BP-16 Rate Proceeding

Transmission Revenue Requirement Study Documentation

BP-16-FS-BPA-08A

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TRANSMISSION REVENUE REQUIREMENT STUDY DOCUMENTATION

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COMMONLY USED ACRONYMS AND SHORT FORMS

ACNR	Accumulated Calibrated Net Revenue
ACS	Ancillary and Control Area Services
AF	Advance Funding
aMW	average megawatt(s)
ANR	Accumulated Net Revenues
ASC	Average System Cost
BAA	Balancing Authority Area
BiOp	Biological Opinion
BPA	Bonneville Power Administration
Btu	British thermal unit
CDQ	Contract Demand Quantity
CGS	Columbia Generating Station
CHWM	Contract High Water Mark
CIR	Capital Investment Review
COE	U.S. Army Corps of Engineers
COI	California-Oregon Intertie
Commission	Federal Energy Regulatory Commission
Corps	U.S. Army Corps of Engineers
COSA	Cost of Service Analysis
COU	consumer-owned utility
Council	Northwest Power and Conservation Council
CP	Coincidental Peak
CRAC	Cost Recovery Adjustment Clause
CSP	Customer System Peak
CT	combustion turbine
CY	calendar year (January through December)
DDC	Dividend Distribution Clause
dec	decrease, decrement, or decremental
DERBS	Dispatchable Energy Resource Balancing Service
DFS	Diurnal Flattening Service
DNR	Designated Network Resource
DOE	Department of Energy
DOI	Department of Interior
DSI	direct-service industrial customer or direct-service industry
DSO	Dispatcher Standing Order
EE	Energy Efficiency
EIS	Environmental Impact Statement
EN	Energy Northwest, Inc.
ESA	Endangered Species Act
ESS	Energy Shaping Service
e-Tag	electronic interchange transaction information
FBS	Federal base system
FCRPS	Federal Columbia River Power System
FCRTS	Federal Columbia River Transmission System

FELCC	firm energy load carrying capability
FORS	Forced Outage Reserve Service
FPS	Firm Power and Surplus Products and Services
FPT	Formula Power Transmission
FY	fiscal year (October through September)
G&A	general and administrative (costs)
GARD	Generation and Reserves Dispatch (computer model)
GMS	Grandfathered Generation Management Service
GSR	Generation Supplied Reactive
GRSPs	General Rate Schedule Provisions
GTA	General Transfer Agreement
GWh	gigawatthour
HLH	Heavy Load Hour(s)
HOSS	Hourly Operating and Scheduling Simulator (computer model)
HYDSIM	Hydrosystem Simulator (computer model)
IE	Eastern Intertie
IM	Montana Intertie
inc	increase, increment, or incremental
IOU	investor-owned utility
IP	Industrial Firm Power
IPR	Integrated Program Review
IR	Integration of Resources
IRD	Irrigation Rate Discount
IRM	Irrigation Rate Mitigation
IRMP	Irrigation Rate Mitigation Product
IS	Southern Intertie
kcfs	thousand cubic feet per second
kW	kilowatt
kWh	kilowatthour
LDD	Low Density Discount
LLH	Light Load Hour(s)
LPP	Large Project Program
LPTAC	Large Project Targeted Adjustment Charge
Maf	million acre-feet
Mid-C	Mid-Columbia
MMBtu	million British thermal units
MRNR	Minimum Required Net Revenue
MW	megawatt
MWh	megawatthour
NCP	Non-Coincidental Peak
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NFB	**N**ational Marine Fisheries Service (NMFS) **F**ederal Columbia River Power System (FCRPS) **B**iological Opinion (BiOp)
NIFC	Northwest Infrastructure Financing Corporation
NLSL	New Large Single Load

NMFS	National Marine Fisheries Service
NOAA Fisheries	National Oceanographic and Atmospheric Administration Fisheries
NORM	Non-Operating Risk Model (computer model)
Northwest Power Act	Pacific Northwest Electric Power Planning and Conservation Act
NP-15	North of Path 15
NPCC	Pacific Northwest Electric Power and Conservation Planning Council
NPV	net present value
NR	New Resource Firm Power
NRFS	NR Resource Flattening Service
NT	Network Integration
NTSA	Non-Treaty Storage Agreement
NUG	non-utility generation
NWPP	Northwest Power Pool
OATT	Open Access Transmission Tariff
O&M	operation and maintenance
OATI	Open Access Technology International, Inc.
OMP	Oversupply Management Protocol
OS	Oversupply
OY	operating year (August through July)
PDCI	Pacific DC Intertie
Peak	Peak Reliability
PF	Priority Firm Power
PFIA	Projects Funded in Advance
PFp	Priority Firm Public
PFx	Priority Firm Exchange
PNCA	Pacific Northwest Coordination Agreement
PNRR	Planned Net Revenues for Risk
PNW	Pacific Northwest
POD	Point of Delivery
POI	Point of Integration or Point of Interconnection
POR	Point of Receipt
Project Act	Bonneville Project Act
PRS	Power Rates Study
PS	Power Services
PSC	power sales contract
PSW	Pacific Southwest
PTP	Point to Point
PUD	public or people's utility district
PW	WECC and Peak Service
RAM	Rate Analysis Model (computer model)
RD	Regional Dialogue
REC	Renewable Energy Certificate
Reclamation	U.S. Bureau of Reclamation
REP	Residential Exchange Program
REPSIA	REP Settlement Implementation Agreement

RevSim	Revenue Simulation Model
RFA	Revenue Forecast Application (database)
RHWM	Rate Period High Water Mark
ROD	Record of Decision
RPSA	Residential Purchase and Sale Agreement
RR	Resource Replacement
RRS	Resource Remarketing Service
RSC	Resource Shaping Charge
RSS	Resource Support Services
RT1SC	RHWM Tier 1 System Capability
SCD	Scheduling, System Control, and Dispatch rate
SCS	Secondary Crediting Service
SDD	Short Distance Discount
SILS	Southeast Idaho Load Service
Slice	Slice of the System (product)
T1SFCO	Tier 1 System Firm Critical Output
TCMS	Transmission Curtailment Management Service
TGT	Townsend-Garrison Transmission
TOCA	Tier 1 Cost Allocator
TPP	Treasury Payment Probability
TRAM	Transmission Risk Analysis Model
Transmission System Act	Federal Columbia River Transmission System Act
Treaty	Columbia River Treaty
TRL	Total Retail Load
TRM	Tiered Rate Methodology
TS	Transmission Services
TSS	Transmission Scheduling Service
UAI	Unauthorized Increase
UFT	Use of Facilities Transmission
UIC	Unauthorized Increase Charge
ULS	Unanticipated Load Service
USACE	U.S. Army Corps of Engineers
USBR	U.S. Bureau of Reclamation
USFWS	U.S. Fish & Wildlife Service
VERBS	Variable Energy Resources Balancing Service
VOR	Value of Reserves
VR1-2014	First Vintage Rate of the BP-14 rate period (PF Tier 2 rate)
VR1-2016	First Vintage Rate of the BP-16 rate period (PF Tier 2 rate)
WECC	Western Electricity Coordinating Council
WSPP	Western Systems Power Pool

1. TRANSMISSION REVENUE REQUIREMENTS

1.1 Introduction

Chapter 1 documents how the Bonneville Power Administration's (BPA) annual transmission revenue requirements are determined. Two tables are presented, each showing both years of the rate period (FY 2016 and FY 2017). On the first table, revenue requirements for FY 2016 and FY 2017 are projected in an income statement format. The second table, a statement of annual cash flows, determines the minimum required net revenues and presents the annual cash flows available for risk mitigation.

1.2 Income Statement

Below is a line-by-line description of each of the components in the Income Statement (Table 1-1).

Transmission operations (line 2). Transmission operations includes spending for technical operations; substation operations; control center support; power system dispatching; Transmission information technology (IT) costs, including corporate agency services IT costs that are allocated to Transmission Services (TS); and scheduling services (reservations, pre-scheduling, real-time and after-the-fact scheduling, and technical support). This category also includes spending for business strategy and assessment, billing, finance, contract management, and internal operations. *See* ch. 3.

Transmission engineering (line 3). This category includes spending on asset management and planning, design of lines/towers/substations, construction planning, construction management, and real property services. *Id.*

Transmission maintenance (line 4). This category includes spending for all Transmission Services maintenance activities, such as ongoing maintenance of substations, lines, and protection control systems. This category also includes spending on environmental analysis and pollution prevention and abatement. *Id.*

Transmission acquisition & ancillary services (line 5). This category includes inter-business line expenses resulting from functional separation and costs of ancillary services products, including Power Services generation inputs to ancillary services. It also includes the costs of station service and remedial action schemes, Corps of Engineers (Corps) and Bureau of Reclamation (Reclamation) transmission facilities serving the Network and Utility Delivery segments, and payments to other utilities for stability reserves, settlements, and operating leases. *Id.*

BPA internal support (line 6). This category comprises spending on general and administrative programs that are allocated to BPA's two business units. These programs include legal services, finance, risk management, security and emergency management, human resources, and executive oversight and management. *Id.*

Other income, expenses & adjustments (line 7). Generally, this category includes items that do not fit in any other category.

Depreciation & amortization (line 8). Depreciation is the annual capital recovery expense associated with Federal Columbia River Transmission System (FCRTS) plant-in-service. BPA transmission and general plant are depreciated by the straight-line method, using the remaining life technique. Amortization refers to the annual capital recovery expense for deferred transmission assets. *See* ch. 3 & 4.

Total operating expenses (line 9). Total operating expenses is the sum of the above expenses (lines 2 through 8).

Federal appropriations (line 12). Federal appropriations consists of interest on the appropriations BPA received prior to full implementation of BPA's self-financing authority and is determined in the transmission repayment studies. *See* ch. 3.

Capitalization adjustment (line 13). Implementation of the BPA Appropriations Refinancing Act (*see* Transmission Revenue Requirement Study, BP-16-FS-BPA-08, at § 1.2.1.2) entailed a change in capitalization on BPA's financial statements. Outstanding appropriations attributed to the transmission function were reduced by $470 million as a result of the refinancing. The reduction is recognized annually over the remaining repayment period of the refinanced appropriations. The annual recognition of this adjustment is based on the increase in annual interest expense resulting from implementation of the Act, as shown in repayment studies for the year of the refinancing transaction (1997). The capitalization adjustment is included on the income statement as a non-cash expense. *See* ch. 3 .

Long-term debt (line 14). Long-term debt includes interest on bonds that BPA issues to the U.S. Treasury to fund investments in transmission plant, environment, general plant supportive of transmission, and capital equipment. Such interest expense is determined in the transmission repayment studies. This line includes any payments of call premiums for bonds projected to be amortized. *Id.*

Amortization of capitalized bond premiums (line 15). When a bond issued to the U.S. Treasury is refinanced, any call premium resulting from early retirement of the original bond is capitalized and included in the principal of the new bond. The capitalized call premium then is amortized

over the term of the new bond. The annual amortization is a non-cash component of interest expense. *Id.*

Debt service reassignment interest (line 16). Debt service reassignment interest consists of the interest component of the debt service reassigned to TS through the Debt Optimization Program. *Id.* and ch. 8.

Non-Federal interest (line 17). Non-Federal interest consists of interest paid on BPA's lease-financing projects and other capital leases as well as interest paid on customer advance funding for generator interconnection agreements and for the California-Oregon Intertie (COI) upgrade. The customers' advanced funds accrue interest on the outstanding balances until they are returned to customers through credits for transmission service. *See* Transmission Revenue Requirement Study, BP-16-FS-BPA-08, at § 2.3.5.

Allowance for funds used during construction (AFUDC) (line 18). AFUDC for U.S. Treasury-financed transmission projects is a credit against interest on long-term debt (line 14). This non-cash reduction to interest expense reflects an estimate of interest on the funds used during the construction period of facilities that are not yet in service. Also included is the interest accrued on LGIA funds during the construction period of the associated facilities. AFUDC is capitalized along with other construction costs and is recovered through rates over the expected service life of the related plant as part of the depreciation expense after the facilities are placed in service. *See* ch. 3.

Interest income (line 19). Interest income is computed on the projected year-end cash balances in the BPA Fund that are attributed to the transmission function and that carry over into the next year. It is credited against interest on long-term debt. Also included is an interest income credit

calculated in the transmission repayment studies on funds to be collected during each year for payments of Federal interest and amortization at the end of the fiscal year. *See* ch. 5.

Net interest expense (line 20). Net interest expense is computed as the sum of the interest on Federal appropriations (line 12), capitalization adjustment (line 13), long-term debt (line 14), amortization of capitalized bond premiums (line 15), debt service reassignment interest (line 16), non-Federal interest (line 17), AFUDC (line 18), and interest income (line 19).

Total expenses (line 21). Total expenses is the sum of total operating expenses (line 9) and net interest expense (line 20).

Minimum Required Net Revenues (line 22). Minimum required net revenues (MRNR), an input from line 2 of the Statement of Cash Flows (Table 1-2), may be necessary to cover cash requirements in excess of accrued expenses. An explanation of the method used for determining MRNR is included in chapter 1.3 below.

Planned Net Revenues for Risk (line 23). Planned net revenues for risk (PNRR) is the amount of net revenues, if any, to be included in rates for financial risk mitigation. There are no Planned Net Revenues for Risk included in the Initial Rate Proposal. Starting Transmission reserves in FY 2016 are projected to be sufficient to mitigate risk in FY 2016 and 2017. *See* Transmission Revenue Requirement Study, BP-16-FS-BPA-08, at § 2.2.

Total planned net revenues (line 24). Total planned net revenues is the sum of Minimum Required Net Revenues (line 22) and Planned Net Revenues for Risk (line 23).

Total revenue requirement (line 25). Total revenue requirement is the sum of total expenses (line 21) and total planned net revenues (line 24).

1.3 Statement of Cash Flows

Below is a line-by-line description of each of the components in the Statement of Cash Flows (Table 1-2).

Minimum Required Net Revenue (MRNR) (line 2). BPA determines whether MRNR is necessary by evaluating the annual cash inflows and outflows shown on the Statement of Cash Flows. MRNR may be necessary to ensure that the cash provided by current operations (line 12) will be sufficient to cover the planned amortization payments (the difference between lines 16 and 23) without causing the annual increase (decrease) in cash (line 24) to be negative. The MRNR determined in the Statement of Cash Flows is incorporated in the Income Statement (Table 1-1, line 22).

Drawdown of cash reserves for capital funding (line 3). The drawdown of cash reserves for capital funding refers to the use of cash accumulated from transmission revenues in prior rate periods to fund a portion of capital expenditures in each year of the rate period rather than borrowing from the U.S. Treasury. It is included on this statement to avoid having the amount of this reserve financing included in the calculation of MRNR.

Depreciation & amortization (line 5). The depreciation amount is from the Income Statement (Table 1-1, line 8). It, like the following five lines, is added back to net revenues in computing cash provided by current operations (Table 1-2, line 12) because it is a non-cash expense.

Transmission credit projects net interest (line 6). Transmission credit projects net interest is the non-cash expenses from the Income Statement for generator interconnection and COI upgrade

customers' interest on their credit balances for advance funding (included in Table 1-1, line 17) and the AFUDC on the projects under construction funded by those customers (included in Table 1-1, line 18).

Amortization of capitalized bond premiums (line 7). Amortization of capitalized bond premiums, from the Income Statement (Table 1-1, line 15), is a non-cash expense.

Capitalization adjustment (line 8). The capitalization adjustment, from the Income Statement (Table 1-1, line 13), is a negative non-cash expense.

LGIA (line 10). Revenue credits associated with customer-funded capital projects are recognized as non-cash revenues. Customers provide an up-front deposit for construction of transmission facilities which is returned to them through a transmission credit on their transmission service bill until the deposit is repaid.

AC Intertie/fiber (line 11). Accrual revenues are recognized here because these revenues provide no cash for cost recovery. BPA accounts for the AC Intertie non-Federal capacity ownership lump-sum payments received in FY 1995 as unearned revenues that are recognized annually over the estimated average service life of the associated transmission facilities. Similarly, some leases of fiber optic capacity have included up-front payments, which are being recognized over the life of the particular contract. The annual accrual revenues, which are part of the total revenues recovering the FCRTS revenue requirement, are included here as a non-cash adjustment to cash from current operations.

Cash provided by current operations (line 12). Cash provided by current operations, the sum of lines 2, 3, 5, 6, 7, 8, 10, and 11, is available for the year to satisfy cash requirements.

Investment in utility plant (line 15). Investment in utility plant represents the annual increase in capital expenditures for additions and replacements to the transmission system funded by U.S. Treasury bonds or available cash reserves. *See* ch. 3.

Cash used for capital investments (line 16). Cash used for capital investments is the sum of investments in utility plant.

Increase in long-term debt (line 18). Increase in long-term debt reflects the new bonds issued by BPA to the U.S. Treasury to fund the construction and environmental capital equipment programs. This amount also includes any notes issued to the U.S. Treasury. *See* ch. 7.

Debt service reassignment principal (line 19). Debt service reassignment principal is the principal component of the debt service obligation reassigned to TS through the Debt Optimization Program. *See* ch. 8.

Repayment of capital leases (line 20). Repayment of capital leases is BPA's payment of the principal component of certain capital leases.

Repayment of long-term debt (line 21). Repayment of long-term debt is BPA's planned repayment of outstanding bonds issued by BPA to the U.S. Treasury, as determined in the repayment studies. *See* ch. 3.

Repayment of capital appropriations (line 22). Repayment of capital appropriations represents projected amortization of outstanding BPA appropriations (pre-self-financing) as determined in the repayment studies. *Id.*

Cash from treasury borrowing and appropriations (line 23). Cash from treasury borrowing and appropriations is the sum of lines 18 through 22. This is the net cash flow resulting from increases in cash from new long-term debt and decreases in cash from repayment of long-term debt and capital appropriations.

Annual increase (decrease) in cash (line 24). Annual increase (decrease) in cash, the sum of lines 12, 16, and 23, reflects the annual net cash flow from current operations, investing, and financing activities. Revenue requirements are set to meet all projected annual cash flow requirements, as included on the Statement of Cash Flows. A decrease shown in this line would indicate that annual revenues are insufficient to cover the year's cash requirements. In such cases, Minimum Required Net Revenues are included to offset such decrease. *See* above discussion of Minimum Required Net Revenues (line 2).

Planned net revenues for risk (line 25). Planned net revenues for risk reflects the amounts included in revenue requirements to meet BPA's risk mitigation objectives (from Table 1-1, line 24.)

Total annual increase (decrease) in cash (line 26). Total annual increase (decrease) in cash, the sum of Lines 24 and 25, is the total annual cash that is projected to be available to add to BPA's cash reserves.

TABLE 1-1
TRANSMISSION REVENUE REQUIREMENT INCOME STATEMENT

($000)

		A FY 2016	B FY 2017
1	OPERATING EXPENSES		
2	TRANSMISSION OPERATIONS	155,274	160,800
3	TRANSMISSION ENGINEERING	54,421	54,915
4	TRANSMISSION MAINTENANCE	162,552	164,272
5	TRANSMISSION ACQUISITION & ANCILLARY SERVICES	140,767	140,782
6	BPA INTERNAL SUPPORT	82,038	84,523
7	OTHER INCOME, EXPENSES & ADJUSTMENTS	(2,100)	(2,100)
8	DEPRECIATION & AMORTIZATION	234,327	253,854
9	TOTAL OPERATING EXPENSES	827,279	857,047
10	INTEREST EXPENSE		
11	INTEREST EXPENSE		
12	FEDERAL APPROPRIATIONS	14,386	8,954
13	CAPITALIZATION ADJUSTMENT	(18,968)	(18,968)
14	ON LONG-TERM DEBT	113,232	138,162
15	AMORTIZATION OF CAPITALIZED BOND PREMIUMS	561	561
16	DEBT SERVICE REASSIGNMENT INTEREST	31,431	23,072
17	NON-FEDERAL INTEREST	52,521	53,100
18	AFUDC	(42,886)	(41,346)
19	INTEREST INCOME	(9,197)	(15,290)
20	NET INTEREST EXPENSE	141,083	148,255
21	TOTAL EXPENSES	968,363	1,005,302
22	MINIMUM REQUIRED NET REVENUE 1/	105,925	90,472
23	PLANNED NET REVENUES FOR RISK	0	0
24	TOTAL PLANNED NET REVENUE	105,925	90,472
25	**TOTAL REVENUE REQUIREMENT**	**1,074,288**	**1,095,775**

1/ SEE NOTE ON CASH FLOW TABLE.

TABLE 1-2
TRANSMISSION REVENUE REQUIREMENT STATEMENT OF CASH FLOWS

($000)

		A FY 2016	B FY 2017
1	CASH FROM CURRENT OPERATIONS:		
2	MINIMUM REQUIRED NET REVENUE	105,925	90,472
3	DRAWDOWN OF CASH RESERVES FOR CAPITAL FUNDING	15,000	15,000
4	EXPENSES NOT REQUIRING CASH:		
5	DEPRECIATION & AMORTIZATION	234,327	253,854
6	TRANSMISSION CREDIT PROJECTS NET INTEREST	5,616	5,273
7	AMORTIZATION OF CAPITALIZED BOND PREMIUMS	561	561
8	CAPITALIZATION ADJUSTMENT	(18,968)	(18,968)
9	NON-CASH REVENUES/ACCRUAL REVENUES		
10	LGIA	(39,503)	(26,424)
11	AC INTERTIE CO/FIBER	(6,853)	(6,853)
12	CASH PROVIDED BY CURRENT OPERATIONS	296,106	312,916
13	CASH USED FOR CAPITAL INVESTMENTS:		
14	INVESTMENT IN:		
15	UTILITY PLANT	(655,150)	(590,002)
16	CASH USED FOR CAPITAL INVESTMENTS	(655,150)	(590,002)
17	CASH FROM TREASURY BORROWING AND APPROPRIATIONS:		
18	INCREASE IN LONG-TERM DEBT	640,150	575,002
19	DEBT SERVICE REASSIGNMENT PRINCIPAL	(185,303)	(199,991)
20	REPAYMENT OF CAPITAL LEASES	(1,392)	(1,486)
21	REPAYMENT OF LONG-TERM DEBT	(19,500)	(40,950)
22	REPAYMENT OF CAPITAL APPROPRIATIONS	(74,910)	(55,489)
23	CASH FROM TREASURY BORROWING AND APPROPRIATIONS	359,044	277,087
24	ANNUAL INCREASE (DECREASE) IN CASH [1/]	-	-
25	PLANNED NET REVENUE FOR RISK	-	-
26	TOTAL ANNUAL INCREASE (DECREASE) IN CASH	-	-

1/ Line 24 must be greater than or equal to zero, otherwise net revenues will be added so that there are no negative cash flows for the year.

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2. SEGMENTATION OF TRANSMISSION REVENUE REQUIREMENT

2.1 Introduction

This chapter documents how the components of the transmission revenue requirements are allocated to the transmission segments, defined in the Transmission Segmentation Study and Documentation (BP-16-FS-BPA-06). This allocation results in the segmented revenue requirements, which are used to develop proposed transmission and ancillary services rates. *See* Transmission Rates Study and Documentation, BP-16-FS-BPA-07.

2.2 Segmentation

The allocation of the revenue requirement components to the transmission segments is described below.

Operations & Maintenance Expense (O&M)

BPA transmission O&M (*see* chapter 3 – Transmission Expenses) is segmented in three steps. Step 1: certain costs are directly assigned to the segments and Ancillary Services to which they are attributed: (1) costs for balancing reserve capacity to the Ancillary and Control Area Services that recover those costs; (2) the annual costs of transmission facilities owned and operated by the Corps of Engineers and Bureau of Reclamation to the Network and Utility Delivery segments; (3) costs associated with synchronous condensing and remedial action schemes for generation dropping to the Network and Southern Intertie segment; (4) costs associated with redispatch provided by Power Services to Transmission Services under Attachment M of the tariff to the Network segment; (5) portions of Transmission Services O&M (specifically, certain costs associated with the Ancillary Service of Scheduling, System Control and Dispatch (SCD)— the costs of the scheduling program, portions of the costs of the system operations program, and costs of related pilot programs) to Ancillary Services.

Step 2: the costs of the direct programs for operating and maintaining the transmission system are allocated between lines and substations according to the percentage share of historical O&M spending on lines and substations. *See* Transmission Segmentation Study and Documentation, BP-16-FS-BPA-06, at table 4.3. The costs of these direct programs include all the remaining costs of the system operations program (those not assigned to SCD) and the costs of system maintenance and environmental operations programs. Then costs assigned to the lines and substations are allocated to the segments based on the percentage share of historical O&M spending that has been identified for each segment in the Transmission Segmentation Study and Documentation. Costs are allocated first to lines and substations and then to the segments because historically the division of costs between lines and substations has varied by segment and this method allows BPA to reflect the appropriate division of costs for lines and for substations by segment. Station service costs are allocated to the segments based on the percentage share of historical substation O&M in each segment. *See id.* This second step results in segmented direct O&M expenses.

Step 3: the directly assigned O&M in step 1 and segmented direct transmission O&M expenses in step 2 are summed for each segment, including ancillary services. The remaining expense programs (marketing, business support, engineering and corporate agency services, and costs associated with General Transfer Agreement (GTA) settlements) are then allocated to the segments pro rata based on the ratio of the sum for each segment to total O&M. Finally, the costs in one remaining expense category—non-between-business-line ancillary services—are segmented based on the ratio of net plant investment in each segment to total transmission net plant investment, except payments for operating leases of transmission facilities are directly assigned to the Network segment. The costs are segmented on this basis, rather than by O&M-based ratio, because they are transmission system overhead not directly associated with or influenced by BPA O&M activities.

Net Interest Expense and Planned Net Revenues

Transmission net interest expense (Table 1-1, line 20) and total planned net revenues (line 24) are segmented similarly in a two-step process. As with O&M, costs that can be directly assigned are allocated to the segments first, after which the remainder are allocated.

Net Interest:

Step 1: interest expense and AFUDC associated with Large and Small Generator Interconnection Agreements (LGIA and SGIA) transmission credits is directly assigned to the Network segment. Interest expense and AFUDC associated with transmission credits related to the California-Oregon Intertie (COI) upgrade project is directly assigned to the Southern Intertie segment. Section 2.3.5 of the Transmission Revenue Requirement Study, BP-16-FS-BPA-08, discusses these credits in more detail.

Step 2: after subtracting the total net interest expense directly assigned above (interest net of AFUDC), the remaining net interest expense to the segments and ancillary services is allocated pro rata based on the ratio of net plant investment in each segment to total transmission net plant.

Total Planned Net Revenue:

Step 1: minimum required net revenue related to LGIA/SGIA transmission credits and COI upgrade transmission credits is calculated and directly assigned to the Network and Southern Intertie segments, respectively. The calculation begins with the total revenue credits to be repaid (that is, non-cash revenues) and subtracts from that net interest and depreciation expense associated with the advance-funded facilities. The result is the minimum required net revenues required to ensure that cash requirements can be met.

Step 2: after subtracting the total minimum required net revenue assigned directly above, the remaining planned net revenue is allocated to the segments and ancillary services based on the ratio of net plant investment in each segment to total net plant investment.

Depreciation

Depreciation is segmented in two steps.

Step 1: depreciation is calculated directly for each segment and ancillary service based on gross plant investment for the particular year (see chapter 4 for more discussion on plant investment).

Step 2: after calculating depreciation for the gross investment particular to each segment, general plant depreciation (exclusive of that associated with ancillary services) is allocated to the segments and ancillary services based on the ratio of direct O&M in each segment to total transmission O&M.

TABLE 2-1:
SEGMENTATION OF O&M

($000s)

	FY 2016	A TOTAL FCRTS	B GENERATION INTEGRATION	C NETWORK	D SOUTHERN INTERTIE	E EASTERN INTERTIE	F UTILITY DELIVERY	G DSI DELIVERY	H ANCILLARY SERVICES
	SEGMENTATION STUDY AVERAGES								
1	7-YEAR AVERAGE O&M: LINES	50,699	412	45,595	2,810	1,873	9	-	-
2	7-YEAR AVERAGE O&M: SUBSTATIONS	103,590	2,450	83,961	15,497	497	731	454	-
3	**TOTAL 7-YEAR AVERAGE O&M (LN 2+3)**	**154,289**							
	SYSTEM OPERATION, MAINTENANCE & ENVIRONMENT								
4	SYSTEM OPERATION[1/]	21,922							56,398
5	SYSTEM MAINTENANCE [2/]	162,552							
6	**TOTAL TO SEGMENT (LN 4+5)**	**184,473**							
7	DIRECT LINES O&M	60,617	493	54,515	3,359	2,239	11	-	
8	DIRECT SUBS O&M	123,856	2,929	100,387	18,528	595	874	543	
9	DIRECT TRANSMISSION O&M SUBTOTAL (LN 7+8)	184,473	3,422	154,902	21,887	2,834	885	543	
10	SCHEDULING	11,110							11,110
11	**TOTAL DIRECT TRANSMISSION O&M W/ANCILLARY SERVICES**	**251,982**	**3,422**	**154,902**	**21,887**	**2,834**	**885**	**543**	**67,508**
	OVERHEAD CATEGORIES								
12	MARKETING	18,033	245	11,086	1,566	203	63	39	4,831
13	BUSINESS SUPPORT	47,811	649	29,391	4,153	538	168	103	12,809
14	SYSTEM ENGINEERING	54,421	662	29,966	4,234	548	171	105	18,734
15	CORPORATE	79,938	1,086	49,141	6,944	899	281	172	21,416
16	OVERHEAD CATEGORIES SUBTOTAL (LN 12+13+14+15)	452,185	6,063	274,485	38,784	5,022	1,568	963	125,299
17	**TOTAL 2016 O&M (LN 11+16)**	**704,166**	**9,485**	**429,387**	**60,672**	**7,856**	**2,453**	**1,506**	**192,808**
	FY 2017								
	SEGMENTATION STUDY AVERAGES								
18	7-YEAR AVERAGE O&M: LINES	50,699	412	45,595	2,810	1,873	9	-	-
19	7-YEAR AVERAGE O&M: SUBSTATIONS	103,590	2,450	83,961	15,497	497	731	454	-
20	**TOTAL 7-YEAR AVERAGE O&M (LN 18+19)**	**154,289**							
	SYSTEM OPERATION, MAINTENANCE & ENVIRONMENT								
21	SYSTEM OPERATION [1/]	22,340							57,002
22	SYSTEM MAINTENANCE [2/]	164,272							
23	**TOTAL TO SEGMENT (LN 21+22)**	**186,612**							
24	DIRECT LINES O&M	61,320	499	55,147	3,398	2,265	11	-	
25	DIRECT SUBS O&M	125,292	2,963	101,551	18,743	602	884	549	
26	DIRECT TRANSMISSION O&M SUBTOTAL (LN 24+25)	186,612	3,462	156,698	22,141	2,867	895	549	
27	SCHEDULING	11,376							11,376
28	**TOTAL DIRECT TRANSMISSION O&M W/ANCILLARY SERVICES**	**254,990**	**3,462**	**156,698**	**22,141**	**2,867**	**895**	**549**	**68,378**
	OVERHEAD CATEGORIES								
29	MARKETING	18,426	250	11,323	1,600	207	65	40	4,941
30	BUSINESS SUPPORT	51,657	701	31,745	4,486	581	181	111	13,852
31	SYSTEM ENGINEERING	54,915	667	30,202	4,268	553	173	106	18,947
32	CORPORATE/OTHER	82,423	1,119	50,651	7,157	927	289	178	22,102
33	OVERHEAD CATEGORIES SUBTOTAL (LN 29+30+31+32)	207,421	2,737	123,921	17,510	2,267	708	435	59,843
34	**TOTAL 2017 O&M (LN 28+33)**	**462,411**	**6,199**	**280,618**	**39,651**	**5,134**	**1,603**	**984**	**128,221**

1/ SYSTEM OPERATION EXPENSES NET OF ANCILLARY SERVICES
2/ INCLUDES ENVIRONMENTAL OPERATIONS

TABLE 2-2
INVESTMENT BASE

($000s)

			A TOTAL FCRTS	B GENERATION INTEGRATION	C NETWORK	D SOUTHERN INTERTIE	E EASTERN INTERTIE	F UTILITY DELIVERY	G DSI DELIVERY	H ANCILLARY SERVICES
	FY 2016									
1	FCRTS INVESTMENT BASE		4,860,913	69,532	4,015,841	521,365	79,736	8,154	7,270	159,015
2		PERCENT	100.00%	1.43%	82.61%	10.73%	1.64%	0.17%	0.15%	3.27%
	FY 2017									
3	FCRTS INVESTMENT BASE		5,292,153	67,045	4,259,601	682,941	76,825	7,924	7,014	190,804
4		PERCENT	100.00%	1.27%	80.49%	12.90%	1.45%	0.15%	0.13%	3.61%

TABLE 2-3
SEGMENTATION OF DEPRECIATION

($000s)

