DOCUMENTATION

FOR

FINAL

REVENUE REQUIREMENT STUDY

Volume 1

Part 2 of 2

PREPARED BY

BONNEVILLE POWER ADMINISTRATION

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CHAPTER 1

FUNCTIONALIZED REVENUE REQUIREMENTS

Purpose: To determine Bonneville Power Administration's (BPA) annual functionalized revenue requirements. On the first of the tables for FYs 1997, 1998, 1999, 2000, and 2001, functionalized revenue requirements are stated in an income statement format. The second table for each year determines the minimum required net revenues and presents the functionalized cash flows resulting from revenue requirements.

Method:

Functionalized Revenue Requirements Table (Income statement format) - A more detailed description of the following line items is included in Section 4.1 of the Revenue Requirement Study. Operating expenses (lines 1-18) include BPA, Corps of Engineers (COE), U.S. Bureau of Reclamation (BOR), and United States Fish and Wildlife Service (USFWS) operation and maintenance expenses, including the Colville Settlement Act payments to the Confederated Colville Tribes (lines 2-3); short-term purchases of power and storage services (line 4); acquisitions of energy resources to meet BPA loads, e.g., Cowlitz Falls and Idaho Falls (line 7); annual expenses of nuclear project capitalized contracts (lines 8-11), and Eugene Water and Electric Board (EWEB) conservation financing (line 12); gross expenses for the Residential Exchange Program (line 13); the expense portion of BPA's funding for fish and wildlife protection, mitigation and enhancement pursuant to Section 4(h) of the Northwest Power Act; and amortization of fish and wildlife, reflecting the annual write-off of capitalized investments (lines 14-15); the expense portion of BPA's energy conservation program (excluding EWEB conservation financing) and the annual write-off of BPA capitalized conservation investment (lines 16-17); and annual straight-line depreciation for BPA, COE, and BOR plant-in-service (line 18).

Federal interest expense is calculated on appropriations granted by Congress for capital investment purposes (COE, BOR and pre-Transmission System Act BPA) (line 22). Interest expense for bonds that BPA issues to Treasury is calculated and reduced by the interest income on BPA's cash reserves (lines 23-24). The gross interest expense is reduced by the capitalization adjustment and the BPA Allowance for Funds Used During Construction (AFUDC) (lines 25-26). The capitalization adjustment, a non-cash expense, is the annual recognition of the write-down in principal resulting from the BPA Appropriations Refinancing Act (See Chapter 9 of this document).

Total planned net revenues (lines 29-31) are included to ensure coverage of planned amortization payments and revenue financing requirements (minimum required net revenues) and to meet the Administrator's risk mitigation policy (planned net revenues for risk).

Functionalized Cash Flow Table

Cash from Current Operations: Minimum required net revenues (line 2) is the amount necessary to ensure that cash from operations is sufficient for planned amortization payments in each function (the amount of planned amortization payments to Treasury exceeding expenses not requiring cash [depreciation and amortization of conservation and fish and wildlife investments (lines 3-5)]). Capitalization adjustment (line 6) is the non-cash component of interest expense from the write-down in principal resulting from the refinancing of capital appropriations. Capacity ownership accrual revenues (line 7) are the annual revenues (non-cash) recognized from the FY 1995 lump sum receipts from sale of AC Intertie capacity.

Cash Used for Capital Investments: Investment in utility plant (line 11) is the increase in investment for additions to plant for BPA, COE, and BOR and for BPA construction work in progress (CWIP). Investment in conservation (line 12) and fish and wildlife (line 13) is the annual capital outlays for these intangible assets.

Cash from Treasury Borrowing and Appropriations: The increase in long-term debt (line 16) is the annual increment in bonds that BPA issues to Treasury to fund BPA plant-in-service and CWIP, BOR and COE investments that BPA plans to direct-fund, and BPA conservation and fish and wildlife investments, including amounts that may be necessary to finance CWIP. Repayment of long-term debt (line 17) is planned amortization of bonds issued to Treasury. Increase in Congressional capital appropriations (line 18) is projected annual appropriations for capital investment purposes to fund the Federal Columbia River Power System (FCRPS) portion of new COE and BOR plant-in-service that BPA is not direct-funding with bonds issued to Treasury. Repayment of capital appropriations (line 19) is planned amortization of investment associated with the COE, BOR and (pre-Transmission System Act) BPA.

Application of Methodology: The methods used to functionalize operating expenses are documented in Chapter 4 - Functionalized Expenses. Depreciation is functionalized according to its associated investment. Interest costs are calculated in the separate generation and transmission repayment studies. AFUDC functionalized to transmission is in association with the types of projects that carry over in BPA's CWIP balances from one year to the next. AFUDC functionalized to generation is associated with BPA's direct funding of COE and BOR power-related capital projects (see Chapter 4 for AFUDC). The interest income credit on BPA's cash reserves is functionalized based on the adjusted cumulative net positions for the previous year from the separate accounting analysis. (Adjustments are made to net positions for major cash flow activities outside the scope of

the separate accounting analysis and the functionalized cash flow - see Chapter 6.) The total functionalized expenses are the sum of annual expenses in each function that must be recovered by revenues in each function.

Minimum required net revenues are determined in the Functionalized Cash Flow Tables as the amount of planned amortization payments to Treasury and revenue financing requirements that exceeds depreciation/amortization of conservation and fish and wildlife investments. Planned net revenues for risk are functionalized entirely to generation. See Revenue Requirement study (WP-96-FS-BPA-02), Chapter 4 - FY 1997 - 2001 Revenue Requirements.

In the Functionalized Cash Flow tables, the annual change in net position is cash provided by current operations (line 8), less cash used for capital investments (line 14) and less net cash from Treasury borrowing and appropriations (line 21).

REVENUE REQUIREMENTS
FY 1997

REVENUE REQUIREMENTS
FY 1998

REVENUE REQUIREMENTS
FY 1999

REVENUE REQUIREMENTS
FY 2000

REVENUE REQUIREMENTS
FY 2001

CHAPTER 2

SEGMENTATION OF TRANSMISSION REVENUE REQUIREMENT

Purpose: To segment the components of revenue requirements in the transmission function in order to identify the cost of each transmission service provided by the Federal Columbia River Transmission System (FCRTS). The segmented revenue requirement is the basis for the equitable allocation of costs between Federal and non-Federal classes of service according to their expected usage of the system. See Transmission Rate Design Study (WP-96-FS-BPA-06).

Method: The components of the transmission revenue requirement, as identified in Table 1 - Functionalized Revenue Requirement, are individually segmented to the appropriate transmission services (segments). BPA Operations & Maintenance (O&M) functionalized to transmission is separately segmented to lines and substations, recognizing the distinct characteristics of operations and maintenance for these facilities. COE and BOR O&M functionalized to transmission is segmented prorata according to average gross investment. Transmission depreciation expense is calculated from the gross line and substation investment in each segment. Transmission interest expense and planned net revenues are segmented according to the average net transmission plant for each segment.

Application of Methodology: BPA transmission O&M (see Chapter 4 - Functionalized Expenses) is segmented in three steps. In the first step, transmission Research & Development (R&D) and wheeling services expenses are deducted from total transmission operation expenses. Transmission R&D is then segmented to Network to correspond with the general benefits expected from those activities. Wheeling services expense, the cost of

customer maintenance of BPA facilities and for BPA to lease facilities or pay wheeling charges to deliver power to customers not directly linked to the FCRTS, is segmented to the specific transmission services involved. Identification of specific services is made from an examination of the contracts and accounts and is based on an analysis of the latest operating year's payments. In the second step, maintenance and remaining operations expense are divided between lines and substations according to a 3-year historical average of that split. In the third step, operations and maintenance for lines and substation are then segmented according to the 3-year historical averages of O&M for lines and substations by segment. See Segmentation Study, WP-96-FS-BPA-03, Table D.

BPA depreciation is segmented in two steps. In the first step, BPA transmission depreciation is calculated for each segment from the gross investment for both lines and substations (see Chapter 5 - Functionalized Investment Base). In the second step, general plant transmission depreciation is prorated to the segments based on their depreciation expense.

COE and BOR O&M at the individual project level is segmented prorata according to the average gross project investment (see Chapter 4). Depreciation is also calculated at the individual project level in proportion to segmented gross investment (see Chapter 5). BOR transmission general plant depreciation is then prorated to BOR segments based on the depreciation expense in those segments.

The transmission net interest expense (line 5, Table 1 - Functionalized Revenue Requirement) and the planned net revenues (line 30, Table 1) are prorated to the remaining segments based on the average net plant investment in those segments (see Chapter 5). The Southern Intertie net plant is adjusted to remove the balance of the unearned revenues associated with non-Federal capacity ownership.

CHAPTER 3

GENERATION REVENUE REQUIREMENT BY RESOURCE POOL

Purpose: To associate the components of the generation revenue requirement with each FCRPS resource pool.

Method: Generation costs, as identified in Table 1 - Functionalized Revenue Requirement, are assigned to the resource pools primarily by direct identification, related to the rate development requirements of the Northwest Power Act. Exceptions are net interest expenses and planned net revenues, which are first split between conservation and the remainder of generation by the use of equivalent annual costs (defined below). The generation portions are then divided between the Federal Base System (FBS) and BPA generation programs based on average net investment.

Application of Methodology: FBS Resources are COE, BOR, fish and wildlife, net-billed and balancing (short-term) power purchase costs. Operations consists of COE and BOR operations expense, and expenses for BPA operating programs: fish and wildlife, upstream benefits, and PNCA interchange costs. Maintenance is COE and BOR maintenance expense. The nuclear project capitalized contract expense is also part of the FBS with the exception of WNP 3 investor owned utility (IOU) settlement costs. Depreciation is COE and BOR depreciation expense, and the annual (accrual) amortization of BPA fish and wildlife investments. FBS costs also consist of net interest expense and planned net revenues allocated to the FBS based on COE, BOR and BPA fish and wildlife average net investment.

Exchange resources are the gross IOU and public utility costs of the residential exchange program (see Chapter 4 - Functionalized Expenses).

New Resources consists of the cost of long-term power purchases acquired by BPA under the Pacific Northwest Power Act, including the capitalized contract obligations for power from the Idaho Falls and Cowlitz Falls Hydro Projects.

Conservation consists of the conservation costs from Table 1 (Functionalized Revenue Requirement), EWEB conservation financing programs, the billing credits program and the net interest expense and planned net revenues allocated to conservation by the equivalent annual costs.

Other Generation is the remaining BPA O&M functionalized to generation and the depreciation associated with generation investment in the Dittmer control facilities and the general oversight of the FCRPS. It also consists of the generation portion of net interest expense and planned net revenues allocated to other generation based on BPA average net investment.

Equivalent annual costs, used to prorate net interest expense and planned net revenues between conservation and the remainder of generation, are calculated as levelized principal and interest payments (mortgage basis) using completed plant and projected additions. A weighted average interest rate is used for the historical plant and projected interest rates for additions. The proration is based on the sum of all calculated proxy-payments for COE, BOR, and BPA plant and BPA fish and wildlife investment (generation) and all BPA conservation investments (conservation). The generation portion is then allocated between FBS and other generation based on average net plant investment.

CHAPTER 4

FUNCTIONALIZED EXPENSES

Purpose: To functionalize the expenses that are the basis for cost recovery in determination of generation and transmission revenue requirements for the rate approval period.

