these, and other related policy questions, before it can fully and consistently implement the conservation provisions of the act.

BONNEVILLE'S ASSESSMENT OF REGIONAL CONSERVATION POTENTIALS

In April 1981, Bonneville's staff completed a preliminary resource assessment which estimated the potential savings available from conservation.

The assessment showed that it was technically feasible for the region to conserve over 4,700 MW by 1990. BPA staff estimated that only about 2,800 MW of that total was potentially achievable because of social and institutional constraints such as resistance to change, lack of reliable information, and financial restraints. Bonneville's assessment shows that 980 MW of the achievable potential can be realized through Bonneville's program efforts. The remaining 1,800 MW could be secured by conservation efforts undertaken by regional industries, States and municipalities, and utilities on their own initiative. Bonneville officials caution that their preliminary assessment is based on last year's load forecast and excludes certain service areas which were included in the region for purposes of the act.

Bonneville's preliminary assessment of the region's conservation potential appears to be within the range of other regional assessments made earlier by Skidmore, Owings and Merrill (SOM), the Northwest Energy Policy Project (NEPP), and the Natural Resources Defense Council (NRDC). (See enclosure II.) In certain areas, however, such as residential appliances and industrial metals, Bonneville may be underestimating its own ability to encourage cost-effective conservation.

COST-EFFECTIVENESS CRITERIA

Public Law 96-501 provides that the Administrator and the Northwest Power Planning Council 1/ when planning for resource

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1/An eight member regional power planning council created by P.L. 96-501 to develop a long range power and conservation plan for the Pacific Northwest.

acquisitions under the act shall give priority, in the following order, to all cost-effective measures: first conservation, second renewable resources, third to waste heat utilization, and lastly to other resources. Cost-effective, according to the Act, means such measures or resources forecasted

--to be reliable and available when needed and

--to meet or reduce power demand at an estimated incremental system cost no greater than that of the least-cost similarly reliable and available alternative measure.

The act further provides that such "system costs" shall include quantifiable environmental costs and benefits.

In the absence of a regional power and conservation plan, Bonneville is developing cost-effectiveness criteria for the purpose of planning resource acquisitions, including conservation programs. Bonneville officials told us they plan to complete a policy statement on cost-effectiveness criteria by the fall of 1981. Major issues to be resolved by Bonneville, before such a policy statement can be finalized, include determining (1) how to value "quantifiable environmental costs and benefits" as required by the act and (2) what discount rates to apply when comparing the future costs and benefits of alternative resources. According to BPA representatives, the discount rate is of particular importance because it can have a significant bearing on both the quantity and mix of resources acquired.

Bonneville is using an interim figure of 68 mills/killowatt hour (kWh) to represent "replacement cost" for purposes of initial program development. This figure was derived by assuming that, for the next 2 years, BPA would need to make short-term power purchases to meet new loads, because the short time frame makes it impossible to bring large resources on line. A value of 80 mills/kWh (1980 dollars) was used to represent avoided costs for the first 2 years. For the years thereafter, a value of 65 mills/kWh (1980 dollars) was chosen to represent the cost of new resources brought on line. These values levelized over 25 years yield a comparative value of 68 mills/kWh. As a practical matter, BPA's first-year efforts are far from "pushing" this interim cost-effectiveness criteria. Our review of the fiscal year 1981 budget submission showed that most conservation resources will cost Bonneville less than 30 mills/kWh. In subsequent years' programs, however, the need for a completed cost-effectiveness criteria will become more pronounced as Bonneville starts to consider more costly options such as retrofitting homes with solar hot water heaters and electric heat pumps.