		A TOTAL FCRTS	B GENERATION INTEGRATION	C NETWORK	D SOUTHERN INTERTIE	E EASTERN INTERTIE	F UTILITY DELIVERY	G DSI DELIVERY	H ANCILLARY SERVICES
	FY 2016								
1	DIRECT DEPRECIATION	167,388	2,187	132,538	19,357	2,639	252	225	10,190
2	PERCENTAGE OF DIRECT O&M W/OUT ANCILLARY SERVICES	100.00%	1.36%	61.47%	8.69%	1.12%	0.35%	0.22%	26.79%
3	TRANSMISSION GENERAL PLANT	66,939	909	41,150	5,814	753	235	144	17,934
4	**TOTAL 2016 DEPRECIATION EXPENSE**	**234,327**	**3,096**	**173,688**	**25,171**	**3,392**	**487**	**369**	**28,124**
	FY 2017								
6	DIRECT DEPRECIATION	180,033	2,187	140,075	22,831	2,641	253	225	11,821
7	PERCENTAGE OF DIRECT O&M W/OUT ANCILLARY SERVICES	100.00%	1.36%	61.45%	8.68%	1.12%	0.35%	0.22%	26.82%
8	TRANSMISSION GENERAL PLANT	73,821	1,002	45,365	6,410	830	259	159	19,796
9	**TOTAL 2017 DEPRECIATION EXPENSE**	**253,854**	**3,189**	**185,440**	**29,241**	**3,471**	**512**	**384**	**31,617**

TABLE 2-4
SEGMENTATION OF INTEREST EXPENSE

($000s)

		A TOTAL FCRTS	B GENERATION INTEGRATION	C NETWORK	D SOUTHERN INTERTIE	E EASTERN INTERTIE	F UTILITY DELIVERY	G DSI DELIVERY	H ANCILLARY SERVICES
	FY 2016								
1	TC PROJECTS INTEREST EXPENSE	6,176		5,557	619				
2	TC PROJECTS AFUDC	(560)		(560)					
3	TC PROJECTS NET INTEREST	5,616		4,997	619				
4	REMAINING NET INTEREST EXPENSE	135,467	1,938	111,916	14,530	2,222	227	203	4,432
5	**TOTAL 2016 NET INTEREST**	**141,083**	**1,938**	**116,914**	**15,148**	**2,222**	**227**	**203**	**4,432**
	FY 2017								
8	TC PROJECTS INTEREST EXPENSE	6,041		5,774	267				
9	TC PROJECTS AFUDC	(768)		(768)					
10	TC PROJECTS NET INTEREST	5,273		5,006	267				
11	REMAINING NET INTEREST EXPENSE	142,982	1,811	115,085	18,452	2,076	214	190	5,155
12	**TOTAL 2017 NET INTEREST**	**148,255**	**1,811**	**120,091**	**18,719**	**2,076**	**214**	**190**	**5,155**

TABLE 2-5
SEGMENTATION OF PLANNED NET REVENUE

($000s)

	A	B	C	D	E	F	G	H
FY 2016	**TOTAL FCRTS**	**GENERATION INTEGRATION**	**NETWORK**	**SOUTHERN INTERTIE**	**EASTERN INTERTIE**	**UTILITY DELIVERY**	**DSI DELIVERY**	**ANCILLARY SERVICES**
1 TC PROJECTS REVENUE CREDITS			31,482	8,021				
2 TC PROJECTS NET INTEREST			4,997	619				
3 TC PROJECTS DEPRECIATION			8,376	280				
4 TC PROJECTS MINIMUM REQUIRED NET REVENUE (LN 1-2-3)	25,231		18,108	7,122				
5 REMAINING PLANNED NET REVENUE	80,695	1,154	66,666	8,655	1,324	135	121	2,640
6 **TOTAL PLANNED NET REVENUE (LN 4+5)**	**105,925**	**1,154**	**84,774**	**15,777**	**1,324**	**135**	**121**	**2,640**
FY 2017								
9 TC PROJECTS REVENUE CREDITS			18,403	8,021				
10 TC PROJECTS NET INTEREST			5,006	267				
11 TC PROJECTS DEPRECIATION			8,376	280				
12 TC PROJECTS MINIMUM REQUIRED NET REVENUE (LN 9-10-11)	12,494		5,021	7,474				
13 REMAINING PLANNED NET REVENUE	77,978	988	62,764	10,063	1,132	117	103	2,811
14 **TOTAL PLANNED NET REVENUE (LN 12+13)**	**90,472**	**988**	**67,784**	**17,537**	**1,132**	**117**	**103**	**2,811**

TABLE 2-6
SEGMENTATION OF TRANSMISSION ACQUISITION & ANCILLARY SERVICES

($000s)

	A	B	C	D	E	F	G	H
FY 2016	**TOTAL FCRTS**	**GENERATION INTEGRATION**	**NETWORK**	**SOUTHERN INTERTIE**	**EASTERN INTERTIE**	**UTILITY DELIVERY**	**DSI DELIVERY**	**ANCILLARY SERVICES**
PAYMENTS TO POWER SERVICES:								
1 COE/USBR TRANSMISSION	7,367		7,167			200		
2 GEN DROPPING	415			415				
3 REDISPATCH	225		225					
4 SYNCHRONOUS CONDENSERS	1,610		867	743				
5 STATION SERVICE	2,785	66	2,257	417	13	20	12	
6 GENERATION INPUTS	101,027							101,027
PAYMENTS TO OTHERS (NON-PS):								
7 NON-BBL ANCILLARY SERVICES	18,560	48	2,776	360	55	6	5	15,310
8 OPERATING LEASES	7,447		7,447					
9 SETTLEMENT AGREEMENTS	18	0	11	2	0	0	0	5
10 TRANSMISSION RENEWABLES	1,313	16	738	104	13	4	3	434
11 **TOTAL 2016 TRANS ACQ & ANCLRY**	**140,767**	**130**	**21,488**	**2,041**	**82**	**230**	**20**	**116,776**
FY 2017								
PAYMENTS TO POWER SERVICES:								
12 COE/USBR TRANSMISSION	7,367		7,167			200		
13 GEN DROPPING	415			415				
14 REDISPATCH	225		225					
15 SYNCHRONOUS CONDENSERS	1,610		867	743				
16 STATION SERVICE	2,785	66	2,257	417	13	20	12	
17 GENERATION INPUTS	101,027							101,027
PAYMENTS TO OTHERS (NON-PS):								
18 NON-BBL ANCILLARY SERVICES	18,560	43	2,704	434	49	5	4	15,321
19 OPERATING LEASES	7,447		7,447					
20 SETTLEMENT AGREEMENTS	18	0	11	2	0	0	0	5
21 TRANSMISSION RENEWABLES	1,328	16	737	104	13	4	3	450
22 **TOTAL 2017 TRANS ACQ & ANCLRY**	**140,782**	**125**	**21,416**	**2,114**	**76**	**229**	**19**	**116,803**

TABLE 2-7
REVENUE REQUIREMENTS FOR ANCILLARY SERVICES

($000s)

	FY 2016	A TOTAL ANCILLARY SERVICES	B SCHEDULING, SYST CONTROL, & DISPATCH
1	DIRECT O&M	83,257	68,057
2	OVERHEADS	57,791	57,791
3	**TOTAL O&M**	**141,048**	**125,848**
4	GENERATION INPUTS	101,027	0
5	DEPRECIATION	28,124	28,124
6	NET INTEREST EXPENSE	4,432	4,432
7	PLANNED NET REVENUE	2,640	2,640
8	**TOTAL REV REQ**	**277,270**	**161,043**

	FY 2017	TOTAL ANCILLARY SERVICES	SCHEDULING, SYST CONTROL, & DISPATCH
9	DIRECT O&M	84,154	68,954
10	OVERHEADS	59,843	59,843
11	**TOTAL O&M**	**143,996**	**128,796**
12	GENERATION INPUTS	101,027	0
13	DEPRECIATION	31,617	31,617
14	NET INTEREST EXPENSE	5,155	5,155
15	PLANNED NET REVENUE	2,811	2,811
16	**TOTAL REV REQ**	**284,607**	**168,380**

TABLE 2-8
SEGMENTED REVENUE REQUIREMENT

($000s)

FY 2016	A TOTAL	B GENERATION INTEGRATION	C NETWORK	D SOUTHERN INTERTIE	E EASTERN INTERTIE	F UTILITY DELIVERY	G DSI DELIVERY	H ANCILLARY SERVICES
1 OPERATIONS & MAINTENANCE	452,185	6,063	274,485	38,784	5,022	1,568	963	125,299
2 TRANSMISSION ACQUISITION & ANCILLARY SERVICES	140,767	130	21,488	2,041	82	230	20	116,776
3 DEPRECIATION	234,327	3,096	173,688	25,171	3,392	487	369	28,124
4 NET INTEREST EXPENSE	141,083	1,938	116,914	15,148	2,222	227	203	4,432
5 PLANNED NET REVENUES	105,925	1,154	84,774	15,777	1,324	135	121	2,640
6 **TOTAL TRANSMISSION REVENUE REQUIREMENT**	**1,074,288**	**12,382**	**671,349**	**96,923**	**12,042**	**2,648**	**1,675**	**277,270**

FY 2017	TOTAL	GENERATION INTEGRATION	NETWORK	SOUTHERN INTERTIE	EASTERN INTERTIE	UTILITY DELIVERY	DSI DELIVERY	ANCILLARY SERVICES
7 OPERATIONS & MAINTENANCE	462,411	6,199	280,618	39,651	5,134	1,603	984	128,221
8 TRANSMISSION ACQUISITION & ANCILLARY SERVICES	140,782	125	21,416	2,114	76	229	19	116,803
9 DEPRECIATION	253,854	3,189	185,440	29,241	3,471	512	384	31,617
10 NET INTEREST EXPENSE	148,255	1,811	120,091	18,719	2,076	214	190	5,155
11 PLANNED NET REVENUES	90,472	988	67,784	17,537	1,132	117	103	2,811
12 **TOTAL TRANSMISSION REVENUE REQUIREMENT**	**1,095,775**	**12,312**	**675,350**	**107,262**	**11,888**	**2,675**	**1,680**	**284,607**

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3. TRANSMISSION EXPENSES

3.1 Introduction

This chapter compiles the expenses that are included in transmission revenue requirements for the rate period.

3.2 Expenses

Table 3-1 displays the forecast program spending levels that are the basis for the revenue requirement study. O&M expenses came from the Integrated Program Review process; *see* Transmission Rates Study and Documentation, BP-16-FS-BPA-07, at § 2. Inter-business line expenses, including the cost of redispatch, are composed of two groups of costs. The first is the generation inputs for ancillary services. The second is the annual cost of Network segment facilities and Utility Delivery segment facilities of the Corps of Engineers and Bureau of Reclamation annual costs of those agencies. These inter-business line expenses are recovered by rates agreed to in the Generation Inputs settlement. *See* Fisher and Fredrickson, BP-16-E-BPA-12.

Depreciation and amortization expense is calculated using the straight-line method and remaining-life technique for lines, substations, and each of the FERC Accounts in the general plant category. *See* ch. 4.

Interest expense is calculated in the transmission repayment study using the capital appropriations and BPA revenue bonds issued to the U.S. Treasury at individual interest rates. See chapter 5 for calculation of the interest credit on cash reserves.

TABLE 3-1
TRANSMISSION PROGRAM SPENDING FORECAST
($000s)

	PROGRAM & OTHER OPERATING COSTS	A FY 2016	B FY 2017
1	**TRANSMISSION SYSTEM OPERATIONS**		
2	POWER SYSTEM DISPATCHING	13,536	13,671
3	INFORMATION TECHNOLOGY	10,377	10,558
4	CONTROL CENTER SUPPORT	18,572	18,757
5	TECHNICAL OPERATIONS	14,436	14,538
6	SUBSTATION OPERATIONS	21,399	21,817
7	OVERSUPPLY ADMIN	523	523
8	**SUB-TOTAL TRANSMISSION SYSTEM OPERATIONS**	**78,842**	**79,864**
9	**TRANSMISSION SCHEDULING**		
10	RESERVATIONS	1,362	1,383
11	PRE-SCHEDULING	268	276
12	REAL-TIME SCHEDULING	5,038	5,169
13	SCHEDULING TECHNICAL SUPPORT	4,161	4,259
14	SCHEDULING AFTER-THE-FACT	281	289
15	**SUB-TOTAL TRANSMISSION SCHEDULING**	**11,110**	**11,376**
16	**TRANSMISSION MARKETING**		
17	TRANSMISSION SALES	2,700	2,775
18	CONTRACT MANAGEMENT	4,862	4,984
19	TRANSMISSION BILLING	3,301	3,377
20	BUSINESS STRATEGY & ASSESSMENT	7,171	7,291
21	**SUB-TOTAL TRANSMISSION MARKETING**	**18,033**	**18,426**
22	**TRANSMISSION BUSINESS SUPPORT**		
23	EXECUTIVE AND ADMIN SERVICES	24,235	27,540
24	AIRCRAFT SERVICES	2,205	2,230
25	TS INTERNAL GENERAL & ADMINISTRATIVE	12,961	13,135
26	LOGISTICS SERVICES	4,325	4,488
27	SECURITY ENHANCEMENTS	754	716
28	LEGAL SUPPORT	3,331	3,548
29	**SUB-TOTAL TRANSMISSION BUSINESS SUPPORT**	**47,811**	**51,657**
30	**TRANSMISSION ENGINEERING**		
31	RESEARCH & DEVELOPMENT	9,522	9,555
32	TSD PLANNING & ANALYSIS	16,486	16,738
33	CAPITAL TO EXPENSE TRANSFER	4,307	4,351
34	NERC/WECC COMPLIANCE	20,311	20,422
35	ENVIRONMENTAL POLICY/PLANNING	1,599	1,642
36	ENG. LINE RATING	2,195	2,207
37	**SUB-TOTAL TRANSMISSION ENGINEERING**	**54,421**	**54,915**

TABLE 3-1
TRANSMISSION PROGRAM SPENDING FORECAST
($000s)

	PROGRAM & OTHER OPERATING COSTS	A FY 2016	B FY 2017
38	**TRANSMISSION SYSTEM MAINTENANCE**		
39	NON-ELECTRIC MAINTENANCE	30,750	31,424
40	SUBSTATION MAINTENANCE	28,566	29,043
41	TRANSMISSION LINE MAINTENANCE	27,054	27,482
42	SYSTEM PROTECTION CONTROL MAINTENANCE	13,541	13,741
43	POWER SYSTEM CONTROL MAINTENANCE	18,239	18,507
44	JOINT COST MAINTENANCE	111	113
45	SYSTEM MAINTENANCE MANAGEMENT	9,954	9,556
46	RIGHT OF WAY MAINTENANCE	10,098	10,162
47	POLLUTION PREVENTION & ABATEMENT	4,690	4,787
48	TECHNICAL TRAINING	2,368	2,418
49	VEGETATION MANAGEMENT	17,181	17,039
50	**SUB-TOTAL TRANSMISSION SYSTEM MAINTENANCE**	**162,552**	**164,272**
51	**SUB-TOTAL TRANSMISSION SYSTEM OPERATIONS & MAINTENANCE**	**372,770**	**380,510**
52	**NON-BETWEEN BUSINESS LINE ANCILLARY SERVICES**		
53	LEASED FACILITIES	7,447	7,447
54	SETTLEMENT AGREEMENTS	18	18
55	NON-BBL ANCILLARY SERVICES	18,560	18,560
56	TRANSMISSION RENEWABLES	1,313	1,328
57	**SUB-TOTAL NON-BETWEEN BUSINESS LINE ANCILLARY SERVICES**	**27,338**	**27,353**
58	**CORPORATE EXPENSES**		
59	UNFUNDED RETIREMENT BENEFITS	19,143	19,748
60	CORPORATE OVERHEAD DISTRIBUTIONS	62,895	64,775
61	**SUB-TOTAL CORPORATE CHARGES**	82,038	84,523
62	**OTHER INCOME AND ADJUSTMENTS**	(2,100)	(2,100)
63	**TOTAL TRANSMISSION IPR PROGRAM LEVELS**	**480,045**	**490,286**

TABLE 3-2
SUMMARY OF TRANSMISSION REPAYMENT STUDY DATA

($000s)

		A	B
		2016	**2017**
1	DSR INTEREST	31,431	23,072
2	NON-FEDERAL/CAPITAL LEASES INTEREST	46,349	47,068
3	APPROPRIATION INTEREST	14,386	8,954
4	BOND INTEREST	111,968	135,822
5	**TOTAL GROSS INTEREST**	**204,134**	**214,916**
6	DSR PRINCIPAL	185,303	199,991
7	NON-FEDERAL/CAPITAL LEASE PRINCIPAL	1,392	1,486
8	APPROPRIATION PRINCIPAL	74,910	55,489
9	BOND PRINCIPAL	19,500	40,950
10	**TOTAL PRINCIPAL**	**281,106**	**297,916**

TABLE 3-3
ALLOWANCE FOR FUNDS USED DURING CONSTRUCTION

($000s)

		A	B
PLANT FUNDED FROM BPA BORROWING			
		2016	**2017**
1	CAPITAL EXPENDITURES	595,859	536,063
2	PLANT-IN-SERVICE	618,174	755,608
3	SOY CWIP BALANCE	1,279,714	1,257,399
4	EOY CWIP BALANCE	1,257,399	1,037,854
5	AVERAGE CWIP BALANCE	1,268,557	1,147,626
6	AFUDC RATE	3.29%	3.49%
7	AFUDC FOR FEDERAL PROJECTS	41,736	40,052
8	CORPORATE CAPITAL (65% OF TOTAL)	16,997	13,119
9	CORPORATE AFUDC	591	526
10	**TOTAL AFUDC FOR BPA BORROWING**	**42,327**	**40,578**
PLANT FUNDED FROM REVENUES & BY THIRD PARTIES			
11	CAPITAL EXPENDITURES	10,000	10,000
12	PLANT-IN-SERVICE	5,000	5,000
13	SOY CWIP BALANCE	14,511	19,511
14	EOY CWIP BALANCE	19,511	24,511
15	AVERAGE CWIP BALANCE	17,011	22,011
16	AFUDC RATE	3.29%	3.49%
17	**AFUDC FOR NON-FEDERAL PROJECTS**	**560**	**768**
18	**TOTAL AFUDC**	**42,886**	**41,346**

TABLE 3-4
AMORTIZATION OF PREMIUMS OF BOND REFINANCINGS
($000s)

	A	B	C	D	E	F	G	H	I	J	K	L
	DATE OF REFINANCING	PREMIUM	PRORATION	NO. OF MONTHS	MONTHLY AMORTIZATION	TYPE OF BOND	LAST MONTH TO AMORTIZE	CALCULATION OF ANNUAL AMOUNTS 2013	2014	2015	2016	2017
1	1/0/1998	2,556,947		156	16,391	CONSTRUCTION	May-2011	-	-	-	-	-
2	5/31/1998	6,322,053		408	15,495	CONSTRUCTION	May-2032	186	186	186	186	186
3	8/31/1998	4,684,950		360	13,014	CONSTRUCTION	Aug-2028	156	156	156	156	156
4	8/31/1998	6,560,000		360	18,222	CONSTRUCTION	Aug-2028	219	219	219	219	219
5	**Total**	**20,123,950**			**63,122**			**561**	**561**	**561**	**561**	**561**

TABLE 3-5
BETWEEN BUSINESS LINE COSTS
($000s)

		A	B	C
		2016	**2017**	**AVERAGE**
1	ANCILLARY SERVICES	101,027	101,027	101,027
2	SYNCHRONOUS CONDENSING	1,610	1,610	1,610
3	GENERATION DROPPING	415	415	415
4	COE/RECLAMATION NETWORK/ DELIVERY FACILITIES SEGMENTATION	7,367	7,367	7,367
5	REDISPATCH	225	225	225
6	STATION SERVICE	2,785	2,785	2,785
7	**TOTAL**	**113,429**	**113,429**	**113,429**

TABLE 3-6
SUMMARY OF DEPRECIATION
($000s)

		A 2016	B 2017
1	**TRANSMISSION PLANT**		
2	LINES	72,885	76,625
3	SUBSTATION	81,863	89,102
4	STATION EQUIPMENT	2,132	2,549
5	GENERAL PLANT	66,939	73,821
6	ANCILLARY SERVICES	8,058	9,272
7	INTANGIBLE ASSETS	353	353
8	REGULATORY ASSET	2,098	2,132
9	**TOTAL**	**234,327**	**253,854**

TABLE 3-7
TRANSMISSION REGULATORY ASSETS
($000s)

		A FY 2016	B FY 2017
1	SPACER DAMPERS - 30 YR LIFE		
2	ADDITIONS	-	-
3	AMORTIZATION	936	936
4	SPACER DAMPERS - 25 YR LIFE		
5	ADDITIONS	771	949
6	AMORTIZATION	1,162	1,196
7	CAPITALIZED BOND PREMIUMS	561	561

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4. FCRTS INVESTMENT BASE

4.1 Introduction

This chapter documents the development of the FCRTS investment for the rate period, which is the basis for annual depreciation expense calculations and the allocation of financing-related costs (net interest expense and planned net revenue) to the segments.

4.2 Methodology

The calculation of investment base for each year of the rate period starts with historical transmission plant investment, which is provided by the Transmission Segmentation Study and Documentation, BP-16-FS-BPA-06. The general plant investment is identified according to FERC Account from BPA plant investment records. In addition, general plant investment for facilities required for Ancillary Services is separately identified and treated by FERC Account. The historical investment information includes plant investments associated with Projects Funded In Advance. Entities provide BPA with funding for exclusive use facilities and BPA retains ownership of the facilities. The facilities are excluded from general rate development, but depreciation of the facilities is included in BPA expenses. The depreciation calculated herein on these facilities is used for budgeting purposes, but neither the investment nor associated depreciation is incorporated into ratemaking.

Forecast plant additions, derived from capital budgets, are then added to the historical year investment. The additions are adjusted to take into account retirements. The ratio of retirements to additions based on an average of the most recent five years of actual data by FERC Account is applied to the additions in each year of the cost evaluation period. This procedure produces gross investment for lines, substations, and general plant accounts for each year of the cost evaluation period.

The gross investment is then reduced by accumulated depreciation. Depreciation is calculated using the straight-line method, remaining-life technique. For general plant categories, annual depreciation rates are used unadjusted. For lines and substations, the annual depreciation rate has been weighted by the depreciation rates of each FERC account that composes these facilities. Depreciation is calculated on gross plant investment in each plant category according to the category's group rates. For each forecast year, depreciation expense is added to the prior year's accumulated depreciation to establish the forecast of accumulated depreciation.

Calculation of the investment base for each of the segments for each of the rate period years starts with the average net plant investment for that year (gross investment less accumulated depreciation). Various adjustments are made to the calculated investment base to reflect plant not included in the Transmission Segmentation Study and Documentation's analysis of historical investment and additions, and to remove plant that was funded in advance by customer deposits. First, net investment related to intangible plant (capacity rights acquired by BPA) is added to the Network and Southern Intertie segments based on contract analysis. The regulatory asset net investment (spacer dampers) is added to the Network segment. Then, net investment in general plant categories is prorated to the segments based on the sum of all investments above. Next the Network net plant investment is reduced by the net plant associated with LGIAs, and the Southern Intertie net plant investment is reduced by the net plant associated with the COI upgrade. The Southern Intertie net plant investment is also reduced to remove the balance of the unearned revenues associated with non-Federal capacity ownership on the AC Intertie. Finally, the unearned revenue balance associated with prepaid fiber optic leases is allocated to each segment pro rata based on the communications plant in each segment.

TABLE 4-1
BPA TRANSMISSION PLANT DEPRECIATION AND ACCUMULATED DEPRECIATION
($000s)

		A 2015 PLANT INVEST	B 2015 DEPR EXPENSE	C 2015 ACCUM DEPR	D 2016 PLANT INVEST	E 2016 DEPR EXPENSE	F 2016 ACCUM DEPR	G 2017 PLANT INVEST	H 2017 DEPR EXPENSE	I 2017 ACCUM DEPR
1	**LINES**									
2	GENERATION-INTEGRATION	18,053	404	7,370	18,053	404	7,774	18,053	404	8,178
3	NETWORK	2,851,395	62,292	1,108,171	3,026,362	65,831	1,174,002	3,150,652	69,183	1,243,185
4	SOUTHERN INTERTIE	200,953	4,482	81,373	202,634	4,520	85,893	235,538	4,908	90,801
5	EASTERN INTERTIE	94,891	2,126	38,742	94,891	2,126	40,868	94,891	2,126	42,994
6	UTILITY DELIVERY	170	4	70	170	4	74	170	4	78
7	DSI DELIVERY	0	0	0	0	0	0	0	0	0
8	**TOTAL LINES**	**3,165,463**	**69,308**	**1,235,726**	**3,342,110**	**72,885**	**1,308,611**	**3,499,304**	**76,625**	**1,385,236**
9	PFIA	52,040	1,166	21,247	52,040	1,166	22,413	52,040	1,166	23,579
10	**SUBSTATIONS**									
11	GENERATION-INTEGRATION	81,774	1,783	30,643	81,774	1,783	32,426	81,774	1,783	34,209
12	NETWORK	2,847,222	60,239	1,005,846	3,066,474	64,459	1,070,305	3,227,929	68,609	1,138,914
13	SOUTHERN INTERTIE	660,622	14,137	238,705	682,032	14,635	253,340	943,762	17,721	271,061
14	EASTERN INTERTIE	23,494	510	8,735	23,577	513	9,248	23,656	515	9,763
15	UTILITY DELIVERY	11,354	247	4,237	11,412	248	4,485	11,453	249	4,734
16	DSI DELIVERY	10,333	225	3,872	10,333	225	4,097	10,333	225	4,322
17	**TOTAL SUBSTATIONS**	**3,634,800**	**77,141**	**1,292,039**	**3,875,602**	**81,863**	**1,373,902**	**4,298,907**	**89,102**	**1,463,004**
18	PFIA	90,072	1,964	33,753	90,072	1,964	35,717	90,072	1,964	37,681
19	INTANGIBLE PLANT	9,559	353	1,042	9,559	353	1,395	9,559	353	1,747
20	NETWORK	4,085	151	445	4,085	151	596	4,085	151	747
21	SOUTHERN INTERTIE	5,473	202	597	5,473	202	799	5,473	202	1,001

TRANSMISSION DEPRECIATION SUMMARY

		2015	2016	2017
1	TRANSMISSION PLANT			
2	LINES	69,308	72,885	76,625
3	SUBSTATION	77,141	81,863	89,102
4	GENERAL PLANT	59,644	66,939	73,821
5	ANCILLARY SERVICES	8,133	10,190	11,821
6	INTANGIBLE PLANT	353	353	353
7	REGULATORY ASSET	2,069	2,098	2,132
8	**TOTAL FOR TS RATES**	**216,648**	**234,327**	**253,854**

TABLE 4-2
INVESTMENT BASE
($000s)

		A	B	C	D	E	F
		BALANCE-AS-OF		AVERAGE	BALANCE-AS-OF		AVERAGE
		2015	2016	2016	2016	2017	2017
	COMPLETED PLANT						
1	GENERATION-INTEGRATION	99,827	99,827	99,827	99,827	99,827	99,827
2	NETWORK	5,698,618	6,092,835	5,895,726	6,092,835	6,378,581	6,235,708
3	SOUTHERN INTERTIE	861,576	884,667	873,121	884,667	1,179,300	1,031,983
4	EASTERN INERTIE	118,386	118,469	118,427	118,469	118,548	118,508
5	UTILITY DELIVERY	11,524	11,582	11,553	11,582	11,623	11,603
6	DSI DELIVERY	10,333	10,333	10,333	10,333	10,333	10,333
7	REGULATORY ASSET	56,738	57,509	57,124	57,509	58,458	57,984
8	INTANGIBLE PLANT	9,559	9,559	9,559	9,559	9,559	9,559
9	ANCILLARY SERVICES	184,833	231,009	207,921	231,009	262,278	246,644
10	GENERAL PLANT	1,066,967	1,192,288	1,129,627	1,192,288	1,306,050	1,249,169
11	**TOTAL COMPLETED PLANT**	**8,118,359**	**8,708,077**	**8,413,218**	**8,708,077**	**9,434,556**	**9,071,317**
	ACCUMULATED DEPRECIATION						
12	GENERATION-INTEGRATION	38,013	40,200	39,107	40,200	42,387	41,294
13	NETWORK	2,114,017	2,244,307	2,179,162	2,244,307	2,382,099	2,313,203
14	SOUTHERN INTERTIE	320,078	339,233	329,656	339,233	361,862	350,548
15	EASTERN INERTIE	47,477	50,116	48,797	50,116	52,757	51,437
16	UTILITY DELIVERY	4,306	4,558	4,432	4,558	4,811	4,685
17	DSI DELIVERY	3,872	4,097	3,984	4,097	4,322	4,209
18	REGULATORY ASSET	8,225	10,323	9,274	10,323	12,455	11,389
19	INTANGIBLE PLANT	1,042	1,395	1,218	1,395	1,747	1,571
20	ANCILLARY SERVICES	63,964	74,154	69,059	74,154	85,975	80,064
21	GENERAL PLANT	407,391	474,330	440,861	474,330	548,151	511,241
22	**TOTAL ACCUMULATED DEPRECIATION**	**3,008,387**	**3,242,714**	**3,125,550**	**3,242,714**	**3,496,568**	**3,369,641**
	NET PLANT INVESTMENT						
23	GENERATION-INTEGRATION	61,814	59,627	60,720	59,627	57,440	58,533
24	NETWORK	3,584,600	3,848,528	3,716,564	3,848,528	3,996,481	3,922,505
25	SOUTHERN INTERTIE	541,497	545,433	543,465	545,433	817,437	681,435
26	EASTERN INERTIE	70,908	68,352	69,630	68,352	65,790	67,071
27	UTILITY DELIVERY	7,218	7,023	7,121	7,023	6,812	6,918
28	DSI DELIVERY	6,461	6,236	6,349	6,236	6,011	6,124
29	REGULATORY ASSET	48,513	47,186	47,850	47,186	46,003	46,595
30	INTANGIBLE PLANT	8,516	8,164	8,340	8,164	7,811	7,987
31	ANCILLARY SERVICES	120,870	156,856	138,863	156,856	176,304	166,580
32	GENERAL PLANT	659,575	717,958	688,767	717,958	757,899	737,929
33	**TOTAL NET PLANT INVESTMENT**	**5,109,973**	**5,465,363**	**5,287,668**	**5,465,363**	**5,937,988**	**5,701,676**

TABLE 4-3
BPA PROJECTED TRANSMISSION PLANT INVESTMENT
($000s)

		A	B	C	D	E	F
		2015 ADDITIONS	TOTAL 2015 INVEST	2016 ADDITIONS	TOTAL 2016 INVEST	2017 ADDITIONS	TOTAL 2017 INVEST
1	GENERATION-INTEGRATION	0	99,827	0	99,827	0	99,827
2	NETWORK	308,870	5,698,618	394,218	6,092,835	285,745	6,378,581
3	SOUTHERN INTERTIE	26,007	861,576	23,091	884,667	294,633	1,179,300
4	EASTERN INTERTIE	189	118,386	83	118,469	79	118,548
5	UTILITY DELIVERY	49	11,524	58	11,582	41	11,623
6	DSI DELIVERY	0	10,333	0	10,333	0	10,333
7	REGULATORY ASSET	655	56,738	771	57,509	949	58,458
8	GENERAL PLANT	122,773	1,066,967	125,322	1,192,288	113,762	1,306,050
9	ANCILLARY SERVICES	37,481	184,833	46,176	231,009	31,269	262,278
10	INTANGIBLE - SPACER DAMPERS	0	9,559	0	9,559	0	9,559
11	**TOTAL BPA**	**496,024**	**8,118,360**	**589,718**	**8,708,078**	**726,479**	**9,434,557**

TABLE 4-4
INVESTMENT BASE BY SEGMENT
($000s)

			A	B	C	E	F	G	H	I
	FY 2016		**TOTAL**	**GENERATION INTEGRATION**	**NETWORK**	**SOUTHERN INTERTIE**	**EASTERN INTERTIE**	**UTILITY DELIVERY**	**DSI DELIVERY**	**ANCILLARY SERVICES**
1	NET TRANSMISSION PLANT		4,542,711	60,720	3,716,564	543,465	69,630	7,121	6,349	138,863
2	INTANGIBLE PLANT		8,340		3,565	4,775				
3	REGULATORY ASSET		47,850		47,850					
4	SUBTOTAL INVESTMENT		4,598,901	60,720	3,767,978	548,241	69,630	7,121	6,349	138,863
5		PERCENT	100%	1.32%	81.93%	11.92%	1.51%	0.15%	0.14%	3.02%
6	GENERAL PLANT		688,767	9,094	564,321	82,109	10,428	1,066	951	20,797
7	TC PROJECTS (NET PLANT)		(309,093)		(298,976)	(10,117)				
8	ACC REV BAL ADJ - Fiber		(21,338)	(282)	(17,483)	(2,544)	(323)	(33)	(29)	(644)
9	ACC REV BAL ADJ - 3AC		(96,324)			(96,324)				
10	**INVESTMENT BASE**		**4,860,913**	**69,532**	**4,015,841**	**521,365**	**79,736**	**8,154**	**7,270**	**159,015**
	FY 2017									
11	NET TRANSMISSION PLANT		4,909,165	58,533	3,922,505	681,435	67,071	6,918	6,124	166,580
12	INTANGIBLE PLANT		7,987		3,414	4,574				
13	REGULATORY ASSET		46,595		46,595					
14	SUBTOTAL INVESTMENT		4,963,747	58,533	3,972,513	686,009	67,071	6,918	6,124	166,580
15		PERCENT	100%	1.18%	80.03%	13.82%	1.35%	0.14%	0.12%	3.36%
16	GENERAL PLANT		737,929	8,702	590,568	101,985	9,971	1,028	910	24,764
17	TC PROJECTS (NET PLANT)		(300,436)		(290,599)	(9,837)				
18	ACC REV BAL ADJ - Fiber		(16,096)	(190)	(12,882)	(2,225)	(217)	(22)	(20)	(540)
19	ACC REV BAL ADJ - 3AC		(92,991)			(92,991)				
20	**INVESTMENT BASE**		**5,292,153**	**67,045**	**4,259,601**	**682,941**	**76,825**	**7,924**	**7,014**	**190,804**