Method: All expenses recovered through BPA's rates must be functionalized between generation and transmission. Residential Exchange and Purchase Power expenses are directly identified as generation expenses. Operation and maintenance expenses are functionalized according to their intended activities (either in association with related functionalized investment or through an association with specific accounts or areas of accounts in the Federal Energy Regulatory Commission Uniform System of Accounts [FERC accounts]). Interest expense is functionalized in the separate repayment studies for generation and transmission.

Application of Methodology: Expense program levels are functionalized according to the nature of the intended activities of the programs. Expense program levels are examined and associated with FERC accounts. The Planning Council costs are functionalized to generation in association with the corresponding BPA activities of resource planning and fish and wildlife protection. The Power Marketing program is functionalized between generation and transmission based on the relative weight of the direct historical three-year averages of generation and transmission expenses in that program. Power Scheduling was functionalized between generation and transmission based on an analysis of the number of FTE involved in scheduling.

COE and BOR O&M is functionalized based on average gross investment at the individual project level.

Purchase and exchange power, as acquired resources, are functionalized entirely to generation. However, for rate development purposes, the residential exchange program is functionalized according to the characteristics of the costs of the participating utilities, but this is not a cost recovered through FCRTS revenues.

Depreciation expense, calculated using the straight-line method, is functionalized according to the associated investment used in the calculations. See Chapter 5 - Functionalized Investment Base.

Interest expense is calculated in the separate repayment studies for generation and transmission, using the functionalized capital appropriations and BPA revenue bonds issued to Treasury at individual interest rates. The AFUDC functionalized to transmission is associated with the types of transmission construction and replacement projects that are carried over from one year to the next in BPA's CWIP balances. AFUDC functionalized to generation is associated with BPA's direct funding of COE and BOR power-related capital projects.

See Chapter 6 - Projected Cash Balances / Interest Credit for functionalization of the interest credit on cash reserves.

BPA Allowance for Funds Used During Construction (AFUDC)

Purpose: To forecast BPA's annual interest costs that will be capitalized as AFUDC.

Method: AFUDC is calculated outside the repayment program and studies. To compute AFUDC, the forecasting model tracks two separate variables: (1) the average balance of construction work in progress (CWIP); and (2) the weighted-average interest cost on BPA revenue bonds issued to Treasury. The weighted-average interest rate is applied to 60 percent of the average CWIP balance to generate the annual estimate of AFUDC.

Application of Methodology:

Average CWIP Balance - To the actual FY 1994 ending CWIP balance is added the previous year's AFUDC and the unadjusted transmission construction program outlays that provide the raw data in support of the BPA budget formulation and PIP processes (see Chapter 8 - Projected Bonds to Treasury, Crosswalk: Obligations to Outlays to Plant-in-Service). New transmission plant-in-service is then deducted. This computation of outlays in and plant-in-service out provides an estimate of year-end CWIP balances. The average CWIP balance for a year is the average of the beginning and ending CWIP balances.

AFUDC CWIP Principal - Not all of the CWIP balance is used in calculating AFUDC. BPA performed an analysis of detailed historical accounting ledgers and found that, on average, 60 percent of BPA's CWIP balance was used as the principal for computing AFUDC; some equipment and work orders with balances under $10,000 are excluded. Therefore, the model uses 60 percent of the average CWIP balance as AFUDC CWIP principal.

AFUDC Interest Rate - The interest rate for calculating AFUDC is the weighted-average interest rate on BPA's outstanding revenue bonds as of the end of the previous fiscal year. The model tracks the projected new bonds and their forecasted interest rates, and the amount and interest rates on bonds planned to be amortized to project the cumulative bonds outstanding and the annual weighted interest cost.

AFUDC - BOR and COE Direct Funding

Purpose: To forecast annual interest costs associated with BOR and COE projects directly-funded by BPA that will be capitalized as AFUDC and to forecast the associated plant-in-service.

Method: AFUDC is calculated outside the repayment program and studies. To compute AFUDC, the funding of each outlay for each project is separately tracked from the year the outlay is made to the year of energization as plant-in-service. The annual rate for calculating the AFUDC is the same rate as the BPA AFUDC rate. The plant-in-service for each project is the sum of the outlays and all associated AFUDC.

Application of Methodology: For each project, the individual outlays accrue interest at the rate of 1/2 year for the year of the outlay, 1/2 year for the year of energization, and a full year for any years in between. Where outlay and energization occur in the same year, no AFUDC is calculated. The effective interest rate is the weighted-average interest rate on BPA borrowings as of the end of the previous year. Plant-in-service is the sum of all outlays for each project and the associated AFUDC. The plant amounts are included in the BOR and COE investment and depreciation calculations in Chapter 5 - Functionalized Investment Base.

CHAPTER 5

FUNCTIONALIZED INVESTMENT BASE

Purpose: To document the development of the FCRPS investment base by function and transmission segment. The investment data are the source of depreciation calculations and provide input into the separate repayment studies.

Method: The FCRPS plant investment is functionalized and segmented, then depreciated, by agency. The investment information is separately prepared for the COE, BOR, and BPA. BPA conservation and fish and wildlife investments are also part of this analysis. See Segmentation Study (WP-96-FS-BPA-03).

BPA general plant is separately analyzed to identify the amount of BPA investment functionalized to generation and transmission.

All investment is depreciated using the straight-line method.

Application of Methodology: Historical investment data are taken from plant investment records and supporting documents of FCRPS financial statements. These data are analyzed, and associated with transmission segments and generating facilities for COE and BOR investment.

BPA general plant contains equipment associated with the generation function. To properly identify investment associated with generation, general plant investment is identified according to different types of facilities (communications, supervisory control, buildings, etc.) so each may be functionalized separately according to use. System

Operations in the Transmission Services Group identifies the percentage of usage for the Dittmer Control facilities devoted to generation and transmission.

Depreciation is calculated using the straight-line method. For COE and BOR facilities, depreciation expense from the historical base year is used as the annual increment associated with historical investment. Any additions are depreciated according to the average service lives of the individual projects.

For BPA facilities, forecasted depreciation expense is calculated consistent with the group concept methodology used for plant accounting records. For general plant categories, average service lives incorporate an adjustment for salvage applicable to the individual groups. For lines and substations, this salvage adjustment has been weighted by the groups that compose these facilities, e.g., Substations = land and land rights, structures and improvements, and station equipment. Both historical investment and forecasted additions are depreciated according to their adjusted group life.

BPA conservation and fish and wildlife investments are written-off (amortized) over 20 years and 15 years, respectively.

Projected investments and projected depreciation expenses are accumulated with historical amounts to provide projected cumulative investments and accumulated depreciation for each forecasted year.

CHAPTER 6

PROJECTED CASH BALANCES / INTEREST CREDITS

Purpose: To project BPA's cash balances for the cost evaluation period and estimate the interest income (credits) to be earned on BPA's projected cash balances and on funds to be returned to Treasury. Also to functionalize the interest credit on cash balances, which is an offset to interest expense on long-term debt. This chapter also includes a quarterly forecast of ending FY 1996 financial reserves.

Method:

Interest credits on BPA's projected cash balances: BPA's cash balances, actual and projected, from the Second Quarter Review are used to establish projected from a beginning base for FY 1997. Among other uses, the Second Quarter Review reserve forecast is as an input to the Tool Kit model to project the Treasury repayment probability for the rate period. Added to this is annual incremental cash provided from forecasted net revenues. Using projected interest earnings rates, annual interest income is calculated from projected average annual cash balances. The resulting interest income is applied as a credit against interest expense in rate period revenue requirements and functionalized based on the measurement of the relative contributions to cash balances from generation and transmission net revenues.

Interest income (repayment program calculation): Separately, an interest income credit is computed within the repayment program based on the average cash balance of COE & BOR O&M, interest, bond premiums, and amortization payments calculated for return to Treasury in that year.

Application of Methodology:

Interest credits on BPA's projected cash balances: The ending cash balance for FY 1996 is the starting point to which projected incremental end of year cash is added to estimate the cash balance in each year of the cost evaluation period. FY 1996 incremental and end-of-year cash was based on the latest projections of revenues, expenses and cash flow events available when final rate proposal revenue requirements were determined (BPA Second Quarter Review, May 1996).

For FYs 1997-2001, projected annual incremental cash is derived from annual cash flows generated by revenue requirements (See Chapter 1 - Functionalized Cash Flow, line 23), the current revenue test (See Revenue Requirement Study, WP-96-FS-BPA-02, Tables 10B, 11B, 12B, 13B, and 14B, line 24) and the revised revenue test (id., Tables 16B, 17B, 18B, 19B, and 20B, line 24). They are adjusted for any projected accrual-to-cash timing considerations. The interest earnings rate is the projected weighted average interest rate on outstanding bonds BPA issued to Treasury from the end of the previous year. The interest credit is calculated from the projected average annual cash balance.

Functionalization of interest credits on BPA's projected cash balances: The net position from the separate accounting analysis is used as the basis for functionalizing the interest credit. This measure--revenues less cash outlays and amortization--is adjusted for each year for any cash-related items not incorporated in the calculation of the net positions in the annual functionalized cash flows. The analysis begins with the results of the separate accounting analysis through FY 1995 and incorporates quarterly review estimates for FY 1996. The adjusted cumulative net positions for a given year is used as the basis for the pro rata functionalization of the followings year’s interest credit, e.g., for FY 1997, the interest credit is functionalized based on the adjusted cumulative net position for FY 1996.

Interest income (repayment program calculation): The BPA interest income rates listed in this chapter are calculated and used in power repayment studies to determine an interest income credit. Interest income is computed within the power repayment studies on funds required to be collected throughout each year for year-end payment of amortization and interest on BPA, COE, and BOR appropriations, bonds BPA issued to U.S. Treasury, and COE and BOR O&M. The repayment program assumes the cash accumulates at a uniform rate throughout the year, except for interest paid on bonds issued to Treasury at mid-year. At the end of the year, the cash balance, together with the interest credit earned thereon, is used in the program for payment of interest expense, amortization of the Federal investment, payment of bond premiums, and payment of COE and BOR O&M. For a further explanation of the calculation of the interest credit computed within repayment studies, see Revenue Requirement Study (WP-96-FS-BPA-02), Appendix D - The Repayment Program.

CHAPTER 7

INTEREST RATES FOR TREASURY SOURCES OF CAPITAL AND PRICE DEFLATORS

Purpose: Interest rates on bonds issued by BPA to Treasury and interest rates for COE, BOR, and, prior to 1974, BPA appropriations are used in development of repayment studies and projections of Federal interest expense in revenue requirements. Price deflators are used for developing spending levels in revenue requirements.

Method: WEFA provides projections of Treasury yield curves that BPA uses to calculate interest during construction (IDC) projections on CWIP balances for FCRPS investments funded by appropriations and to project interest rates on bonds issued to Treasury and on appropriated investments as plant is placed in service. WEFA is also the source of price deflators which BPA treats as escalators for purposes of developing spending levels. The price deflators are derived from projections of Gross Domestic Product (GDP). The GDP consists of the sum of consumption, investment, government purchases and net exports and excludes transfers to foreigners.

Application of Methodology: Projected interest rates for BPA bonds issued to Treasury are based on WEFA's yield curve projections of Treasury market rates, plus a 75 basis point markup. The markup estimate reflects statutory requirements that Treasury price BPA bonds at a level comparable to securities issued by U.S. government corporations. The markup estimate reflects the average basis point markup on recent intermediate and long-term bonds issued by BPA.