PACE OF CONSERVATION PROGRAM

Bonneville established a conservation division in late 1978 and in 1979 initiated several test and demonstration efforts with

selected utilities. About 2 weeks after passage of Public Law 96-501 in December 1980, Bonneville submitted a revised budget for fiscal year 1981 including a conservation program which expanded on its previous efforts. This first-year effort under the act, estimated to cost over $400 million during the next 5 years, is designed to achieve conservation savings estimated to be about 300 MW, or about 30 percent of Bonneville's self-assessed potential of 980 MW. Bonneville officials are well aware that this initial program will not capitalize on all cost-effective conservation opportunities contemplated by the Act. The 1981 program, they said, was designed to concentrate on proven, high pay-off efforts--primarily in the residential sector, and to a small extent in the commercial sector. Bonneville officials told us that their fiscal 1982 conservation programs now under review would expand on opportunities in the residential sector and will initiate new efforts in the industrial and commercial sectors. BPA representatives indicated that they were hesitant to proceed with commercial and industrial conservation programs in fiscal year 1981 because they lacked adequate end-use studies showing how electricity is consumed by such customers. Bonneville completed an end-use study for the residential sector in July 1980. It plans to complete similar studies for the industrial sector in October 1981 and for the commercial sector in May 1982.

We believe that Bonneville's fiscal year 1981 conservation program constitutes a good faith first effort to implement Public Law 96-501 under difficult conditions. Separately the following factors may not be significant, but taken collectively they have limited Bonneville's effort. In arriving at this conclusion, we note that:

--The fiscal year 1981 budget revisions containing BPA's first year conservation program was submitted by Bonneville within weeks after the act was passed.

--Bonneville's program and financial staffs have been and are faced with developing or modifying three different budgets (fiscal years 1981, 1982, and 1983) in a short time span to comply with sweeping new legislation.

--Bonneville's new Administrator was not appointed until May 1981, and the senior executive position established by the act for conservation and renewable resource development has not been filled.

--The regional power planning council, established by the act to guide Bonneville's activities through development of region-wide conservation and resource plans, did not become active until May 1981.

We believe, and Bonneville officials agree, that much more can be done in future years to comply with the conservation provisions of Public Law 96-501.

ADDITIONAL CONSERVATION POTENTIALS

Bonneville officials are considering a revision to their fiscal year 1982 budget, which, in addition to continuing the efforts started in fiscal year 1981, will propose increased efforts and involve more local entities. We understand, however, that the planned new efforts may not take full advantage of conservation potentials in the industrial sector.

Industry is the single largest user of electricity in the Pacific Northwest, accounting for a little over 50 percent of total power consumption. Bonneville's 15 direct service industrial customers alone account for nearly 35 percent of the total electricity BPA markets. Because these 15 customers consume so much power and because they are directly served by Bonneville, we believe BPA has a special responsibility to assure that they promptly implement all cost-effective conservation measures.

Bonneville's staff is currently negotiating power supply agreements with its direct service customers and is required by the act to offer them new long-term contracts by September 1981. We believe that Bonneville officials should include provisions in these new industrial contracts to establish reasonable timetables for the implementation of all cost-effective conservation measures, and to assure industry compliance with any conservation policies or standards established by the newly formed regional power planning council.

We also noted that, to date, Bonneville's conservation program has paid little attention to regional opportunities for conserving electricity in the utility sector by reducing transmission and distribution losses. Because such losses average about 9 percent of the total electricity produced, we believe that BPA should focus more attention on this opportunity to save power. Bonneville should determine whether the region could benefit from a voltage reduction program such as the one instituted by California's Public Utility Commission to save more than 500 MW by the year 2000.

We continue to believe that Bonneville, in conjunction with volunteering utilities, should undertake some demonstration projects to test the conservation potentials of various innovative rate structures. We mentioned this need for research on conservation-inducing rate structures in our recent report to the Secretary of Energy (see enclosure III). This is an example of the programs Bonneville should consider which could achieve conservation savings without requiring large monetary investments.