TABLE 4-5
CALCULATION OF RETIREMENT RATIOS
($000s)

		A	B	C	D	E	F	G	H
	RETIREMENTS	**FERC Account**	**2010**	**2011**	**2012**	**2013**	**2014**	**Total**	**5-Year Average**
1	STRUCTURES/IMPROVEMENTS	352	343	424	1,132	289	329	2,516	503
2	STATION EQUIPMENT	353	27,319	8,382	11,390	12,295	12,439	71,825	14,365
3	TOWERS & FIXTURES	354	440	390	1,221	62	376	2,489	498
4	POLES & FIXTURES	355	2,556	1,792	706	701	5,395	11,150	2,230
5	OVERHEAD CONDUCTOR	356	1,177	1,433	1,001	457	3,512	7,580	1,516
6	UNDERGROUND CONDUCTOR	358	12	(12)	0	-	7	7	1
7	ROADS & TRAILS	359	17	71	0	6	-	93	19

		A	B	C	D	E	F	G	H	I	J	K	L
	ADDITIONS	**FERC Account**	**2010**	**2011**	**2012**	**2013**	**2014**	**Total**	**5-Year Average Additions**	**Additions Net of Retirement**	**Weighted**	**Ratio (I/H)**	**Weighted Ratio (JxK)**
8	STRUCTURES/IMPROVEMENTS	352	7,821	9,169	12,218	26,098	26,115	81,421	16,284	15,781	0.1088	0.9691	0.1055
9	STATION EQUIPMENT	353	132,473	112,100	156,599	169,468	147,182	717,822	143,564	129,200	0.8912	0.8999	0.8020
10	**STATION SUB-TOTAL (Lines 8+9)**									**144,980**			**0.9075**
11	TOWERS & FIXTURES	354	16,070	6,739	106,865	4,546	10,447	144,668	28,934	28,436	0.2986	0.9828	0.2935
12	POLES & FIXTURES	355	43,086	23,976	16,255	13,061	28,434	124,811	24,962	22,732	0.2387	0.9107	0.2174
13	OVERHEAD CONDUCTOR	356	23,976	18,772	72,871	7,035	15,061	137,714	27,543	26,027	0.2733	0.9450	0.2583
14	UNDERGROUND CONDUCTOR	358	259	0	0	49	-	308	62	60	0.0006	0.9762	0.0006
15	ROADS & TRAILS	359	12,891	12,736	28,411	24,632	11,234	89,905	17,981	17,962	0.1886	0.9990	0.1885
16	**LINES SUB-TOTAL (Lines 11+12+13+14+15)**									**95,217**			**0.9583**

	Ratios of Additions Net of Retirements	
17	Substations	**0.9075**
18	Lines	**0.9583**

TABLE 4-6
BPA TRANSMISSION PLANT INVESTMENT ADDITIONS
($000s)

	E	F	G	H	I	J	K	L	M	N	O	P
GROSS INVESTMENTS	**LINES**	**SUBS**	**OTHER**	**TOTAL 2015 ADDITIONS**	**LINES**	**SUBS**	**OTHER**	**TOTAL 2016 ADDITIONS**	**LINES**	**SUBS**	**OTHER**	**TOTAL 2017 ADDITIONS**
1 GENERATION-INTEGRATION	0	0	0	0	0	0	0	0	0	0	0	0
2 NETWORK	147,123	185,004	0	332,127	182,584	241,608	0	424,192	129,702	177,918	0	307,620
3 SOUTHERN INTERTIE	1,762	26,797	0	28,560	1,754	23,593	0	25,347	34,336	288,417	0	322,753
4 EASTERN INTERTIE	0	208	0	208	0	91	0	91	0	87	0	87
5 UTILITY DELIVERY	0	54	0	54	0	63	0	63	0	46	0	46
6 DSI DELIVERY	0	0	0	0	0	0	0	0	0	0	0	0
7 REGULATORY ASSET	0	0	655	655	0	0	771	771	0	0	949	949
8 GENERAL PLANT	0	0	122,773	122,773	0	0	125,322	125,322	0	0	113,762	113,762
9 **TOTAL BPA**	**148,886**	**212,064**	**123,428**	**484,378**	**184,339**	**265,355**	**126,093**	**575,787**	**164,038**	**466,468**	**114,711**	**745,217**
INVESTMENTS NET OF RETIREMENTS												
10 GENERATION-INTEGRATION	0	0	0	0	0	0	0	0	0	0	0	0
11 NETWORK	140,985	167,885	0	308,870	174,966	219,251	0	394,218	124,290	161,455	0	285,745
12 SOUTHERN INTERTIE	1,689	24,318	0	26,007	1,681	21,410	0	23,091	32,903	261,730	0	294,633
13 EASTERN INTERTIE	0	189	0	189	0	83	0	83	0	79	0	79
14 UTILITY DELIVERY	0	49	0	49	0	58	0	58	0	41	0	41
15 DSI DELIVERY	0	0	0	0	0	0	0	0	0	0	0	0
16 REGULATORY ASSET	0	0	655	655	0	0	771	771	0	0	949	949
17 GENERAL PLANT	0	0	122,773	122,773	0	0	125,322	125,322	0	0	113,762	113,762
18 **TOTAL BPA**	**142,674**	**192,441**	**123,428**	**458,543**	**176,648**	**240,802**	**126,093**	**543,542**	**157,194**	**423,305**	**114,711**	**695,210**

TABLE 4-7
AMORTIZATION OF BPA TRANSMISSION OTHER DEFERRED ASSETS
($000s)

SPACER DAMPERS
30-YEAR SERVICE LIFE

		A	B	C	D	E	F	G	H	I	J
	FY	INVESTMENT	PARTIAL YEAR AMORTIZATION	FULL YEAR AMORTIZATION	ANNUAL AMORTIZATION	ACCUMULATED AMORTIZATION	CUMULATIVE INVESTMENT	DEFERRED INVESTMENT	NET INVESTMENT	ORIGINAL INVESTMENT	RETIREMENT
1	2006	1,094	45	36		0	1,094	5,696		2,728	(1,634)
2	2007	1,123	46	37		0	2,216	5,200		2,800	(1,677)
3	2008	9,658	334	322		0	11,875		11,875	24,091	(14,433)
4	2009	1,119	37	37		0	12,993		12,993	2,790	(1,671)
5	2010	2,688	66	90		0	15,681		15,681	6,704	(4,016)
6	2011	7,802	130	260		1,630	23,483		21,853	39,113	(23,431)
7	2012	3,888	67	130	850	2,480	27,371		24,891		
8	2013	715	25	24	937	3,417	28,086		24,669		
9	2014	0	0	0	936	4,353	28,086		23,733		
10	2015	0	0	0	936	5,290	28,086		22,796		
11	2016	0	0	0	936	6,226	28,086		21,860		
12	2017	0	0	0	936	7,162	28,086		20,924		

FY 2008 investment = 9,617 plus total deferred investment from 2006 and 2007.
FY 2011: retirement of $23,431 of impaired assets

TABLE 4-7

AMORTIZATION OF BPA TRANSMISSION OTHER DEFERRED ASSETS

($000s)

SPACER DAMPERS
25-YEAR SERVICE LIFE

		A	B	C	D	E	F	G	H
	FY	INVESTMENT	PARTIAL YEAR AMORTIZATION	FULL YEAR AMORTIZATION	ANNUAL AMORTIZATION	ACCUMULATED AMORTIZATION	CUMULATIVE INVESTMENT	DEFERRED INVESTMENT	NET INVESTMENT
16	2012	13,020	136	521	136	136	13,020	0	12,884
17	2013	9,662	132	386	653	789	22,682	0	21,893
18	2014	5,315	106	213	1,014	1,802	27,997	0	26,195
19	2015	655	13	26	1,133	2,935	28,652	0	25,717
20	2016	771	15	31	1,162	4,097	29,423	0	25,326
21	2017	949	19	38	1,196	5,293	30,372	0	25,079

TABLE 4-7
AMORTIZATION OF BPA TRANSMISSION OTHER DEFERRED ASSETS
($000s)

SPACER DAMPERS
30-YEAR SERVICE LIFE

		A	B	C	D	E	F	G	H	I	J
	FY	INVESTMENT	PARTIAL YEAR AMORTIZATION	FULL YEAR AMORTIZATION	ANNUAL AMORTIZATION	ACCUMULATED AMORTIZATION	CUMULATIVE INVESTMENT	DEFERRED INVESTMENT	NET INVESTMENT	ORIGINAL INVESTMENT	RETIREMENT
1	2006	1,094	45	36		0	1,094	5,696		2,728	(1,634)
2	2007	1,123	46	37		0	2,216	5,200		2,800	(1,677)
3	2008	9,658	334	322		0	11,875		11,875	24,091	(14,433)
4	2009	1,119	37	37		0	12,993		12,993	2,790	(1,671)
5	2010	2,688	66	90		0	15,681		15,681	6,704	(4,016)
6	2011	7,802	130	260		1,630	23,483		21,853	39,113	(23,431)
7	2012	3,888	67	130	850	2,480	27,371		24,891		
8	2013	715	25	24	937	3,417	28,086		24,669		
9	2014	0	0	0	921	4,321	27,652		23,331		
10	2015	0	0	0	921	5,242	27,652		22,410		
11	2016	0	0	0	921	6,163	27,652		21,489		
12	2017	0	0	0	921	7,084	27,652		20,568		
13	2018	0	0	0	921	8,005	27,652		19,647		
14	2019	0	0	0	921	8,926	27,652		18,726		
15	2020	0	0	0	921	9,847	27,652		17,805		

FY 2008 investment = 9,617 plus total deferred investment from 2006 and 2007.
FY 2011: retirement of $23,431 of impaired assets

TABLE 4-7
AMORTIZATION OF BPA TRANSMISSION OTHER DEFERRED ASSETS
($000s)

SPACER DAMPERS
25-YEAR SERVICE LIFE

		A	B	C	D	E	F	G	H
	FY	INVESTMENT	PARTIAL YEAR AMORTIZATION	FULL YEAR AMORTIZATION	ANNUAL AMORTIZATION	ACCUMULATED AMORTIZATION	CUMULATIVE INVESTMENT	DEFERRED INVESTMENT	NET INVESTMENT
16	2012	13,020	136	521	136	136	13,020	0	12,884
17	2013	9,662	132	386	653	789	22,682	0	21,893
18	2014	5,315	106	213	1,014	1,802	27,997	0	26,195
19	2015	655	13	26	1,133	2,935	28,652	0	25,717
20	2016	771	15	31	1,162	4,097	29,423	0	25,326
21	2017	949	19	38	1,196	5,293	30,372	0	25,079
22	2018	350	7	14	1,222	6,515	30,722	0	24,207
23	2019	0	0	0	1,229	7,744	30,722	0	22,978
24	2020	0	0	0	1,229	8,972	30,722	0	21,750

Modified Table- Added Original Investment and Retirements and 25 year life amortization table

TABLE 4-8
DEPRECIATION OF CUSTOMER-FUNDED INVESTMENTS
($000s)

LARGE GENERATOR INTERCONNECTION AGREEMENTS

	A	B	C	D	E	F	G	H	I	J
						DEPRECIATION		ACCUMULATED DEPRECIATION		
	IN-SERVICE	CUMULATIVE INVESTMENT	TOTAL ANNUAL INVESTMENT	LINES	SUBSTATIONS	LINES	SUBSTATIONS	LINES	SUBSTATIONS	TOTAL
1	2006	6,980	6,980	768	6,212	8	77	8	77	85
2	2007	33,827	26,847	2,953	23,894	49	453	57	530	587
3	2008	56,641	22,814	2,510	20,304	108	1,004	165	1,534	1,699
4	2009	128,460	71,819	7,900	63,919	220	2,054	385	3,588	3,973
5	2010	136,700	8,240	1,086	7,154	317	2,940	702	6,528	7,230
6	2011	194,898	58,198	3,446	54,752	366	3,712	1,068	10,240	11,308
7	2012	216,898	22,000	3,300	18,700	439	4,628	1,507	14,868	16,375
8	2013	265,102	48,204	7,299	40,905	554	5,371	2,061	20,240	22,301
9	2014	341,286	76,184	11,428	64,757	756	6,689	2,818	26,929	29,746
10	2015	341,286	-	-	-	880	7,496	3,698	34,425	38,123
11	2016	341,286	-	-	-	880	7,496	4,577	41,921	46,499
12	2017	341,286	-	-	-	880	7,496	5,457	49,418	54,875

CALIFORNIA-OREGON INTERTIE (COI)

						DEPRECIATION		ACCUMULATED DEPRECIATION		
	IN-SERVICE	CUMULATIVE INVESTMENT	TOTAL ANNUAL INVESTMENT	LINES	SUBSTATIONS	LINES	SUBSTATIONS	LINES	SUBSTATIONS	TOTAL
13	2012	11,238	11,238	0	11,238	0	140	0	140	140
14	2013	11,238	0	0	0	0	280	0	420	420
15	2014	11,238	0	0	0	0	280	0	701	701
16	2015	11,238	0	0	0	0	280	0	981	981
17	2016	11,238	0	0	0	0	280	0	1,261	1,261
18	2017	11,238	0	0	0	0	280	0	1,541	1,541

TABLE 4-9
BPA GENERAL PLANT CUMULATIVE INVESTMENT
($000s)

		A	B	C	D	E	F	G	H	I
		FERC ACCT	DEPR ACCRL RATE	FY 2015 TOTAL INVEST	FY 2016 DEPR EXPENSE	FY 2016 ACCUM DEPR	FY 2016 TOTAL INVEST	FY 2017 DEPR EXPENSE	FY 2017 ACCUM DEPR	FY 2017 TOTAL INVEST
1	LAND & LAND RIGHTS	389	0.0642	11,920	1,052	1,435	20,866	1,625	3,060	29,758
2	STRUCTURES & IMPROVEMENTS	390	0.0178	245,923	4,951	67,272	310,421	5,880	73,152	350,278
3	OFFICE FURNITURE & FIXTURES	391.1	0.0527	1,696	43	1,696	1,696	0	1,696	1,696
4	DATA PROCESSING -EQUIPMENT	391.2	0.1327	556	74	423	556	74	497	556
5	DATA PROCESSING -SOFTWARE	391.3	0.1710	37,795	7,034	26,503	44,478	8,134	34,637	50,662
6	TRANSPORT EQUIPMENT	392.1	0.0333	62,309	2,168	24,240	67,925	2,364	26,604	74,040
7	HELICOPTERS	392.2	0.0332	9,234	307	3,294	9,234	307	3,601	9,234
8	AIRPLANES	392.3	0.0630	8,656	545	4,615	8,656	545	5,160	8,656
9	STORES EQUIPMENT	393	0.0391	3,006	118	368	3,006	118	486	3,006
10	TOOLS, SHOP & GARAGE EQUIPMENT	394	0.0410	14,107	656	4,311	17,872	814	5,125	21,821
11	LAB EQUIPMENT	395	0.0688	25,593	1,761	12,573	25,593	1,761	14,334	25,593
12	POWER OPERATED EQUIPMENT	396	0.0540	27,832	1,503	13,510	27,832	1,503	15,013	27,832
13	COMMUNICATIONS EQUIPMENT	397	0.0569	470,998	27,335	224,340	489,815	28,885	253,225	525,461
14	MISC EQUIPMENT	398	0.0670	39,554	2,650	21,269	39,554	2,650	23,919	39,554
15	**SUBTOTAL GENERAL PLANT**			**959,178**	**50,197**	**405,847**	**1,067,503**	**54,660**	**460,507**	**1,168,146**
CORPORATE ASSIGNMENT										
18	OFFICE FURNITURE & FIXTURES	391.1	0.05270	987	0	987	987	0	987	987
19	DATA PROCESSING -EQUIPMENT	391.2	0.13270	32,872	4,362	21,140	32,872	4,362	25,502	32,872
20	DATA PROCESSING -SOFTWARE	391.3	0.17100	58,243	11,276	40,341	73,643	13,594	53,935	85,352
21	COMMUNICATIONS EQUIPMENT	397	0.05690	-	0	-	-	0	-	-
22	MISC EQUIPMENT	398	0.06700	15,687	1,104	6,016	17,283	1,205	7,221	18,694
23	**SUBTOTAL CORPORATE ASSIGNMENT**			**107,789**	**16,742**	**68,483**	**124,785**	**19,161**	**87,644**	**137,904**
24	**TOTAL GENERAL PLANT**			**1,066,967**	**66,939**	**474,330**	**1,192,288**	**73,821**	**548,151**	**1,306,050**

Removed Station Equipment (FERC 353) Line Item, now showing in Ancillary Services Table 4.11

TABLE 4-10
BPA TRANSMISSION GENERAL PLANT PROJECTED PLANT ADDITIONS
($000s)

		A	B	C	D
		FERC ACCT	**2015 ADDTNS**	**2016 ADDTNS**	**2017 ADDTNS**
1	LAND & LAND RIGHTS	389	11,920	8,946	8,892
2	STRUCTURES & IMPROVEMENTS	390	51,874	64,498	39,858
3	OFFICE FURNITURE & FIXTURES	391.1	0	0	0
4	DATA PROCESSING -EQUIPMENT	391.2	0	0	0
5	DATA PROCESSING -SOFTWARE	391.3	7,840	6,683	6,183
6	TRANSPORT EQUIPMENT	392.1	5,700	5,616	6,115
7	HELICOPTERS	392.2	0	0	0
8	AIRPLANES	392.3	0	0	0
9	STORES EQUIPMENT	393	0	0	0
10	TOOLS, SHOP & GARAGE EQUIPMENT	394	3,824	3,765	3,949
11	LAB EQUIPMENT	395	0	0	0
12	POWER OPERATED EQUIPMENT	396	0	0	0
13	COMMUNICATIONS EQUIPMENT	397	22,669	18,817	35,646
14	MISC EQUIPMENT	398	0	0	0
15	**SUBTOTAL GENERAL PLANT**		**103,827**	**108,325**	**100,643**
16	STATION EQUIPMENT	353	12,751	14,298	23,967
17	**TOTAL GENERAL PLANT**		**116,578**	**122,623**	**124,610**
	CORPORATE ASSIGNMENT				
18	OFFICE FURNITURE & FIXTURES	391.1	0	0	0
19	DATA PROCESSING -EQUIPMENT	391.2	0	0	0
20	DATA PROCESSING -SOFTWARE	391.3	17,711	15,400	11,709
21	COMMUNICATIONS EQUIPMENT	397	0	0	0
22	MISC EQUIPMENT	398	1,235	1,596	1,411
23	**TOTAL CORPORATE ASSIGNMENT**		**18,946**	**16,997**	**13,119**

TABLE 4-11
ANCILLARY SERVICES
SCHEDULING, SYSTEM CONTROL, AND DISPATCH SERVICES
($000s)

	PLANT ADDITIONS	A	B	C
	FERC ACCOUNT	2015	2016	2017
1	353	12,751	14,298	23,967
2	391.2	0	0	0
3	391.3	1,214	1,421	326
4	397	23,516	30,457	6,976
5	Total	37,481	46,176	31,269

		A	B	C	D	E	F	G	H
	FERC ACCOUNT	DEPR ACCRL RATE	2015 TOTAL INVEST	2016 DEPR EXP	2016 ACCUM DEPR	2016 TOTAL INVEST	2017 DEPR EXP	2017 ACCUM DEPR	2017 TOTAL INVEST
6	353	0.02180	90,655	2,132	31,463	104,953	2,549	34,012	128,920
7	391.2	0.13270	13,103	1,739	9,959	13,103	1,739	11,698	13,103
8	391.3	0.17100	6,287	1,197	4,485	7,709	1,346	5,831	8,034
9	397	0.05690	74,788	5,122	28,247	105,245	6,187	34,434	112,221
10	Total		184,833	10,190	74,154	231,009	11,821	85,975	262,278

		A	B	C	D	E	F
	FERC ACCOUNT PLANT INVESTMENT	2015	2016	AVERAGE 2016	2016	2017	AVERAGE 2017
11	353	90,655	104,953	97,804	104,953	128,920	116,936
12	391.2	13,103	13,103	13,103	13,103	13,103	13,103
13	391.3	6,287	7,709	6,998	7,709	8,034	7,872
14	397	74,788	105,245	90,016	105,245	112,221	108,733
15	Total	184,833	231,009	207,921	231,009	262,278	246,644
	ACCUMULATED DEPRECIATION						
16	353	29,331	31,463	30,397	31,463	34,012	32,738
17	391.2	8,220	9,959	9,089	9,959	11,698	10,828
18	391.3	3,288	4,485	3,886	4,485	5,831	5,158
19	397	23,125	28,247	25,686	28,247	34,434	31,340
20	Total	63,964	74,154	69,059	74,154	85,975	80,064
	NET PLANT INVESTMENT						
21	353	61,324	73,490	67,407	73,490	94,908	84,199
22	391.2	4,883	3,144	4,013	3,144	1,405	2,274
23	391.3	3,000	3,224	3,112	3,224	2,204	2,714
24	397	51,663	76,998	64,331	76,998	77,788	77,393
25	Total	120,870	156,856	138,863	156,856	176,304	166,580

5. PROJECTED CASH BALANCES/INTEREST CREDITS

5.1 Introduction

This chapter projects Transmission Services' cash balances for the rate period and estimates the interest income (credits) to be earned on BPA's projected cash balances and on annual funds to be returned to the U.S. Treasury.

5.2 Interest credits on BPA's projected cash balances

The beginning rate period cash balance was derived from BPA's business unit cash analysis for the end of FY 2012 and from current forecasts of transmission revenues, expenses, and cash flows for FY 2013. The annual incremental cash provided from forecast net revenues is added to the beginning cash balance for revenue requirements and the current and revised revenue tests. Reserves during the rate period are reduced by $15 million each year for the funding of capital expenditures in lieu of U.S. Treasury borrowing. Using the existing interest earnings rate, annual interest income is calculated from projected average annual cash balances. The resulting interest income is applied as a credit against interest expense in the transmission revenue requirements and in the income statements of the current and revised revenue tests.

5.3 Interest credits on funds held for others

The projected interest earnings rate is multiplied by the funds held for others (FHFO) average cash balance for each year to determine the annual interest income. The resulting interest income is applied as a credit against interest expense in the transmission revenue requirement.

5.4 Interest income (repayment program calculation)

Separately, interest income rates listed in this chapter are calculated and used within the repayment program to calculate an interest credit based on the average cash necessary to pay the interest, bond call premiums, and amortization payments calculated by the study for return to the

U.S. Treasury in each study year. The repayment program assumes the cash accumulates at a uniform rate throughout the year, except for interest paid on bonds issued to the U.S. 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, and payment of bond premiums.

TABLE 5-1

INTEREST INCOME FROM PROJECTED CASH BALANCES

REVENUE REQUIREMENT DEVELOPMENT

($000s)

		A	B
		2016	**2017**
1	ANNUAL CASH SURPLUS/(DEFICIT)	-	-
2	ADJUSTMENTS TO CASH	(15,000)	(15,000)
3	SOY CASH BALANCE	460,000	445,000
4	EOY CASH BALANCE	445,000	430,000
5	AVERAGE CASH BALANCE	452,500	437,500
6	INTEREST INCOME RATE	1.48%	2.67%
7	INTEREST ON BPA FUND/INVESTMENTS (LN 5 X LN 6)	6,697	11,681
8	REPAYMENT STUDY INTEREST INCOME	1,264	2,341
INTEREST EARNED ON FUNDS HELD FOR OTHERS			
9	SOY CASH BALANCE	100,000	40,000
10	EOY CASH BALANCE	40,000	40,000
11	AVERAGE CASH BALANCE	70,000	40,000
12	INTEREST ON FUNDS HELD FOR OTHERS (LN 11 X LN 6)	1,036	1,068
13	TRUSTEE INTEREST INCOME	200	200
14	**TOTAL ANNUAL INTEREST INCOME (LN 7+8+12+13)**	**9,197**	**15,290**

TABLE 5-2

INTEREST INCOME FROM PROJECTED CASH BALANCES

REVENUES FROM CURRENT RATES

($000s)

		A	B
		2016	**2017**
1	ANNUAL CASH SURPLUS/(DEFICIT)	(41,288)	(60,914)
2	ADJUSTMENTS TO CASH	(15,000)	(15,000)
3	SOY CASH BALANCE	460,000	403,712
4	EOY CASH BALANCE	403,712	327,798
5	AVERAGE CASH BALANCE	431,856	365,755
6	INTEREST INCOME RATE	1.48%	2.67%
7	INTEREST ON BPA FUND/INVESTMENTS (LN 5 X LN 6)	6,391	9,766
8	REPAYMENT STUDY INTEREST INCOME	1,264	2,341
INTEREST EARNED ON FUNDS HELD FOR OTHERS			
9	SOY CASH BALANCE	100,000	40,000
10	EOY CASH BALANCE	40,000	40,000
11	AVERAGE CASH BALANCE	70,000	40,000
12	INTEREST INCOME (LN 11 X LN 6)	1,036	1,068
	TRUSTEE INTEREST INCOME	200	200
13	**TOTAL ANNUAL INTEREST INCOME (LN 7+8+12+13)**	**8,892**	**13,374**

TABLE 5-3

INTEREST INCOME FROM PROJECTED CASH BALANCES

REVENUES FROM PROPOSED RATES

($000s)

		A	B
		2016	**2017**
1	ANNUAL CASH SURPLUS/(DEFICIT)	4,981	(14,308)
2	ADJUSTMENTS TO CASH	(15,000)	(15,000)
3	SOY CASH BALANCE	460,000	449,981
4	EOY CASH BALANCE	449,981	420,674
5	AVERAGE CASH BALANCE	454,991	435,328
6	INTEREST INCOME RATE	1.48%	2.67%
7	INTEREST ON BPA FUND/INVESTMENTS (LN 5 X LN 6)	6,734	11,623
8	REPAYMENT STUDY INTEREST INCOME	1,264	2,341
INTEREST EARNED ON FUNDS HELD FOR OTHERS			
9	SOY CASH BALANCE	100,000	40,000
10	EOY CASH BALANCE	40,000	40,000
11	AVERAGE CASH BALANCE	70,000	40,000
12	INTEREST INCOME (LN 11 X LN 6)**	1,036	1,068
13	TRUSTEE INTEREST INCOME	200	200
14	**TOTAL ANNUAL INTEREST INCOME (LN 7+8+12+13)**	**9,234**	**15,232**

**Includes additional $200k for trustee interest income from lease financing

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6. INTEREST RATES AND PRICE DEFLATORS

6.1 Introduction

Interest rates on bonds issued by BPA to the U.S. Treasury are used in development of repayment studies and projections of Federal interest expense in revenue requirements.

6.2 Source of Forecasts

To project interest rates on bonds issued to the U.S. Treasury, BPA uses U.S. Treasury yield curve forecasts provided by the IHS Global Insights Group (GI). GI is also the source of price deflators that BPA treats as escalators for purposes of developing spending levels. GI develops the price deflators taking into account projections of Gross Domestic Product (GDP). The GDP consists of the sum of consumption, investment, government purchases, and net exports, excluding transfers to foreigners.

6.3 Interest Rate Projections

Projected interest rates for BPA bonds issued to the U.S. Treasury are based on GI's yield curve projections of U.S. Treasury market rates, plus a markup of up to 190 basis points, depending on the length of time to maturity and call options. The markup estimate reflects an interagency agreement that the U.S. Treasury will price BPA bonds at a level comparable to the price for securities (bonds) 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.

6.4 Deflators

The current and cumulative price deflators used to escalate midyear dollars are derived from the fiscal and calendar year price deflators provided by GI. They are calculated as follows:

$$[(FY1/100) \times 0.5] + 1 = \text{Cumulative Price Deflator1}$$

Thus, 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.

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

Thus, the fiscal year GDP price deflator for a future 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 each successive year.

When deflators are used in developing the FY 2016–2017 spending levels, they are based on the price deflators from the September 2013 GI Base Case forecast.

United States Government **Department of Energy**

Bonneville Power Administration

memorandum

DATE:

REPLY TO ATTN OF: FTC-2

SUBJECT: FY 2015 Interest Rate and Inflation Forecast

TO: See Attached "cc:" List

Please see the attached BPA interest rate and inflation forecast for the period FY 2015 through 2044.

These forecasts provide an internally consistent basis for BPA decisions regarding debt management, budget formulation and other financial analyses, as well as capital budgeting and strategic planning efforts. The FY 2015 forecast is summarized in the following tables:

- Table 1: 30 Year Treasury Yields and BPA Borrowing Rates
- Table 2: Forecast Comparison – 30 Year BPA Borrowing Rate – Callable at Par
- Table 3: 20 Year Treasury Yields and BPA Borrowing Rates
- Table 4: 15 Year Treasury Yields and BPA Borrowing Rates
- Table 5: BPA FY 2015 Appropriation Borrowing Rate Forecast
- Table 6: BPA FY 2015 BPA Borrowing Rate – No Premium
- Table 7: BPA FY 2015 BPA Borrowing Rate – Coupon Scale-Down Redemption Premium
- Table 8: BPA FY 2015 BPA Borrowing Rate – Callable at Par
- Table 9: BPA FY 2015 Third-Party Taxable Borrowing Rate Forecast
- Table 10: BPA FY 2015 Third-Party Tax-Exempt Borrowing Rate Forecast
- Table 11: BPA FY 2015 FERC Borrowing Rate (Bank Prime) Forecast
- Table 12: BPA FY 2015 May 3-Month LIBOR Rate Forecast
- Table 13: Comparison of FY 2015 Inflation Forecast Components

Borrowing Rate Forecast Methodology

The FY 2015 forecast is based on the Global Insight (GI) Third Quarter August 2014 Long-Term Economic Outlook.

Tables 1, 3, and 4 illustrate the components of BPA's Treasury borrowing rate forecasts. GI calendar year (CY) projections of 30-year Treasury bond yields are shown in Column A. BPA fiscal year (FY) projections are shown in Column B. Column C, D, and E reflect BPA's Treasury borrowing rate options.

BPA borrowing rates from the U.S. Treasury reflect a mark-up over the Treasury yield curve. Table 6 is the Government Agency borrowing rate spread over the Treasury yield curve and reflects the rate BPA would borrow at without a call premium. The other two rates {Table 7 and Table 8} reflect the two additional borrowing options BPA

can exercise with Treasury: callable at par and coupon-scale down. A callable at par call option allows BPA to redeem the bond before maturity without paying a call premium at the time of the call. The cost of this call option results in a mark-up to the coupon rate, resulting in higher interest expense paid over the life of the bond. With a coupon scale down call option the call premium is determined at the time of bond issuance for each option call date over the bond's term; this call premium is only paid if the bond is called. In addition to paying a call premium at the time the bond is called, there is also a mark-up to the coupon rate for the coupon scale down option. The premium for these two call options are calculated using historical spread premiums.

Table Descriptions

Tables 1, 3, and 4: Shows the steps involved to arrive at the BPA borrowing rate.
Table 2: Shows the difference between the BPA borrowing rate - callable at par between last year and this year.
Table 5: Forecasts a rate equivalent to the Treasury yield curve.
Table 6: Forecasts the rate at which Bonneville would borrow from the U.S. Treasury for a bullet bond with no call option.
Table 7: Forecasts the rate at which Bonneville would borrow from the U.S. Treasury for a bullet bond with a callable at par call option.
Table 8: Forecasts the rate at which Bonneville would borrow from the U.S. Treasury for a bullet bond with a coupon scale-down call option.
Table 9: Forecasts the rate at which Bonneville would back third-party bonds on a taxable basis, as with the Lease Purchase Program.
Table 10: Forecasts the rate at which Bonneville would back third-party bonds on a tax-exempt basis, as with Bonneville-backed Energy Northwest bonds.
Table 11: Forecasts the Prime rate, the rate at which banks charge interest for their most creditworthy customers.
Table 12: Forecasts the 3-month LIBOR rate, the rate charged by London banks, used as a benchmark rate worldwide.
Table 13: Forecasts the projected change in the Gross Domestic Product (GDP) price deflator and compares to the FY 2014 inflation forecast. The table also forecasts future inflation rates.

Inflation Forecast

BPA inflation assumptions reflect projected changes in the U.S. GDP Price Deflator. The GDP Price Deflator is the broadest measure of inflation in the U.S. economy. GDP reflects the value of all goods and services produced by domestic and foreign capital and labor within the United States. Major components of GDP include: total consumption, investment, government purchases, and net exports. The real GDP calculations reflect both the changing mix of the components in GDP and the relative price changes in these components.

This index assumes a base year of 2009. The projected change in the GDP price deflator and comparison with the FY 2014 inflation forecast is summarized in Table 13. Column A shows the projected trend in GDP inflation rates between 2015-2044 on a calendar year basis and in column B by BPA fiscal year. Column C provides the cumulative price

index projections. The forecast expresses fiscal year dollar values as mid-year dollar values.

If you have questions, or suggestions concerning the FY 2014 Interest Rate and Inflation Forecasts, please contact Bill Hendricks at (503) 230-5389.