Interest rates on projected capital investments funded by appropriations are also based on WEFA's projections of Treasury yield curves. The BPA Appropriations Refinancing Act

makes fundamental changes to FCRPS practices for calculating interest during construction and assigning interest rates to principal for these investments. Table 5, Year 1996, is the yield curve used in this rate proposal to execute the refinancing transaction. More specifically, this curve is used to (1) discount the interest and principal payments on appropriations that BPA would have paid in the absence of the Act in order to reset principal amounts and (2) assign interest rates to the new principal amounts. See Chapter 9 of this Documentation Volume for a detailed discussion on implementation of the Refinancing Act. Table 5 curves for future years are used to calculate IDC and assign interest rates for appropriated investment that is projected during the 5 years of the rate period.

The cumulative price deflator used to escalate midyear dollars is derived from the fiscal and calendar year price deflators provided by WEFA. It is calculated as follows:

$$[(FY_1/100) \text{ X } .5] + 1 = \text{Cumulative Price Deflator}_1$$

The fiscal year GDP price deflator for the current year is divided by one hundred and multiplied by one half. The result, when added to one, yields the cumulative price deflator for the first year.

$$[1 + (FY_t/100)] \text{ X Cumulative Price Deflator}_{t-1} = \text{Cumulative Price Deflator}_t, \quad \text{when } t > 1$$

The fiscal year GDP price deflator for the current year is divided by one hundred and added to one. The result, when multiplied by the cumulative price deflator from the previous year, yields the cumulative price deflator for the current year.

FY 1997-2001 spending levels were based, in part, on price deflators from the Summer 1995 WEFA forecast.

CHAPTER 8

PROJECTED NEW BONDS ISSUED TO TREASURY

Purpose: To provide the projected bonds that BPA plans to issue to the U.S. Treasury to finance BPA capital investments and BOR/COE investments to be direct-funded by BPA.

Method: New long-term debt consist of bonds issued by BPA to Treasury reflecting actual and projected outlays for BPA Transmission, Conservation, and Fish and Wildlife programs and BOR/COE investments to be direct funded by BPA during the cost evaluation period. New debt for FY 1996 reflects projected bonds issued. All bonds projected for issuance are entered into the projected portions of the repayment study.

Application of Methodology: Projections for new bonds issued to Treasury in FY 1996 are consistent with BPA's Second Quarter Review and are based on a FY 1996 Borrowing Analysis. New bonds for the remainder of the cost evaluation period (FYs 1997-01) and projected borrowing for the 7(b)2 rate test period (FYs 2002-05) are based on projected BPA capital program outlays. The difference between projected capital outlay and projected borrowing represents the amount by which BPA has proposed to revenue finance its capital investments.

CHAPTER 9

BPA APPROPRIATIONS REFINANCING ACT

Purpose: To describe the BPA Appropriations Refinancing Act (the Act) and to explain its projected implementation in repayment and revenue requirement studies. This chapter also addresses key corrections and refinements to repayment study databases.

BPA Appropriations Refinancing Act

In late April 1996, Congress passed and the President signed the Act as part of an omnibus FY 1996 Appropriations Act. The Act is intended to permanently eliminate subsidy criticisms directed at the relatively low interest rates assigned to historic FCRPS appropriations. This is accomplished by resetting the principal of BPA's outstanding repayment obligations on appropriations at an amount that is $100 million greater than the present value of the principal and interest BPA would have paid on these obligations in the absence of the Act. The interest rates applicable to the reset principal are based on the U.S. Treasury's borrowing costs prevailing at the time the principal is reset. The effective date of the transaction is October 1, 1996. The Act does not affect BPA bonds issued to Treasury, irrigation assistance, or non-Federal projects debt backed by BPA.

The Act includes assurances to ratepayers that the Government will not increase the repayment obligations in the future. It also revises the credits against BPA's year-end cash transfers to Treasury provided by the Colville Settlement Act of 1994.

Subsection (f) of the Act specifies that IDC on appropriated investment placed in service after September 30, 1996, will be calculated using the prevailing one-year Treasury rate. Subsection (g) of the Act requires that investments placed in service after September 30, 1996, be assigned interest rates from the prevailing Treasury yield curve. Both Subsection (f) and (g) effectively override traditional IDC and interest rate assignment policy in RA 6120.2.

Subsection (e) of the Act, "Prepayment Limitations," precludes BPA from repaying more than $100 million of the refinanced principal ahead of due dates during the first 5 years of the Act (FYs 1997-2001). In the 1996 Final Proposal, substantially less than $100 million of the refinanced principal is being scheduled ahead of due dates during this 5-year period.

A copy of the Act is included in Attachment 1 to this chapter. Attachment 2 is Senator Hatfield's floor speech sponsoring the legislation and report language, including a section-by-section analysis of the Act.

Implementation in Repayment Studies: The repayment studies in this final rate proposal reflect a forecast of the Act's implementation. The following steps were followed to implement the Act in this proposal:

I. Determine principal amounts to be refinanced

II. Determine new principal for each investment being refinanced:

A. Adjust interest rates on certain principal amounts to be refinanced

B. Construct debt service stream for each investment to be refinanced

C. Calculate present value of debt service stream for each investment

D. Add a prorata share of $100 million to the present value total determined for each investment in Step 2C

III. Assign interest rates to new principal amounts

IV. Recalculate IDC for investments projected to be placed in service in FYs 1997-2001

V. Reassign interest rates based on the Treasury yield curve to investment projected to be placed in service in FYs 1997-2001

VI. Run repayment studies

See Attachment 4.

The Act specifies that the appropriations principal outstanding at the end of FY 1996 be refinanced on an investment by investment basis. For this purpose, "investment" means principal that has one or more unique characteristics in terms of: FCRPS agency and project, function (generation or transmission), interest rate, in-service year, or repayment period (due date). Attachment 8 shows how principal and interest rates for each investment are changed as a result of the refinancing transaction.

Under the Act, IDC on appropriations construction work in progress balances beginning in FY 1997 are calculated using the prevailing Treasury one-year interest rate rather than the traditional long-term rate defined in RA 6120.2. IDC is capitalized and included in principal for the investment. See Attachment 10 for investment by investment calculation of IDC for projected investments in the FY 1997-2001 period. When the facility is placed in service, the principal is assigned an interest rate consistent with the prevailing Treasury yield curve and the expected service life of the investment. For this rate proposal, yield curve rates to calculate IDC and to assign interest rates to principal when the plant is placed in service are based on the WEFA forecast included in table 5 of Chapter 7.

Additional Notes on Implementation in 1996 Rate Case

Subsection (d) of the Act, "Repayment Dates," indicates that the repayment date for principal refinanced under subsections (b) and (c) may be the same or longer than the repayment periods that BPA set prior to the refinancing transaction. In all cases, repayment periods assigned prior to the refinancing transaction are retained, as reflected in Attachment 9.

Subsection (h), "Credits to the Administrator's Repayment to the US Treasury", provides credits against BPA's cash transfers to Treasury. This provision is associated with payments BPA makes to the Colville Tribes under the Colville Settlement Act. The credits during the rate period are $15.86 million in FY 1997, $16.49 million in FY 1998, $17.15 million in FY 1999, $17.84 million in FY 2000, and $18.55 million in FY 2001.

The credits effectively serve as a source of cash for BPA's payments to the Treasury. As such, in financial statements and in the rate proposal, the credits are treated as a power (generation function) revenue.

Implementation in Revenue Requirements: The Act entails a reduction in appropriations principal to be repaid that is estimated in this proposal at $2,183 million in total. Accordingly, implementation entails an adjustment (reduction) to outstanding appropriations liabilities in FCRPS financial statements. The total change in capitalization is the amount by which outstanding principal is reduced in the refinancing transaction. The capitalization adjustment is determined separately for the generation and transmission functions and is estimated at $1,846 million in generation and $337 million in transmission. The adjustment is recognized annually over the remaining life of the refinanced appropriations, and is included on BPA's income statement as a negative, non-cash component of interest expense and on the statement of cash flows as a reduction in funds from operations (see Chapter 1). BPA developed a schedule of annual recognition that conforms with generally accepted accounting practices and with the expectations of BPA's financial auditors. The schedule for each function is based on the increase in annual interest expense resulting from implementation of the Act, as reflected in Final Proposal FY 1997 current repayment studies' results. As such, $185.6 million in generation and $76.8 million in transmission of the capitalization adjustment is recognized over the 5-year rate period. See Attachment 18.

Attachment 11 includes four (4) tables that show the projected change in principal and interest payments to the Treasury resulting from implementation of the Act. Amortization for the refinanced appropriations is lower largely because repayable principal is reduced, while interest expense is substantially higher because interest rates are raised to prevailing Treasury market levels. Planned bond amortization and interest are affected by the refinancing because of the increase in appropriations interest rates and the highest interest first policy for scheduling repayment. The first 3 pages of Attachment 11 reflect "raw" repayment study results. As such, these results exclude the impact on BPA's interest credit on cash reserves. (The interest credit on cash reserves is calculated outside of repayment studies and is treated as an adjustment to bond interest expense in revenue requirements. See Chapter 6.) Page 4 of Attachment 11 reflects the repayment study results in the first 3 tables, plus the impact (reduction) in the interest credit on cash reserves. Implementation of the Act results in a lower interest credit (causing bond interest expense to be higher) largely because cash from operations is reduced, as noted above. This fourth page reflects the full projected impact of the Act on BPA's planned debt service payments to Treasury.

Attachments To Refinancing Act Section:

1. BPA Appropriations Refinancing Act
2. Senator Hatfield's floor speech and Section-by-Section analysis
3. Transmittal Letter from the Secretary of Energy to the Speaker of the House, September 15, 1994

4. Implementation Steps in 1996 Final Rate Proposal
5. Before Refinancing Transaction, Projected FCRPS Debt
6. IDC calculations for FY 1995-1996 Appropriations CWIP - Refinancing Transaction
7. Examples of Refinancing Transaction
8. Projected Implementation of BPA Appropriations Refinancing Act, Change in Principal Outstanding and Interest Rates Due to Refinancing
    A. Generation
    B. Transmission
9. After Refinancing Transaction, Projected FCRPS Debt
10. IDC calculations for FY 1997-2001 Appropriations CWIP
11. Impact of BPA Appropriations Refinancing Act, Change in BPA Debt Service Payments to Treasury (4 tables)
12. Payments to Colville Tribes/Credits on BPA's Cash Transfers to Treasury
13. Comparison of Yield Curve Forecasts for Refinancing
14. Application of Amortization
15. Projected Treasury Payments
16. Historical Treasury Payments
17. Capitalization Adjustment by Year, by Function
18. Press Release

Key Corrections and Refinements to Repayment Study Databases

Accumulated net property transfers. Since 1978, BPA has transferred about $43 million of assets to Federal agencies outside the FCRPS (net of transfers to BPA). FCRPS audited financial statements have reflected these transfers as reductions to overall outstanding BPA repayable appropriations. Because the transfers had not been identified by asset and applied to reduce specific individual appropriated investments in financial statements, the $41.8 million reduction has not heretofore been reflected in repayment studies. A reduction of $41.8 million to FY 1996 outstanding principal on appropriations has been made to bring repayment data bases into line with audited financial statements. Since the transferred assets were funded by BPA transmission appropriations, the reduction is reflected in the transmission repayment study databases, in particular, principal outstanding on the last appropriation received by BPA (FY 1977, principal of $89,576 million at 6.125 percent interest). See Attachment 19.