Finally, Bonneville needs to complete work on criteria for (1) evaluating the cost-effectiveness of conservation projects and (2) granting billing credits to customers who have successfully implemented their own conservation programs. As additional and more costly conservation efforts are proposed, Bonneville

will need to have completed criteria in place in order to decide whether to acquire such conservation resources. Bonneville's utility customers will be in an uncertain position to deal with BPA and with their own retail customers until these acquisition criteria are clearly stated. Bonneville officials informed us they plan to have a cost-effectiveness methodology finalized by the fall of 1981 and a billing credit policy by January 1982.

We trust this is responsive to your needs and we would be pleased to meet with you or your representatives to discuss any questions you may have.

Sincerely,

J. Dexter Peach
Director

Enclosures - 3

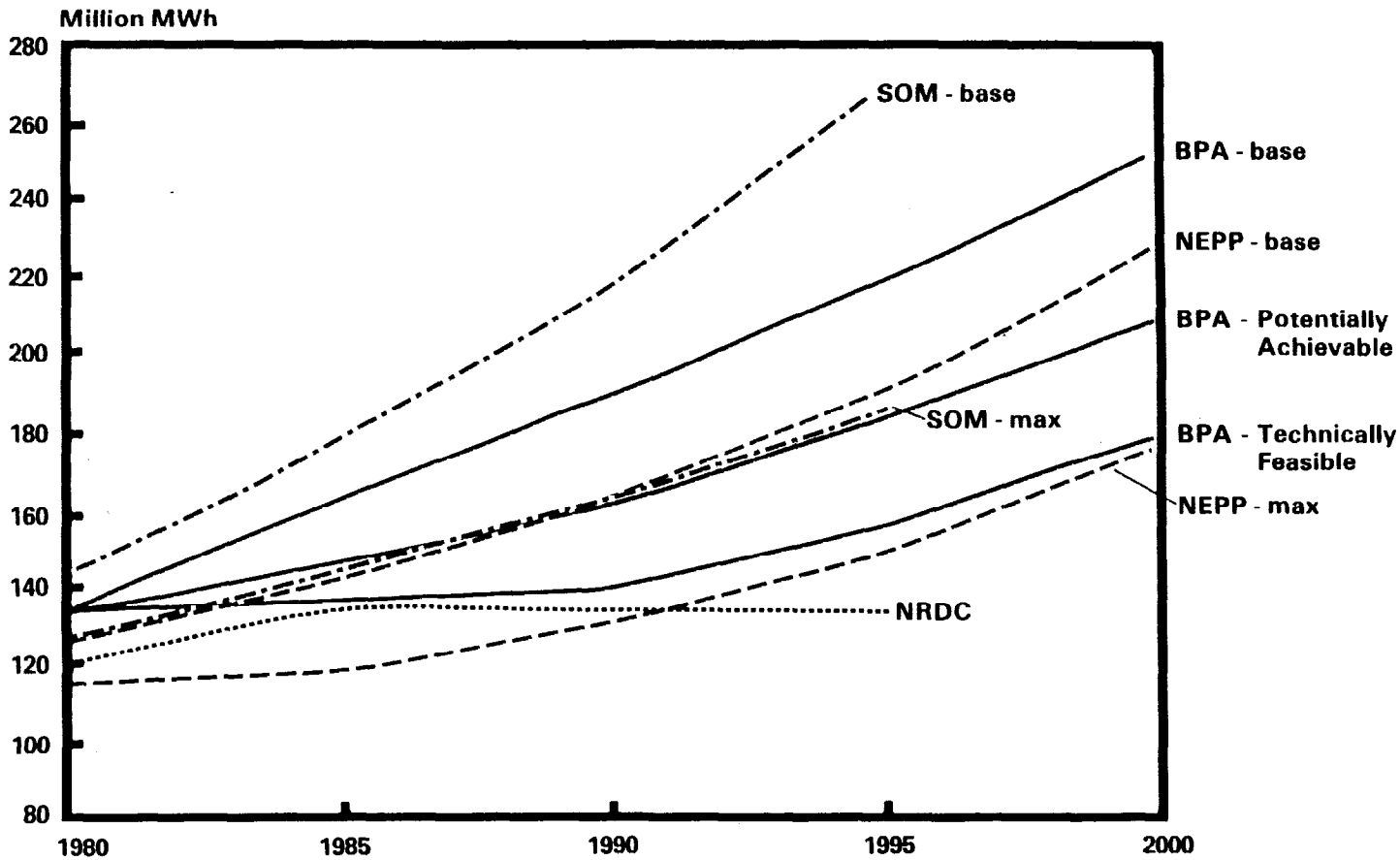
ENCLOSURE I

FISCAL YEAR 1981 BONNEVILLE CONSERVATION PROGRAM

Conservation efforts	Costs (millions)	Projected energy savings (MW)
Home weatherization, water heater wrap, and shower flow restrictors	$255.7	235
Commercial energy efficiency	5.9	41
Street and area lighting incentives	67.5	15
Incentives for new home construction	26.6	13
Solar home builders design	1.7	1/
Pump testing/repair rebate	2.8	1/
Customer system efficiency	.3	1/
Research, development, and demonstration projects	5.8	-
Utility administration, including energy audits	56.0	-
Totals	$422.3	304

1/Less than .5 of a MW

REGIONAL ELECTRICITY SALES
UNDER ALTERNATIVE CONSERVATION SCENARIOS
COMPARISON OF STUDIES



Source: Preliminary Resource Assessment, Bonneville Power Administration, April 1981

ENCLOSURE II

· ENCLOSURE III

UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

ENERGY AND MINERALS
DIVISION

APRIL 8, 1981

B-202535

The Honorable James B. Edwards
The Secretary of Energy

Dear Mr. Secretary:

Subject: Bonneville Power Administration's Efforts In Implementing the Pacific Northwest Electric Power Planning and Conservation Act (EMD-81-67)

Passage of the Pacific Northwest Electric Power Planning and Conservation Act (Public Law 96-501) on December 5, 1980, culminated over 3 years of legislative effort, which significantly expanded the authority and responsibility of the Bonneville Power Administration. During this period, the General Accounting Office (GAO) issued several reports on Northwest power issues, and on legislative proposals to restructure Bonneville. Based on those reports and related work recently performed at Bonneville, we have several observations for your consideration in implementing the act. Our suggestions concern (1) energy planning, (2) power sale contracts, (3) conservation and renewable resource acquisition, and (4) organization and staffing. We are also concluding a review of rates and repayment at Bonneville and will be including our recommendations on these matters in a separate letter.