Bill Hendricks
Financial Analyst, Debt and Investment Management
Attachment

cc:
See Front List
Official File –
http://internal.bpa.gov/finance/FT/FTC/Common%20Agency%20Assumptions/Forms/AllItems.aspx

Table 1

30 Year Treasury Yields and BPA Borrowing Rates

FY 2015 Forecast of BPA Borrowing Rates

Calendar/Fiscal Years 2015-2044

Year	A Bond Rate 1/ Calendar Year	B Bond Rate 2/ Fiscal Year	C BPA Rate 3/ No Premium Fiscal Year	D BPA Rate 4/ Coupon Scale-Down Fiscal Year	E BPA Rate 5/ Callable at Par Fiscal Year
2014	3.91				
2015	4.21	3.25	4.60	5.82	6.04
2016	4.48	4.42	4.93	6.15	6.38
2017	4.61	4.58	5.14	6.37	6.60
2018	4.61	4.61	5.22	6.45	6.69
2019	4.61	4.61	5.26	6.50	6.75
2020	4.61	4.61	5.26	6.51	6.76
2021	4.61	4.61	5.26	6.51	6.76
2022	4.61	4.61	5.26	6.51	6.76
2023	4.61	4.61	5.26	6.51	6.76
2024	4.61	4.61	5.26	6.51	6.76
2025	4.61	4.61	5.26	6.51	6.76
2026	4.61	4.61	5.26	6.51	6.76
2027	4.61	4.61	5.26	6.51	6.76
2028	4.61	4.61	5.26	6.51	6.76
2029	4.61	4.61	5.26	6.51	6.76
2030	4.61	4.61	5.26	6.51	6.76
2031	4.61	4.61	5.26	6.51	6.76
2032	4.61	4.61	5.26	6.51	6.76
2033	4.61	4.61	5.26	6.51	6.76
2034	4.61	4.61	5.26	6.51	6.76
2035	4.61	4.61	5.26	6.51	6.76
2036	4.61	4.61	5.26	6.51	6.76
2037	4.61	4.61	5.26	6.51	6.76
2038	4.61	4.61	5.26	6.51	6.76
2039	4.61	4.61	5.26	6.51	6.76
2040	4.61	4.61	5.26	6.51	6.76
2041	4.61	4.61	5.26	6.51	6.76
2042	4.61	4.61	5.26	6.51	6.76
2043	4.61	4.61	5.26	6.51	6.76
2044	4.61	4.61	5.26	6.51	6.76

1/ Global Insight: The U.S. Economy: 30-Year Focus, August 2014 Forecast, Base Case.

2/ FY 2015 Appropriation rates are determined in accordance with BPA Appropriations Refinancing Act, 16 U.S.C. 8381 enacted on April 26, 1996, and are independent of the Global Insight Treasury Yield forecasts.

3/ Column C = Column B + U.S. Treasury borrowing markup, no premium

4/ Column D = Column B + U.S. Treasury borrowing markup + Coupon Scale-Down premium

5/ Column E = Column B + U.S. Treasury borrowing markup + Callable at Par premium

Table 2

Forecast Comparison - 30 Year BPA Borrowing Rate - Callable at Par

BPA FY 2015 vs. BPA FY 2014

Fiscal Years 2015-2044

Year	A FY 2015 Forecast BPA Rate 1/ Callable at Par	B FY 2014 Forecast BPA Rate 2/ Callable at Par	C Difference (A-B)
2015	6.04	6.13	-0.08
2016	6.38	6.47	-0.09
2017	6.60	6.65	-0.04
2018	6.69	6.66	0.03
2019	6.75	6.67	0.08
2020	6.76	6.67	0.10
2021	6.76	6.67	0.10
2022	6.76	6.67	0.10
2023	6.76	6.67	0.10
2024	6.76	6.67	0.10
2025	6.76	6.67	0.10
2026	6.76	6.67	0.10
2027	6.76	6.67	0.10
2028	6.76	6.67	0.10
2029	6.76	6.67	0.10
2030	6.76	6.67	0.10
2031	6.76	6.67	0.10
2032	6.76	6.67	0.10
2033	6.76	6.67	0.10
2034	6.76	6.67	0.10
2035	6.76	6.67	0.10
2036	6.76	6.67	0.10
2037	6.76	6.67	0.10
2038	6.76	6.67	0.10
2039	6.76	6.67	0.10
2040	6.76	6.67	0.10
2041	6.76	6.67	0.10
2042	6.76	6.67	0.10
2043	6.76	6.67	0.10
2044	6.76		

1/ Global Insight: The U.S. Economy: 30-Year Focus, August 2014 Forecast, Base Case.

2/ Global Insight: The U.S. Economy: 30-year Focus, September 2013 Forecast, Base Case.

Table 3

20 Year Treasury Yields and BPA Borrowing Rates

FY 2015 Forecast of BPA Borrowing Rates

Fiscal Years 2015-2044

Year	A Bond Rate 1/ Calendar Year	B Bond Rate 2/ Fiscal Year	C BPA Rate 3/ No Premium Fiscal Year	D BPA Rate 4/ Coupon Scale-Down Fiscal Year	E BPA Rate 5/ Callable at Par Fiscal Year
2014	3.41				
2015	3.74	3.00	4.15	5.18	5.39
2016	4.11	4.01	4.53	5.58	5.79
2017	4.41	4.33	4.88	5.94	6.16
2018	4.41	4.41	4.99	6.06	6.28
2019	4.41	4.41	5.02	6.10	6.33
2020	4.41	4.41	5.02	6.11	6.35
2021	4.41	4.41	5.02	6.11	6.35
2022	4.41	4.41	5.02	6.11	6.35
2023	4.41	4.41	5.02	6.11	6.35
2024	4.41	4.41	5.02	6.11	6.35
2025	4.41	4.41	5.02	6.11	6.35
2026	4.41	4.41	5.02	6.11	6.35
2027	4.41	4.41	5.02	6.11	6.35
2028	4.41	4.41	5.02	6.11	6.35
2029	4.41	4.41	5.02	6.11	6.35
2030	4.41	4.41	5.02	6.11	6.35
2031	4.41	4.41	5.02	6.11	6.35
2032	4.41	4.41	5.02	6.11	6.35
2033	4.41	4.41	5.02	6.11	6.35
2034	4.41	4.41	5.02	6.11	6.35
2035	4.41	4.41	5.02	6.11	6.35
2036	4.41	4.41	5.02	6.11	6.35
2037	4.41	4.41	5.02	6.11	6.35
2038	4.41	4.41	5.02	6.11	6.35
2039	4.41	4.41	5.02	6.11	6.35
2040	4.41	4.41	5.02	6.11	6.35
2041	4.41	4.41	5.02	6.11	6.35
2042	4.41	4.41	5.02	6.11	6.35
2043	4.41	4.41	5.02	6.11	6.35
2044	4.41	4.41	5.02	6.11	6.35

1/ Global Insight: The U.S. Economy: 30-Year Focus, August 2014 Forecast, Base Case.

2/ FY 2015 Appropriation rates are determined in accordance with BPA Appropriations Refinancing Act, 16 U.S.C. 8381 enacted on April 26, 1996, and are independent of the Global Insight Treasury Yield forecasts.

3/ Column C = Column B + U.S. Treasury borrowing markup, no premium

4/ Column D = Column B + U.S. Treasury borrowing markup + Coupon Scale-Down premium

5/ Column E = Column B + U.S. Treasury borrowing markup + Callable at Par premium

Table 4

15 Year Treasury Yields and BPA Borrowing Rates

FY 2015 Forecast of BPA Borrowing Rates

Fiscal Years 2015-2044

Year	A Bond Rate 1/ Calendar Year	B Bond Rate 2/ Fiscal Year	C BPA Rate 3/ No Premium Fiscal Year	D BPA Rate 4/ Coupon Scale-Down Fiscal Year	E BPA Rate 5/ Callable at Par Fiscal Year
2014	3.16				
2015	3.50	2.84	3.92	4.86	5.06
2016	3.92	3.81	4.34	5.29	5.50
2017	4.30	4.21	4.75	5.72	5.93
2018	4.31	4.31	4.87	5.86	6.08
2019	4.31	4.31	4.90	5.89	6.12
2020	4.31	4.31	4.90	5.90	6.14
2021	4.31	4.31	4.90	5.90	6.14
2022	4.31	4.31	4.90	5.90	6.14
2023	4.31	4.31	4.90	5.90	6.14
2024	4.31	4.31	4.90	5.90	6.14
2025	4.31	4.31	4.90	5.90	6.14
2026	4.31	4.31	4.90	5.90	6.14
2027	4.31	4.31	4.90	5.90	6.14
2028	4.31	4.31	4.90	5.90	6.14
2029	4.31	4.31	4.90	5.90	6.14
2030	4.31	4.31	4.90	5.90	6.14
2031	4.31	4.31	4.90	5.90	6.14
2032	4.31	4.31	4.90	5.90	6.14
2033	4.31	4.31	4.90	5.90	6.14
2034	4.31	4.31	4.90	5.90	6.14
2035	4.31	4.31	4.90	5.90	6.14
2036	4.31	4.31	4.90	5.90	6.14
2037	4.31	4.31	4.90	5.90	6.14
2038	4.31	4.31	4.90	5.90	6.14
2039	4.31	4.31	4.90	5.90	6.14
2040	4.31	4.31	4.90	5.90	6.14
2041	4.31	4.31	4.90	5.90	6.14
2042	4.31	4.31	4.90	5.90	6.14
2043	4.31	4.31	4.90	5.90	6.14
2044	4.31	4.31	4.90	5.90	6.14

1/ Global Insight: The U.S. Economy: 30-Year Focus, August 2014 Forecast, Base Case.

2/ FY 2015 Appropriation rates are determined in accordance with BPA Appropriations Refinancing Act, 16 U.S.C. 8381 enacted on April 26, 1996, and are independent of the Global Insight Treasury Yield forecasts.

3/ Column C = Column B + U.S. Treasury borrowing markup, no premium

4/ Column D = Column B + U.S. Treasury borrowing markup + Coupon Scale-Down premium

5/ Column E = Column B + U.S. Treasury borrowing markup + Callable at Par premium

Table 5

BPA FY 2015 Appropriation Borrowing Rate Forecast 1/

Fiscal Years 2015-2044

(continued on next page)

	Maturity														
Year	**1 Year**	**2 Year**	**3 Year**	**4 Year**	**5 Year**	**6 Year**	**7 Year**	**8 Year**	**9 Year**	**10 Year**	**11 Year**	**12 Year**	**13 Year**	**14 Year**	**15 Year**
2015	0.29	0.77	1.21	1.57	1.86	2.08	2.24	2.36	2.46	2.50	2.63	2.65	2.75	2.75	2.84
2016	1.93	2.22	2.39	2.57	2.75	2.92	3.09	3.27	3.44	3.61	3.65	3.69	3.73	3.77	3.81
2017	3.28	3.45	3.55	3.66	3.76	3.82	3.89	3.95	4.02	4.08	4.10	4.13	4.16	4.18	4.21
2018	3.60	3.74	3.83	3.93	4.03	4.06	4.10	4.14	4.17	4.21	4.23	4.25	4.27	4.29	4.31
2019	3.61	3.74	3.84	3.94	4.03	4.07	4.11	4.14	4.18	4.21	4.23	4.25	4.27	4.29	4.31
2020	3.61	3.74	3.84	3.94	4.03	4.07	4.11	4.14	4.18	4.21	4.23	4.25	4.27	4.29	4.31
2021	3.61	3.74	3.84	3.94	4.03	4.07	4.11	4.14	4.18	4.21	4.23	4.25	4.27	4.29	4.31
2022	3.61	3.74	3.84	3.94	4.03	4.07	4.11	4.14	4.18	4.21	4.23	4.25	4.27	4.29	4.31
2023	3.61	3.74	3.84	3.94	4.03	4.07	4.11	4.14	4.18	4.21	4.23	4.25	4.27	4.29	4.31
2024	3.61	3.74	3.84	3.94	4.03	4.07	4.11	4.14	4.18	4.21	4.23	4.25	4.27	4.29	4.31
2025	3.61	3.74	3.84	3.94	4.03	4.07	4.11	4.14	4.18	4.21	4.23	4.25	4.27	4.29	4.31
2026	3.61	3.74	3.84	3.94	4.03	4.07	4.11	4.14	4.18	4.21	4.23	4.25	4.27	4.29	4.31
2027	3.61	3.74	3.84	3.94	4.03	4.07	4.11	4.14	4.18	4.21	4.23	4.25	4.27	4.29	4.31
2028	3.61	3.74	3.84	3.94	4.03	4.07	4.11	4.14	4.18	4.21	4.23	4.25	4.27	4.29	4.31
2029	3.61	3.74	3.84	3.94	4.03	4.07	4.11	4.14	4.18	4.21	4.23	4.25	4.27	4.29	4.31
2030	3.61	3.74	3.84	3.94	4.03	4.07	4.11	4.14	4.18	4.21	4.23	4.25	4.27	4.29	4.31
2031	3.61	3.74	3.84	3.94	4.03	4.07	4.11	4.14	4.18	4.21	4.23	4.25	4.27	4.29	4.31
2032	3.61	3.74	3.84	3.94	4.03	4.07	4.11	4.14	4.18	4.21	4.23	4.25	4.27	4.29	4.31
2033	3.61	3.74	3.84	3.94	4.03	4.07	4.11	4.14	4.18	4.21	4.23	4.25	4.27	4.29	4.31
2034	3.61	3.74	3.84	3.94	4.03	4.07	4.11	4.14	4.18	4.21	4.23	4.25	4.27	4.29	4.31
2035	3.61	3.74	3.84	3.94	4.03	4.07	4.11	4.14	4.18	4.21	4.23	4.25	4.27	4.29	4.31
2036	3.61	3.74	3.84	3.94	4.03	4.07	4.11	4.14	4.18	4.21	4.23	4.25	4.27	4.29	4.31
2037	3.61	3.74	3.84	3.94	4.03	4.07	4.11	4.14	4.18	4.21	4.23	4.25	4.27	4.29	4.31
2038	3.61	3.74	3.84	3.94	4.03	4.07	4.11	4.14	4.18	4.21	4.23	4.25	4.27	4.29	4.31
2039	3.61	3.74	3.84	3.94	4.03	4.07	4.11	4.14	4.18	4.21	4.23	4.25	4.27	4.29	4.31
2040	3.61	3.74	3.84	3.94	4.03	4.07	4.11	4.14	4.18	4.21	4.23	4.25	4.27	4.29	4.31
2041	3.61	3.74	3.84	3.94	4.03	4.07	4.11	4.14	4.18	4.21	4.23	4.25	4.27	4.29	4.31
2042	3.61	3.74	3.84	3.94	4.03	4.07	4.11	4.14	4.18	4.21	4.23	4.25	4.27	4.29	4.31
2043	3.61	3.74	3.84	3.94	4.03	4.07	4.11	4.14	4.18	4.21	4.23	4.25	4.27	4.29	4.31
2044	3.61	3.74	3.84	3.94	4.03	4.07	4.11	4.14	4.18	4.21	4.23	4.25	4.27	4.29	4.31

1/ Global Insight: The U.S. Economy: 30-Year Focus, August 2014 Forecast, Base Case.

2/ FY 2015 Appropriation rates are determined in accordance with BPA Appropriations Refinancing Act, 16 U.S.C. 8381 enacted on April 26, 1996, and are independent of the Global Insight Treasury Yield forecasts.

Table 5

BPA FY 2015 Appropriation Borrowing Rate Forecast 1/

Fiscal Years 2015-2044

Maturity																
16 Year	**17 Year**	**18 Year**	**19 Year**	**20 Year**	**21 Year**	**22 Year**	**23 Year**	**24 Year**	**25 Year**	**26 Year**	**27 Year**	**28 Year**	**29 Year**	**30 Year**	**50 Year**	**Year**
2.88	2.88	2.96	3.00	3.00	3.00	3.08	3.13	3.13	3.13	3.15	3.25	3.25	3.25	3.25	3.25	**2015**
3.85	3.89	3.93	3.97	4.01	4.05	4.09	4.13	4.17	4.21	4.25	4.29	4.33	4.38	4.42	4.42	**2016**
4.23	4.26	4.28	4.31	4.33	4.36	4.38	4.41	4.43	4.46	4.48	4.51	4.53	4.56	4.58	4.58	**2017**
4.33	4.35	4.37	4.39	4.41	4.43	4.45	4.47	4.49	4.51	4.53	4.55	4.57	4.59	4.61	4.61	**2018**
4.33	4.35	4.37	4.39	4.41	4.43	4.45	4.47	4.49	4.51	4.53	4.55	4.57	4.59	4.61	4.61	**2019**
4.33	4.35	4.37	4.39	4.41	4.43	4.45	4.47	4.49	4.51	4.53	4.55	4.57	4.59	4.61	4.61	**2020**
4.33	4.35	4.37	4.39	4.41	4.43	4.45	4.47	4.49	4.51	4.53	4.55	4.57	4.59	4.61	4.61	**2021**
4.33	4.35	4.37	4.39	4.41	4.43	4.45	4.47	4.49	4.51	4.53	4.55	4.57	4.59	4.61	4.61	**2022**
4.33	4.35	4.37	4.39	4.41	4.43	4.45	4.47	4.49	4.51	4.53	4.55	4.57	4.59	4.61	4.61	**2023**
4.33	4.35	4.37	4.39	4.41	4.43	4.45	4.47	4.49	4.51	4.53	4.55	4.57	4.59	4.61	4.61	**2024**
4.33	4.35	4.37	4.39	4.41	4.43	4.45	4.47	4.49	4.51	4.53	4.55	4.57	4.59	4.61	4.61	**2025**
4.33	4.35	4.37	4.39	4.41	4.43	4.45	4.47	4.49	4.51	4.53	4.55	4.57	4.59	4.61	4.61	**2026**
4.33	4.35	4.37	4.39	4.41	4.43	4.45	4.47	4.49	4.51	4.53	4.55	4.57	4.59	4.61	4.61	**2027**
4.33	4.35	4.37	4.39	4.41	4.43	4.45	4.47	4.49	4.51	4.53	4.55	4.57	4.59	4.61	4.61	**2028**
4.33	4.35	4.37	4.39	4.41	4.43	4.45	4.47	4.49	4.51	4.53	4.55	4.57	4.59	4.61	4.61	**2029**
4.33	4.35	4.37	4.39	4.41	4.43	4.45	4.47	4.49	4.51	4.53	4.55	4.57	4.59	4.61	4.61	**2030**
4.33	4.35	4.37	4.39	4.41	4.43	4.45	4.47	4.49	4.51	4.53	4.55	4.57	4.59	4.61	4.61	**2031**
4.33	4.35	4.37	4.39	4.41	4.43	4.45	4.47	4.49	4.51	4.53	4.55	4.57	4.59	4.61	4.61	**2032**
4.33	4.35	4.37	4.39	4.41	4.43	4.45	4.47	4.49	4.51	4.53	4.55	4.57	4.59	4.61	4.61	**2033**
4.33	4.35	4.37	4.39	4.41	4.43	4.45	4.47	4.49	4.51	4.53	4.55	4.57	4.59	4.61	4.61	**2034**
4.33	4.35	4.37	4.39	4.41	4.43	4.45	4.47	4.49	4.51	4.53	4.55	4.57	4.59	4.61	4.61	**2035**
4.33	4.35	4.37	4.39	4.41	4.43	4.45	4.47	4.49	4.51	4.53	4.55	4.57	4.59	4.61	4.61	**2036**
4.33	4.35	4.37	4.39	4.41	4.43	4.45	4.47	4.49	4.51	4.53	4.55	4.57	4.59	4.61	4.61	**2037**
4.33	4.35	4.37	4.39	4.41	4.43	4.45	4.47	4.49	4.51	4.53	4.55	4.57	4.59	4.61	4.61	**2038**
4.33	4.35	4.37	4.39	4.41	4.43	4.45	4.47	4.49	4.51	4.53	4.55	4.57	4.59	4.61	4.61	**2039**
4.33	4.35	4.37	4.39	4.41	4.43	4.45	4.47	4.49	4.51	4.53	4.55	4.57	4.59	4.61	4.61	**2040**
4.33	4.35	4.37	4.39	4.41	4.43	4.45	4.47	4.49	4.51	4.53	4.55	4.57	4.59	4.61	4.61	**2041**
4.33	4.35	4.37	4.39	4.41	4.43	4.45	4.47	4.49	4.51	4.53	4.55	4.57	4.59	4.61	4.61	**2042**
4.33	4.35	4.37	4.39	4.41	4.43	4.45	4.47	4.49	4.51	4.53	4.55	4.57	4.59	4.61	4.61	**2043**
4.33	4.35	4.37	4.39	4.41	4.43	4.45	4.47	4.49	4.51	4.53	4.55	4.57	4.59	4.61	4.61	**2044**

1/ Global Insight: The U.S. Economy: 30-Year Focus, August 2014 Forecast, Base Case.

2/ FY 2015 Appropriation rates are determined in accordance with BPA Appropriations Refinancing Act, 16 U.S.C. 8381 enacted on April 26, 1996, and are independent of the Global Insight Treasury Yield forecasts.

Table 6

BPA FY 2015 BPA Borrowing Rate - No Premium 1/

Fiscal Years 2015-2044

(continued on next page)

	Maturity														
Year	**1 Year**	**2 Year**	**3 Year**	**4 Year**	**5 Year**	**6 Year**	**7 Year**	**8 Year**	**9 Year**	**10 Year**	**11 Year**	**12 Year**	**13 Year**	**14 Year**	**15 Year**
2015	0.56	0.90	1.30	1.70	2.10	2.42	2.74	3.06	3.38	3.70	3.74	3.79	3.83	3.88	3.92
2016	2.06	2.36	2.58	2.80	3.02	3.25	3.47	3.70	3.92	4.14	4.18	4.22	4.26	4.30	4.34
2017	3.45	3.65	3.80	3.95	4.09	4.20	4.31	4.41	4.52	4.62	4.65	4.67	4.70	4.72	4.75
2018	3.81	3.98	4.13	4.27	4.42	4.49	4.56	4.62	4.69	4.76	4.78	4.81	4.83	4.85	4.87
2019	3.85	4.04	4.19	4.33	4.48	4.54	4.60	4.66	4.72	4.77	4.80	4.82	4.85	4.87	4.90
2020	3.85	4.04	4.19	4.33	4.48	4.54	4.60	4.66	4.72	4.77	4.80	4.82	4.85	4.87	4.90
2021	3.85	4.04	4.19	4.33	4.48	4.54	4.60	4.66	4.72	4.77	4.80	4.82	4.85	4.87	4.90
2022	3.85	4.04	4.19	4.33	4.48	4.54	4.60	4.66	4.72	4.77	4.80	4.82	4.85	4.87	4.90
2023	3.85	4.04	4.19	4.33	4.48	4.54	4.60	4.66	4.72	4.77	4.80	4.82	4.85	4.87	4.90
2024	3.85	4.04	4.19	4.33	4.48	4.54	4.60	4.66	4.72	4.77	4.80	4.82	4.85	4.87	4.90
2025	3.85	4.04	4.19	4.33	4.48	4.54	4.60	4.66	4.72	4.77	4.80	4.82	4.85	4.87	4.90
2026	3.85	4.04	4.19	4.33	4.48	4.54	4.60	4.66	4.72	4.77	4.80	4.82	4.85	4.87	4.90
2027	3.85	4.04	4.19	4.33	4.48	4.54	4.60	4.66	4.72	4.77	4.80	4.82	4.85	4.87	4.90
2028	3.85	4.04	4.19	4.33	4.48	4.54	4.60	4.66	4.72	4.77	4.80	4.82	4.85	4.87	4.90
2029	3.85	4.04	4.19	4.33	4.48	4.54	4.60	4.66	4.72	4.77	4.80	4.82	4.85	4.87	4.90
2030	3.85	4.04	4.19	4.33	4.48	4.54	4.60	4.66	4.72	4.77	4.80	4.82	4.85	4.87	4.90
2031	3.85	4.04	4.19	4.33	4.48	4.54	4.60	4.66	4.72	4.77	4.80	4.82	4.85	4.87	4.90
2032	3.85	4.04	4.19	4.33	4.48	4.54	4.60	4.66	4.72	4.77	4.80	4.82	4.85	4.87	4.90
2033	3.85	4.04	4.19	4.33	4.48	4.54	4.60	4.66	4.72	4.77	4.80	4.82	4.85	4.87	4.90
2034	3.85	4.04	4.19	4.33	4.48	4.54	4.60	4.66	4.72	4.77	4.80	4.82	4.85	4.87	4.90
2035	3.85	4.04	4.19	4.33	4.48	4.54	4.60	4.66	4.72	4.77	4.80	4.82	4.85	4.87	4.90
2036	3.85	4.04	4.19	4.33	4.48	4.54	4.60	4.66	4.72	4.77	4.80	4.82	4.85	4.87	4.90
2037	3.85	4.04	4.19	4.33	4.48	4.54	4.60	4.66	4.72	4.77	4.80	4.82	4.85	4.87	4.90
2038	3.85	4.04	4.19	4.33	4.48	4.54	4.60	4.66	4.72	4.77	4.80	4.82	4.85	4.87	4.90
2039	3.85	4.04	4.19	4.33	4.48	4.54	4.60	4.66	4.72	4.77	4.80	4.82	4.85	4.87	4.90
2040	3.85	4.04	4.19	4.33	4.48	4.54	4.60	4.66	4.72	4.77	4.80	4.82	4.85	4.87	4.90
2041	3.85	4.04	4.19	4.33	4.48	4.54	4.60	4.66	4.72	4.77	4.80	4.82	4.85	4.87	4.90
2042	3.85	4.04	4.19	4.33	4.48	4.54	4.60	4.66	4.72	4.77	4.80	4.82	4.85	4.87	4.90
2043	3.85	4.04	4.19	4.33	4.48	4.54	4.60	4.66	4.72	4.77	4.80	4.82	4.85	4.87	4.90
2044	3.85	4.04	4.19	4.33	4.48	4.54	4.60	4.66	4.72	4.77	4.80	4.82	4.85	4.87	4.90

1/ Global Insight: The U.S. Economy: 30-Year Focus, August 2014 Forecast, Base Case.

Table 6

BPA FY 2015 BPA Borrowing Rate - No Premium 1/

Fiscal Years 2015-2044

Maturity																
16 Year	**17 Year**	**18 Year**	**19 Year**	**20 Year**	**21 Year**	**22 Year**	**23 Year**	**24 Year**	**25 Year**	**26 Year**	**27 Year**	**28 Year**	**29 Year**	**30 Year**	**50 Year**	**Year**
3.97	4.01	4.06	4.10	4.15	4.19	4.24	4.28	4.33	4.37	4.42	4.47	4.51	4.56	4.60	4.60	**2015**
4.38	4.42	4.46	4.50	4.53	4.57	4.61	4.65	4.69	4.73	4.77	4.81	4.85	4.89	4.93	4.93	**2016**
4.78	4.80	4.83	4.85	4.88	4.91	4.93	4.96	4.98	5.01	5.04	5.06	5.09	5.11	5.14	5.14	**2017**
4.90	4.92	4.94	4.97	4.99	5.01	5.03	5.06	5.08	5.10	5.13	5.15	5.17	5.19	5.22	5.22	**2018**
4.92	4.95	4.97	4.99	5.02	5.04	5.07	5.09	5.12	5.14	5.17	5.19	5.21	5.24	5.26	5.26	**2019**
4.92	4.95	4.97	4.99	5.02	5.04	5.07	5.09	5.12	5.14	5.17	5.19	5.21	5.24	5.26	5.26	**2020**
4.92	4.95	4.97	4.99	5.02	5.04	5.07	5.09	5.12	5.14	5.17	5.19	5.21	5.24	5.26	5.26	**2021**
4.92	4.95	4.97	4.99	5.02	5.04	5.07	5.09	5.12	5.14	5.17	5.19	5.21	5.24	5.26	5.26	**2022**
4.92	4.95	4.97	4.99	5.02	5.04	5.07	5.09	5.12	5.14	5.17	5.19	5.21	5.24	5.26	5.26	**2023**
4.92	4.95	4.97	4.99	5.02	5.04	5.07	5.09	5.12	5.14	5.17	5.19	5.21	5.24	5.26	5.26	**2024**
4.92	4.95	4.97	4.99	5.02	5.04	5.07	5.09	5.12	5.14	5.17	5.19	5.21	5.24	5.26	5.26	**2025**
4.92	4.95	4.97	4.99	5.02	5.04	5.07	5.09	5.12	5.14	5.17	5.19	5.21	5.24	5.26	5.26	**2026**
4.92	4.95	4.97	4.99	5.02	5.04	5.07	5.09	5.12	5.14	5.17	5.19	5.21	5.24	5.26	5.26	**2027**
4.92	4.95	4.97	4.99	5.02	5.04	5.07	5.09	5.12	5.14	5.17	5.19	5.21	5.24	5.26	5.26	**2028**
4.92	4.95	4.97	4.99	5.02	5.04	5.07	5.09	5.12	5.14	5.17	5.19	5.21	5.24	5.26	5.26	**2029**
4.92	4.95	4.97	4.99	5.02	5.04	5.07	5.09	5.12	5.14	5.17	5.19	5.21	5.24	5.26	5.26	**2030**
4.92	4.95	4.97	4.99	5.02	5.04	5.07	5.09	5.12	5.14	5.17	5.19	5.21	5.24	5.26	5.26	**2031**
4.92	4.95	4.97	4.99	5.02	5.04	5.07	5.09	5.12	5.14	5.17	5.19	5.21	5.24	5.26	5.26	**2032**
4.92	4.95	4.97	4.99	5.02	5.04	5.07	5.09	5.12	5.14	5.17	5.19	5.21	5.24	5.26	5.26	**2033**
4.92	4.95	4.97	4.99	5.02	5.04	5.07	5.09	5.12	5.14	5.17	5.19	5.21	5.24	5.26	5.26	**2034**
4.92	4.95	4.97	4.99	5.02	5.04	5.07	5.09	5.12	5.14	5.17	5.19	5.21	5.24	5.26	5.26	**2035**
4.92	4.95	4.97	4.99	5.02	5.04	5.07	5.09	5.12	5.14	5.17	5.19	5.21	5.24	5.26	5.26	**2036**
4.92	4.95	4.97	4.99	5.02	5.04	5.07	5.09	5.12	5.14	5.17	5.19	5.21	5.24	5.26	5.26	**2037**
4.92	4.95	4.97	4.99	5.02	5.04	5.07	5.09	5.12	5.14	5.17	5.19	5.21	5.24	5.26	5.26	**2038**
4.92	4.95	4.97	4.99	5.02	5.04	5.07	5.09	5.12	5.14	5.17	5.19	5.21	5.24	5.26	5.26	**2039**
4.92	4.95	4.97	4.99	5.02	5.04	5.07	5.09	5.12	5.14	5.17	5.19	5.21	5.24	5.26	5.26	**2040**
4.92	4.95	4.97	4.99	5.02	5.04	5.07	5.09	5.12	5.14	5.17	5.19	5.21	5.24	5.26	5.26	**2041**
4.92	4.95	4.97	4.99	5.02	5.04	5.07	5.09	5.12	5.14	5.17	5.19	5.21	5.24	5.26	5.26	**2042**
4.92	4.95	4.97	4.99	5.02	5.04	5.07	5.09	5.12	5.14	5.17	5.19	5.21	5.24	5.26	5.26	**2043**
4.92	4.95	4.97	4.99	5.02	5.04	5.07	5.09	5.12	5.14	5.17	5.19	5.21	5.24	5.26	5.26	**2044**

1/ Global Insight: The U.S. Economy: 30-Year Focus, August 2014 Forecast, Base Case.