Change in procedure for determining repayment periods COE and BOR beginning in FY 1995. Prior to this rate proposal, repayment periods for COE and BOR replacement investments have been established as the period from their in-service year to the year when the original investment (appropriation) is due.

All original investments in the Bonneville project have come due. Consequently, this procedure can no longer be used for the Bonneville project. Appropriations that fund project replacements would need to be scheduled and repaid before the replacements are placed in service and the repayment liability is incurred. As time passes, this problem would compound and occur with other projects.

Before the 1985 rate case, the total annual increments of investment by project were reported to BPA by COE and BOR without identification of initial or replacement investment. These data were normally entered in the repayment system as single obligations with 50 year repayment periods. If the generating units of a project came into service over a period of more than one year, BPA would apportion the investment of the project among the years by the number of generating units which came into service in each year. If there was more than one authorization for a project, for example the Bonneville Second Powerhouse or Grand Coulee Third Powerhouse, then this investment data was reported separately and entered separately using the same logic.

FERC then asked BPA to report replacements separately from initial investment in accordance with RA 6120.2. Since replacement detail was not available for COE and BOR data, the investment in replacements at a given project was assumed to be the difference between the current, cumulative investment and the initial investment in the project. The initial investment was processed as described above. The assumed replacements, were apportioned uniformly over the period beginning with the year following the last initial investment to 1983. These replacements retained the due date of the last initial investment, but were given in-service dates corresponding to the years to which they were apportioned. It was at this time that the due date procedure employed in prior rate filings came into effect.

Transmission plant detail was available at the time by year, but was not identified as initial plant or replacement plant. A set of criteria was established for partitioning the annual investment of each location (transmission line or substation) between initial and replacement. The total initial investment and the total replacement investment of each year were then given a due date based on that in-service year and the useful service life.

To correct this due date assignment problem, repayment periods for COE and BOR replacement investments at a given project have been set at the weighted average service life of all replacements going into service at that project in that year. The procedure is applied to COE and BOR replacement investments that are funded by appropriations and that are in placed in service in 1995 or later.

This new procedure brings BPA practice into close conformance with the repayment period requirements of RA 6120.2. Section 10.d specifies:

> Unless otherwise prescribed by law, each dollar of investment is to be repaid within a period not-to-exceed 50 years. Repayment periods of less than 50 years may be established when the facilities involved have useful life expectancies of less than 50 years. Such shorter repayment periods are appropriate for. . .replacement of power facilities. . . In such cases, the expected useful life of the facility involved generally will be used as the repayment period.

Repayment periods for appropriations that fund FCRPS replacements are to be based on the average service life of the plant.

The new procedure for generation is consistent with the due date assignment procedure for transmission, wherein each appropriation has been given a due date based on in-service date and average service life. Although some transmission bonds have recently been sold with a shorter life, they are never sold with a term that exceeds the average service life of the transmission system.

Finally, the new procedure is also consistent with the BPA Appropriations Refinancing Act, which specifies that appropriated capital investments that were not assigned a repayment period before October 1, 1994, must be assigned a repayment period in accordance with paragraph 10(d)(1) of RA 6120.2. Since the new procedure is based on RA 6120.2 requirements, this change implements the intent as well as the letter of the Act. During this rate proceeding, BPA planned to implement this change regardless of whether the Act were enacted.

Libby plant investment. BPA has determined that the plant investment in accounting records and, therefore, the generation repayment study for the Libby project has been overstated. An adjustment has been made to the original investment and outstanding principal in generation repayment data. In the 1970's, the Corps of Engineers purchased four generators to be installed at Libby, as additions to the four installed as part of the original plant. In the 1980's, one of the four additional generators was installed, but the three remaining were not. All four were erroneously recorded as plant-in-service in 1988. BPA has recorded a reduction in plant-in-service to reflect the fact that only one of the

four acquired generators is in service. This adjustment, supported by BPA's independent auditors, was reflected in BPA's 1995 rate filing. Plant investment previously included $60,616 for all four generators. BPA estimated that the three uninstalled generators cost $40,000, leaving $20,616 as the installed cost of the fourth generator.

Key Corrections and Refinements to Repayment Studies Attachments:

19. Schedule of Federal Investment in BPA Transmission

20. FCRPS Repayments to Treasury

21. FCRPS Investments Funded by Appropriations

22. Summary of Change in Total Investment

CHAPTER 10

CAPITALIZED CONTRACTS AND OTHER LONG-TERM RESOURCE ACQUISITION OBLIGATIONS

Purpose: To determine the amount of third party debt service or payment costs associated with capitalized contracts and other long-term, fixed contractual obligations.

Method: To determine debt service streams for Washington Public Power Supply System (Supply System) Nuclear Projects - 1 (WNP-1), WNP-2, and WNP-3, a bond model specifically developed for Supply System debt is used, and streams are based on the amount of Supply System debt outstanding. Model results are verified by BPA's Nuclear Projects Division staff. Debt service streams for other capitalized contracts are derived from such sources as Official Statements, Agency agreements, Agency contracts, and budgetary data.

The debt service stream which was input into the repayment model for Cowlitz Falls is $1 million per year higher through the rate period than the debt service stream showing on Table 10 of the attached Memorandum on Non-Federal Net Debt Service Forecasts. This is due to the inclusion of the estimated debt service stream for a projected $12 million in additional costs to complete fish facilities. It is expected to be financed in 1996.

The capital improvements for WNP-2 are categorized as “Revenue Financed” and “Debt Financed. As called for in the 10-Year Financial Plan, those assets with lives of 10 years or less are assumed to be revenue-financed. Those with asset lives greater than 10 years are assumed to be debt-financed. Since the Supply System budget does not yet have the detailed information necessary to determine specifically what the asset lives will be for capital improvements for FYs 1997 through 2005, the amount of 10-year-and less and

over-10-year assets has been determined using a 10%-90% ratio. This proportion is based on a study done in 1992 which included tracking each capital improvement for the year and determining its asset life. The total debt service for WNP-2 is the original debt service (Table 2) plus the debt service for capital additions with asset lives greater than 10 years (Table 4). Table 3 shows the total debt service for WNP-2. The tables for the Supply System have been updated since the Supplemental Rate Proposal to reflect a more recent interest rate forecast.

The debt service for the Northern Wasco project is included after 2011. Subsequent to the bond issuance BPA decided to cancel its participation in the project. The debt service will be paid from the construction fund until it is exhausted in 2011.

Application of Methodology: Input the debt service and payment streams into the repayment program and study.

CHAPTER 11

IRRIGATION ASSISTANCE

Purpose: To determine the amount of irrigation construction costs for Federal reclamation projects in the Pacific Northwest allocated to irrigation use that the FCRPS has an obligation to repay. These payments are known as irrigation assistance.

Background: In an effort to encourage settlement of the arid and semiarid lands of the western United States, the BOR was created by the 1902 Reclamation Act to develop water resources for irrigation. The 1902 Reclamation Act provided that irrigators using the reclamation projects had 10 years to repay the construction costs of such projects. Title to the reclamation projects, however, remained with the Federal government even after all construction costs were repaid.

By the 1920s, a 10-year repayment period for irrigators was determined to be economically unrealistic. After several leniency acts and extensions, Congress passed the 1939 Reclamation Act which changed the repayment period on reclamation projects to 40 years after a 10-year development period. Later revisions and project-specific legislation extended repayment periods for most reclamation projects to 50 years after a 10-year development period. Kennewick project, however, has a 66-year repayment period.

Originally, irrigators were responsible for repaying all project construction costs, without interest. However, a by-product of many reclamation projects is hydro-power, and since the reclamation projects did not require all the power they generated for irrigation works, Congress authorized BOR to lease surplus power and use the proceeds to repay part of the costs of the reclamation projects, beginning as early as the Town Sites and Power Development Act (April 16, 1906, ch. 1631, 34 Stat. 116).

The concept of power revenues contributing to the repayment of BOR's multipurpose projects evolved to the current policy, in which power revenues are used to repay that portion of the project construction costs allocated to irrigation use that are beyond the irrigators' "ability to repay." The costs to be repaid by power revenues, known as irrigation assistance, are to be repaid without interest as well. BOR has the responsibility to make the determination of the amount that is beyond the irrigators' "ability to repay" through a farm budget analysis. The results of this analysis are used to establish the irrigators' repayment responsibility. The irrigators, as an irrigation district, and BOR formalize this repayment responsibility in irrigation contracts.

In the Pacific Northwest, the Third Powerplant, Grand Coulee Dam legislation, P.L. 89-448, authorized repayment of the irrigation assistance costs from net revenues of the entire FCRPS. There are, however, limitations on the FCRPS's repayment responsibility. These limitations were added in amendment to the Third Powerplant, Grand Coulee Dam legislation, P.L. 89-561, and apply to reclamation projects, including projects not previously receiving similar assistance, authorized to receive such assistance for which construction was authorized after September 7, 1966. The limitations are:

- The irrigation assistance for such projects is to be paid only from net revenues of the power system, with net revenues being defined as those revenues over and above the amount needed to recover all costs allocated to power, including the cost of acquiring power by purchase or exchange, and previously authorized irrigation assistance;

- The construction of such projects shall be scheduled so that the repayment of the irrigation assistance associated with such projects from power revenues will not require an increase in the BPA power rate level; and

- The total of all irrigation assistance to be repaid from power revenues shall not average more than $30 million per year in any period of 20 consecutive years.

BOR provides BPA with data on the irrigation assistance to be repaid from each reclamation project, and estimates for future additions to such projects. This information is included in the generation repayment study. Because irrigation assistance costs are repaid without interest and BPA repays highest interest-bearing investment first, irrigation assistance is generally scheduled to be repaid in the last year of the repayment period on each reclamation project.

The FCRPS repayment study data has been changed to reflect an adjustment to the irrigation assistance scheduled for payment for the Columbia Basin project, as follows.

Columbia Basin

The original BOR plan for the Columbia Basin irrigation project included development of 1,095,000 acres. To date, BOR has developed approximately half of the projected project acreage (577,419 acres). In the past several years, there has been some doubt whether the second half of the project would be developed. As a result, in 1988 BPA's independent audit firm recommended an adjustment to BPA's financial statements. This adjustment reflected the fact that some of the equipment and plant installed and in use for the first half of the project would also be used by new irrigators in the second half of the project, and therefore a portion of those costs were assigned to the future irrigators of the second half of the project. If the second half were not developed, those costs would likely be reassigned to the first half, would be deemed beyond the irrigators' ability to pay, and would be included in BPA's irrigation assistance amounts for the first half. The auditors therefore recommended that the financial statements reflect an increase of approximately

$67 million to the irrigation assistance on the first half of the project. This $67 million is the auditors' estimate of the portion of the cost of the installed plant and equipment which is allocated to the currently undeveloped area.

This adjustment was not made to the repayment study data previously, since BOR was still considering development of the second half of the Columbia Basin project. BOR explored three alternatives for future development of the project through an Environmental Impact Statement (EIS). The alternatives examined were: full development of all remaining acres of the project; development limited to an additional 87,000 acres; and a no action alternative. A draft EIS was issued in March 1991, with a second draft, which addressed supplemental issues, issued in September 1993.