ENERGY PLANNING

Forecasts by regional utilities indicate the Pacific Northwest could experience power shortages in the 1980s during periods of unfavorable water conditions. Differing opinions exist, however, as to whether such shortages will occur, or how severe they might be. Several reasons exist for continuing disagreements about energy demand projections.

--The methodology for estimating the relationship between energy demand and the many independent variables remains an uncertain art.

--The Northwest's energy data bases, while vastly improved, still contain errors and omissions. The data base on end use consumption in sectors other than transportation is still weak. This results in imprecise estimates of the degree to which oil, gas, and electricity can be substituted for one another.

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ENCLOSURE III

--Even with consensus about the methodology and an improved data base, uncertainties will still exist about future changes in the key assumptions that determine energy demand.

--Uncertainty exists about how anticipated electric rate increases and energy conservation programs will affect consumption patterns.

--Questions also exist about how quickly renewable energy resources can be brought on line and, since there is little historical experience with many of these resources, how such impacts can be captured in the forecast.

The act provides for the creation of a regional council of State representatives and charges it with the responsibility for developing a regional conservation and electric power plan, which includes a 20-year electricity demand and supply forecast. Because the act allows the states up to 1 year to create the council and an additional 2 years to develop a plan, 3 years could pass before a regional demand forecast is developed. In the interim, to meet its own responsibilities, Bonneville is planning to review utility forecasts and to prepare a regional forecast. Such efforts could be useful to the council when established. Given the uncertainties inherent in demand forecasting, we believe that Bonneville should explicitly recognize the risk of planning errors in preparing its forecasts. Bonneville should not limit itself to a single prediction in projecting future power demands. The forecast should include a probable range of eventualities, indicating the high, low, and medium level of demand. This would allow the development of alternative strategies to deal with unexpected shifts in demand.