Table 7

BPA FY 2015 BPA Borrowing Rate - Coupon Scale-Down Redemption Premium 1/

Fiscal Years 2015-2044

(continued on next page)

	Maturity														
Year	**1 Year**	**2 Year**	**3 Year**	**4 Year**	**5 Year**	**6 Year**	**7 Year**	**8 Year**	**9 Year**	**10 Year**	**11 Year**	**12 Year**	**13 Year**	**14 Year**	**15 Year**
2015	0.65	1.07	1.55	2.04	2.52	2.93	3.33	3.74	4.14	4.55	4.61	4.67	4.74	4.80	4.86
2016	2.15	2.53	2.84	3.15	3.46	3.77	4.08	4.39	4.70	5.01	5.07	5.12	5.18	5.24	5.29
2017	3.54	3.82	4.06	4.30	4.54	4.73	4.92	5.12	5.31	5.50	5.55	5.59	5.63	5.68	5.72
2018	3.90	4.16	4.40	4.63	4.87	5.03	5.18	5.34	5.50	5.66	5.70	5.74	5.78	5.82	5.86
2019	3.94	4.22	4.46	4.70	4.94	5.09	5.24	5.39	5.54	5.69	5.73	5.77	5.81	5.85	5.89
2020	3.95	4.23	4.47	4.71	4.95	5.10	5.25	5.40	5.55	5.70	5.74	5.78	5.82	5.86	5.90
2021	3.95	4.23	4.47	4.71	4.95	5.10	5.25	5.40	5.55	5.70	5.74	5.78	5.82	5.86	5.90
2022	3.95	4.23	4.47	4.71	4.95	5.10	5.25	5.40	5.55	5.70	5.74	5.78	5.82	5.86	5.90
2023	3.95	4.23	4.47	4.71	4.95	5.10	5.25	5.40	5.55	5.70	5.74	5.78	5.82	5.86	5.90
2024	3.95	4.23	4.47	4.71	4.95	5.10	5.25	5.40	5.55	5.70	5.74	5.78	5.82	5.86	5.90
2025	3.95	4.23	4.47	4.71	4.95	5.10	5.25	5.40	5.55	5.70	5.74	5.78	5.82	5.86	5.90
2026	3.95	4.23	4.47	4.71	4.95	5.10	5.25	5.40	5.55	5.70	5.74	5.78	5.82	5.86	5.90
2027	3.95	4.23	4.47	4.71	4.95	5.10	5.25	5.40	5.55	5.70	5.74	5.78	5.82	5.86	5.90
2028	3.95	4.23	4.47	4.71	4.95	5.10	5.25	5.40	5.55	5.70	5.74	5.78	5.82	5.86	5.90
2029	3.95	4.23	4.47	4.71	4.95	5.10	5.25	5.40	5.55	5.70	5.74	5.78	5.82	5.86	5.90
2030	3.95	4.23	4.47	4.71	4.95	5.10	5.25	5.40	5.55	5.70	5.74	5.78	5.82	5.86	5.90
2031	3.95	4.23	4.47	4.71	4.95	5.10	5.25	5.40	5.55	5.70	5.74	5.78	5.82	5.86	5.90
2032	3.95	4.23	4.47	4.71	4.95	5.10	5.25	5.40	5.55	5.70	5.74	5.78	5.82	5.86	5.90
2033	3.95	4.23	4.47	4.71	4.95	5.10	5.25	5.40	5.55	5.70	5.74	5.78	5.82	5.86	5.90
2034	3.95	4.23	4.47	4.71	4.95	5.10	5.25	5.40	5.55	5.70	5.74	5.78	5.82	5.86	5.90
2035	3.95	4.23	4.47	4.71	4.95	5.10	5.25	5.40	5.55	5.70	5.74	5.78	5.82	5.86	5.90
2036	3.95	4.23	4.47	4.71	4.95	5.10	5.25	5.40	5.55	5.70	5.74	5.78	5.82	5.86	5.90
2037	3.95	4.23	4.47	4.71	4.95	5.10	5.25	5.40	5.55	5.70	5.74	5.78	5.82	5.86	5.90
2038	3.95	4.23	4.47	4.71	4.95	5.10	5.25	5.40	5.55	5.70	5.74	5.78	5.82	5.86	5.90
2039	3.95	4.23	4.47	4.71	4.95	5.10	5.25	5.40	5.55	5.70	5.74	5.78	5.82	5.86	5.90
2040	3.95	4.23	4.47	4.71	4.95	5.10	5.25	5.40	5.55	5.70	5.74	5.78	5.82	5.86	5.90
2041	3.95	4.23	4.47	4.71	4.95	5.10	5.25	5.40	5.55	5.70	5.74	5.78	5.82	5.86	5.90
2042	3.95	4.23	4.47	4.71	4.95	5.10	5.25	5.40	5.55	5.70	5.74	5.78	5.82	5.86	5.90
2043	3.95	4.23	4.47	4.71	4.95	5.10	5.25	5.40	5.55	5.70	5.74	5.78	5.82	5.86	5.90
2044	3.95	4.23	4.47	4.71	4.95	5.10	5.25	5.40	5.55	5.70	5.74	5.78	5.82	5.86	5.90

1/ Global Insight: The U.S. Economy: 30-Year Focus, August 2014 Forecast, Base Case.

Table 7

BPA FY 2015 BPA Borrowing Rate - Coupon Scale-Down Redemption Premium 1/

Fiscal Years 2015-2044

Maturity																
16 Year	**17 Year**	**18 Year**	**19 Year**	**20 Year**	**21 Year**	**22 Year**	**23 Year**	**24 Year**	**25 Year**	**26 Year**	**27 Year**	**28 Year**	**29 Year**	**30 Year**	**50 Year**	**Year**
4.93	4.99	5.05	5.12	5.18	5.25	5.31	5.37	5.44	5.50	5.56	5.63	5.69	5.75	5.82	5.82	**2015**
5.35	5.41	5.46	5.52	5.58	5.64	5.69	5.75	5.81	5.86	5.92	5.98	6.03	6.09	6.15	6.15	**2016**
5.76	5.81	5.85	5.89	5.94	5.98	6.02	6.06	6.11	6.15	6.19	6.24	6.28	6.32	6.37	6.37	**2017**
5.90	5.94	5.98	6.02	6.06	6.09	6.13	6.17	6.21	6.25	6.29	6.33	6.37	6.41	6.45	6.45	**2018**
5.93	5.97	6.01	6.05	6.10	6.14	6.18	6.22	6.26	6.30	6.34	6.38	6.42	6.46	6.50	6.50	**2019**
5.95	5.99	6.03	6.07	6.11	6.15	6.19	6.23	6.27	6.31	6.35	6.39	6.43	6.47	6.51	6.51	**2020**
5.95	5.99	6.03	6.07	6.11	6.15	6.19	6.23	6.27	6.31	6.35	6.39	6.43	6.47	6.51	6.51	**2021**
5.95	5.99	6.03	6.07	6.11	6.15	6.19	6.23	6.27	6.31	6.35	6.39	6.43	6.47	6.51	6.51	**2022**
5.95	5.99	6.03	6.07	6.11	6.15	6.19	6.23	6.27	6.31	6.35	6.39	6.43	6.47	6.51	6.51	**2023**
5.95	5.99	6.03	6.07	6.11	6.15	6.19	6.23	6.27	6.31	6.35	6.39	6.43	6.47	6.51	6.51	**2024**
5.95	5.99	6.03	6.07	6.11	6.15	6.19	6.23	6.27	6.31	6.35	6.39	6.43	6.47	6.51	6.51	**2025**
5.95	5.99	6.03	6.07	6.11	6.15	6.19	6.23	6.27	6.31	6.35	6.39	6.43	6.47	6.51	6.51	**2026**
5.95	5.99	6.03	6.07	6.11	6.15	6.19	6.23	6.27	6.31	6.35	6.39	6.43	6.47	6.51	6.51	**2027**
5.95	5.99	6.03	6.07	6.11	6.15	6.19	6.23	6.27	6.31	6.35	6.39	6.43	6.47	6.51	6.51	**2028**
5.95	5.99	6.03	6.07	6.11	6.15	6.19	6.23	6.27	6.31	6.35	6.39	6.43	6.47	6.51	6.51	**2029**
5.95	5.99	6.03	6.07	6.11	6.15	6.19	6.23	6.27	6.31	6.35	6.39	6.43	6.47	6.51	6.51	**2030**
5.95	5.99	6.03	6.07	6.11	6.15	6.19	6.23	6.27	6.31	6.35	6.39	6.43	6.47	6.51	6.51	**2031**
5.95	5.99	6.03	6.07	6.11	6.15	6.19	6.23	6.27	6.31	6.35	6.39	6.43	6.47	6.51	6.51	**2032**
5.95	5.99	6.03	6.07	6.11	6.15	6.19	6.23	6.27	6.31	6.35	6.39	6.43	6.47	6.51	6.51	**2033**
5.95	5.99	6.03	6.07	6.11	6.15	6.19	6.23	6.27	6.31	6.35	6.39	6.43	6.47	6.51	6.51	**2034**
5.95	5.99	6.03	6.07	6.11	6.15	6.19	6.23	6.27	6.31	6.35	6.39	6.43	6.47	6.51	6.51	**2035**
5.95	5.99	6.03	6.07	6.11	6.15	6.19	6.23	6.27	6.31	6.35	6.39	6.43	6.47	6.51	6.51	**2036**
5.95	5.99	6.03	6.07	6.11	6.15	6.19	6.23	6.27	6.31	6.35	6.39	6.43	6.47	6.51	6.51	**2037**
5.95	5.99	6.03	6.07	6.11	6.15	6.19	6.23	6.27	6.31	6.35	6.39	6.43	6.47	6.51	6.51	**2038**
5.95	5.99	6.03	6.07	6.11	6.15	6.19	6.23	6.27	6.31	6.35	6.39	6.43	6.47	6.51	6.51	**2039**
5.95	5.99	6.03	6.07	6.11	6.15	6.19	6.23	6.27	6.31	6.35	6.39	6.43	6.47	6.51	6.51	**2040**
5.95	5.99	6.03	6.07	6.11	6.15	6.19	6.23	6.27	6.31	6.35	6.39	6.43	6.47	6.51	6.51	**2041**
5.95	5.99	6.03	6.07	6.11	6.15	6.19	6.23	6.27	6.31	6.35	6.39	6.43	6.47	6.51	6.51	**2042**
5.95	5.99	6.03	6.07	6.11	6.15	6.19	6.23	6.27	6.31	6.35	6.39	6.43	6.47	6.51	6.51	**2043**
5.95	5.99	6.03	6.07	6.11	6.15	6.19	6.23	6.27	6.31	6.35	6.39	6.43	6.47	6.51	6.51	**2044**

1/ Global Insight: The U.S. Economy: 30-Year Focus, August 2014 Forecast, Base Case.

Table 8

BPA FY 2015 BPA Borrowing Rate - Callable at Par 1/

Fiscal Years 2015-2044

(continued on next page)

	Maturity														
Year	**1 Year**	**2 Year**	**3 Year**	**4 Year**	**5 Year**	**6 Year**	**7 Year**	**8 Year**	**9 Year**	**10 Year**	**11 Year**	**12 Year**	**13 Year**	**14 Year**	**15 Year**
2015	0.67	1.11	1.61	2.11	2.62	3.04	3.47	3.89	4.31	4.74	4.80	4.87	4.93	5.00	5.06
2016	2.17	2.57	2.90	3.23	3.56	3.89	4.22	4.55	4.88	5.21	5.26	5.32	5.38	5.44	5.50
2017	3.56	3.86	4.12	4.38	4.64	4.85	5.07	5.28	5.49	5.71	5.75	5.80	5.84	5.89	5.93
2018	3.92	4.21	4.46	4.72	4.97	5.15	5.33	5.51	5.69	5.87	5.91	5.95	5.99	6.03	6.08
2019	3.97	4.27	4.53	4.79	5.05	5.22	5.39	5.56	5.73	5.91	5.95	5.99	6.03	6.08	6.12
2020	3.97	4.27	4.53	4.80	5.06	5.23	5.41	5.58	5.76	5.93	5.97	6.01	6.05	6.10	6.14
2021	3.97	4.27	4.53	4.80	5.06	5.23	5.41	5.58	5.76	5.93	5.97	6.01	6.05	6.10	6.14
2022	3.97	4.27	4.53	4.80	5.06	5.23	5.41	5.58	5.76	5.93	5.97	6.01	6.05	6.10	6.14
2023	3.97	4.27	4.53	4.80	5.06	5.23	5.41	5.58	5.76	5.93	5.97	6.01	6.05	6.10	6.14
2024	3.97	4.27	4.53	4.80	5.06	5.23	5.41	5.58	5.76	5.93	5.97	6.01	6.05	6.10	6.14
2025	3.97	4.27	4.53	4.80	5.06	5.23	5.41	5.58	5.76	5.93	5.97	6.01	6.05	6.10	6.14
2026	3.97	4.27	4.53	4.80	5.06	5.23	5.41	5.58	5.76	5.93	5.97	6.01	6.05	6.10	6.14
2027	3.97	4.27	4.53	4.80	5.06	5.23	5.41	5.58	5.76	5.93	5.97	6.01	6.05	6.10	6.14
2028	3.97	4.27	4.53	4.80	5.06	5.23	5.41	5.58	5.76	5.93	5.97	6.01	6.05	6.10	6.14
2029	3.97	4.27	4.53	4.80	5.06	5.23	5.41	5.58	5.76	5.93	5.97	6.01	6.05	6.10	6.14
2030	3.97	4.27	4.53	4.80	5.06	5.23	5.41	5.58	5.76	5.93	5.97	6.01	6.05	6.10	6.14
2031	3.97	4.27	4.53	4.80	5.06	5.23	5.41	5.58	5.76	5.93	5.97	6.01	6.05	6.10	6.14
2032	3.97	4.27	4.53	4.80	5.06	5.23	5.41	5.58	5.76	5.93	5.97	6.01	6.05	6.10	6.14
2033	3.97	4.27	4.53	4.80	5.06	5.23	5.41	5.58	5.76	5.93	5.97	6.01	6.05	6.10	6.14
2034	3.97	4.27	4.53	4.80	5.06	5.23	5.41	5.58	5.76	5.93	5.97	6.01	6.05	6.10	6.14
2035	3.97	4.27	4.53	4.80	5.06	5.23	5.41	5.58	5.76	5.93	5.97	6.01	6.05	6.10	6.14
2036	3.97	4.27	4.53	4.80	5.06	5.23	5.41	5.58	5.76	5.93	5.97	6.01	6.05	6.10	6.14
2037	3.97	4.27	4.53	4.80	5.06	5.23	5.41	5.58	5.76	5.93	5.97	6.01	6.05	6.10	6.14
2038	3.97	4.27	4.53	4.80	5.06	5.23	5.41	5.58	5.76	5.93	5.97	6.01	6.05	6.10	6.14
2039	3.97	4.27	4.53	4.80	5.06	5.23	5.41	5.58	5.76	5.93	5.97	6.01	6.05	6.10	6.14
2040	3.97	4.27	4.53	4.80	5.06	5.23	5.41	5.58	5.76	5.93	5.97	6.01	6.05	6.10	6.14
2041	3.97	4.27	4.53	4.80	5.06	5.23	5.41	5.58	5.76	5.93	5.97	6.01	6.05	6.10	6.14
2042	3.97	4.27	4.53	4.80	5.06	5.23	5.41	5.58	5.76	5.93	5.97	6.01	6.05	6.10	6.14
2043	3.97	4.27	4.53	4.80	5.06	5.23	5.41	5.58	5.76	5.93	5.97	6.01	6.05	6.10	6.14
2044	3.97	4.27	4.53	4.80	5.06	5.23	5.41	5.58	5.76	5.93	5.97	6.01	6.05	6.10	6.14

1/ Global Insight: The U.S. Economy: 30-Year Focus, August 2014 Forecast, Base Case.

Table 8

BPA FY 2015 BPA Borrowing Rate - Callable at Par 1/

Fiscal Years 2015-2044

Maturity																
16 Year	**17 Year**	**18 Year**	**19 Year**	**20 Year**	**21 Year**	**22 Year**	**23 Year**	**24 Year**	**25 Year**	**26 Year**	**27 Year**	**28 Year**	**29 Year**	**30 Year**	**50 Year**	**Year**
5.13	5.19	5.26	5.32	5.39	5.45	5.52	5.59	5.65	5.72	5.78	5.85	5.91	5.98	6.04	6.04	**2015**
5.56	5.62	5.68	5.73	5.79	5.85	5.91	5.97	6.03	6.09	6.14	6.20	6.26	6.32	6.38	6.38	**2016**
5.98	6.02	6.07	6.11	6.16	6.20	6.25	6.29	6.33	6.38	6.42	6.47	6.51	6.56	6.60	6.60	**2017**
6.12	6.16	6.20	6.24	6.28	6.32	6.36	6.41	6.45	6.49	6.53	6.57	6.61	6.65	6.69	6.69	**2018**
6.16	6.20	6.24	6.29	6.33	6.37	6.41	6.46	6.50	6.54	6.58	6.62	6.67	6.71	6.75	6.75	**2019**
6.18	6.22	6.26	6.30	6.35	6.39	6.43	6.47	6.51	6.55	6.60	6.64	6.68	6.72	6.76	6.76	**2020**
6.18	6.22	6.26	6.30	6.35	6.39	6.43	6.47	6.51	6.55	6.60	6.64	6.68	6.72	6.76	6.76	**2021**
6.18	6.22	6.26	6.30	6.35	6.39	6.43	6.47	6.51	6.55	6.60	6.64	6.68	6.72	6.76	6.76	**2022**
6.18	6.22	6.26	6.30	6.35	6.39	6.43	6.47	6.51	6.55	6.60	6.64	6.68	6.72	6.76	6.76	**2023**
6.18	6.22	6.26	6.30	6.35	6.39	6.43	6.47	6.51	6.55	6.60	6.64	6.68	6.72	6.76	6.76	**2024**
6.18	6.22	6.26	6.30	6.35	6.39	6.43	6.47	6.51	6.55	6.60	6.64	6.68	6.72	6.76	6.76	**2025**
6.18	6.22	6.26	6.30	6.35	6.39	6.43	6.47	6.51	6.55	6.60	6.64	6.68	6.72	6.76	6.76	**2026**
6.18	6.22	6.26	6.30	6.35	6.39	6.43	6.47	6.51	6.55	6.60	6.64	6.68	6.72	6.76	6.76	**2027**
6.18	6.22	6.26	6.30	6.35	6.39	6.43	6.47	6.51	6.55	6.60	6.64	6.68	6.72	6.76	6.76	**2028**
6.18	6.22	6.26	6.30	6.35	6.39	6.43	6.47	6.51	6.55	6.60	6.64	6.68	6.72	6.76	6.76	**2029**
6.18	6.22	6.26	6.30	6.35	6.39	6.43	6.47	6.51	6.55	6.60	6.64	6.68	6.72	6.76	6.76	**2030**
6.18	6.22	6.26	6.30	6.35	6.39	6.43	6.47	6.51	6.55	6.60	6.64	6.68	6.72	6.76	6.76	**2031**
6.18	6.22	6.26	6.30	6.35	6.39	6.43	6.47	6.51	6.55	6.60	6.64	6.68	6.72	6.76	6.76	**2032**
6.18	6.22	6.26	6.30	6.35	6.39	6.43	6.47	6.51	6.55	6.60	6.64	6.68	6.72	6.76	6.76	**2033**
6.18	6.22	6.26	6.30	6.35	6.39	6.43	6.47	6.51	6.55	6.60	6.64	6.68	6.72	6.76	6.76	**2034**
6.18	6.22	6.26	6.30	6.35	6.39	6.43	6.47	6.51	6.55	6.60	6.64	6.68	6.72	6.76	6.76	**2035**
6.18	6.22	6.26	6.30	6.35	6.39	6.43	6.47	6.51	6.55	6.60	6.64	6.68	6.72	6.76	6.76	**2036**
6.18	6.22	6.26	6.30	6.35	6.39	6.43	6.47	6.51	6.55	6.60	6.64	6.68	6.72	6.76	6.76	**2037**
6.18	6.22	6.26	6.30	6.35	6.39	6.43	6.47	6.51	6.55	6.60	6.64	6.68	6.72	6.76	6.76	**2038**
6.18	6.22	6.26	6.30	6.35	6.39	6.43	6.47	6.51	6.55	6.60	6.64	6.68	6.72	6.76	6.76	**2039**
6.18	6.22	6.26	6.30	6.35	6.39	6.43	6.47	6.51	6.55	6.60	6.64	6.68	6.72	6.76	6.76	**2040**
6.18	6.22	6.26	6.30	6.35	6.39	6.43	6.47	6.51	6.55	6.60	6.64	6.68	6.72	6.76	6.76	**2041**
6.18	6.22	6.26	6.30	6.35	6.39	6.43	6.47	6.51	6.55	6.60	6.64	6.68	6.72	6.76	6.76	**2042**
6.18	6.22	6.26	6.30	6.35	6.39	6.43	6.47	6.51	6.55	6.60	6.64	6.68	6.72	6.76	6.76	**2043**
6.18	6.22	6.26	6.30	6.35	6.39	6.43	6.47	6.51	6.55	6.60	6.64	6.68	6.72	6.76	6.76	**2044**

1/ Global Insight: The U.S. Economy: 30-Year Focus, August 2014 Forecast, Base Case.

Table 9

BPA FY 2015 Third-Party Taxable Borrowing Rate Forecast 1/

Fiscal Years 2015-2044

(continued on next page)

	Maturity														
Year	**1 Year**	**2 Year**	**3 Year**	**4 Year**	**5 Year**	**6 Year**	**7 Year**	**8 Year**	**9 Year**	**10 Year**	**11 Year**	**12 Year**	**13 Year**	**14 Year**	**15 Year**
2015	1.19	1.25	1.68	2.11	2.54	2.88	3.22	3.57	3.91	4.25	4.33	4.41	4.49	4.57	4.64
2016	2.71	2.98	3.19	3.41	3.62	3.85	4.07	4.30	4.53	4.76	4.83	4.90	4.96	5.03	5.10
2017	4.42	4.64	4.75	4.85	4.95	5.04	5.12	5.21	5.29	5.38	5.43	5.48	5.52	5.57	5.62
2018	4.84	5.03	5.12	5.21	5.30	5.35	5.40	5.45	5.50	5.55	5.59	5.63	5.68	5.72	5.76
2019	4.85	5.03	5.13	5.22	5.31	5.36	5.41	5.46	5.51	5.55	5.60	5.64	5.68	5.72	5.77
2020	4.85	5.03	5.13	5.22	5.31	5.36	5.41	5.46	5.51	5.55	5.60	5.64	5.68	5.72	5.77
2021	4.85	5.03	5.13	5.22	5.31	5.36	5.41	5.46	5.51	5.55	5.60	5.64	5.68	5.72	5.77
2022	4.85	5.03	5.13	5.22	5.31	5.36	5.41	5.46	5.51	5.55	5.60	5.64	5.68	5.72	5.77
2023	4.85	5.03	5.13	5.22	5.31	5.36	5.41	5.46	5.51	5.55	5.60	5.64	5.68	5.72	5.77
2024	4.85	5.03	5.13	5.22	5.31	5.36	5.41	5.46	5.51	5.55	5.60	5.64	5.68	5.72	5.77
2025	4.85	5.03	5.13	5.22	5.31	5.36	5.41	5.46	5.51	5.55	5.60	5.64	5.68	5.72	5.77
2026	4.85	5.03	5.13	5.22	5.31	5.36	5.41	5.46	5.51	5.55	5.60	5.64	5.68	5.72	5.77
2027	4.85	5.03	5.13	5.22	5.31	5.36	5.41	5.46	5.51	5.55	5.60	5.64	5.68	5.72	5.77
2028	4.85	5.03	5.13	5.22	5.31	5.36	5.41	5.46	5.51	5.55	5.60	5.64	5.68	5.72	5.77
2029	4.85	5.03	5.13	5.22	5.31	5.36	5.41	5.46	5.51	5.55	5.60	5.64	5.68	5.72	5.77
2030	4.85	5.03	5.13	5.22	5.31	5.36	5.41	5.46	5.51	5.55	5.60	5.64	5.68	5.72	5.77
2031	4.85	5.03	5.13	5.22	5.31	5.36	5.41	5.46	5.51	5.55	5.60	5.64	5.68	5.72	5.77
2032	4.85	5.03	5.13	5.22	5.31	5.36	5.41	5.46	5.51	5.55	5.60	5.64	5.68	5.72	5.77
2033	4.85	5.03	5.13	5.22	5.31	5.36	5.41	5.46	5.51	5.55	5.60	5.64	5.68	5.72	5.77
2034	4.85	5.03	5.13	5.22	5.31	5.36	5.41	5.46	5.51	5.55	5.60	5.64	5.68	5.72	5.77
2035	4.85	5.03	5.13	5.22	5.31	5.36	5.41	5.46	5.51	5.55	5.60	5.64	5.68	5.72	5.77
2036	4.85	5.03	5.13	5.22	5.31	5.36	5.41	5.46	5.51	5.55	5.60	5.64	5.68	5.72	5.77
2037	4.85	5.03	5.13	5.22	5.31	5.36	5.41	5.46	5.51	5.55	5.60	5.64	5.68	5.72	5.77
2038	4.85	5.03	5.13	5.22	5.31	5.36	5.41	5.46	5.51	5.55	5.60	5.64	5.68	5.72	5.77
2039	4.85	5.03	5.13	5.22	5.31	5.36	5.41	5.46	5.51	5.55	5.60	5.64	5.68	5.72	5.77
2040	4.85	5.03	5.13	5.22	5.31	5.36	5.41	5.46	5.51	5.55	5.60	5.64	5.68	5.72	5.77
2041	4.85	5.03	5.13	5.22	5.31	5.36	5.41	5.46	5.51	5.55	5.60	5.64	5.68	5.72	5.77
2042	4.85	5.03	5.13	5.22	5.31	5.36	5.41	5.46	5.51	5.55	5.60	5.64	5.68	5.72	5.77
2043	4.85	5.03	5.13	5.22	5.31	5.36	5.41	5.46	5.51	5.55	5.60	5.64	5.68	5.72	5.77
2044	4.85	5.03	5.13	5.22	5.31	5.36	5.41	5.46	5.51	5.55	5.60	5.64	5.68	5.72	5.77

1/ Global Insight: The U.S. Economy: 30-Year Focus, August 2014 Forecast, Base Case.

Table 9

BPA FY 2015 Third-Party Taxable Borrowing Rate Forecast 1/

Fiscal Years 2015-2044

Maturity																
16 Year	**17 Year**	**18 Year**	**19 Year**	**20 Year**	**21 Year**	**22 Year**	**23 Year**	**24 Year**	**25 Year**	**26 Year**	**27 Year**	**28 Year**	**29 Year**	**30 Year**	**50 Year**	**Year**
4.72	4.80	4.88	4.96	5.04	5.12	5.20	5.28	5.36	5.44	5.52	5.60	5.67	5.75	5.83	5.83	**2015**
5.17	5.24	5.31	5.37	5.44	5.51	5.58	5.65	5.71	5.78	5.85	5.92	5.99	6.06	6.12	6.12	**2016**
5.67	5.72	5.77	5.82	5.87	5.92	5.96	6.01	6.06	6.11	6.16	6.21	6.26	6.31	6.36	6.36	**2017**
5.80	5.85	5.89	5.93	5.97	6.02	6.06	6.10	6.15	6.19	6.23	6.27	6.32	6.36	6.40	6.40	**2018**
5.81	5.85	5.89	5.94	5.98	6.02	6.06	6.10	6.15	6.19	6.23	6.27	6.32	6.36	6.40	6.40	**2019**
5.81	5.85	5.89	5.94	5.98	6.02	6.06	6.10	6.15	6.19	6.23	6.27	6.32	6.36	6.40	6.40	**2020**
5.81	5.85	5.89	5.94	5.98	6.02	6.06	6.10	6.15	6.19	6.23	6.27	6.32	6.36	6.40	6.40	**2021**
5.81	5.85	5.89	5.94	5.98	6.02	6.06	6.10	6.15	6.19	6.23	6.27	6.32	6.36	6.40	6.40	**2022**
5.81	5.85	5.89	5.94	5.98	6.02	6.06	6.10	6.15	6.19	6.23	6.27	6.32	6.36	6.40	6.40	**2023**
5.81	5.85	5.89	5.94	5.98	6.02	6.06	6.10	6.15	6.19	6.23	6.27	6.32	6.36	6.40	6.40	**2024**
5.81	5.85	5.89	5.94	5.98	6.02	6.06	6.10	6.15	6.19	6.23	6.27	6.32	6.36	6.40	6.40	**2025**
5.81	5.85	5.89	5.94	5.98	6.02	6.06	6.10	6.15	6.19	6.23	6.27	6.32	6.36	6.40	6.40	**2026**
5.81	5.85	5.89	5.94	5.98	6.02	6.06	6.10	6.15	6.19	6.23	6.27	6.32	6.36	6.40	6.40	**2027**
5.81	5.85	5.89	5.94	5.98	6.02	6.06	6.10	6.15	6.19	6.23	6.27	6.32	6.36	6.40	6.40	**2028**
5.81	5.85	5.89	5.94	5.98	6.02	6.06	6.10	6.15	6.19	6.23	6.27	6.32	6.36	6.40	6.40	**2029**
5.81	5.85	5.89	5.94	5.98	6.02	6.06	6.10	6.15	6.19	6.23	6.27	6.32	6.36	6.40	6.40	**2030**
5.81	5.85	5.89	5.94	5.98	6.02	6.06	6.10	6.15	6.19	6.23	6.27	6.32	6.36	6.40	6.40	**2031**
5.81	5.85	5.89	5.94	5.98	6.02	6.06	6.10	6.15	6.19	6.23	6.27	6.32	6.36	6.40	6.40	**2032**
5.81	5.85	5.89	5.94	5.98	6.02	6.06	6.10	6.15	6.19	6.23	6.27	6.32	6.36	6.40	6.40	**2033**
5.81	5.85	5.89	5.94	5.98	6.02	6.06	6.10	6.15	6.19	6.23	6.27	6.32	6.36	6.40	6.40	**2034**
5.81	5.85	5.89	5.94	5.98	6.02	6.06	6.10	6.15	6.19	6.23	6.27	6.32	6.36	6.40	6.40	**2035**
5.81	5.85	5.89	5.94	5.98	6.02	6.06	6.10	6.15	6.19	6.23	6.27	6.32	6.36	6.40	6.40	**2036**
5.81	5.85	5.89	5.94	5.98	6.02	6.06	6.10	6.15	6.19	6.23	6.27	6.32	6.36	6.40	6.40	**2037**
5.81	5.85	5.89	5.94	5.98	6.02	6.06	6.10	6.15	6.19	6.23	6.27	6.32	6.36	6.40	6.40	**2038**
5.81	5.85	5.89	5.94	5.98	6.02	6.06	6.10	6.15	6.19	6.23	6.27	6.32	6.36	6.40	6.40	**2039**
5.81	5.85	5.89	5.94	5.98	6.02	6.06	6.10	6.15	6.19	6.23	6.27	6.32	6.36	6.40	6.40	**2040**
5.81	5.85	5.89	5.94	5.98	6.02	6.06	6.10	6.15	6.19	6.23	6.27	6.32	6.36	6.40	6.40	**2041**
5.81	5.85	5.89	5.94	5.98	6.02	6.06	6.10	6.15	6.19	6.23	6.27	6.32	6.36	6.40	6.40	**2042**
5.81	5.85	5.89	5.94	5.98	6.02	6.06	6.10	6.15	6.19	6.23	6.27	6.32	6.36	6.40	6.40	**2043**
5.81	5.85	5.89	5.94	5.98	6.02	6.06	6.10	6.15	6.19	6.23	6.27	6.32	6.36	6.40	6.40	**2044**

1/ Global Insight: The U.S. Economy: 30-Year Focus, August 2014 Forecast, Base Case.

Table 10

BPA FY 2015 Third-Party Tax-Exempt Borrowing Rate Forecast 1/

Fiscal Years 2015-2044

(continued on next page)

	Maturity														
Year	**1 Year**	**2 Year**	**3 Year**	**4 Year**	**5 Year**	**6 Year**	**7 Year**	**8 Year**	**9 Year**	**10 Year**	**11 Year**	**12 Year**	**13 Year**	**14 Year**	**15 Year**
2015	0.65	0.74	1.05	1.36	1.67	1.94	2.22	2.49	2.76	3.03	3.10	3.16	3.23	3.29	3.36
2016	1.72	1.90	2.07	2.25	2.42	2.63	2.84	3.05	3.26	3.47	3.53	3.60	3.66	3.72	3.78
2017	2.82	2.96	3.08	3.19	3.31	3.43	3.55	3.68	3.80	3.92	3.97	4.02	4.07	4.12	4.16
2018	3.09	3.20	3.32	3.43	3.54	3.64	3.75	3.85	3.95	4.05	4.09	4.14	4.18	4.22	4.27
2019	3.09	3.21	3.32	3.44	3.55	3.65	3.75	3.85	3.95	4.05	4.09	4.14	4.18	4.23	4.27
2020	3.09	3.21	3.32	3.44	3.55	3.65	3.75	3.85	3.95	4.05	4.09	4.14	4.18	4.23	4.27
2021	3.09	3.21	3.32	3.44	3.55	3.65	3.75	3.85	3.95	4.05	4.09	4.14	4.18	4.23	4.27
2022	3.09	3.21	3.32	3.44	3.55	3.65	3.75	3.85	3.95	4.05	4.09	4.14	4.18	4.23	4.27
2023	3.09	3.21	3.32	3.44	3.55	3.65	3.75	3.85	3.95	4.05	4.09	4.14	4.18	4.23	4.27
2024	3.09	3.21	3.32	3.44	3.55	3.65	3.75	3.85	3.95	4.05	4.09	4.14	4.18	4.23	4.27
2025	3.09	3.21	3.32	3.44	3.55	3.65	3.75	3.85	3.95	4.05	4.09	4.14	4.18	4.23	4.27
2026	3.09	3.21	3.32	3.44	3.55	3.65	3.75	3.85	3.95	4.05	4.09	4.14	4.18	4.23	4.27
2027	3.09	3.21	3.32	3.44	3.55	3.65	3.75	3.85	3.95	4.05	4.09	4.14	4.18	4.23	4.27
2028	3.09	3.21	3.32	3.44	3.55	3.65	3.75	3.85	3.95	4.05	4.09	4.14	4.18	4.23	4.27
2029	3.09	3.21	3.32	3.44	3.55	3.65	3.75	3.85	3.95	4.05	4.09	4.14	4.18	4.23	4.27
2030	3.09	3.21	3.32	3.44	3.55	3.65	3.75	3.85	3.95	4.05	4.09	4.14	4.18	4.23	4.27
2031	3.09	3.21	3.32	3.44	3.55	3.65	3.75	3.85	3.95	4.05	4.09	4.14	4.18	4.23	4.27
2032	3.09	3.21	3.32	3.44	3.55	3.65	3.75	3.85	3.95	4.05	4.09	4.14	4.18	4.23	4.27
2033	3.09	3.21	3.32	3.44	3.55	3.65	3.75	3.85	3.95	4.05	4.09	4.14	4.18	4.23	4.27
2034	3.09	3.21	3.32	3.44	3.55	3.65	3.75	3.85	3.95	4.05	4.09	4.14	4.18	4.23	4.27
2035	3.09	3.21	3.32	3.44	3.55	3.65	3.75	3.85	3.95	4.05	4.09	4.14	4.18	4.23	4.27
2036	3.09	3.21	3.32	3.44	3.55	3.65	3.75	3.85	3.95	4.05	4.09	4.14	4.18	4.23	4.27
2037	3.09	3.21	3.32	3.44	3.55	3.65	3.75	3.85	3.95	4.05	4.09	4.14	4.18	4.23	4.27
2038	3.09	3.21	3.32	3.44	3.55	3.65	3.75	3.85	3.95	4.05	4.09	4.14	4.18	4.23	4.27
2039	3.09	3.21	3.32	3.44	3.55	3.65	3.75	3.85	3.95	4.05	4.09	4.14	4.18	4.23	4.27
2040	3.09	3.21	3.32	3.44	3.55	3.65	3.75	3.85	3.95	4.05	4.09	4.14	4.18	4.23	4.27
2041	3.09	3.21	3.32	3.44	3.55	3.65	3.75	3.85	3.95	4.05	4.09	4.14	4.18	4.23	4.27
2042	3.09	3.21	3.32	3.44	3.55	3.65	3.75	3.85	3.95	4.05	4.09	4.14	4.18	4.23	4.27
2043	3.09	3.21	3.32	3.44	3.55	3.65	3.75	3.85	3.95	4.05	4.09	4.14	4.18	4.23	4.27
2044	3.09	3.21	3.32	3.44	3.55	3.65	3.75	3.85	3.95	4.05	4.09	4.14	4.18	4.23	4.27

1/ Global Insight: The U.S. Economy: 30-Year Focus, August 2014 Forecast, Base Case.