BOR made the decision in 1994 not to pursue further development of the Columbia Basin, and not to issue a Final EIS at this time. In BOR's response to the BPA budget call memo (See Attachment) they stated for the first time that they do not intend to request funding for the second half of the project unless future conditions change such that continued project irrigation development is warranted. The "irrigation assistance requirements" data provided by BOR, however, does not reflect this decision. Rather, the data includes irrigation assistance payments for the second half of the Columbia Basin project beginning in 2060. Because it has become much clearer that the second half will not be developed, and to bring the repayment studies in line with the financial statements, we have taken the $67 million projected by BPA's auditors and spread it proportionally over the first half of the project. (See Attachment B.)

Boise Project

The irrigation assistance data provided by BOR for the Boise project reflects unsold space in the Cascade and Deadwood reservoirs as a source of future revenues. Previously, BOR

proposed to sell 380,000 acre-feet of conservation pool space in these reservoirs to the State of Idaho. The Memorandum of Agreement between BOR and the State of Idaho was never signed due to the state's objection to the inclusion of language pertaining to endangered species issues. BOR no longer considers the storage space to be available for sale, as BOR is using the space to store water to address salmon issues. BOR anticipates some future adjustment in the irrigation assistance data to reflect this change. (See Attachment A.) BPA is including the data as provided by BOR for the revenue requirement study since it has no basis on which to project revised costs. When BOR adjusts the data, BPA will reflect that adjustment in the revenue requirement study.

Method: Incorporate the payment schedule and the estimates of the amounts due for irrigation assistance as obtained from the Bureau of Reclamation, with modifications to the Columbia Basin project estimates.

Application of Methodology: Input the data into the repayment study.

CHAPTER 12

REPLACEMENTS PROJECTED AFTER THE COST EVALUATION PERIOD

Purpose: To project the amount of additional capital investment necessary to maintain an existing project at its current operating level after the Cost Evaluation Period.

Method: The COE and BOR estimates replacements for each project by service life. BPA uses the Iowa Curve Methodology to forecast replacements for the transmission system.

Application of Methodology: The repayment study incorporates a schedule of Federal investment with the replacements that are expected to occur over the repayment period for existing generation projects and transmission system. This schedule is expressed in midyear dollars for FYs 1997 through 2001 and is based on the amount of investment in the generating projects for the COE and BOR, and the amount of the plant-in-service in the transmission system for BPA through the end of the cost evaluation period.

Transmission Replacements:

The Iowa Curve methodology is used to calculate future replacements for the transmission system. The Iowa Curves are a set of curves with different shapes corresponding to how much of the initial asset survives as a function of time. They are described in the book Statistical Analyses of Industrial Property Retirements by Robley Winfrey, bulletin 125 revised, Engineering Research Institute, Iowa State University. The Iowa Curves are initially used in BPA's depreciation studies, the most recent being dated September 30, 1987. BPA's total plant, catalogued by FERC account and in-service date, was analyzed and the various FERC accounts were assigned to various Iowa Curves and lifetimes (see TABLE 1 - FINDINGS AND RECOMMENDATIONS ON DEPRECIATION EXPENSE, columns C and F).

A corresponding table from Winfrey's book, TABLE 22 - TOTAL RENEWALS FOR TYPE CURVES, tells what fraction of plant represented by a given curve will have to be replaced each tenth-of-lifetime to maintain the initial plant. A data file with the contents of that table accurate to 12 lifetimes has been created for use in calculating BPA's future transmission replacements (see TABLE 22). For each of the Iowa Curves Table 22 will call for replacements equal to about 50 percent of the initial plant in the first lifetime and approaching 100 percent of initial plant in later lifetimes.

Table 22 gives replacement plant in the same physical units as the initial plant. The net investment in plant of any historical year must first be converted to units of physical plant by dividing the investment by an appropriate historical cost per unit plant. BPA's plant cost is converted to quasi-physical units of plant by use of the Handy-Whitman Index. The Handy-Whitman Index provides cost trends for electric, gas, telephone, and water utilities in geographical regions of generally similar characteristics. The Handy-Whitman Index numbers are widely used in the industry to trend original cost records to estimate reproduction cost at prices prevailing at a later date. The cost trends for each of the utilities are further subdivided by type of plant. In particular, the cost trends for electrical utilities include trends for total transmission plant and trends for the major FERC accounts within transmission plant (see table entitled HANDY-WHITMAN INDICES). The trends for individual FERC accounts are used when available. The trends for total transmission plant are used for those accounts for which no specific trend is included.

Surviving transmission plant investment by FERC account and in-service year is obtained from BPA's Plant Investment Section (see years 1940 through 2001 of table entitled PLANT INVESTMENT BY YEAR AND FERC ACCOUNT). The plant investment of each year and account is divided by the corresponding Handy-Whitman number to obtain

plant in quasi-physical units. The quasi-physical plant is then multiplied by factors obtained by interpolating in the appropriate column of Table 22 to obtain quasi-physical replacements for all years from the last year of the Handy-Whitman index through the last year of the repayment period. The resulting quasi-physical units are multiplied by the Handy-Whitman number for the last year of the index for the corresponding FERC account to yield replacement costs in the dollars of that last year. These replacement costs are accumulated by future year and FERC account (see table entitled REPLACEMENTS BY INDIVIDUAL FERC ACCOUNTS).

Gross plant investment data for the cost evaluation period is obtained from BPA's Budget Support (see table entitled COST-EVALUATION PERIOD DATA). This latter plant is first de-escalated to the dollars of the last year of the Handy-Whitman index and then distributed among the various FERC accounts in the same proportions as the total plant of BPA's summary of BPA investment from plant balances as of September 30, 1995 (see years 1997 through 2001 of table entitled PLANT INVESTMENT BY YEAR AND FERC ACCOUNT). Some of the historical plant obtained from the Plant Investment Section will be retired during the cost evaluation period and be replaced with plant funded by amounts obtained from Budget Support. If future replacements were calculated for both, a double counting would occur. Therefore the amount budgeted for a cost evaluation period year is reduced by the amount calculated for replacements for the same year. Future replacements are then calculated for only the remaining net initial investment of that year (see table entitled ADJUSTED PLANT INVESTMENT BY YEAR AND FERC ACCOUNT).

The replacement costs of each future year and FERC account are then accumulated for all FERC accounts and inflated from the dollars of the most recent Handy-Whitman year to the dollars of the rate change year (see the table entitled FUTURE REPLACEMENTS).

Third AC Replacements:

Future replacements on the AC Intertie Facilities are calculated separately so that the contributions made toward those replacements by new Non-Federal Capacity Owners can be properly credited in the repayment studies. For historical plant, the plant investment as of September 30, 1995 in each of the lines and substations composing the AC Intertie System (see LINES and SUBSTATIONS) was apportioned among the years on the basis of the same line or substation data in a recent plant investment file. These investments by year were accumulated for all lines and substations to obtain historical plant investment by year. These annual investments were apportioned among land and the major FERC accounts on the same basis as the total lines and substations (see table entitled AC INTERTIE PLANT-IN-SERVICE).

The cost-evaluation period data for the AC Intertie was obtained **(**see the table entitled Segmentation Summary). The resulting plant data was then processed by the replacement methodology as described above. Those listings which apply only to the AC Intertie follow those for the transmission system. The results are the future replacements for the total AC Intertie and have to be multiplied by the appropriate fraction, 21 percent, to obtain the future contributions required by new capacity owners. These fractional parts, together with the amounts budgeted for the cost evaluation period, are entered into the Transmission Repayment Studies as negative expenses in the Capital Contract Obligation field (see transmission input data in volume 2 of documentation).

Generation Replacements:

The data received from the COE and BOR are expressed in constant year dollars. The COE estimates its replacement costs for each piece of equipment by project, and by expected service life (see Cost of Engineers Estimated Long-Term Replacements by

Average Service Life). Each piece of equipment has a life of 50 years or less as determined by Engineering Studies. A few years ago, Electric Power Research Institute (EPRI) worked with the COE and did a study that confirmed that the replacement years currently in place are proper. For more information on COE replacements, see COE paper entitled "Schedule of Replacement Costs Provided Annually to the Bonneville Power Administration."

The BOR estimates its replacements' costs by project and by expected service life to create a single figure for each service life category (see BOR tables entitled INDEXED ANNUAL REPLACEMENT COSTS BY SERVICE LIFE GROUPS). The BOR's estimated costs of replacements are obtained from two sources: (1) program schedules reflecting a budget based on anticipated need and condition of facilities, and (2) computer printouts covering the long range estimates of replacements. The replacements are a product of the BOR's indexed capitalized replacement investments procedure which provides for replacement of original facilities at current costs based on the latest cost indices. The cumulative reimbursable power investment are distributed into various FERC accounts for input into the replacement study. The latest cost indices are computed by BOR personnel located in the Engineering and Research Center at Denver, Colorado.

In order to incorporate projected replacements into the repayment study, an in-service date is calculated when the replacements for the COE and BOR are to begin. The table entitled WEIGHTED AVERAGE, CALCULATION OF IN-SERVICE DATE FOR COE/BOR PROJECTS shows a method which estimates when a replacement will start. Each project's actual in-service date for each of its respective generating units are observed and a weighted average in-service date for each project is determined by weighting the number of generating units by the in-service years associated with those particular units.

BPA REPLACEMENTS

3rd AC INTERTIE REPLACEMENTS

COE-BOR REPLACEMENTS

CHAPTER 13

RISK MITIGATION AND TREASURY PAYMENT PROBABILITY

13.1. Introduction

Working together in a collaborative effort, BPA and its customers developed the STREAM and Tool Kit models during the 10-Year Financial Plan process. The 10-Year Financial Plan was completed in January of 1993 and was adopted in BPA's 1993 Final Rate Proposal. In BPA's 1993, 1995 and 1996 rate cases, BPA has used the Short Term Risk Evaluation and Analysis Model (STREAM) to quantify operating risk, and the Risk Mitigation Tool Kit Model (Tool Kit) to evaluate BPA's probability of making Treasury payment in full and on time during the rate period. Documentation for the STREAM is contained in the Wholesale Power Rate Development Study (WPRDS). Documentation for the Tool Kit is included in the following pages.

13.2. Treasury Payment Probability

In the Administrator's Record of Decision, 1993 Final Rate Proposal, WP-93-A-02, at page 68, the Administrator indicated the high priority BPA places on making Treasury payments in full and on time during the rate period by adopting the financial policies contained in BPA's 10-Year Financial Plan. Specifically, BPA adopted a 95 percent probability standard of making its U.S. Treasury payments in full and on time for each future 2-year rate period, "absent a determination by the Administrator that the policy should be modified to meet BPA's changing operating environment." Id.

The 1996 rate proposal is for a 5-year rate period consisting of the fiscal years FY 1997 through FY 2001. As previously noted, BPA has adopted a Treasury payment probability standard of 95 percent. There was no consideration in the 10-year Financial Plan,

however, or in previous rate decisions for a probability standard for a period other than 2 years. BPA has thus developed a comparable standard for the 5-year rate period. A 95 percent probability standard for a 2-year rate period implies that there is, on average, a 97.5 percent probability of making the Treasury payment in full and on time in each year of the 2-year rate period. This 97.5 percent comparable standard is statistically derived as the square root of the 95 percent probability Treasury payment probability standard adopted in the 1993 Final Rate Proposal. For the corresponding five-year rate period, the probability standard would be 88 percent, expressed in the formula 97.5 * 97.5 * 97.5 * 97.5 * 97.5 = 88.