The complexities of demand forecasting suggest to us that Bonneville should assign a high priority to this effort, and should develop a highly qualified forecasting section with a wide variety of expertise. Bonneville's Administrator should direct top management's attention to developing a credible and independent demand forecast. Every effort should be made to ensure that

--a range of forecasts is developed using the best methodologies available;

--forecasts are based on accurate and comprehensive information, including appropriate end-use data whenever possible; and

--the forecasting assumptions are made explicit, and special attention is given to the possible impacts of anticipated rate increases and conservation programs.

ENCLOSURE III

POWER SALE CONTRACTS

The act directs Bonneville to offer its customers long-term contracts for the sale of electricity within 9 months of the passage of the act. This requirement places significant time pressures on Bonneville's contracting staff which must develop about 150 power sale contracts by early September 1981 for Federal agencies, direct service industries, and public and private utilities.

The following provisions, in our opinion, should be included in these contracts.

--Conservation. The act provides for the inclusion of model conservation standards in the electric power plan to be developed by the council. It also authorizes the imposition of surcharges on rates to customers not implementing appropriate conservation measures. However, the act also allows up to 2 years for plan development after the council is formed. Because these standards will most likely be developed well after the September deadline when Bonneville must make contract offers to customers, Bonneville should make all contracts subject to the standards to be subsequently developed, as well as any surcharges which might be levied.

--Access to records. The act requires Bonneville, upon request from customers, to pay billing credits for conservation activities and for resource acquisition activities which reduce Bonneville's obligation to acquire resources. Because the credits will be related to costs incurred by customers, power contracts should provide Bonneville with sufficient access to customer records to verify such cost data.

In addition, Bonneville is authorized to exchange power with Northwest utilities at "average system costs" for qualifying residential loads. Here again, an access to utility records is required to verify such costs, and to assure that benefits from such exchanges are properly passed through to intended end users.

CONSERVATION AND RENEWABLE RESOURCE ACQUISITION

The act increased Bonneville's bonding authority for self-financing by $1.25 billion and reserved this amount for conservation and renewable resource development. As mentioned earlier, the act mandates these resources as first and second priority for Bonneville when acquiring additional resources. Although currently being revised, Bonneville's initial assessments show that the region could secure about 400 megawatts from conservation and about 500 megawatts from renewable resources by 1985.

ENCLOSURE III

B-202535

Conservation

Bonneville established a Conservation Division in late 1978 and in late 1979 initiated a conservation test and demonstration effort estimated to cost about $6 million. This effort consisted of home weatherization loans, irrigation pump testing, and installing solar hot water heaters and small windmills.

With passage of the act, Bonneville developed a proposed fiscal year 1981 conservation program for implementation during the next 5 years which included nine efforts, estimated to cost $422.5 million, as follows:

	(Millions)
Home weatherization, water heater wrap, and flow restrictors	$255.7
Commercial energy efficiency	5.9
Street and area lighting incentives	67.5
Incentives for new home construction standards	26.6
Solar home builders design	1.7
Pump testing/repair rebate	2.8
Customer system efficiency	.3
Research, development, and demonstration projects	5.8
Utility administration, including energy audits	56.0
Total	$422.3

The above activities are described by Bonneville as its first phase efforts in implementing the conservation provisions of the act. They were selected because of their identified potential for obtaining substantial savings.