Table 10

BPA FY 2015 Third-Party Tax-Exempt Borrowing Rate Forecast 1/

Fiscal Years 2015-2044

Maturity																
16 Year	**17 Year**	**18 Year**	**19 Year**	**20 Year**	**21 Year**	**22 Year**	**23 Year**	**24 Year**	**25 Year**	**26 Year**	**27 Year**	**28 Year**	**29 Year**	**30 Year**	**50 Year**	**Year**
3.42	3.49	3.55	3.62	3.68	3.75	3.81	3.88	3.94	4.01	4.07	4.14	4.20	4.26	4.33	4.33	**2015**
3.84	3.91	3.97	4.03	4.09	4.16	4.22	4.28	4.34	4.40	4.47	4.53	4.59	4.65	4.71	4.71	**2016**
4.21	4.26	4.31	4.36	4.41	4.46	4.50	4.55	4.60	4.65	4.70	4.75	4.80	4.84	4.89	4.89	**2017**
4.31	4.36	4.40	4.44	4.49	4.53	4.58	4.62	4.66	4.71	4.75	4.80	4.84	4.88	4.93	4.93	**2018**
4.31	4.36	4.40	4.45	4.49	4.53	4.58	4.62	4.66	4.71	4.75	4.80	4.84	4.88	4.93	4.93	**2019**
4.31	4.36	4.40	4.45	4.49	4.53	4.58	4.62	4.66	4.71	4.75	4.80	4.84	4.88	4.93	4.93	**2020**
4.31	4.36	4.40	4.45	4.49	4.53	4.58	4.62	4.66	4.71	4.75	4.80	4.84	4.88	4.93	4.93	**2021**
4.31	4.36	4.40	4.45	4.49	4.53	4.58	4.62	4.66	4.71	4.75	4.80	4.84	4.88	4.93	4.93	**2022**
4.31	4.36	4.40	4.45	4.49	4.53	4.58	4.62	4.66	4.71	4.75	4.80	4.84	4.88	4.93	4.93	**2023**
4.31	4.36	4.40	4.45	4.49	4.53	4.58	4.62	4.66	4.71	4.75	4.80	4.84	4.88	4.93	4.93	**2024**
4.31	4.36	4.40	4.45	4.49	4.53	4.58	4.62	4.66	4.71	4.75	4.80	4.84	4.88	4.93	4.93	**2025**
4.31	4.36	4.40	4.45	4.49	4.53	4.58	4.62	4.66	4.71	4.75	4.80	4.84	4.88	4.93	4.93	**2026**
4.31	4.36	4.40	4.45	4.49	4.53	4.58	4.62	4.66	4.71	4.75	4.80	4.84	4.88	4.93	4.93	**2027**
4.31	4.36	4.40	4.45	4.49	4.53	4.58	4.62	4.66	4.71	4.75	4.80	4.84	4.88	4.93	4.93	**2028**
4.31	4.36	4.40	4.45	4.49	4.53	4.58	4.62	4.66	4.71	4.75	4.80	4.84	4.88	4.93	4.93	**2029**
4.31	4.36	4.40	4.45	4.49	4.53	4.58	4.62	4.66	4.71	4.75	4.80	4.84	4.88	4.93	4.93	**2030**
4.31	4.36	4.40	4.45	4.49	4.53	4.58	4.62	4.66	4.71	4.75	4.80	4.84	4.88	4.93	4.93	**2031**
4.31	4.36	4.40	4.45	4.49	4.53	4.58	4.62	4.66	4.71	4.75	4.80	4.84	4.88	4.93	4.93	**2032**
4.31	4.36	4.40	4.45	4.49	4.53	4.58	4.62	4.66	4.71	4.75	4.80	4.84	4.88	4.93	4.93	**2033**
4.31	4.36	4.40	4.45	4.49	4.53	4.58	4.62	4.66	4.71	4.75	4.80	4.84	4.88	4.93	4.93	**2034**
4.31	4.36	4.40	4.45	4.49	4.53	4.58	4.62	4.66	4.71	4.75	4.80	4.84	4.88	4.93	4.93	**2035**
4.31	4.36	4.40	4.45	4.49	4.53	4.58	4.62	4.66	4.71	4.75	4.80	4.84	4.88	4.93	4.93	**2036**
4.31	4.36	4.40	4.45	4.49	4.53	4.58	4.62	4.66	4.71	4.75	4.80	4.84	4.88	4.93	4.93	**2037**
4.31	4.36	4.40	4.45	4.49	4.53	4.58	4.62	4.66	4.71	4.75	4.80	4.84	4.88	4.93	4.93	**2038**
4.31	4.36	4.40	4.45	4.49	4.53	4.58	4.62	4.66	4.71	4.75	4.80	4.84	4.88	4.93	4.93	**2039**
4.31	4.36	4.40	4.45	4.49	4.53	4.58	4.62	4.66	4.71	4.75	4.80	4.84	4.88	4.93	4.93	**2040**
4.31	4.36	4.40	4.45	4.49	4.53	4.58	4.62	4.66	4.71	4.75	4.80	4.84	4.88	4.93	4.93	**2041**
4.31	4.36	4.40	4.45	4.49	4.53	4.58	4.62	4.66	4.71	4.75	4.80	4.84	4.88	4.93	4.93	**2042**
4.31	4.36	4.40	4.45	4.49	4.53	4.58	4.62	4.66	4.71	4.75	4.80	4.84	4.88	4.93	4.93	**2043**
4.31	4.36	4.40	4.45	4.49	4.53	4.58	4.62	4.66	4.71	4.75	4.80	4.84	4.88	4.93	4.93	**2044**

1/ Global Insight: The U.S. Economy: 30-Year Focus, August 2014 Forecast, Base Case.

Table 11

BPA FY 2015 FERC Borrowing Rate (Bank Prime) Forecast 1/

Calendar/Fiscal Years 2015-2044

Year	A FERC Rate Calendar Year	B FERC Rate Fiscal Year
2015	3.37	3.34
2016	4.96	4.56
2017	6.59	6.18
2018	6.75	6.71
2019	6.75	6.75
2020	6.75	6.75
2021	6.75	6.75
2022	6.75	6.75
2023	6.75	6.75
2024	6.75	6.75
2025	6.75	6.75
2026	6.75	6.75
2027	6.75	6.75
2028	6.75	6.75
2029	6.75	6.75
2030	6.75	6.75
2031	6.75	6.75
2032	6.75	6.75
2033	6.75	6.75
2034	6.75	6.75
2035	6.75	6.75
2036	6.75	6.75
2037	6.75	6.75
2038	6.75	6.75
2039	6.75	6.75
2040	6.75	6.75
2041	6.75	6.75
2042	6.75	6.75
2043	6.75	6.75
2044	6.75	6.75

1/ Global Insight: The U.S. Economy: 30-Year Focus, August 2014 Forecast, Base Case.

Table 12

BPA FY 2015 May 3-Month LIBOR Rate Forecast 1/

Calendar/Fiscal Years 2015-2044

Year	A 3-Mo LIBOR Calendar Year	B 3-Mo LIBOR Fiscal Year
2015	0.57	0.50
2016	2.25	1.83
2017	3.85	3.45
2018	3.98	3.95
2019	3.98	3.98
2020	3.98	3.98
2021	3.98	3.98
2022	3.98	3.98
2023	3.98	3.98
2024	3.98	3.98
2025	3.98	3.98
2026	3.98	3.98
2027	3.98	3.98
2028	3.98	3.98
2029	3.98	3.98
2030	3.98	3.98
2031	3.98	3.98
2032	3.98	3.98
2033	3.98	3.98
2034	3.98	3.98
2035	3.98	3.98
2036	3.98	3.98
2037	3.98	3.98
2038	3.98	3.98
2039	3.98	3.98
2040	3.98	3.98
2041	3.98	3.98
2042	3.98	3.98
2043	3.98	3.98
2044	3.98	3.98

1/ Global Insight: The U.S. Economy: 30-Year Focus, August 2014 Forecast, Base Case.

Table 13

Comparison of FY 2015 Inflation Forecast Components

Calendar/Fiscal Year Forecasts 2015 vs. 2014

Calendar/Fiscal Years 2015-2044

YEAR	A CY 2015 1/ Calendar Year GDP Price Deflator (%)	B FY 2015 1/ Fiscal Year GDP Price Deflator (%)	C FY 2015 2/ Fiscal Year Cumulative Price Deflator (Base Year 2014)	D FY 2014 3/ Fiscal Year GDP Price Deflator (%)	E FY 2014 3/ Fiscal Year Cumulative Price Deflator (Base Year 2013)	F Change in the GDP Price Deflator (B-D)	G Change in the Cumulative Price Deflator (C-E)
2015	1.92%	1.84%	1.009	1.64%	1.024	0.20%	-0.015
2016	1.81%	1.84%	1.028	1.66%	1.041	0.18%	-0.013
2017	1.89%	1.87%	1.047	1.62%	1.058	0.25%	-0.011
2018	1.86%	1.87%	1.066	1.60%	1.075	0.26%	-0.009
2019	1.82%	1.83%	1.086	1.57%	1.092	0.26%	-0.007
2020	1.88%	1.86%	1.106	1.63%	1.110	0.24%	-0.003
2021	1.88%	1.88%	1.127	1.69%	1.128	0.19%	-0.001
2022	1.91%	1.90%	1.148	1.71%	1.147	0.19%	0.002
2023	1.93%	1.92%	1.171	1.72%	1.166	0.20%	0.004
2024	1.99%	1.98%	1.194	1.72%	1.186	0.25%	0.007
2025	2.01%	2.01%	1.218	1.74%	1.207	0.27%	0.011
2026	1.93%	1.95%	1.241	1.79%	1.228	0.16%	0.013
2027	1.93%	1.93%	1.265	1.84%	1.250	0.09%	0.015
2028	1.88%	1.89%	1.289	1.84%	1.273	0.05%	0.016
2029	1.87%	1.87%	1.313	1.85%	1.296	0.02%	0.017
2030	1.87%	1.87%	1.338	1.86%	1.320	0.01%	0.018
2031	1.93%	1.92%	1.363	1.91%	1.345	0.01%	0.019
2032	1.92%	1.92%	1.390	1.93%	1.370	-0.01%	0.019
2033	1.92%	1.92%	1.416	1.96%	1.397	-0.05%	0.019
2034	1.89%	1.90%	1.443	2.00%	1.424	-0.10%	0.019
2035	1.95%	1.94%	1.471	1.98%	1.453	-0.04%	0.018
2036	1.97%	1.96%	1.500	1.97%	1.481	-0.01%	0.019
2037	1.96%	1.96%	1.529	1.99%	1.511	-0.03%	0.019
2038	2.00%	1.99%	1.560	2.01%	1.541	-0.02%	0.019
2039	2.02%	2.02%	1.591	2.02%	1.572	0.00%	0.019
2040	2.00%	2.00%	1.623	2.01%	1.603	-0.01%	0.020
2041	1.98%	1.98%	1.655	2.01%	1.636	-0.03%	0.020
2042	2.03%	2.02%	1.689	2.01%	1.669	0.01%	0.020
2043	2.05%	2.04%	1.723	2.01%	1.702	0.03%	0.021
2044	2.09%	2.08%	1.759				

1/ Global Insight: The U.S. Economy: 30-Year Focus, August 2014 Forecast, Base Case.

2/ Fiscal Year Cumulative Price Deflator escalates to midyear dollars. The first year, 2015, is determined as follows: 1.009={(1.84/100)*.5}+1. An example of subsequent year cumulative growth, such as in 2016, is found as: 1.028={1+(1.84/100)}*1.009

3/ Global Insight: The U.S. Economy: 30-year Focus, September 2013 Forecast, Base Case.

7. HISTORICAL AND PROJECTED NEW BONDS ISSUED TO TREASURY

7.1 Purpose

This chapter documents all the bonds that BPA has issued and those it projects it will issue to the U.S. Treasury to finance capital investments.

7.2 Method

New long-term debt consists of bonds issued by BPA to the U.S. Treasury reflecting projected outlays for BPA transmission, construction, and environmental programs during the cost evaluation period (FY 2015–2017). All bonds projected for issuance are entered into the projected portions of the repayment study.

New bonds projected to be issued for the cost evaluation period are based on Integrated Program Review capital program outlays.

TABLE 7-1
PROJECTED FEDERAL BORROWING FOR FY 2014 - 2017
($000s)

	A	B	C	D	E
	FISCAL YEAR	**DESCRIPTION**	**INTEREST RATE**	**TERM**	**TOTAL BORROWING**
1	2015	Environment	3.92%	15	3,000
2		Construction	3.60%	8.00548	3,000
3		Construction	3.66%	8.00548	12,000
4		Construction	3.60%	16.1781	20,000
5		Construction	3.54%	7.00548	48,000
6		Construction	3.54%	8.00548	38,000
7		Construction	3.54%	11.0082	38,000
8		Construction	3.54%	10.0082	52,000
9		Construction	3.66%	15.011	56,000
10		Construction (AS)	2.42%	6.00548	1,300
11		Construction (AS)	2.42%	6.00548	1,950
12		Construction (AS)	2.10%	5.00548	1,300
13		Construction (AS)	2.42%	6.00548	1,300
14		Construction (AS)	2.42%	6.00548	3,250
15		Total			279,100
16					
17	2016	Environment	3.70%	8.00548	6,000
18		Construction	3.47%	7.00548	34,000
19		Construction	3.70%	8.00548	21,000
20		Construction	3.92%	9.00822	40,000
21		Construction	4.14%	10.0082	28,000
22		Construction	4.18%	11.0082	33,000
23		Construction	4.22%	12.0082	58,000
24		Construction	4.26%	13.0082	45,000
25		Construction	4.30%	14.0082	47,000
26		Construction	4.34%	15.0082	42,000
27		Construction	4.38%	16.011	40,000
28		Construction	4.42%	17.011	54,000
29		Construction	4.46%	18.011	92,000
30		Construction (AS)	3.25%	6.00274	9,100
31		Construction (AS)	3.25%	6.00274	9,100
32		Total			558,200

TABLE 7-1
PROJECTED FEDERAL BORROWING FOR FY 2014 - 2017
($000s)

	A	B	C	D	E
	FISCAL YEAR	**DESCRIPTION**	**INTEREST RATE**	**TERM**	**TOTAL BORROWING**
33					
34	2017	Environment	4.41%	8.00548	6,000
35		Construction	4.83%	18.011	34,000
36		Construction	4.88%	20.0137	21,000
37		Construction	4.91%	21.0137	40,000
38		Construction	4.93%	22.0137	28,000
39		Construction	4.96%	23.0137	33,000
40		Construction	4.98%	24.0164	58,000
41		Construction	5.01%	25.0164	45,000
42		Construction	5.04%	26.0164	48,000
43		Construction	5.06%	27.0192	42,000
44		Construction	5.09%	28.0192	40,000
45		Construction	5.11%	29.0192	55,000
46		Construction	5.14%	30.0192	93,000
47		Construction (AS)	4.20%	6.00274	7,150
48		Construction (AS)	4.20%	6.00274	7,150
49		Total			557,300

TABLE 7-2
ADJUSTMENTS TO TRANSMISSION CAPITAL FORECAST FOR PROJECTED TREASURY BORROWINGS
($000s)

	Forecast Treasury Borrowings [1/]	A 2015	B 2016	C 2017
1	Transmission Construction	720,912	631,708	570,450
2	Less Reserve Financing	(15,000)	(15,000)	(15,000)
3	Less Master Leases Signed To-Date	(218,872)	(81,967)	(17,577)
4	Less Federal Borrowing To-Date	(220,000)	0	0
5	**Transmission Construction**	**267,040**	**534,741**	**537,873**
6				
7	**Environment**	**6,535**	**6,445**	**6,433**
8	Less Federal Borrowing To-Date	(3,500)	0	0
9	**Environment**	**3,035**	**6,445**	**6,433**
10				
11	**Transmission Agency Services**	**19,239**	**17,588**	**13,645**
12	Less Federal Borrowing To-Date	(10,100)	0	0
13	**Environment**	**9,139**	**17,588**	**13,645**

1/ AFUDC Included

8. NON-FEDERAL PAYMENT OBLIGATIONS

8.1 Introduction

There are two forms of non-Federal payment obligations associated with transmission assets in this rate proposal. One is a lease-purchase arrangement for capitalized asset purchases. The other is the functional reassignment to transmission of debt service payment obligations associated with non-Federal, Energy Northwest (EN) bonds.

8.2 Capital Leases

BPA entered into a lease-purchase agreement with the Northwest Infrastructure Financing Corporation (NIFC) to provide for the construction of the 500-kV Schultz-Wautoma transmission line. Since the completion of that project, BPA has entered into additional lease-purchase agreements with other NIFC entities and the Port of Morrow for other capital projects. The resulting payment streams are treated as debt service in the repayment study. BPA also has several legacy capital leases such as those for the Teton-Swan Valley and the Goshen-Drummond lines. Table 8-1 displays the consolidated payment stream.

8.3 Debt Service Reassignment

Debt Service Reassignment (DSR) is an accounting and ratemaking mechanism created to make full use of the Debt Optimization Program (DOP). It allows the use of cash flows generated by DOP actions for advanced amortization payments of transmission debt. In return, DSR ensures that Transmission revenues repay the full cost of the associated EN debt. DOP and DSR ended in FY 2009, but the associated financial obligations exist through FY 2018.

Under DOP, the proceeds from EN refinancing bonds are used to pay principal on the currently maturing EN bonds in a given fiscal year. Since BPA power rates were set to recover the originally expected EN principal payments on the maturing bonds, and the associated debt

service requirement was expected to decrease the EN budget (when the principal was paid from the proceeds of the newly issued refinancing bonds), funds in the BPA Fund then became available for other purposes. The amount made available equals the principal of the amortized EN bonds. BPA uses these funds to amortize Federal obligations associated with generation and transmission assets ahead of schedule, thereby replenishing or creating future opportunities to replenish BPA's available U.S. Treasury borrowing authority.

DSR is applicable when BPA uses the funds made available from DOP to early-amortize Federal Transmission obligations. The stream of annual all-in costs from the DSR transaction is assigned to Transmission Services and recovered in transmission rates. The all-in costs include debt service on tax-exempt and taxable bonds and other costs associated with the DSR transaction, which are described later. Conversely, the costs attached to these EN refinancing bonds are no longer assigned for recovery from Power revenues.

Transmission's total DSR payment obligation and the related relief of Power's payment obligations are shown in Table 8-2. Transmission's total principal obligation can be higher or lower than the total principal relief for Power if premium or discount bonds are issued. The interest associated with outstanding obligations may change over time if DSR bonds are refinanced for interest savings.

TABLE 8-1
LEASE PURCHASE PAYMENT STREAM
($000s)

	A	B	C	D	E
	Fiscal Year	**Principal**	**Interest**	**Expenses**	**Total**
1	2015	-	45,484	12,528	58,012
2	2016	-	47,589	6,469	54,058
3	2017	-	51,874	1,690	53,563
4	2018	-	51,923	382	52,305
5	2019	-	55,894	428	56,321
6	2020	-	61,942	596	62,538
7	2021	-	74,033	941	74,974
8	2022	-	81,010	1,033	82,042
9	2023	-	81,010	1,030	82,039
10	2024	-	81,091	1,027	82,118
11	2025	-	81,010	1,024	82,033
12	2026	-	81,010	1,020	82,030
13	2027	-	81,010	1,017	82,027
14	2028	-	81,091	1,013	82,105
15	2029	-	81,010	1,010	82,019
16	2030	-	81,010	1,006	82,015
17	2031	-	81,010	1,002	82,011
18	2032	-	81,091	998	82,089
19	2033	50,278	81,630	993	132,901
20	2034	151,227	75,929	420	227,576
21	2035	-	69,589	(48)	69,541
22	2036	-	69,657	(49)	69,608
23	2037	-	69,589	(50)	69,539
24	2038	200,000	64,359	(51)	264,308
25	2039	-	59,129	(52)	59,077
26	2040	-	59,197	(54)	59,143
27	2041	118,000	59,129	(56)	177,073
28	2042	281,932	46,166	(55)	328,044
29	2043	99,982	32,838	-	132,820
30	2044	502,073	17,022	-	519,096
31	**Total**	**1,403,493**	**1,984,328**	**35,208**	**3,423,029**

TABLE 8-2
RELIEF OF GENERATION & TRANSMISSION'S DSR OBLIGATION
($000s)

		A	B	C	D	E	F
		Relief of Generation Obligation			Transmission DSR Payment Obligation		
	BPA FY	Principal	Interest	Total	Principal	Interest	Total
1	2004	-	16,366	16,366	-	15,088	15,088
2	2005	-	27,505	27,505	-	25,240	25,240
3	2006	-	35,780	35,780	-	33,041	33,041
4	2007	674	45,812	46,486	716	42,809	43,524
5	2008	4,271	57,069	61,340	4,518	51,369	55,887
6	2009	9,950	61,506	71,456	10,432	56,154	66,586
7	2010	12	62,109	62,121	12	57,173	57,185
8	2011	147	61,999	62,146	154	57,327	57,480
9	2012	39,287	59,879	99,165	41,165	55,051	96,216
10	2013	157,982	57,078	215,060	165,827	51,887	217,714
11	2014	166,651	48,411	215,062	175,119	44,348	219,466
12	2015	178,179	36,010	214,189	185,160	34,324	219,484
13	2016	177,527	26,332	203,858	185,303	24,143	209,446
14	2017	189,775	19,281	209,056	199,991	15,810	215,800
15	2018	182,509	11,195	193,704	191,504	8,392	199,896
16	2019	5,520	3,042	8,561	4,838	3,666	8,504
17	2020	17,552	2,887	20,439	19,592	1,040	20,632
18	2021	18,068	2,372	20,441	20,571	105	20,676
19	2022	18,666	1,770	20,436	21,596	(881)	20,715
20	2023	19,297	1,145	20,442	22,678	(1,912)	20,767
21	2024	14,835	498	15,333	17,640	(2,037)	15,603
22	**Total**	**1,200,902**	**638,047**	**1,838,949**	**1,266,815**	**572,134**	**1,838,949**

9. REPAYMENT PERIOD REPLACEMENTS

9.1 Introduction

Consistent with the requirements of Department of Energy Order RA 6120.2, each repayment study includes funding for replacements to the transmission system during the repayment period. The purpose of these investments is to maintain the existing revenue-generating capability of the system. This schedule is expressed in mid-year dollars for the study year and is assigned the interest rates of the projected long-term borrowing for the study year.

9.2 Transmission Replacements

BPA's Transmission replacement methodology combines the Iowa Curve methodology, the Handy-Whitman Index, and BPA's expected service lives of its assets to produce projected replacements through the cost evaluation period. The Iowa Curves are a set of curves with different shapes corresponding to how much of an 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, April 1967. The specific curves are assigned to FERC Accounts in BPA's depreciation study.

BPA's total plant is analyzed, by FERC account and in-service date, and assigned the various FERC Accounts Iowa Curves as determined by the depreciation study. A 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 a lifetime to maintain the initial plant. A data file with the contents of Table 22, accurate to 12 lifetimes, is used in calculating repayment period transmission replacements. For each of the Iowa Curves, Table 22 identifies a percentage of plant to be replaced for each tenth of a lifetime.

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 provided by the Index for electrical utilities include trends for total transmission plant and trends for the major FERC accounts within transmission plant. BPA uses the trends for individual FERC accounts when they are available. When the Handy-Whitman Index does not provide a cost trend for a specific account, BPA used the trends for total transmission plant.

To determine replacement costs, BPA also must determine the expected service life of its assets. BPA assigns most assets an expected service life based on its periodic depreciation studies. The service life determined by the depreciation studies reflects early retirements that may occur as a result of facility upgrades to expand the system for load growth and other system conditions. However, for assets that are more likely to be retired early to facilitate upgrades, replacements are based on the expected physical life of the asset, not on a lifetime that is shortened by early retirements. The purpose of repayment period replacements is to maintain the *existing* system's revenue-producing capability over the repayment period. These assets are retired early to facilitate expansion of the system. If service life was used for determining replacements for these assets, we would be forecasting replacements for an expanded system and therefore overstating costs.

BPA has long assumed that transmission towers and fixtures (FERC Account 354) have an expected service life that matches their expected physical life of 100 years, despite the depreciation study assigning that account a service life of 65 years. For other accounts, this study uses the service life developed by the latest BPA depreciation study produced in 2012.

Transmission plant investment by FERC account and in-service year was obtained from BPA's plant investment records. Based on the year plant was placed in service and the year of the cost evaluation period being analyzed, BPA calculated the number of tenths of a lifetime since the plant was placed in service. The result was then indexed using the appropriate survival curve in Table 22 to identify the portion of plant that would be replaced in a given tenth of a lifetime. Next, the original plant investment was inflated to study-year dollars using the Handy-Whitman Index and BPA's inflation forecast. Projected plant investment was added for the rate period. The result was multiplied by the portion of plant that should be replaced, as indicated by Table 22, and the portion of the expected service life to yield a cost of replacement in the cost evaluation year for a given year's investment. The product is the replacement cost for FERC account and in-service year. Finally, these replacement costs were accumulated by future year and FERC account.

BPA's capital program includes a replacement program that recognizes that some historical plant is retired over time. If future replacements were calculated for the planned replacement program, a double counting would occur. Therefore, the projections for a cost evaluation year were reduced by the amount calculated for replacements for the same year. Future replacements were then calculated for only the remaining net initial investment of that year.

9.3 Replacement Credits

Replacement credits are calculated for two sets of customer-funded plant, the AC Intertie and facilities constructed for the dedicated use of a customer through the Projects Funded in Advance mechanism.

The cost evaluation period data for the AC Intertie is determined by multiplying the total replacements for each year by the average proportion of actual plant that is attributed to the AC Intertie. The result is then multiplied by 22 percent, the AC Intertie capacity owners' share of

the Intertie. The results are the future replacements for the total AC. These replacements are multiplied by the appropriate percentage representing the amount that will be allocated to the capacity owners to obtain the future contributions required from capacity owners. The future replacement costs for the cost evaluation period are included in the repayment study, and the associated contributions from capacity owners are also included as negative expenses.

BPA receives funds from customers for the construction of facilities that are dedicated to the use of those customers, known as Projects Funded in Advance (PFIA). Although the customer-financed facilities are BPA assets, the customer is responsible for the future cost of replacement of these facilities. As with the AC Intertie, BPA calculates the future replacement cost of customer-financed facilities. Because the customer will provide the up-front funding for the replacements, that funding is applied as a credit against future replacement costs in the repayment study. The replacement credit for these facilities is calculated as a percentage of the total replacement cost for each account based on the portion of plant in each account that has been funded through customer advances.

TABLE 9-1
FUTURE REPLACEMENTS FOR FY 2016
($000s)

		A	B	C
	FY	AMOUNT	RATE	DUE
1	2017	181,144	4.930%	2052
2	2018	189,269	4.930%	2053
3	2019	196,441	4.930%	2054
4	2020	203,726	4.930%	2055
5	2021	208,847	4.930%	2056
6	2022	216,173	4.930%	2057
7	2023	222,464	4.930%	2058
8	2024	229,015	4.930%	2059
9	2025	234,493	4.930%	2060
10	2026	239,850	4.930%	2061
11	2027	244,746	4.930%	2062
12	2028	249,638	4.930%	2063
13	2029	253,884	4.930%	2064
14	2030	258,751	4.930%	2065
15	2031	263,033	4.930%	2066
16	2032	267,807	4.930%	2067
17	2033	272,570	4.930%	2068
18	2034	277,538	4.930%	2069
19	2035	282,584	4.930%	2070
20	2036	287,736	4.930%	2071
21	2037	291,452	4.930%	2072
22	2038	295,766	4.930%	2073
23	2039	300,074	4.930%	2074
24	2040	304,271	4.930%	2075
25	2041	306,942	4.930%	2076
26	2042	311,080	4.930%	2077
27	2043	315,353	4.930%	2078
28	2044	319,790	4.930%	2079
29	2045	324,180	4.930%	2080
30	2046	328,247	4.930%	2081
31	2047	331,445	4.930%	2082
32	2048	335,607	4.930%	2083
33	2049	340,653	4.930%	2084
34	2050	344,483	4.930%	2085
35	2051	347,640	4.930%	2086

TABLE 9-2
FUTURE REPLACEMENTS FOR FY 2017
($000s)

		A	B	C
	FY	AMOUNT	RATE	DUE
1	2018	193,362	5.140%	2053
2	2019	200,668	5.140%	2054
3	2020	208,088	5.140%	2055
4	2021	213,309	5.140%	2056
5	2022	220,766	5.140%	2057
6	2023	227,182	5.140%	2058
7	2024	234,754	5.140%	2059
8	2025	240,370	5.140%	2060
9	2026	245,815	5.140%	2061
10	2027	250,852	5.140%	2062
11	2028	256,754	5.140%	2063
12	2029	261,191	5.140%	2064
13	2030	266,136	5.140%	2065
14	2031	270,572	5.140%	2066
15	2032	276,362	5.140%	2067
16	2033	281,294	5.140%	2068
17	2034	286,347	5.140%	2069
18	2035	291,548	5.140%	2070
19	2036	296,784	5.140%	2071
20	2037	301,537	5.140%	2072
21	2038	305,947	5.140%	2073
22	2039	310,405	5.140%	2074
23	2040	314,665	5.140%	2075
24	2041	318,274	5.140%	2076
25	2042	322,462	5.140%	2077
26	2043	326,815	5.140%	2078
27	2044	331,288	5.140%	2079
28	2045	336,586	5.140%	2080
29	2046	340,690	5.140%	2081
30	2047	343,949	5.140%	2082
31	2048	348,152	5.140%	2083
32	2049	353,397	5.140%	2084
33	2050	358,025	5.140%	2085
34	2051	361,241	5.140%	2086
35	2052	364,275	5.140%	2087

TABLE 9-3
REPLACEMENT CREDITS
($000s)

		A	B	C	D	E	F
		AC INTERTIE		PFIA		TOTAL	
		1.52% of Total Replacements [1/]		2.59% of Total Replacements			
		2016 STUDY	2017 STUDY	2016 STUDY	2017 STUDY	2016 STUDY	2017 STUDY
1	2017	(2,758)	-	(4,692)	-	(7,449)	-
2	2018	(2,881)	(2,944)	(4,902)	(5,008)	(7,783)	(7,952)
3	2019	(2,991)	(3,055)	(5,088)	(5,197)	(8,078)	(8,252)
4	2020	(3,102)	(3,168)	(5,276)	(5,389)	(8,378)	(8,557)
5	2021	(3,179)	(3,247)	(5,409)	(5,525)	(8,589)	(8,772)
6	2022	(3,291)	(3,361)	(5,599)	(5,718)	(8,890)	(9,079)
7	2023	(3,387)	(3,459)	(5,762)	(5,884)	(9,149)	(9,343)
8	2024	(3,487)	(3,574)	(5,931)	(6,080)	(9,418)	(9,654)
9	2025	(3,570)	(3,659)	(6,073)	(6,226)	(9,643)	(9,885)
10	2026	(3,651)	(3,742)	(6,212)	(6,367)	(9,864)	(10,109)
11	2027	(3,726)	(3,819)	(6,339)	(6,497)	(10,065)	(10,316)
12	2028	(3,800)	(3,909)	(6,466)	(6,650)	(10,266)	(10,559)
13	2029	(3,865)	(3,976)	(6,576)	(6,765)	(10,441)	(10,741)
14	2030	(3,939)	(4,052)	(6,702)	(6,893)	(10,641)	(10,945)
15	2031	(4,004)	(4,119)	(6,813)	(7,008)	(10,817)	(11,127)
16	2032	(4,077)	(4,207)	(6,936)	(7,158)	(11,013)	(11,365)
17	2033	(4,150)	(4,282)	(7,060)	(7,286)	(11,209)	(11,568)
18	2034	(4,225)	(4,359)	(7,188)	(7,416)	(11,413)	(11,776)
19	2035	(4,302)	(4,439)	(7,319)	(7,551)	(11,621)	(11,990)
20	2036	(4,380)	(4,518)	(7,452)	(7,687)	(11,833)	(12,205)
21	2037	(4,437)	(4,591)	(7,549)	(7,810)	(11,986)	(12,400)
22	2038	(4,503)	(4,658)	(7,660)	(7,924)	(12,163)	(12,582)
23	2039	(4,568)	(4,726)	(7,772)	(8,039)	(12,340)	(12,765)
24	2040	(4,632)	(4,790)	(7,881)	(8,150)	(12,513)	(12,940)
25	2041	(4,673)	(4,845)	(7,950)	(8,243)	(12,623)	(13,089)
26	2042	(4,736)	(4,909)	(8,057)	(8,352)	(12,793)	(13,261)
27	2043	(4,801)	(4,975)	(8,168)	(8,464)	(12,969)	(13,440)
28	2044	(4,868)	(5,044)	(8,283)	(8,580)	(13,151)	(13,624)
29	2045	(4,935)	(5,124)	(8,396)	(8,718)	(13,332)	(13,842)
30	2046	(4,997)	(5,187)	(8,502)	(8,824)	(13,499)	(14,011)
31	2047	(5,046)	(5,236)	(8,584)	(8,908)	(13,630)	(14,145)
32	2048	(5,109)	(5,300)	(8,692)	(9,017)	(13,802)	(14,317)
33	2049	(5,186)	(5,380)	(8,823)	(9,153)	(14,009)	(14,533)
34	2050	(5,244)	(5,451)	(8,922)	(9,273)	(14,166)	(14,723)
35	2051	(5,292)	(5,500)	(9,004)	(9,356)	(14,296)	(14,856)
36	2052	-	(5,546)	-	(9,435)	-	(14,980)

1/ Represents share (22%) of the 6.92% average AC plant represents of total Transmission plant.