A 95 percent Treasury probability standard for a 2-year rate period is thus comparable to an 88 percent probability of full Treasury repayment during a 5-year rate period. These comparable probabilities are summarized below in Table 1.

Table 1: 2-Year, 1-Year, and 5-Year Probability Standards

Treasury payment probability	Explanation	Formula for computation
95.0%	BPA's Financial policy probability for making both Treasury payments in full and on time during a 2-year rate period	N/A
97.5%	payment probability for 1 year comparable to 95% standard for 2-year rate period.	square root of 95%
88.0%	payment probability for 5-year rate period, comparable to 95% standard for 2-year rate period.	97.5% ^5

BPA uses the Tool Kit model to determine the amount of cash for risk that must be included in BPA's revenue requirement to achieve the 95% and equivalent Treasury payment probabilities. The amounts of cash for risk that are required to achieve a

Treasury probability for the rate period roughly equivalent to the 95% Treasury probability standard are shown on the following page in Table 2.

Table 2: Cash Required for Risk at 88 Percent (5-Year Basis)

Year	Cash Required for Risk	Treasury payment probability
FY 1997	$101	98%
FY 1998	101	96%
FY 1999	101	95%
FY 2000	101	94%
FY 2001	101	93%
Rate Period FY 1997 through FY 2001		88%

13.3. Relationship of Policy on Treasury Payment Probability to Cost-Sharing Arrangement with the Administration

Given BPA's current competitive exigency, the Treasury payment probability of 95 percent (or 88 percent per five-year period) has been relaxed, as noted in the testimony of DeWolf, et al., WP-96-E-BPA-014 on the cost-sharing arrangement with the Administration. The arrangement includes a recognition on the part of the Administration that BPA may, to the extent necessary, reduce the probability of meeting its obligation to make its annual Treasury payments relative to the long-term 95% probability standard that was adopted in the Final Administrator's Record of Decision in the 1993 rate case.

13.4. Risk Mitigation Rate Tools

The 10-year Financial Plan included the evaluation and adoption of the program cost deferral and the Interim Rate Adjustment (IRA) as contingent risk mitigation rate tools that could be used to mitigate financial risk in the event that financial reserves fall below a

specified trigger point. Due to competitive pressures, neither an IRA nor a program cost deferral are included in this rate proposal, as noted in the testimony of Arnold et al., WP-96-E-BPA-15. See also WP-96-FS-BPA-02, Section 2.2.

13.5. Relationship of STREAM to Risk Mitigation Tool Kit

The STREAM is used to produce a distribution of anticipated variation in BPA's "annual cash flows at risk." This distribution is an input to the Tool Kit and reflects STREAM's projection of the financial uncertainty surrounding the revenue and expense forecasts used to set rates. The differences in net revenues between the "normal" case and the "surprise" cases reflect the net revenue risk that BPA faces due to the operating risks modeled. By subtracting the "normal" case net revenue result from the results of each of the "surprise" cases, a series of deviations in net revenues (and "cash flows at risk") is developed. STREAM is discussed in more detail in Appendix C to the WPRDS, WP-96-FS-BPA-05.

For purposes of this Final Proposal, BPA has used a STREAM distribution consisting of 1800 observations (of cash flows) representing 300 six-year period scenarios. Each six-year period represents the one-year FY 1996 rate period followed by a five-year rate period representing FY 1997 through FY 2001. For purposes of convenience, the Tool Kit determines the average of the STREAM distribution and the average of each year. This average is referred to as the STREAM bias. One element of BPA's 10-Year Financial Plan states that BPA's rates will be set to recover any inherent downward bias in BPA's expected cash flow distribution. This downward bias is represented in the STREAM bias. The STREAM distribution that has been used in the 1996 Final Proposal is summarized in Table 3.

Table 3: STREAM bias

Year (s)	Number of observations	Adjusted STREAM distribution bias ($Millions)
FY 1996	300	-22.4
FY 1997-FY 2001	1500	-19.8

13.6. The BPA Fish Cost Contingency Fund

A major new risk mitigation tool is the BPA Fish Cost Contingency Fund which comprises expenditures BPA made in the past for nonpower-related purposes. Section 4(h)(10)(C) of the Northwest Power Act directs the Administrator to take credits for fish and wildlife expenditures made by BPA at projects whose costs are not allocated 100% to power. The Fund is comprised of credits that BPA accumulated since enactment of the Northwest Power Act but has not yet applied. An October 24, 1995 letter from OMB Director Alice Rivlin to Sen. Hatfield explains an agreement between BPA and the Administration for BPA's access to these accumulated credits. (The entire text of this letter is provided in an attachment to Chapter 14 of this volume. See also Chapter 5 of WP-96-FS-BPA-02.) BPA has estimated that the fund contains $325 million as of September 30, 1995. The BPA Fish Cost Contingency Fund (FCCF) will provide protection against two kinds of risks, and there are thus two different conditions under which BPA will be able to draw against this fund.

A draft interagency fish mitigation funding agreement, that is also covered in Ms. Rivlin's letter, limits BPA's spending for fish programs to an average of $435 million over the FY 1996 to FY 2001 period. The first risk is that this agreement may be modified by court

actions that result in higher costs. BPA will be able to draw upon the FCCF in the amount that annual costs as ordered by courts exceed the amount in the draft agreement. Any increased costs of this nature will be estimated using the same methodology currently used to calculate the annual amount of 4(h)(10)(C) credit BPA receives. (See DeWolf, et al., WP-96-E-BPA-14, at 3 & 4, and WP-96-E-BPA-69, at 2-7.) While this type of access to the FCCF does indeed reduce the risk that BPA's fish program costs will rise unexpectedly, this is not a risk that BPA has explicitly modeled and assessed quantitatively, so this variety of risk mitigation also has no impact on BPA's quantitative risk assessments (e.g., the calculation of the Treasury payment probability).

The second risk is that adverse hydro conditions in FY 1996 through FY 2001 will increase BPA's power purchase costs or decrease its nonfirm revenue. Access to the FCCF under this part of the agreement serves as an effective risk mitigation tool that can be modeled by STREAM and the Tool Kit, and increases the probability that BPA will make all of its Treasury payments on time and in full. This second type of access is described next in the Overview, Preparation of Parameters, Annual Determination of Benefits, Calculation of the Threshold, and Calculation of the Treasury Payment Probability sections.

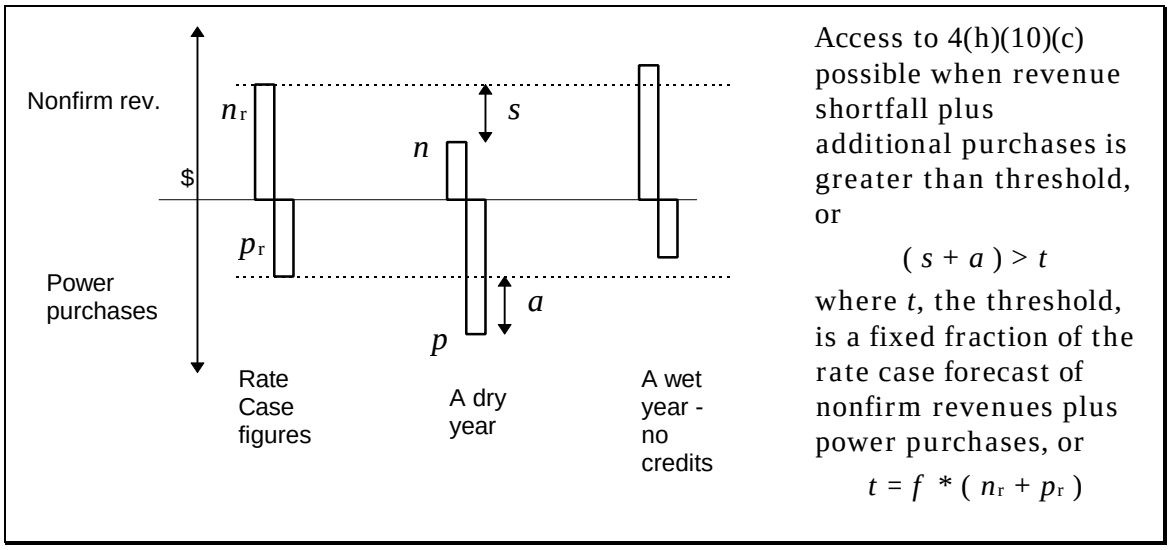
13.6.1. Overview of the Fish Cost Contingency Fund

Director of OMB Alice Rivlin described the adverse hydro access to the FCCF in her letter to Sen. Hatfield of Oregon on October 24, 1995:

> Credits may be used from the BPA Fish Cost Contingency Fund, to the extent that credit balances are available, to defray fish and other water-related costs during the next six years (fiscal years 1996-2001) as follows: (a) for incremental costs resulting from court action which requires changes or additional activities that increase the net annual costs to BPA of the fish and wildlife Plan above the target spending level described earlier; and (b) for additional costs stemming from adverse water conditions, specifically, for the amount by which additional power purchases and shortfalls in non-firm power revenues, combined, exceed a percentage of the sum of those two projected annual levels for 1996-2001 in BPA's final rate case. The specific threshold levels will be determined in a manner that will be predicted to make this funding available 25 to 30 percent of the time during the six year period of this agreement. Use of credits from the Fund shall be made upon application by BPA, with appropriate documentation, that these conditions have been met, certified by the Department of Energy and concurred in by the Department of Treasury and the Office of Management and Budget.

The accompanying figure illustrates how the determination of the size of the annual benefit, if any will be determined under the conditions laid out in Ms. Rivlin's letter. BPA will be permitted to draw credits from the FCCF when any nonfirm shortfall, *s*, plus any additions to power purchases, *a*, that are due to adverse hydro conditions exceed a threshold, *t*. The threshold *t* will be determined as a percentage *f* of the sum of the forecasted power purchases p_r and nonfirm revenues n_r as published in the final 1996 rate filing. There will be a different percentage *f* for each of the 6 years (FY 1996 through FY

2001), and a different threshold *t* for each year. The thresholds will be determined so that this access is to be available not more than 25% - 30% of the time. BPA will determine these fractions, the *f*'s, so that retrospective benefits are available in 30% of the years in a 300-scenario, 6-year STREAM output distribution, as described in the Calculation of the Threshold section below.



Key:

n_r forecasted nonfirm revenue for Year *Y* from final 1996 rate filing

p_r forecasted power purchases for Year *Y* from final 1996 rate filing

n nonfirm revenues for Year *Y* when actual hydro conditions modeled

s shortfalls in nonfirm revenues = n_r - *n*

p power purchases for Year *Y* when actual hydro conditions modeled

a additional power purchases = *p* - p_r

f fraction used to determine annual threshold

13.6.2. Preparation of Parameters

A hydro regulation study is run for eventual use by models run by the Rates staff using the Hydrosim model. The output of this study will be saved, comprising surpluses and deficits for each of the 50 water years for each of FYs 1996 through 2001. These results will be processed by the Load/Resource Analysis Model which makes adjustments to each water year's surplus/deficit numbers to account for the variable amount of load the generating publics can place on BPA. These adjusted surpluses and deficits will then be converted into dollar estimates of nonfirm revenues and power purchases using the pricing logic that the revenue forecasting model uses. These results will be averaged over the 50 water years. The data and code for Hydrosim, the Load/Resource Analysis model, and the load forecasting model's pricing module will be preserved through the end of the rate period for Annual Determination use.