We are aware of the short time frames within which Bonneville developed this early effort and realize that revisions or additions may be made as better information is collected and program needs are further defined. We do, however, have observations that may be useful to Bonneville in considering future program revisions. We noted that activities for the commercial sector appear to be modest and there are no efforts aimed at the industrial sector, which is the single largest user of electricity in the Pacific Northwest, using a little over 50 percent. The 15 direct service industries served by Bonneville alone account for nearly 35 percent of the total electricity it markets. Bonneville is undertaking an industrial end-use study, scheduled to be completed in October 1981, of Northwest industries which should provide a basis for designing industrial conservation program efforts. The study is determining industrial energy uses; potential for cost effective electricity conservation within the industries; maximum regional conservation potential; and the financial, institutional, and technical barriers to conservation.

ENCLOSURE III

We believe every effort needs to be made to assure that conservation opportunities in the industrial sector, including Bonneville's direct service customers, are identified as soon as possible and program efforts aggressively launched as soon as possible. In addition, Bonneville should develop a system for monitoring the rate of progress by customers in implementing conservation efforts. This will provide Bonneville with information required to evaluate program effectiveness, design new program efforts, and impose any rate surcharges provided for under the act, should the regional council decide to grant this authority.

In a related area--rate design--we observed that considerable uncertainty and disagreement exists among Bonneville staff, wholesale customers, and various end-user groups on the merits of using alternative rate structures to encourage conservation. The act requires the regional council to prepare, in consultation with Bonneville and others, a report with recommendations on use of such rate structures. To help provide empirical data for the council's use, we believe that Bonneville, in conjunction with volunteering utilities, should conduct a series of demonstration projects to evaluate the use and impact of a variety of conservation-inducing rate structures.

Renewable resources

With respect to renewable resource acquisition, Bonneville did not have a program effort underway prior to the new act. Bonneville's fiscal year 1981 budget contains the following estimates for renewable resource power acquisition.

Fiscal year	Millions of dollars
1981	$ 5.8
1982	12.6
1983	23.5
1984	34.7
1985	58.1

Staff are currently preparing guidelines and procedures for acquiring the power output from or directly sponsoring the development of individual renewable resource projects. With respect to the budget amounts shown above, Bonneville officials caution that the speed with which renewable resources are developed, or power acquired, will depend on (1) how fast sufficient staff capabilities are acquired to analyze and process individual renewable projects and (2) the time needed to comply with environmental requirements. We were informed that if an environmental impact statement is required, 21 to 33 months would be needed to prepare the statement.

To assure that renewable resources make a contribution to the region's power resources as soon as possible, Bonneville management should make every effort to streamline and finalize acquisition procedures and guidelines.

ORGANIZATION AND STAFFING

Since 1937, Bonneville's major role has been that of a distributor and marketer of Federal power. Consequently, the agency has been organized and staffed to construct transmission lines and wheel Federal electric power to customers. The new act significantly expanded Bonneville's responsibilities in energy planning, and for the first time provided it with broad purchase authority to meet regional power needs. The act strongly emphasizes conserving electricity and developing renewable resources by making these activities Bonneville's first and second priority when acquiring new resources. Additional emphasis is provided in the act by directing the Bonneville Administrator to establish an executive level position for conservation and renewable resource development. To assure the effectiveness of the position, it should be placed sufficiently high enough within Bonneville's organizational structure, possibly reporting directly to the Administrator, to assure the priority emphasis intended by the act.

Bonneville recently was granted authority to increase its ceiling by 34 employees in fiscal year 1981 and 83 employees in fiscal year 1982 to implement the new responsibilities placed upon it by the act. With a new legislative mandate, increased staffing, and a new Administrator, this seems like an opportune time for the Department, in conjunction with Bonneville, to comprehensively examine Bonneville's organizational structure. This study should thoroughly examine organizational alternatives, program options, priorities, and funding levels.

We would appreciate your comments, and those of the new Bonneville Administrator, when appointed, on the above observations. Should you or the new Administrator desire, members of my staff and I stand ready to discuss the above matters.

Sincerely yours,

J. Dexter Peach
Director