TABLE 9-4
SUMMARY OF HISTORICAL PLANT INVESTMENT
AS OF 9/30/2014

	A	B	C	D	E	F
	FERC ACCOUNT	**ACCOUNT NAME**	**TOTAL PLANT**	**AC INTERTIE**	**PFIA**	**ALL OTHER**
1	352	STRUCTURES & IMPROVEMENTS	$ 356,216,363	$ 25,843,615	$ 3,416,761	$ 326,955,986
2	353	STATION EQUIPMENT	3,285,239,871	348,811,410	84,505,675	2,851,922,785
3	354	TOWERS & FIXTURES	1,141,884,821	35,433,594	19,276,379	1,087,174,848
4	355	POLES & FIXTURES	352,063,463	1,728,256	16,944,251	333,390,956
5	356	CONDUCTOR & CLEARING ROW	1,193,052,452	43,500,715	16,848,265	1,132,703,472
6	358	UNDERGROUND CONDUCTOR & DEVICES	21,865,435	-	-	21,865,435
7	359	ROADS & TRAILS	190,082,767	6,056,355	763,641	183,262,772
8	397	COMMUNICATION EQUIPMENT	650,364,738	36,542,160	44,451,487	569,371,091
9		**TOTAL:**	**$ 7,190,769,910**	**$ 497,916,106**	**$ 186,206,459**	**$ 6,506,647,345**

TABLE 9-5
PLANT INVESTMENT BY ACCOUNT AND YEAR OF INVESTMENT
(FIGURES ARE IN $ DOLLARS)

	A	B	C	D	E	F	G	H	I	J
1	ACCOUNT	352	353	354	355	356	358	359	397	
2	NAME	STRUCTURES & IMPROVEMENTS	STATION EQUIPMENT	TOWERS & FIXTURES	POLES & FIXTURES	CONDUCTOR & CLEARING ROW	UNDERGROUND CONDUCTOR & DEVICES	ROADS & TRAILS	COMMUNICATION EQUIPMENT	TOTAL
3	CURVE	R2.5	S1	R3	R2.5	R4	S3	R3	S2	
4	SERVICE LIFE	65	45	100	55	100	40	75	19	
5	1940	476,062	1,812,502	926,103	25,606	1,079,234	-	91,782		4,411,289
6	1941	927,550	917,191	3,730,079	433,380	6,515,414	-	144,555		12,668,169
7	1942	655,363	1,339,495	67,986	210,246	1,257,105	-	289,447		3,819,642
8	1943	587,688	1,105,707	4,226,245	36,859	2,895,795	-	381,085		9,233,379
9	1944	14,066	8,933	918	16,690	305,568	-	131,489		477,664
10	1945	32,032	268,695	536,141	136,702	742,578	-	129,005		1,845,152
11	1946	153,424	318,920	602,984	50,451	299,611	-	41,441		1,466,831
12	1947	64,746	20,890	9,107	183,835	547,687	-	112,439		938,704
13	1948	282,743	1,351,847	324,789	398,494	1,761,543	-	160,519		4,279,935
14	1949	88,566	1,994,547	393,538	899,670	1,575,879	-	114,243		5,066,444
15	1950	657,081	1,797,360	3,994,408	707,803	5,500,526	-	949,689		13,606,867
16	1951	420,867	2,705,453	2,043,375	713,559	4,276,588	-	11,879		10,171,722
17	1952	355,096	2,054,048	7,179,525	479,848	7,133,967	193,932	9,140		17,405,556
18	1953	1,394,228	8,777,672	9,406,359	3,090,439	10,927,304	-	231,375		33,827,378
19	1954	835,601	2,876,027	13,091,368	1,303,062	12,296,500	-	1,581,255		31,983,813
20	1955	841,817	4,918,080	2,126,071	386,867	2,605,388	-	49,245		10,927,468
21	1956	711,374	7,184,829	16,294,005	349,009	12,765,653	-	355,213		37,660,084
22	1957	1,039,728	7,209,196	1,477,666	991,206	3,641,597	-	299,050		14,658,443
23	1958	577,916	4,155,308	5,493,794	1,759,261	6,958,712	-	738,896		19,683,887
24	1959	308,063	6,755,886	2,159,559	1,035,953	3,358,277	-	236,348	-	13,854,086
25	1960	121,487	2,517,503	756,488	336,802	1,104,808	-	38,778		4,875,865
26	1961	378,023	3,682,537	3,183,277	717,643	4,168,609	-	283,261		12,413,350
27	1962	513,912	2,532,676	11,358,446	1,232,702	9,760,967	-	529,044		25,927,747
28	1963	257,014	1,831,817	1,222,631	411,811	1,840,281	-	405,707		5,969,261
29	1964	545,408	2,295,248	12,142,615	193,118	1,538,415	-	52,736		16,767,540
30	1965	164,570	2,574,919	8,881,139	277,461	23,513,104	-	538,436		35,949,629
31	1966	534,437	6,448,389	4,065,177	1,078,563	6,173,805	-	264,808	-	18,565,178
32	1967	1,082,426	7,662,147	11,213,131	775,955	11,962,679	284,507	235,346		33,216,190
33	1968	2,586,901	14,631,972	34,619,212	398,131	36,706,310	-	1,035,661	-	89,978,187
34	1969	1,929,033	14,902,901	25,131,430	1,128,553	27,655,524	-	487,407	-	71,234,847
35	1970	11,392,850	38,007,381	26,607,338	1,132,938	28,490,386	-	943,394		106,574,287
36	1971	1,339,043	8,888,950	15,948,455	724,414	14,206,774	-	328,307	-	41,435,943
37	1972	2,187,552	12,490,376	14,909,761	1,182,298	18,851,150	-	878,608		50,499,745
38	1973	2,032,890	11,860,844	28,621,272	507,773	26,205,327	1,493,582	1,613,013	-	72,334,701
39	1974	955,300	12,475,644	6,503,689	1,527,927	7,245,614	-	1,101,600		29,809,774
40	1975	3,411,759	21,707,421	20,932,602	1,555,515	14,493,367	-	1,319,642	-	63,420,306
41	1976	1,730,520	20,019,399	32,771,629	2,029,686	29,176,322	1,317,799	860,285	-	87,905,640
42	1977	2,211,926	22,288,765	52,128,905	1,432,076	57,076,176	64,799	946,696	-	136,149,343
43	1978	1,156,144	33,453,208	7,713,140	1,381,584	7,584,533	43,378	50,708	-	51,382,695

TABLE 9-5
PLANT INVESTMENT BY ACCOUNT AND YEAR OF INVESTMENT
(FIGURES ARE IN $ DOLLARS)

	A	B	C	D	E	F	G	H	I	J
1	ACCOUNT	352	353	354	355	356	358	359	397	
2	NAME	STRUCTURES & IMPROVEMENTS	STATION EQUIPMENT	TOWERS & FIXTURES	POLES & FIXTURES	CONDUCTOR & CLEARING ROW	UNDERGROUND CONDUCTOR & DEVICES	ROADS & TRAILS	COMMUNICATION EQUIPMENT	TOTAL
3	CURVE	R2.5	S1	R3	R2.5	R4	S3	R3	S2	
4	SERVICE LIFE	65	45	100	55	100	40	75	19	
44	1979	829,125	13,900,487	9,161,554	1,970,345	12,018,086	-	1,336,894	-	39,216,491
45	1980	1,553,847	18,000,316	14,400,660	780,350	16,022,767	-	201,487	-	50,959,427
46	1981	2,361,683	33,936,118	61,360,719	1,234,848	64,049,936	-	526,795	-	163,470,099
47	1982	1,831,205	31,235,190	3,575,782	662,029	5,060,449	-	355,871	-	42,720,526
48	1983	4,938,306	37,003,778	28,577,207	2,931,584	28,663,225	-	826,879	-	102,940,979
49	1984	6,818,386	52,095,432	76,260,479	3,244,293	78,997,002	-	8,388,752	-	225,804,344
50	1985	7,875,754	49,228,437	286,797	1,929,796	1,561,203	4,573,403	59,347	-	65,514,737
51	1986	4,967,389	21,648,043	7,491,442	8,485,733	16,210,096	-	742,455	-	59,545,158
52	1987	7,506,190	32,340,604	100,490,771	13,847,331	145,470,634	-	40,286,606	-	339,942,136
53	1988	8,268,167	19,372,113	4,837,575	2,508,510	6,810,774	-	309,066	-	42,106,205
54	1989	25,777,277	105,837,423	2,055,601	3,645,863	2,294,160	-	141,340	-	139,751,664
55	1990	3,704,482	51,930,584	3,377,301	1,341,163	2,590,241	-		-	62,943,771
56	1991	6,621,529	93,186,876	1,304,831	1,493,504	3,257,771	-		-	105,864,511
57	1992	3,157,930	118,942,933	11,015,954	2,025,109	20,029,162	-	2,021,035	-	157,192,123
58	1993	8,269,431	77,266,995	14,158,498	2,859,084	23,645,239	-	4,253,512	-	130,452,759
59	1994	28,174,069	231,481,549	5,806,581	3,641,305	4,863,220	-	117,722	-	274,084,446
60	1995	11,104,797	66,685,299	825,569	996,873	5,071,877	-	201,091	21,205,386	106,090,892
61	1996	6,766,302	80,581,744	1,685,145	198,282	3,844,738	-	1,925	39,790,978	132,869,114
62	1997	7,022,574	86,057,649	15,093,318	2,160,086	12,029,703	13,996	2,634,641	46,458,040	171,470,007
63	1998	11,205,585	52,296,087	8,932,174	2,860,997	12,737,573	7,328	1,782,782	49,096,462	138,918,988
64	1999	5,425,683	75,801,415	(644,635)	7,715,074	121,378	-	416,353	79,012,124	167,847,392
65	2000	1,548,591	39,830,312	89,833	2,071,939	654,477	-	428	7,811,984	52,007,564
66	2001	2,901,840	58,925,772	1,404,165	4,261,666	2,921,401	-	1,197,852	7,643,129	79,255,825
67	2002	6,639,600	85,493,827	1,956,554	23,741,448	14,693,786	5,548,135	806,409	29,960,602	168,840,362
68	2003	7,172,199	113,387,384	23,211,669	7,159,904	19,106,084	9,405	1,152,777	33,722,915	204,922,337
69	2004	6,305,985	147,315,945	44,017,733	12,557,226	16,120,192	26,853	1,148,355	27,587,094	255,079,382
70	2005	6,785,951	98,550,784	65,512,047	18,608,221	49,892,215	-	14,830	24,301,368	263,665,415
71	2006	12,062,449	82,574,783	74,122,412	9,641,185	45,701,248	8,218,798	697,144	48,718,944	281,736,963
72	2007	8,059,402	73,468,007	1,340,875	15,000,211	9,620,210	20,273	5,069,935	23,600,950	136,179,863
73	2008	6,165,343	93,138,841	4,094,580	28,467,955	13,219,453	-	4,455,860	25,811,888	175,353,920
74	2009	8,144,329	107,550,433	482,741	7,908,823	3,621,393	-	3,120,294	11,254,036	142,082,050
75	2010	7,820,685	142,473,362	31,433,761	43,086,120	23,975,563	-	12,891,176	35,067,066	296,747,733
76	2011	9,044,032	122,607,342	9,274,022	23,975,907	18,771,527	-	12,736,052	27,667,948	224,076,829
77	2012	12,217,990	156,599,491	106,864,593	16,322,045	72,871,097		28,343,785	39,812,948	433,031,950
78	2013	26,097,572	169,467,868	4,546,280	13,060,878	7,034,784	49,246	24,632,389	22,519,721	267,408,737
79	2014	26,115,479	147,181,966	10,685,877	28,433,884	15,300,712	0	11,239,396	49,321,155	288,278,470
80	**Total**	**356,216,363**	**3,285,239,871**	**1,141,884,821**	**352,063,463**	**1,193,052,452**	**21,865,435**	**190,082,767**	**650,364,738**	**7,190,769,910**

TABLE 9-6

PLANT INVESTMENT BY ACCOUNT FOR REPLACEMENT CALCULATIONS

($000s)

		A	B	C
	ACCOUNTS	**2015**	**2016**	**2017**
1	LINES 354	137,645	171,338	151,752
2	SUBS 353	101,082	153,957	346,216
3	COMM EQUIP 397	31,542	37,902	7,655
4	**TOTAL**	**270,269**	**363,197**	**505,623**

TABLE 9-7:
"STATISTICAL ANALYSIS OF INDUSTRIAL PROPERTY RETIREMENTS," TABLE 22

Tenth of Life	L0	L1	L2	L3	L4	L5	S0	S1	S2	S3	S4	S5	S6	R0.5	R1	R2	R2.5	R3	R4	R5	O1
1	2.93	0.95	0.11	-	-	-	1.17	0.16	-	-	-	-	-	2.42	2.78	1.14	0.65	0.15	0.02	-	2.53
2	4.82	2.09	0.68	0.08	-	-	2.68	0.89	0.12	-	-	-	-	3.49	3.23	1.57	0.99	0.40	0.06	-	5.25
3	5.92	3.64	1.60	0.47	-	-	3.84	2.03	0.58	0.06	-	-	-	4.29	3.69	2.12	1.50	0.88	0.19	-	5.52
4	6.72	5.35	2.78	1.22	0.16	-	4.83	3.36	1.59	0.38	-	-	-	4.98	4.18	2.81	2.21	1.60	0.51	-	5.80
5	7.32	6.90	4.83	2.40	0.95	0.01	5.71	4.78	3.16	1.34	0.10	-	-	5.64	4.76	3.67	3.13	2.59	1.18	0.05	6.10
6	7.77	7.95	7.42	4.63	2.64	0.46	6.52	6.17	5.18	3.32	0.79	0.02	-	6.31	5.47	4.73	4.28	3.83	2.45	0.46	6.41
7	8.18	8.45	9.50	8.28	5.00	2.64	7.25	7.48	7.39	6.36	3.28	0.46	-	7.01	6.31	6.01	5.69	5.37	4.53	1.96	6.74
8	8.54	8.82	10.62	12.11	8.66	6.70	7.94	8.63	9.49	10.00	8.66	4.05	0.36	7.75	7.25	7.50	7.50	7.50	7.49	5.59	7.09
9	8.87	9.16	10.85	14.12	16.35	14.73	8.56	9.61	11.20	13.32	15.88	15.63	8.93	8.48	8.25	9.17	9.78	10.38	11.23	13.40	7.45
10	9.16	9.47	10.58	13.60	20.53	28.50	9.14	10.37	12.30	15.36	21.28	29.85	40.71	9.20	9.24	10.85	12.21	13.57	17.14	24.92	7.83
11	9.41	9.73	10.20	11.66	16.77	23.71	9.67	10.92	12.71	15.52	21.28	29.85	40.71	9.85	10.16	12.32	14.13	15.94	21.62	29.98	8.23
12	9.62	9.93	9.93	9.80	11.27	12.45	10.14	11.24	12.45	13.88	15.91	15.63	8.93	10.41	10.94	13.23	14.72	16.20	18.76	18.70	8.66
13	9.78	10.08	9.86	8.80	7.93	6.23	10.54	11.34	11.68	11.17	8.80	4.05	0.36	10.84	11.52	13.26	13.53	13.79	11.69	4.71	9.10
14	9.92	10.18	9.94	8.70	6.40	3.26	10.86	11.24	10.64	8.49	3.79	0.47	-	11.12	11.84	12.34	11.16	9.97	5.69	0.49	9.57
15	10.01	10.24	10.06	9.14	6.00	2.09	11.08	10.96	9.61	6.79	2.20	0.14	-	11.20	11.86	10.85	9.24	7.63	3.08	0.65	10.06
16	10.08	10.25	10.16	9.76	6.57	2.78	11.20	10.54	8.84	6.50	3.31	0.74	0.01	11.10	11.56	9.54	7.94	6.34	3.94	1.78	10.57
17	10.12	10.24	10.19	10.26	8.12	5.42	11.17	10.05	8.52	7.44	6.10	2.95	0.30	10.81	10.97	8.66	7.49	6.31	5.87	4.13	11.11
18	10.15	10.21	10.16	10.48	10.34	9.68	10.95	9.55	8.69	8.99	9.76	8.16	3.18	10.37	10.18	8.04	7.86	7.68	8.19	8.17	11.68
19	10.15	10.16	10.09	10.42	12.28	14.97	10.48	9.17	9.23	10.50	13.32	15.90	14.83	9.85	9.39	8.17	8.65	9.13	10.67	13.68	12.28
20	10.14	10.11	10.02	10.18	12.93	18.28	9.55	9.08	9.89	11.51	15.55	22.11	31.68	9.36	8.87	8.94	9.70	10.46	12.94	18.94	12.91
21	10.12	10.06	9.96	9.94	12.22	16.98	8.86	9.43	10.38	11.87	15.61	22.11	31.68	9.12	8.74	9.66	10.57	11.48	14.43	20.78	11.01
22	10.10	10.01	9.93	9.80	10.88	12.84	9.22	9.81	10.62	11.60	13.57	15.90	14.83	9.41	9.15	10.24	11.12	12.00	14.40	17.13	8.76
23	10.08	9.97	9.92	9.80	9.62	8.75	9.51	10.06	10.62	10.91	10.39	8.19	3.18	9.66	9.52	10.62	11.27	11.92	12.67	10.08	8.93
24	10.05	9.95	9.94	9.89	8.78	5.94	9.73	10.20	10.48	10.07	7.45	3.11	0.30	9.87	9.84	10.79	11.04	11.29	10.00	4.35	9.10
25	10.03	9.94	9.96	10.00	8.47	4.73	9.90	10.26	10.25	9.37	5.82	1.35	0.02	10.02	10.08	10.77	10.56	10.35	7.64	2.27	9.26
26	10.01	9.94	9.99	10.07	8.69	5.25	10.02	10.25	10.02	8.99	5.88	2.06	0.15	10.13	10.25	10.58	10.01	9.44	6.54	3.02	9.41
27	10.00	9.94	10.00	10.10	9.33	7.28	10.10	10.20	9.84	8.99	7.34	4.82	1.23	10.20	10.34	10.30	9.57	8.84	6.85	5.40	9.56
28	9.98	9.96	10.02	10.07	10.12	10.24	10.15	10.13	9.75	9.31	9.53	9.42	5.79	10.21	10.36	10.00	9.35	8.70	8.11	8.85	9.69
29	9.98	9.97	10.02	10.03	10.73	13.08	10.17	10.05	9.74	9.78	11.62	14.70	16.08	10.19	10.31	9.76	9.37	8.97	9.70	12.74	9.82
30	9.98	9.99	10.02	9.98	10.96	14.53	10.16	9.99	9.79	10.23	12.94	18.34	26.73	10.15	10.23	9.61	9.55	9.49	11.13	15.91	9.93
31	9.98	10.00	10.01	9.96	10.79	13.98	10.14	9.94	9.89	10.52	13.10	18.35	26.73	10.10	10.13	9.59	9.83	10.06	12.06	16.93	10.03
32	9.98	10.01	10.00	9.96	10.38	11.95	10.10	9.91	9.99	10.59	12.15	14.73	16.08	10.03	10.02	9.67	10.09	10.50	12.29	15.07	10.11
33	9.98	10.01	10.00	9.98	9.93	9.53	10.06	9.91	10.07	10.47	10.54	9.55	5.79	9.98	9.93	9.82	10.28	10.73	11.77	11.12	10.17
34	9.99	10.01	10.00	10.00	9.60	7.61	10.02	9.92	10.12	10.22	8.92	5.26	1.24	9.93	9.86	9.98	10.35	10.71	10.70	7.04	10.21
35	9.99	10.01	10.00	10.01	9.46	6.72	9.98	9.95	10.12	9.96	7.86	3.21	0.22	9.91	9.84	10.11	10.31	10.50	9.49	4.65	10.24
36	10.00	10.01	10.00	10.02	9.52	7.04	9.94	9.98	10.09	9.76	7.67	3.60	0.51	9.91	9.84	10.19	10.19	10.18	8.57	4.54	10.23
37	10.00	10.00	10.00	10.01	9.75	8.36	9.92	10.01	10.04	9.67	8.33	6.01	2.36	9.92	9.88	10.20	10.03	9.86	8.26	6.24	10.20
38	10.00	10.00	10.00	10.01	10.02	10.19	9.92	10.03	10.00	9.70	9.49	9.73	7.47	9.95	9.93	10.17	9.90	9.63	8.58	8.94	10.14
39	10.00	10.00	10.00	10.00	10.23	11.82	9.93	10.04	9.96	9.82	10.70	13.56	16.07	9.98	9.99	10.10	9.82	9.54	9.33	11.83	10.05
40	10.00	10.00	10.00	9.99	10.32	12.63	9.96	10.04	9.95	9.97	11.53	16.02	23.53	10.01	10.03	10.03	9.82	9.61	10.18	14.02	9.92
41	10.00	10.00	10.00	9.99	10.28	12.36	9.99	10.02	9.95	10.10	11.73	16.04	23.53	10.03	10.06	9.96	9.87	9.77	10.86	14.74	9.78
42	10.00	10.00	10.00	10.00	10.15	11.24	10.02	10.01	9.96	10.17	11.30	13.66	16.07	10.04	10.07	9.92	9.95	9.97	11.18	13.67	9.80
43	10.00	10.00	10.00	10.00	9.99	9.80	10.03	10.00	9.98	10.18	10.47	10.02	7.48	10.04	10.06	9.90	10.03	10.15	11.09	11.21	9.85
44	10.00	10.00	10.00	10.00	9.87	8.60	10.03	9.99	10.00	10.13	9.56	6.70	2.39	10.03	10.04	9.91	10.08	10.25	10.66	8.43	9.89
45	10.00	10.00	10.00	10.00	9.81	8.02	10.03	9.99	10.02	10.05	8.91	4.88	0.70	10.02	10.02	9.94	10.10	10.26	10.06	6.47	9.93
46	10.00	10.00	10.00	10.00	9.83	8.19	10.02	10.00	10.02	9.97	8.71	5.02	1.05	10.01	10.00	9.98	10.09	10.20	9.51	6.01	9.96
47	10.00	10.00	10.00	10.00	9.90	9.00	10.01	10.00	10.02	9.92	8.99	6.89	3.38	10.00	9.99	10.01	10.05	10.09	9.18	7.01	9.99
48	10.00	10.00	10.00	10.00	10.00	10.10	10.01	10.00	10.02	9.90	9.59	9.76	8.49	9.99	9.98	10.04	10.01	9.97	9.16	8.95	10.00
49	10.00	10.00	10.00	10.00	10.07	11.07	10.00	10.00	10.01	9.91	10.26	12.63	15.66	9.99	9.97	10.05	9.97	9.88	9.42	11.09	10.02

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
1																						
2	**TABLE 9-7:** **"STATISTICAL ANALYSIS OF INDUSTRIAL PROPERTY RETIREMENTS," TABLE 22**																					
3																						
4	**Tenth of Life**	**L0**	**L1**	**L2**	**L3**	**L4**	**L5**	**S0**	**S1**	**S2**	**S3**	**S4**	**S5**	**S6**	**R0.5**	**R1**	**R2**	**R2.5**	**R3**	**R4**	**R5**	**O1**
54	50	10.00	10.00	10.00	10.00	10.11	11.55	9.99	10.00	10.00	9.95	10.77	14.42	21.26	9.98	9.97	10.04	9.94	9.84	9.84	12.73	10.03
55	51	10.00	10.00	10.00	10.00	10.10	11.42	9.99	10.00	9.99	10.00	10.95	14.47	21.26	9.99	9.98	10.01	9.93	9.85	10.26	13.32	10.03
56	52	10.00	10.00	10.00	10.00	10.06	10.77	9.99	10.00	9.99	10.04	10.78	12.81	15.66	9.99	9.98	9.99	9.95	9.90	10.54	12.69	10.03
57	53	10.00	10.00	10.00	10.00	10.00	9.92	9.99	10.00	9.99	10.06	10.35	10.19	8.50	9.99	9.99	9.98	9.98	9.98	10.61	11.10	10.02
58	54	10.00	10.00	10.00	10.00	9.96	9.18	10.00	10.00	9.99	10.05	9.85	7.67	3.46	10.00	10.00	9.97	10.01	10.04	10.47	9.18	10.01
59	55	10.00	10.00	10.00	10.00	9.94	8.81	10.00	10.00	10.00	10.04	9.46	6.19	1.40	10.01	10.01	9.97	10.03	10.08	10.20	7.70	10.00
60	56	10.00	10.00	10.00	10.00	9.94	8.90	10.00	10.00	10.00	10.01	9.30	6.20	1.72	10.01	10.01	9.98	10.04	10.10	9.90	7.18	9.99
61	57	10.00	10.00	10.00	10.00	9.96	9.39	10.00	10.00	10.00	9.98	9.40	7.57	4.25	10.01	10.01	10.00	10.04	10.08	9.66	7.72	9.98
62	58	10.00	10.00	10.00	10.00	10.00	10.05	10.00	10.00	10.00	9.97	9.70	9.75	9.09	10.01	10.01	10.01	10.03	10.04	9.53	9.03	9.97
63	59	10.00	10.00	10.00	10.00	10.02	10.63	10.00	10.00	10.00	9.97	10.08	11.91	15.14	10.00	10.00	10.01	10.01	10.00	9.62	10.58	9.96
64	60	10.00	10.00	10.00	10.00	10.04	10.92	10.00	10.00	10.00	9.98	10.38	13.27	19.53	10.00	10.00	10.02	9.99	9.96	9.79	11.82	9.96
65	61	10.00	10.00	10.00	10.00	10.04	10.85	10.00	10.00	10.00	9.99	10.52	13.34	19.53	10.00	10.00	10.01	9.98	9.94	10.02	12.34	9.96
66	62	10.00	10.00	10.00	10.00	10.02	10.48	10.00	10.00	10.00	10.00	10.46	12.16	15.14	10.00	9.99	10.01	9.98	9.94	10.20	11.98	9.97
67	63	10.00	10.00	10.00	10.00	10.00	9.97	10.00	10.00	10.00	10.01	10.24	10.24	9.12	10.00	9.99	10.00	9.98	9.96	10.30	10.94	9.98
68	64	10.00	10.00	10.00	10.00	9.99	9.52	10.00	10.00	10.00	10.02	9.97	8.35	4.39	10.00	9.99	10.00	9.99	9.98	10.29	9.61	9.99
69	65	10.00	10.00	10.00	10.00	9.98	9.29	10.00	10.00	10.00	10.02	9.74	7.18	2.18	10.00	9.99	9.99	10.00	10.01	10.18	8.51	9.99
70	66	10.00	10.00	10.00	10.00	9.98	9.34	10.00	10.00	10.00	10.01	9.62	7.12	2.44	10.00	10.00	9.99	10.01	10.03	10.03	8.03	9.99
71	67	10.00	10.00	10.00	10.00	9.99	9.62	10.00	10.00	10.00	10.00	9.65	8.12	4.97	10.00	10.00	9.99	10.01	10.03	9.88	8.30	9.99
72	68	10.00	10.00	10.00	10.00	10.00	10.02	10.00	10.00	10.00	9.99	9.80	9.74	9.44	10.00	10.00	10.00	10.02	10.03	9.79	9.16	9.99
73	69	10.00	10.00	10.00	10.00	10.01	10.37	10.00	10.00	10.00	9.99	10.00	11.38	14.60	10.00	10.00	10.00	10.01	10.02	9.78	10.26	9.99
74	70	10.00	10.00	10.00	10.00	10.01	10.55	10.00	10.00	10.00	9.99	10.18	12.42	18.17	10.00	10.00	10.00	10.00	10.00	9.84	11.19	9.99
75	71	10.00	10.00	10.00	10.00	10.01	10.51	10.00	10.00	10.00	9.99	10.28	12.51	18.17	10.00	10.00	10.00	10.00	9.99	9.94	11.63	9.99
76	72	10.00	10.00	10.00	10.00	10.01	10.29	10.00	10.00	10.00	10.00	10.26	11.66	14.62	10.00	10.00	10.00	9.99	9.98	10.05	11.46	9.99
77	73	10.00	10.00	10.00	10.00	10.00	9.99	10.00	10.00	10.00	10.00	10.16	10.25	9.50	10.00	10.00	10.00	9.99	9.98	10.13	10.77	9.98
78	74	10.00	10.00	10.00	10.00	10.00	9.72	10.00	10.00	10.00	10.00	10.01	8.82	5.18	10.00	10.00	10.00	9.99	9.98	10.16	9.85	9.98
79	75	10.00	10.00	10.00	10.00	9.99	9.58	10.00	10.00	10.00	10.00	9.88	7.92	2.98	10.00	10.00	10.00	10.00	9.99	10.13	9.04	9.98
80	76	10.00	10.00	10.00	10.00	9.99	9.60	10.00	10.00	10.00	10.00	9.80	7.83	3.18	10.00	10.00	10.00	10.00	10.00	10.06	8.63	9.98
81	77	10.00	10.00	10.00	10.00	9.99	9.77	10.00	10.00	10.00	10.00	9.80	8.54	5.58	10.00	10.00	10.00	10.01	10.01	9.98	8.74	9.98
82	78	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	9.87	9.75	9.64	10.00	10.00	10.00	10.01	10.01	9.91	9.30	9.98
83	79	10.00	10.00	10.00	10.00	10.00	10.22	10.00	10.00	10.00	10.00	9.98	10.99	14.09	10.00	10.00	10.00	10.01	10.01	9.88	10.08	9.98
84	80	10.00	10.00	10.00	10.00	10.00	10.33	10.00	10.00	10.00	10.00	10.08	11.79	17.06	10.00	10.00	10.00	10.01	10.01	9.89	10.76	9.98
85	81	10.00	10.00	10.00	10.00	10.00	10.31	10.00	10.00	10.00	10.00	10.14	11.88	17.06	10.00	10.00	10.00	10.00	10.00	9.91	11.13	9.98
86	82	10.00	10.00	10.00	10.00	10.00	10.18	10.00	10.00	10.00	10.00	10.15	11.28	14.12	10.00	10.00	10.00	10.00	10.00	9.97	11.07	9.99
87	83	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.10	10.24	11.07	10.00	10.00	10.00	10.00	10.00	10.03	10.62	9.99
88	84	10.00	10.00	10.00	10.00	10.00	9.84	10.00	10.00	10.00	10.00	10.02	9.16	4.51	10.00	10.00	10.00	10.00	10.00	10.08	9.98	9.99
89	85	10.00	10.00	10.00	10.00	10.00	9.75	10.00	10.00	10.00	10.00	9.94	8.46	3.75	10.00	10.00	10.00	10.00	10.00	10.09	9.39	9.99
90	86	10.00	10.00	10.00	10.00	10.00	9.76	10.00	10.00	10.00	10.00	9.90	8.37	3.88	10.00	10.00	10.00	10.00	10.00	10.07	9.06	9.99
91	87	10.00	10.00	10.00	10.00	10.00	9.86	10.00	10.00	10.00	10.00	9.89	8.88	6.10	10.00	10.00	10.00	10.00	10.00	10.02	9.09	9.99
92	88	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	9.92	9.77	9.75	10.00	10.00	10.00	10.00	10.00	9.98	9.44	9.98
93	89	10.00	10.00	10.00	10.00	10.00	10.12	10.00	10.00	10.00	10.00	9.98	10.70	13.62	10.00	10.00	10.00	10.00	10.00	9.95	9.98	9.98
94	90	10.00	10.00	10.00	10.00	10.00	10.19	10.00	10.00	10.00	10.00	10.04	11.32	16.13	10.00	10.00	10.00	10.00	10.00	9.94	10.48	9.98
95	91	10.00	10.00	10.00	10.00	10.00	10.19	10.00	10.00	10.00	10.00	10.08	11.42	16.17	10.00	10.00	10.00	10.00	10.00	9.95	10.78	9.98
96	92	10.00	10.00	10.00	10.00	10.00	10.11	10.00	10.00	10.00	10.00	10.08	10.98	13.94	10.00	10.00	10.00	10.00	10.00	9.98	10.78	9.98
97	93	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.06	10.21	10.23	10.00	10.00	10.00	10.00	10.00	10.02	10.49	9.98
98	94	10.00	10.00	10.00	10.00	10.00	9.90	10.00	10.00	10.00	10.00	10.02	9.41	6.06	10.00	10.00	10.00	10.00	10.00	10.04	10.05	9.98
99	95	10.00	10.00	10.00	10.00	10.00	9.85	10.00	10.00	10.00	10.00	9.98	8.86	4.18	10.00	10.00	10.00	10.00	10.00	10.05	9.62	9.98
100	96	10.00	10.00	10.00	10.00	10.00	9.85	10.00	10.00	10.00	10.00	9.95	8.77	4.52	10.00	10.00	10.00	10.00	10.00	10.04	9.36	9.98
101	97	10.00	10.00	10.00	10.00	10.00	9.91	10.00	10.00	10.00	10.00	9.94	9.14	6.55	10.00	10.00	10.00	10.00	10.00	10.01	9.34	9.98
102	98	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	9.95	9.80	9.81	10.00	10.00	10.00	10.00	10.00	9.98	9.56	9.98
103	99	10.00	10.00	10.00	10.00	10.00	10.07	10.00	10.00	10.00	10.00	9.98	10.50	13.19	10.00	10.00	10.00	10.00	10.00	9.99	9.93	9.98