13.6.3. Annual Determination of Benefits

As each hydro season nears its end, probably in August as the Third Quarter Review is being prepared, staff in Generation Supply will insert the actual monthly flows for that year into Hydrosim, using estimates for those months that remain in the year. All other Hydrosim data, and all the Hydrosim code, used in the Preparation stage will be used in this stage also. The surplus/deficit tables will be adjusted by the Load/Resource Analysis Model. The adjusted surpluses and deficits will be priced using the pricing logic and data from the revenue forecasting model. The resulting nonfirm revenues and power purchases resulting will be compared to the base numbers calculated in Preparation. Any differences will be due solely to hydro conditions, since all other data will be the same. The sum of any shortfall in nonfirm revenue and additional power purchases, the "total deviation", will

be compared against the threshold. Any amount by which the total deviation exceeds the threshold will be available to BPA at the end of that year as a credit against the scheduled payment to Treasury.

After the end of the fiscal year, when actual flow data is available for all 12 months, a true-up calculation will be made if the first estimate was off by more than $1.0 million. This may be done around the time of the preparation of the Fourth Quarter Review when the true-up for the annual 4(h)(10)(C) calculation is made. BPA will submit to Treasury a statement of the year-end balance of the Fish Cost Contingency Fund.

13.6.4. Calculation of the Threshold

Six sets of 50 annual amounts of nonfirm revenues and power purchases will be produced from the hydroregulation study, Load/Resource Analysis Model, and pricing module described in the Preparation stage above, one set for each of the six study years (FY 1996 through FY 2001). For each of the fifty water years, a nonfirm revenue shortfall will be calculated by subtracting the nonfirm figure for that year from the average. Similarly, the additional power purchase will be calculated by subtracting the power purchase average from the power purchase figure for that year. The total deviation, that is, the sum of the nonfirm shortfall and additional power purchase, for the 50 water years will be sorted. The sixteenth largest of total deviation will be adopted as the threshold. Thus, there will be 15 years out of 50, or 30% of the years, in which the total deviation exceeds the threshold. The retrospective 4(h)(10)(C) credit due BPA in each of the 50 water years in the hydroregulation study described above can then be calculated and recorded.

13.6.5. Calculation of Treasury Payment Probability

The STREAM model used by BPA for estimating the probability of Treasury payments uses the same set of 50 water years that Hydrosim uses. In each year of its simulations, STREAM prints out the water year it is using. As the Tool Kit calculates the level of reserves, it determines whether any retrospective 4(h)(10)(C) credit is due by looking up the credit calculated in the Calculation of the Threshold above that is associated with the water year STREAM is using for that fiscal year.

13.7. Discussion of Tool Kit

The Tool Kit is a computer spreadsheet model that calculates sequential year-end financial reserve balances for a number of different scenarios (or games). It is used to determine the probability of paying Treasury in full and on time during the rate period. The Tool Kit is also used to calculate the amount of cash required for risk needed to achieve a target probability for paying the U.S. Treasury in full and on time during the rate period. Inputs to the spreadsheet include the STREAM distribution of cash flows, the balance of financial reserves at the start of the first year in the sequence being evaluated, an accrual to cash adjustment, and rate mitigation tools which include cash required for risk, IRAs, and program cost deferrals. As previously noted, however, contingent rate mitigation tools (IRA and program cost deferral) are not applicable for the 5-year rate period starting in FY 1997. In addition, the model uses information concerning the amounts of annual U.S. Treasury interest and amortization that is due during the rate period, as well as the amount of discretionary amortization that is scheduled to be paid during the rate period.

13.8. FY 1997 Start of Year Financial Reserves

BPA's financial reserves consist of the balance of cash in the Bonneville fund and BPA's deferred borrowing balance (which represents capital expenditures which have been temporarily financed with revenues). For purposes of this Final Proposal, the Tool Kit was used to evaluate the Treasury payment probability for 300 5-year rate periods scenarios. For each 5-year scenario, the FY 1997 start-of-year financial reserves balance was derived by the Tool Kit through a probabilistic process. This probabilistic process consists of running the Tool Kit using a six-year STREAM distribution that represents the FY 1996 rate period and the FY 1997 to FY 2001 rate period. The initial balance for each of the 300 scenarios was $196.1 million, the balance of financial reserves on hand as of October 1, 1995. For each of the FY 1996 rate periods, $104.5 million of cash for risk was input. In this way, for each scenario, the Tool Kit derived the amount of financial reserves as of October 1, 1996, the start of the 5-year rate period.

13.9. Minimum financial reserve level

For purposes of running the Tool Kit model and evaluating BPA's probability of making its Treasury payments in full and on time in each year of the rate period, BPA has assumed that a $50 million working capital reserve is required. Therefore, a U.S. Treasury deferral is deemed to occur whenever the balance of financial reserves would be below a $50 million trigger point at the end of any year. The Tool Kit counts the number of U.S. Treasury deferrals that occur based on the $50 million cash working capital reserve.

13.10. Accrual to Cash Adjustment

The Treasury payment probability that was cited in this Final rate proposal was determined through the use of a Tool Kit that included an accrual to cash adjustment. As was explained in the 1995 Rate Case Revenue Requirement Documentation, WP-95-FS-BPA-10A at page 295, the accrual to cash adjustment recognizes that the Tool Kit must make

any adjustments to net revenues to account for differences between accrued revenues and cash receipts, as well as differences between accrued expenses and cash disbursements.

The revenue requirement reflects the estimated expenses on an accrual basis which will be incurred during the rate period. The accrual concept means that revenues are recognized when earned, not when received, and expenses are recognized when incurred, not when they are paid. BPA's annual Treasury payment obligation represents a cash outlay in September. BPA's ability to make this Treasury payment is dependent on the level of cash that it has on hand prior to the due date of this payment. Therefore, in order to appropriately estimate the probability of being able to make the scheduled Treasury payments in full and on time in September, the Risk Mitigation Tool Kit must take into account any timing differences between accrued revenues and cash receipts as well as any timing differences between accrued expenses and cash disbursements.

The accrual to cash adjustment has three components including revenue adjustments, power purchase adjustments, and net billing adjustments.

13.10.1 Revenue adjustments

Revenue adjustments are made to adjust for timing differences attributable to differences in loads and/or rates between two different fiscal years. Typically, a revenue adjustment for a fiscal year has two components, (1) an addition to include the cash received during the fiscal year attributable to revenue accrued during September of the previous fiscal year, and (2) a reduction to recognize the fact that cash received during the fiscal year will not include power sales revenues which are accrued in September of the current fiscal year but will not be received until October of the subsequent fiscal year.

13.10.2 Purchase Power Adjustment

The purchase power adjustment recognizes the effect that the difference between accrued expense and cash outlay has on BPA's cash balance. The power purchase expense that is accrued in September of the immediately preceding fiscal year represents an October cash outlay in the current fiscal year, therefore a decrease in cash in the current fiscal year. The purchase power expense that is accrued in September of the current fiscal year will not be a cash outlay until October of the subsequent fiscal year. Therefore it represents an increase in the level of cash available to make the Treasury payment in the current fiscal year.

13.10.3 Net Billing Adjustment

The third category of adjustment is referred to as the "net billing adjustment." The net billing adjustment is necessary to reflect the level of timing differences that occur due to the Washington Public Power Supply System Net Billing Agreements. Under the provisions of these agreements, Project Participants have agreed to purchase the capability of the net billed project, and have also agreed to provide the Supply System with funds necessary to meet all of the costs of the net billed project. The Net Billing Agreements also provide for an assignment of the project capability from the Participants to BPA. (Project Participants receive credit toward their own direct purchases from BPA under the Net Billing Agreements.) To the extent that the costs of the projects are not wholly paid by the Project Participants under the Net Billing Agreements, BPA pays the balance of the project costs.

Under the Net Billing Agreements, BPA customers are obligated to satisfy their portion of the Supply System's annual budget prior to remitting payment for their direct purchases from BPA. The Supply System fiscal year starts in July of each year and ends in June of the subsequent year. Power that is delivered to BPA's customers under the Net Billing

Agreements in May of each year is billed to customers in June. Since there is a 30 day period in which to pay these bills, the payments for the bulk of the June billings will be received by the Supply System in July, which decreases the amount of the utility's obligation to the Supply System for the new budget year that has just commenced in July. BPA's fiscal year starts in October and ends the next September. Therefore, the receipts from the BPA power bills that represent sales to Net Billing Agreement Participants in May, June, July, and August are remitted directly to the Supply System, because of the obligation to pay the Supply System prior to paying for direct purchases from BPA. Consequently, the payments for these four months are not available to BPA as a source of cash. For accounting purposes, these bills represent a prepaid expense, not an increase in cash.

13.11 Relationship of minimum working capital reserve to the accrual to cash adjustment

BPA's policy is to maintain $50 million in working capital reserves. This policy decision is required to insure that BPA will have sufficient cash in early and mid-October to cover outlays that are required at that time. This working capital reserve amount is therefore the minimum level of reserves that BPA must have on hand during the fiscal year. The Tool Kit model statistically counts a Treasury deferral whenever the balance of financial reserves will be less than $50 million in one of the 1500 years that represent the 5 years in the rate period.

13.12 Summary and conclusion regarding accrual-to-cash adjustment

The accrual to cash adjustment is not a measure of the level of financial reserves. It is an adjustment that is made in the Tool Kit to take into account the fact that some receipts and payments of cash lag out of one fiscal year, while other receipts and payments lag into the fiscal year. The accrual to cash adjustment can be positive or negative depending on the magnitude of the lagged revenues and expenses. This Final proposal includes accrual

to cash adjustments of (positive) $15.4 million for FY 1996 and (positive) $18.8 million for FY 1997. This Final proposal does not include accrual to cash adjustments in the Tool Kit evaluation of Treasury payment probability for FYs 1998 through 2001 due to current practical difficulties of forecasting the monthly magnitudes of BPA's revenues, expenses, cash receipts and cash payments.

13.13 Implications of Treasury payment deferrals

As previously stated, the Tool Kit model calculates the Treasury deferrals that occur during the 5-year rate period. A deferral is deemed to occur if the balance of Financial Reserves is less than $50 million at the end of the fiscal year. The Tool Kit counts the number of deferrals that occur for each of the fiscal years in the 300 scenarios that are modeled. Additionally, the Tool Kit counts the number of scenarios in which a Treasury deferral occurs in any one of the years in a rate period.

The logic in the Tool Kit that was used in the Final Rate Proposal evaluates Treasury payment probability over a five-year rate period, FY 1997-FY 2001. The financial reserve balance is not re-initialized during the rate period; in each scenario, the balance of financial reserves at the end of each year is carried over as the starting balance of the subsequent year. If the ending balance in any year is less than $50 million, a missed Treasury payment is deemed to occur equal to $50 million minus the ending balance. If the missed Treasury payment is no larger than the scheduled amortization payment, then amortization equal to the size of the missed payment is deferred. If the missed payment is larger than the scheduled amortization, then the entire amortization is deferred, and part or all of the scheduled interest payment is also deferred.

The model assumes that deferred amortization is not repaid during the 5-year rate period. It is rescheduled for payment by the next official repayment study BPA runs, which is

typically during the next rate case. However, any amount of scheduled Treasury bond interest expense which is not repaid becomes a priority for repayment in the next year in the 5-year scenario. For modeling purposes, this deferred interest expense is paid before the next year's Treasury payment is evaluated.

13.14 Risk Mitigation Tool Kit Results

For the final proposal, cash available to mitigate risk was anticipated in each year as shown below in Table 4. Also shown there are the number of rate periods out of 300 in which at least one year contained a Treasury deferral, and the corresponding probability per year of making that year's Treasury payment.

Table 4: Tool Kit results

Fiscal Year	Cash available to mitigate risk (millions)	Treasury Deferrals	Treasury payment probability (300 scenarios)
FY 1997	42.908	21	93%
FY 1998	50.507	32	89%
FY 1999	82.502	33	89%
FY 2000	101.597	31	90%
FY 2001	86.873	34	89%
FY 1997 to FY 2001 rate period		[1]	80%[1]

[1] For the FY 1997 to FY 2001 rate period, 300 rate periods were modeled. There were Treasury deferrals in 60 of the rate periods, which is an 80.0% probability of making all Treasury payments in full and on time during the rate period.

CHAPTER 14

FISH RECOVERY COSTS

Purpose: To specify fish recovery costs, and in particular, estimated costs associated with the 1995 Biological Opinion issued by the National Marine Fisheries Service (NMFS) in March 1995, which calls for various measures to halt and reverse the decline of salmon stocks. Particular emphasis is placed on COE investments and description of credits allowed under Section 4(h)(10)(C).

Method: Projected COE capital investments for fish mitigation are separated into three categories: (1) the non-1995 Biological Opinion investment the COE plans to make regardless of the Biological Opinion, including continuation of on-going activities; (2) "planned investment," which includes those measures called for in the Biological Opinion and which the COE had included in its capital plans; and (3) "contingent investments," which includes investments called for in the Biological Opinion on a contingency basis, but which are currently awaiting study results to confirm effectiveness of the measures. This category also includes measures (primarily gas abatement work) which are only generally defined at this time and for which no comprehensive cost estimates exist.

The non-1995 Biological Opinion costs are based on the COE budget projections from August 1995. For the planned investments, BPA worked with the COE to identify and determine the cost of measures required by the 1995 Biological Opinion which were not already incorporated in the COE budget. These planned investments include such

activities as additional transport barges, temperature control at fish ladders, and improvements at the Lower Granite Juvenile Bypass Facility. The "contingent investments" include activities such as the installation of surface bypass collectors at powerhouses, which are contingent upon the prototype construction testing and evaluation. The COE and BPA initially developed projections for construction costs, construction periods, and plant-in-service dates for the contingent investments.

In response to legislative proposals regarding BPA fish costs, BPA engaged in numerous discussions with NMFS and the Northwest Power Planning Council (Council), and consulted with COE, to arrive at a more refined estimate of the types and timing of investments which would fulfill the objectives of the Biological Opinion. The resulting revised investment projections are incorporated into the draft Plan described in the October 24 letter from OMB Director Rivlin to Senator Mark Hatfield. (See Attachment 2; see also Testimony of DeWolf, et al., WP-E-96-BPA-69.) This Plan specifies that BPA will spend an average of $435 million per year on fish, with the annual amount allocated among four categories: direct program costs, reimbursable expenditures, annualized costs for capital investment, and hydro operations. (See Attachment 3.) The $435 million has since been clarified to mean an average of $252 million per year on direct fish and wildlife expenditures, plus the costs necessary to implement the hydro operations called for under the Biological Opinion, currently estimated to range between $90 million and $280 million per year, depending on water supply and power market conditions. The allocation of expenditures among categories in the draft agreement is tentative. Discussions regarding these allocations, as well as other issues, are currently underway

among the affected agencies. The costs in this Final Proposal may not exactly reflect those in the draft Plan.

Changes made as a result of the discussions with NMFS and COE are reflected in the attached table of "Corps of Engineers' Estimated Capital Costs Related to 1995 Biological Opinion." (See Attachment 4.) An example of the kind of changes made is that initially the construction of surface bypass collection systems was expected to be completed at all the projects in FY 2001. However, staff from BPA, COE and NMFS determined that it is unlikely the collectors would be effective at all sites, so they may not be installed at all powerhouses or spillways. It also is unlikely that the time required for prototype construction testing and evaluation would allow for construction at other powerhouses to be completed by FY 2001. Therefore, pending more detailed projections, BPA has made a "place-holder" assumption that the total cost remains approximately the same, but that construction will be done in two phases. As shown in Attachment 4, the first phase construction would begin in FY 1997 and be completed and placed in plant in FY 2001. The second phase would begin by or after FY 2001 and be completed by FY 2006. This second phase is assumed to be completed in three segments.

The COE tracks all their fish mitigation capital expenditures, both those previously planned and those required by the 1995 Biological Opinion, in the Columbia River Juvenile Fish Mitigation (CRJFM) project (previously called the Columbia River Fish Bypass (CRFB) project). The CRJFM includes numerous fish mitigation improvements which are to be constructed on some or all of the eight COE dams on the lower Snake and

Columbia Rivers. For purposes of fish mitigation activity, work at each dam is considered a sub-project under the CRJFM. There is also a Mitigation Analysis sub-project, which includes research and studies which may potentially lead to future construction activity at one or more hydroelectric projects.

The COE allocates the investment costs to the various purposes at each dam, e. g., navigation, flood control, recreation and power. See the attached letter dated March 20, 1995 from the COE (Attachment 5) explaining this allocation. For the Mitigation Analysis sub-project power allocation costs, the COE uses an average of the percentage at all eight main-stem dams, with a resulting 80 percent allocation to power. (See Attachment 6.) The research and study costs are tentatively carried in the Mitigation Analysis sub-project, and are assumed to be distributed equally to all eight projects. When the Mitigation Analysis is completed, any construction activity resulting from this effort is normally assigned to the dam it is benefiting. The percentage allocated to power is determined using the particular project allocation, and is applied to the investment. The result becomes the incremental new debt for BPA related to that project. In accordance with current policy, activities performed under the sub-project Mitigation Analysis will be placed in service upon completion, currently scheduled in FY 2001.

IDC has been calculated in accordance with the provisions of the BPA Appropriations Refinancing Act, which states that the principal amount of a new capital investment includes interest in each fiscal year of construction of the related project, facility, or separable unit or feature at a rate equal to the one-year rate for the fiscal year. BPA has

treated each Biological Opinion investment activity as new construction of units or separable power features rather than treating all fish mitigation activity at a particular dam as one project. (See Attachment 7.) In accordance with the Act, for each year during which construction is under way BPA uses the prevailing one-year Treasury interest rate forecast for that year.

The interest rates assigned to the investments in the repayment studies reflect the projected prevailing Treasury interest rate projected for fiscal year in which the unit or separable feature is projected to be placed in service and is of the same maturity to the period between the beginning of the fiscal year and the repayment date for the investment. See Chapter 7 of this Document for interest rate projections.

SECTION 4(h)(10)(C) CREDITS

See 5.1 "Legal Requirements and Policies" in the Revenue Requirement Study (WP-96-FS-BPA-02).

BPA's exercise of authorities under section 4(h)(10)(C) of the Northwest Power Act is addressed in a March 1995 arrangement with the Administration, as described in testimony by OMB Director Alice Rivlin (See Attachment 1), and in the agreement described in an October 24, 1995 letter from Director Rivlin to Senator Hatfield (See Attachment 2). Together, the agreements provide that:

- Beginning in fiscal year 1995, annual credits on a permanent basis under section 4(h)(10)(C) of the Northwest Power Act will be provided for BPA's fish and wildlife expenditures.
- Beginning in fiscal year 1995, section 4(h)(10)(C) credits for BPA's power-purchase costs related to its salmon recovery measures will also be available.

In addition, BPA must assist in covering incremental salmon recovery costs:

- About $30-$40 million a year will be derived through administrative and other cost savings which BPA can achieve. See Testimony of DeWolf, et al., WP-96-E-BPA-14, Section 2.1, pages 4-5.
- To the extent necessary, BPA will reduce its build-up of cash reserves. This may make it more likely that BPA will have to reschedule a portion of its annual Treasury payment in future years. (If such an event occurs, BPA will reschedule its debt consistent with existing policy.)

The section 4(h)(10)(C) credits are 27 percent of:

- BPA's annual Fish and Wildlife program expenses and capital expenditures,
- power purchases for fish net of resale revenues, and
- interest income lost during the year because of the above expenditures.

The 27 percent was derived on a system-wide basis from the power portion of the individual project allocations, weighted by their power output.

BPA receives these credits by reducing its annual cash payment to the U. S. Treasury by an amount equal to the sum of the expenditures in that year that are allocated to non-

power purposes. See Testimony of DeWolf, et al., WP-96-E-BPA-14, Section 2 for a fuller explanation of the March 1995 arrangement and its implementation in this case. Credits are projected to average about $61 million per year in the FYs 1997-2001 rate period. (See Attachment 7.) Actual credits, however, will reflect actual costs.

The October 1995 letter from Director Rivlin commits the Administration to establishing a BPA Fish Cost Contingency Fund consisting of credits to be used by BPA against fish and wildlife costs under certain conditions. The beginning credit balance in this fund shall be the amount of all reimbursements available, but not used, under section 4(h)(10)(C). BPA estimates this amount to be approximately $325 million. See also Testimony of DeWolf, et al., WP-E-96-BPA-69 at Section 2 for discussion of the October 24 letter from Director Rivlin; see also Chapter 13 of this document and Testimony of Arnold, et al., WP-96-E-BPA-71, for further discussion of the Fish Cost Contingency Fund and for implementation in the Tool Kit modeling and probability analysis.

Application of Methodology:

The COE Biological Opinion investment projections are incorporated in the COE investment entered into the repayment study (See Chapter 12.) Direct program costs are included in program levels. The Section 4(h)(10)(C) credits are included in the revenue forecast. (See Revenue Forecast in WP-96-FS-BPA-05A.) The BPA Fish Cost Contingency Fund is accounted for the Risk Mitigation Tool Kit model. (See Chapter 13.)

Attachments:

1. Testimony of Alice M. Rivlin, Director, Office of Management and Budget, before the Subcommittee on Energy and Water - Senate Appropriations Committee; March 15, 1995
2. Letter from Alice Rivlin to Senator Mark Hatfield, October 24, 1995
3. William Stelle, Jr, memorandum - final draft agreement among Administrator of BPA, Regional Director of NMFS and the Chairman of the Council
4. Corps of Engineers' Estimated Capital Costs Related to 1995 Biological Opinion
5. Letter from Major General Harrell to Randy Hardy, March 20, 1995, regarding allocation of costs
6. System - Wide Fish and Wildlife, Percent of Joint Costs Allocated to Power
7. IDC calculations for FYs 1995-2005 Appropriations CWIP
8. BPA Fish and Wildlife Investments Crosscut - FY 1997 Congressional Budget
9. Historical BPA Fish and Wildlife Investments Crosscut - FYs 1978 - 1984
10. Historical BPA Fish and Wildlife Investments
11. Calculation of 4(h)(10)(C) credit

CHAPTER 15

REVENUE TEST DATA

Purpose: This section documents the revenues and the cost changes specifically associated with the current and revised revenue tests (Residential Exchange and Short-term Power Purchases/Storage).