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
1																						
2	**TABLE 9-7:** **"STATISTICAL ANALYSIS OF INDUSTRIAL PROPERTY RETIREMENTS," TABLE 22**																					
3																						
4	**Tenth of Life**	**L0**	**L1**	**L2**	**L3**	**L4**	**L5**	**S0**	**S1**	**S2**	**S3**	**S4**	**S5**	**S6**	**R0.5**	**R1**	**R2**	**R2.5**	**R3**	**R4**	**R5**	**O1**
104	100	10.00	10.00	10.00	10.00	10.00	10.12	10.00	10.00	10.00	10.00	10.01	10.97	15.36	10.00	10.00	10.00	10.00	10.00	10.01	10.30	9.98
105	101	10.00	10.00	10.00	10.00	10.00	10.11	10.00	10.00	10.00	10.00	10.04	11.06	15.45	10.00	10.00	10.00	10.00	10.00	10.01	10.53	9.98
106	102	10.00	10.00	10.00	10.00	10.00	10.07	10.00	10.00	10.00	10.00	10.05	10.76	13.46	10.00	10.00	10.00	10.00	10.00	10.02	10.56	9.98
107	103	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.04	10.19	10.12	10.00	10.00	10.00	10.00	10.00	10.02	10.38	9.98
108	104	10.00	10.00	10.00	10.00	10.00	9.94	10.00	10.00	10.00	10.00	10.02	9.57	6.74	10.00	10.00	10.00	10.00	10.00	10.02	10.08	9.98
109	105	10.00	10.00	10.00	10.00	10.00	9.91	10.00	10.00	10.00	10.00	9.99	9.16	4.89	10.00	10.00	10.00	10.00	10.00	10.01	9.77	9.98
110	106	10.00	10.00	10.00	10.00	10.00	9.91	10.00	10.00	10.00	10.00	9.97	9.08	5.07	10.00	10.00	10.00	10.00	10.00	10.00	9.56	9.98
111	107	10.00	10.00	10.00	10.00	10.00	9.95	10.00	10.00	10.00	10.00	9.96	9.34	6.94	10.00	10.00	10.00	10.00	10.00	9.99	9.53	9.98
112	108	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	9.97	9.83	9.85	10.00	10.00	10.00	10.00	10.00	9.98	9.66	9.98
113	109	10.00	10.00	10.00	10.00	10.00	10.04	10.00	10.00	10.00	10.00	9.99	10.35	12.81	10.00	10.00	10.00	10.00	10.00	9.99	9.91	9.98
114	110	10.00	10.00	10.00	10.00	10.00	10.07	10.00	10.00	10.00	10.00	10.00	10.72	14.70	10.00	10.00	10.00	10.00	10.00	10.00	10.18	9.98
115	111	10.00	10.00	10.00	10.00	10.00	10.07	10.00	10.00	10.00	10.00	10.02	10.80	14.79	10.00	10.00	10.00	10.00	10.00	10.00	10.36	9.98
116	112	10.00	10.00	10.00	10.00	10.00	10.04	10.00	10.00	10.00	10.00	10.03	10.58	13.04	10.00	10.00	10.00	10.00	10.00	10.01	10.40	9.98
117	113	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.02	10.16	10.11	10.00	10.00	10.00	10.00	10.00	10.01	10.29	9.98
118	114	10.00	10.00	10.00	10.00	10.00	9.97	10.00	10.00	10.00	10.00	10.01	9.70	7.21	10.00	10.00	10.00	10.00	10.00	10.01	10.09	9.98
119	115	10.00	10.00	10.00	10.00	10.00	9.95	10.00	10.00	10.00	10.00	10.00	9.38	5.53	10.00	10.00	10.00	10.00	10.00	10.00	9.87	9.98
120	116	10.00	10.00	10.00	10.00	10.00	9.95	10.00	10.00	10.00	10.00	9.99	9.31	5.61	10.00	10.00	10.00	10.00	10.00	9.99	9.71	9.98
121	117	10.00	10.00	10.00	10.00	10.00	9.97	10.00	10.00	10.00	10.00	9.98	9.49	7.27	10.00	10.00	10.00	10.00	10.00	9.99	9.66	9.98
122	118	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	9.98	9.85	9.86	10.00	10.00	10.00	10.00	10.00	9.99	9.74	9.98
123	119	10.00	10.00	10.00	10.00	10.00	10.02	10.00	10.00	10.00	10.00	9.99	10.25	12.47	10.00	10.00	10.00	10.00	10.00	10.00	9.91	9.98
124	120	10.00	10.00	10.00	10.00	10.00	10.04	10.00	10.00	10.00	10.00	10.00	10.53	14.13	10.00	10.00	10.00	10.00	10.00	10.00	10.10	9.98

TABLE 9-8
HANDY-WHITMAN INDEX - PACIFIC REGION - JANUARY 1, 2013

	A	B	C	D	E	F	G
	YEAR ACCOUNT	TOTAL PLANT 300	STATION EQUIPMENT 353	TOWERS & FIXTURES 354	POLES & FIXTURES 355	OVERHEAD CONDUCTOR 356	UNDERGROUND CONDUCTOR 358
1	1940	22	35	17	15	22	22
2	1941	23	36	19	17	23	25
3	1942	25	37	20	18	25	26
4	1943	25	36	20	19	26	26
5	1944	25	35	21	21	26	25
6	1945	26	35	21	22	26	25
7	1946	29	39	24	24	30	30
8	1947	34	47	28	29	35	35
9	1948	37	49	31	32	39	42
10	1949	38	52	32	32	39	46
11	1950	40	56	34	33	41	49
12	1951	45	63	37	36	47	61
13	1952	46	64	39	37	49	63
14	1953	49	68	41	39	51	62
15	1954	50	69	42	40	52	63
16	1955	52	70	43	42	55	66
17	1956	56	77	46	44	61	65
18	1957	57	81	48	47	63	57
19	1958	59	84	51	49	63	57
20	1959	60	83	53	50	62	60
21	1960	60	77	55	52	63	61
22	1961	59	70	57	53	63	61
23	1962	59	69	57	54	65	61
24	1963	59	65	59	55	61	61
25	1964	61	69	61	56	64	66
26	1965	64	73	63	58	67	72
27	1966	67	75	67	61	70	73
28	1967	70	79	71	63	73	75
29	1968	73	83	74	65	73	73
30	1969	78	85	78	69	80	79
31	1970	83	89	82	76	89	82
32	1971	89	91	87	81	98	82
33	1972	93	94	92	87	99	92
34	1973	100	100	100	100	100	100
35	1974	123	124	123	126	117	134
36	1975	145	148	145	144	146	137
37	1976	158	157	149	150	172	143

TABLE 9-8
HANDY-WHITMAN INDEX - PACIFIC REGION - JANUARY 1, 2013

	A	B	C	D	E	F	G
	YEAR ACCOUNT	TOTAL PLANT 300	STATION EQUIPMENT 353	TOWERS & FIXTURES 354	POLES & FIXTURES 355	OVERHEAD CONDUCTOR 356	UNDERGROUND CONDUCTOR 358
38	1977	170	170	155	160	187	158
39	1978	175	182	169	171	179	160
40	1979	190	197	187	189	193	189
41	1980	213	218	210	211	220	221
42	1981	231	237	225	233	241	244
43	1982	244	253	229	252	251	269
44	1983	251	256	234	258	268	273
45	1984	252	259	247	260	258	267
46	1985	253	260	256	256	252	254
47	1986	255	262	261	258	252	275
48	1987	257	269	267	261	243	278
49	1988	281	281	278	281	311	293
50	1989	295	295	287	301	320	314
51	1990	304	312	288	312	323	364
52	1991	309	315	281	333	333	407
53	1992	311	324	284	350	318	416
54	1993	323	337	296	360	330	423
55	1994	337	352	312	378	340	424
56	1995	353	364	322	392	368	436
57	1996	359	366	333	407	374	441
58	1997	365	372	341	420	379	446
59	1998	375	382	347	428	391	450
60	1999	396	388	354	419	354	463
61	2000	395	415	368	422	398	458
62	2001	398	419	373	425	399	468
63	2002	411	429	384	450	416	462
64	2003	415	438	388	454	411	474
65	2004	424	437	415	466	419	481
66	2005	465	493	434	487	463	533
67	2006	503	528	455	509	537	590
68	2007	544	580	472	431	595	603
69	2008	588	618	513	567	657	782
70	2009	623	654	526	593	657	782
71	2010	610	684	520	616	604	837
72	2011	622	708	542	599	598	890
73	2012	634	730	556	609	591	905
74	2013	655	759	568	619	611	948
75	2014	657	757	562	619	628	997

TABLE 9-9
2014 REPLACEMENTS BY ACCOUNT

		A	B	C	D	E	F	G	H	I
		352	353	354	355	356	358	359	397	Total
1	2017	7,544,592	104,134,944	12,105,295	9,259,137	9,894,290	1,280,896	2,345,311	34,579,408	181,143,872
2	2018	7,952,424	107,589,663	12,626,724	9,466,754	10,382,061	1,289,789	2,417,155	37,544,264	189,268,833
3	2019	8,109,679	110,652,950	13,101,247	9,605,041	10,910,489	1,361,590	2,619,517	40,080,923	196,441,436
4	2020	8,298,685	113,632,749	13,559,702	9,682,044	11,620,829	1,394,157	2,791,804	42,745,669	203,725,638
5	2021	8,444,756	116,271,161	13,855,100	9,786,740	12,108,426	1,373,604	2,840,556	44,166,955	208,847,297
6	2022	8,706,812	119,850,430	14,358,208	9,951,456	12,842,137	1,352,743	2,886,758	46,224,815	216,173,359
7	2023	8,920,907	122,743,413	15,054,182	10,062,171	14,091,782	1,343,986	2,962,963	47,284,415	222,463,819
8	2024	9,468,752	125,486,796	15,601,692	10,187,033	14,920,622	1,418,512	3,147,037	48,784,762	229,015,205
9	2025	9,658,730	128,168,909	16,512,805	10,243,975	15,975,028	1,405,581	3,212,352	49,315,877	234,493,256
10	2026	9,851,533	130,772,694	17,282,408	10,310,493	16,716,574	1,364,593	3,262,926	50,288,356	239,849,577
11	2027	9,963,558	133,988,037	17,671,612	10,270,934	17,483,582	1,287,286	3,545,783	50,534,963	244,745,755
12	2028	10,060,534	136,424,352	18,425,423	10,345,434	18,242,070	1,415,863	3,637,956	51,086,850	249,638,481
13	2029	10,353,610	138,651,036	19,043,292	10,501,709	19,176,580	1,413,890	3,703,912	51,040,172	253,884,200
14	2030	10,573,239	141,077,370	19,630,429	10,556,763	20,282,683	1,370,462	3,792,339	51,468,082	258,751,367
15	2031	11,048,727	143,771,794	20,004,319	10,604,250	21,042,587	1,257,189	3,948,936	51,355,117	263,032,919
16	2032	11,222,024	145,925,768	20,640,936	10,600,611	22,141,673	1,430,322	4,019,047	51,826,300	267,806,681
17	2033	11,347,555	147,749,448	21,481,201	10,731,590	24,092,098	1,437,906	4,073,701	51,656,938	272,570,437
18	2034	11,464,799	149,828,662	22,227,894	10,836,581	25,303,212	1,408,800	4,312,905	52,154,792	277,537,645
19	2035	11,706,819	151,929,798	23,354,662	10,938,593	26,866,447	1,300,006	4,394,569	52,092,852	282,583,744
20	2036	11,910,689	153,998,259	24,385,573	10,938,986	27,934,734	1,482,790	4,444,672	52,640,233	287,735,936
21	2037	12,398,978	155,627,375	24,920,277	11,007,291	29,054,147	1,495,093	4,505,701	52,442,944	291,451,808
22	2038	12,570,093	157,192,156	25,944,188	11,086,932	30,124,908	1,488,365	4,601,726	52,757,382	295,765,750
23	2039	12,779,387	159,005,337	26,738,803	11,239,894	31,634,416	1,419,080	4,740,662	52,516,766	300,074,345
24	2040	12,848,309	160,556,712	27,537,044	11,388,604	33,210,237	1,562,372	4,788,499	52,379,368	304,271,144
25	2041	12,957,780	161,765,706	28,042,236	11,445,561	34,304,061	1,574,294	4,805,648	52,046,523	306,941,808
26	2042	13,242,128	163,032,908	28,805,191	11,528,943	35,804,001	1,587,782	5,073,445	52,005,587	311,079,984
27	2043	13,488,129	164,200,790	29,696,887	11,696,127	37,891,532	1,573,720	5,106,050	51,700,144	315,353,378
28	2044	13,669,561	165,675,757	30,640,648	11,850,887	39,524,184	1,635,698	5,175,787	51,617,016	319,789,537
29	2045	13,832,595	166,616,354	31,848,658	12,029,844	41,569,779	1,643,612	5,250,368	51,389,141	324,180,350
30	2046	13,951,414	167,448,030	33,101,826	12,159,964	43,213,391	1,667,349	5,308,900	51,396,148	328,247,022
31	2047	14,087,176	168,421,485	33,793,416	12,218,281	44,655,821	1,703,956	5,350,625	51,214,413	331,445,172
32	2048	14,335,129	169,324,419	35,032,113	12,412,200	46,234,884	1,669,305	5,363,854	51,235,171	335,607,075
33	2049	14,491,473	170,361,508	36,072,707	12,648,928	48,431,976	1,672,019	5,756,082	51,218,654	340,653,348
34	2050	14,607,697	170,831,774	37,098,115	12,786,664	50,449,969	1,695,679	5,688,669	51,323,945	344,482,512
35	2051	14,718,882	171,388,539	37,753,352	13,025,413	51,810,997	1,761,883	5,721,124	51,459,353	347,639,542

TABLE 9-10
2015 REPLACEMENTS BY ACCOUNT

		A	B	C	D	E	F	G	H	I
		352	353	354	355	356	358	359	397	Total
1	2018	8,101,134	110,133,612	12,884,740	9,643,782	10,576,205	1,313,908	2,462,356	38,246,342	193,362,080
2	2019	8,261,330	113,254,184	13,368,136	9,784,656	11,114,515	1,387,051	2,668,502	40,830,064	200,668,438
3	2020	8,453,870	116,289,704	13,835,164	9,863,098	11,838,138	1,420,227	2,844,011	43,544,193	208,088,406
4	2021	8,602,673	118,977,455	14,136,087	9,969,752	12,334,853	1,399,290	2,893,674	44,995,464	213,309,247
5	2022	8,869,630	122,618,732	14,648,603	10,137,548	13,082,285	1,378,039	2,940,740	47,090,090	220,765,667
6	2023	9,087,727	125,558,315	15,357,591	10,250,333	14,355,298	1,369,119	3,018,371	48,184,904	227,181,659
7	2024	9,645,817	129,254,773	15,915,340	10,377,530	15,199,638	1,445,038	3,205,886	49,709,539	234,753,563
8	2025	9,839,348	131,987,042	16,843,490	10,435,538	16,273,761	1,431,866	3,272,423	50,286,408	240,369,875
9	2026	10,035,756	134,634,463	17,627,485	10,503,299	17,029,174	1,390,111	3,323,943	51,271,216	245,815,447
10	2027	10,149,876	137,902,233	18,023,324	10,463,001	17,810,525	1,311,358	3,612,089	51,579,423	250,851,829
11	2028	10,248,666	141,310,036	18,790,430	10,538,894	18,583,196	1,442,340	3,705,986	52,134,095	256,753,642
12	2029	10,547,223	143,578,358	19,457,791	10,698,091	19,535,182	1,440,330	3,773,176	52,161,075	261,191,225
13	2030	10,770,958	146,044,967	20,055,908	10,754,174	20,661,969	1,396,089	3,863,256	52,588,743	266,136,064
14	2031	11,255,338	148,782,009	20,436,789	10,802,549	21,436,083	1,280,699	4,022,781	52,556,194	270,572,442
15	2032	11,431,876	151,910,243	21,085,311	10,798,842	22,555,722	1,457,069	4,094,203	53,028,354	276,361,620
16	2033	11,559,755	153,768,026	21,941,289	10,932,270	24,542,620	1,464,795	4,149,880	52,935,131	281,293,766
17	2034	11,679,190	155,886,121	22,701,946	11,039,225	25,776,382	1,435,145	4,393,557	53,435,916	286,347,481
18	2035	11,925,736	158,021,493	23,849,784	11,143,144	27,368,849	1,324,316	4,476,748	53,438,304	291,548,373
19	2036	12,133,419	160,120,934	24,899,973	11,143,545	28,457,114	1,510,518	4,527,787	53,990,545	296,783,835
20	2037	12,630,839	162,706,444	25,443,441	11,213,128	29,597,460	1,523,052	4,589,957	53,832,359	301,536,679
21	2038	12,805,153	164,300,486	26,484,960	11,294,257	30,688,244	1,516,198	4,687,779	54,170,004	305,947,081
22	2039	13,018,362	166,142,738	27,367,277	11,450,080	32,225,979	1,445,617	4,829,312	53,925,858	310,405,223
23	2040	13,088,573	167,715,759	28,180,444	11,601,571	33,831,268	1,591,588	4,878,044	53,777,806	314,665,052
24	2041	13,200,090	169,833,032	28,695,083	11,659,592	34,945,547	1,603,734	4,895,514	53,441,608	318,274,200
25	2042	13,489,756	171,123,931	29,472,306	11,744,534	36,473,535	1,617,474	5,168,318	53,372,110	322,461,964
26	2043	13,740,356	172,309,168	30,380,677	11,914,844	38,600,103	1,603,148	5,201,533	53,064,835	326,814,665
27	2044	13,925,181	173,804,888	31,342,086	12,072,498	40,263,286	1,666,285	5,272,574	52,941,446	331,288,245
28	2045	14,091,264	175,584,333	32,572,685	12,254,802	42,347,134	1,674,347	5,348,550	52,713,152	336,586,266
29	2046	14,212,305	176,431,561	33,849,288	12,387,355	44,021,482	1,698,528	5,408,177	52,681,178	340,689,874
30	2047	14,350,606	177,423,219	34,551,958	12,446,762	45,490,885	1,735,820	5,450,682	52,498,917	343,948,849
31	2048	14,603,196	178,338,994	35,811,511	12,644,308	47,099,476	1,700,521	5,464,158	52,490,031	348,152,196
32	2049	14,762,463	179,389,317	36,980,827	12,885,463	49,337,654	1,703,286	5,863,721	52,474,399	353,397,130
33	2050	14,880,861	180,609,120	38,025,409	13,025,775	51,393,384	1,727,388	5,795,047	52,568,238	358,025,221
34	2051	14,994,125	181,176,296	38,692,899	13,268,988	52,779,862	1,794,831	5,828,109	52,705,544	361,240,654
35	2052	15,171,267	181,613,319	39,523,862	13,378,535	54,183,802	1,681,177	5,901,855	52,821,151	364,274,968

10. FINANCIAL RISK AND MITIGATION

10.1 Transmission Risk Analysis Model

The foundation of the risk analysis is a transmission financial spreadsheet model. This Excel spreadsheet, the Transmission Risk Analysis Model (TRAM), was developed to estimate the effects of risk and risk mitigation on end-of-year financial reserves and the likelihood of successful U.S. Treasury payment during the rate period. Levels of financial reserves available for risk attributed to Transmission (TS Reserves) at the end of a fiscal year determine whether BPA is able to meet its U.S. Treasury payment obligation in that year. The model is a workbook with individual worksheets including an input matrix of revenues and expenses, an income statement, a cash flow statement, and worksheets for the risks assessed in the model.

TRAM is a Monte Carlo model that produces 3,200 iterations of its calculations. Randomly sampled sets of input values are drawn for each game in a Monte Carlo simulation process that involves computing results of large numbers of games in order to create a probability distribution of outcomes, such as net revenues or TS Reserves. In each game (sometimes called an iteration) the simulation of ending TS Reserves starts with historical data on TS Reserves at the end of FY 2014 (which is the amount of reserves at the beginning of FY 2015). Cash flow (year-to-year change in TS Reserves) for FY 2015 is built on the values from the Income and Cash Flow Statements in the Transmission Revenue Requirement Study, and is modified by drawing randomly from probability distributions over possible values of the risk variables defined in TRAM.

The structure of the income statement and cash flow statement used in the risk analysis is similar to the structure of the statements contained in the Transmission Revenue Requirement Study. The cash flow, added to the start-of-year TS Reserves balance, yields the year-end TS Reserves

balance. This flow of computations is repeated sequentially for each year from FY 2015 through FY 2017.

Simulating transmission cash flows in this manner allows creating a distribution of FY 2016 start-of-year TS Reserves instead of defining FY 2016 start-of-year TS Reserves as a deterministic input value. (A deterministic value is a single-point estimate that does not reflect any uncertainty about the actual value that will be realized later.) The model forecasts the start-of-year FY 2016 TS Reserves based on transmission function historical cash flows, current forecasts of expenses and revenues, and the uncertainty in expenses and revenues explicitly modeled for FY 2015. The "most-likely" forecasts are equal to the mode or peak of the underlying probability distribution for uncertain variables. The most-likely forecast will also equal the expected value (sometimes referred to as the mean) when the underlying distribution is symmetric or the value is a single point estimate. However, in some cases the most-likely forecast is greater or less than the expected (or mean) value because the underlying uncertainty distribution is not symmetric.

10.2 Risk Analysis Computer Software

The model used to perform the risk analysis was developed with Excel® and @RISK Professional version 5.5 and 6.0 (®Palisade Corporation). Excel is a spreadsheet computer program, and @RISK is an Excel® add-in computer program available from Palisade Corporation. The @RISK software allows analysts to develop spreadsheet models that incorporate uncertainty. Uncertainty is incorporated by describing variables of interest as probability distributions over possible values that the variables can take. @RISK samples values from the probability distributions in each game, and then carries out the spreadsheet computations, producing different results for each game. While @RISK provides tools that enable users to turn spreadsheet models into Monte Carlo simulation models, the users still must

determine the input probability distributions for the uncertain variables in the model. This is done in analyses external to Excel® and @RISK®.

10.3 Revenue Risk

Revenue risk is one of the uncertainties for which BPA determines probability distributions for use in TRAM. The amount of revenue earned during the rate period can vary from the revenue forecast due to uncertainty in the quantity of each service sold. To capture the total transmission revenue variability, BPA models revenue drivers and the resulting revenue risk for each transmission revenue segment: Network, Intertie, Ancillary Services, and Other Revenues & Credits. The Network segment comprises Network Integration (NT), long-term Point-to-Point (PTP LT) and short-term Point-to-Point (PTP ST). The Intertie segment comprises long-term Southern Intertie (IS LT) and short-term Southern Intertie (IS ST). The Other Revenues segment comprises Delivery, Fiber & PCS Wireless, and Other Revenues. The Ancillary Services segment comprises Scheduling, System Control and Dispatch (SCD), and Generation Inputs. BPA models revenue risk based on the risk variables discussed below, and determines the revenue risk distribution and the expected value of revenue by running 3,200 revenue forecasting games using Excel® and @RISK.

10.3.1 Network Integration Service (NT) Revenue Risk

Risks in the NT revenue forecast arise from uncertainty in the load forecast, which is the basis for the NT sales and revenue forecast. The load forecast is based on predicted year-to-year NT load growth; actual loads can vary from the forecast because economic conditions are different from those forecast and because load center temperatures are different from the normal temperatures on which the forecast is based. Risk in the growth rate is modeled with a triangular risk distribution defined by a high value, a low value, and a most-likely value, or mode. The most-likely value is the forecast rate of year-to-year load growth. The high value is an optimistic

load growth rate that serves as the 80th percentile of the triangular distribution, and the low value is a pessimistic load growth rate that serves as the 20th percentile of the distribution.

The optimistic load growth rate is determined by adding the predicted year-to-year NT load growth rate to an optimistic forecast of Gross Domestic Product (GDP) obtained from IHS Global Insights, an economic forecasting and analysis firm. Similarly, the pessimistic load growth rate is determined by adding the predicted year-to-year NT load growth rate to a pessimistic GDP forecast obtained from IHS Global Insights. The resulting distribution around growth rate serves as the first component of NT revenue risk.

The impact of temperature variability on the load is also modeled. The load forecast is based on normalized temperature, so the risk arises from the variability of load center temperatures. Variability in these temperatures induces variability in the load. The distribution of temperatures in a 30-year period follows a normal distribution (a bell curve symmetrical around the mean) calculated from historical temperatures.

The NT revenue risk distributions have standard deviations of $3.9 million for FY 2016 and $4.2 million for FY 2017.

10.3.2 Long-Term Network Point-to-Point Service (PTP) Revenue Risk

Risks in revenue from long-term PTP service are related to assumptions about new service and potential deferrals of the service commencement date, exercise of renewals under BPA's Open Access Transmission Tariff (OATT), conversions of Formula Power Transmission (FPT) and Integration of Resources (IR) service to PTP service, and possible customer default. BPA also models revenue risk related to service that has not been granted yet, but that might be granted during the rate period.

BPA models risk for forecast revenue from new transmission service (that is, service that has been offered to customers but has not yet begun) because the customer has a right to defer the service commencement date for up to five years. A deferral delays the revenue from that service for the period of the deferral. The revenue risk associated with deferrals is based on a comparison of the service commencement date on the service reservation to the probable service commencement date after deferrals. BPA identifies possible deferrals by determining whether the service appears to be related to a Large Generator Interconnection Agreement (LGIA). If the generation in-service date has been forecast, then risk around the forecast LGIA generation in-service date is modeled using a triangular distribution, which is defined by maximum, most likely, and minimum values. The transmission service commencement date is assumed to match the risk-adjusted generation in-service date (that is, the analysis assumes the customer would defer its transmission service commencement date to match the generation in-service date). If the generation in-service date has not been forecast, the risk of deferral is identified based on information from BPA's account executive for the customer. The likelihood of deferral is based on the account executive's level of confidence that the request will begin on its current service commencement date.

BPA also models risk associated with revenue from new service to be offered as a result of new infrastructure. During the rate period two Network Open Season infrastructure projects are forecast to be completed (Big Eddy-Knight and Central Ferry-Lower Monumental). A PERT distribution (a distribution in which the user defines the maximum, most-likely, and minimum values) is used to model possible delays to the in-service date for these projects (and resulting delays in the start of service and receipt of revenue). For Big Eddy-Knight, risk of a delay up to one year was modeled. For Central Ferry-Lower Monumental, a delay of up to two years was modeled.

Risk is also modeled for service that is eligible to be renewed during the rate period. Historical data was gathered on the frequency of renewal of long-term PTP service for service reservations that have been eligible for renewal over the past five years. A normal distribution was identified using the historical frequency of renewals for service requests that are eligible for renewal. That distribution is applied to the service requests that are eligible for renewal during the rate period to identify the probability of the service being renewed.

Risk is modeled for service that is eligible to convert from FPT or IR service to PTP service by gathering information from BPA's account executives for the customers on the likelihood that individual requests will convert either after the expiration or prior to the expiration of the FPT or IR contract. The likelihood of conversion is based on the account executive's level of confidence that the request will convert to PTP service during the rate period.

Risk of default is modeled for all current and anticipated service. The probability of default for each customer is modeled using information from Standard & Poor's. BPA applies Standard & Poor's credit rating for each entity and refers to Standard & Poor's Global Corporate Average Default Rate for the level of default risk associated with that credit rating. Standard & Poor's conducts its default studies on the basis of groupings called static pools. Static pools are formed by grouping issuers by rating category at the beginning of each year covered by the study. Annual default rates were calculated for each static pool: first in units and later as percentages with respect to the number of issuers in each rating category. Finally, these percentages were combined to obtain cumulative default rates for the 30 years covered by the study. If a default occurs in the model, we assume that the capacity held by the defaulting customer returns to inventory and is resold for a portion of the remaining months of the fiscal year. Assuming the capacity is resold for only a portion of the year accounts for the time it takes to process and offer the new contract for the service.

Risk associated with additional sales of service that have not yet been requested (the possibility that revenues will be higher than forecast due to these sales) is modeled based on three different sources: new sales associated with new generation that is included in the LGIA forecast but for which long-term service has not yet been requested, new sales from transmission inventory that becomes available due to customer default, as described above, and new sales as a result of competitions performed in accordance with section 17.7 of the OATT (deferral competitions). Sales due to new generation are modeled using a PERT distribution and information from TS's customer service engineering on expected in-service dates. Modeling of sales from inventory that becomes available due to customer default is described above. To model sales that occur after competitions, it is assumed that zero to six competitions will be performed a year. For each competition performed there is a 50 percent chance that the competition will be successful and result in additional revenue.

The long-term PTP revenue risk distribution results in standard deviations of $11.0 million for FY 2016 and $12.5 million for FY 2017.

10.3.3 Short-Term Network Point-to-Point Service Revenue Risk

The short-term PTP revenue forecast carries significant risk due to the nature of the product. This service is not reserved far in advance with an existing contract, but instead is requested on an hourly, daily, weekly, or monthly basis. Short-term PTP service is sensitive to market conditions and streamflow, so we model the risks around the NP-15 minus Mid-C price spread, and streamflow. To model risk around the Mid-C and NP-15 prices we incorporate variability around natural gas prices and streamflow. Natural gas volatility is important because natural gas-fired electricity generation is often the marginal resource in western power markets, and therefore plays an important role in setting the market price of power. Fluctuations in natural gas

prices lead to fluctuations in power prices. We use the natural gas volatility documented in the Power Risk and Market Price Study to model this risk. BP-16-FS-BPA-04, § 2.3.1 Streamflow variability is important for two reasons. First, the Mid-C and NP-15 price spread is positively correlated with streamflow. As streamflow increases, Mid-C prices decrease and the price spread widens. Second, streamflow has a high correlation with short-term transmission reservations made by BPA Power Services. The short-term PTP forecast is developed using a regression analysis, so we also modeled risk of errors in correlation identified between historical sales, streamflow, and price spread. For a more in-depth discussion on the short-term PTP forecast and risk assessment process, see the Transmission Rates Study and Documentation. BP-16-FS-BPA-07, at § 2.2.2.2. The short-term PTP risk distribution resulting from the methodology outlined above results in standard deviations of $13.0 million for FY 2016 and $13.0 million for FY 2017.

10.3.4 Long-Term Southern Intertie Service Revenue Risk

Capacity for long-term service on the Southern Intertie is fully subscribed, meaning that the capacity is completely sold out. In addition, there is a queue of transmission service requests that are seeking long-term Southern Intertie service but that have not been granted service because no long-term Southern Intertie capacity is available for sale. Uncertainties in the revenue forecast are based primarily on transmission service contracts that will expire during the rate period and do not have service renewal rights. Requests in the queue are expected to replace any contracts that expire. Thus, we identified a high service commencement probability, with a normal distribution, for these requests. In addition, we model default risk for service on the Southern Intertie using the same method described for long-term PTP service. The long-term Southern Intertie risk distribution results in standard deviations of $1.8 million for FY 2016 and $2.5 million for FY 2017.

10.3.5 Short-Term Southern Intertie Service Revenue Risk

The revenue forecast for short-term Southern Intertie service carries significant risk due to the nature of the product. This service is not reserved far in advance with an existing contract, but instead is requested on an hourly, daily, weekly, or monthly basis. Short-term Southern Intertie service is sensitive to market conditions and streamflow, so BPA models the risks around the NP-15 minus Mid-C price spread, and streamflow. The forecast is developed using a regression analysis, so BPA also models risk of errors in correlations identified between historical sales, streamflow, and price spread. For a more in-depth discussion on the short-term IS forecast and risk assessment process, see the Transmission Rates Study and Documentation. *Id.* at § 2.3.1.2. The short-term Southern Intertie revenue risk distribution results in standard deviations of $1.4 million for FY 2016 and $1.5 million for FY 2017.

10.3.6 Other Transmission Revenue Risk

The risk related to other transmission revenues arises from variability in Utility Delivery and DSI Delivery revenues, revenues from fiber and wireless contracts, and revenues from other fixed-price contracts. This risk is modeled based on the historical variance between rate case revenue forecasts for these products and actual revenue. Data from FY 2006 through FY 2014 is used and a normal distribution is applied, resulting in a standard deviation of $0.5 million per year for Utility and DSI Delivery revenue, $1.2 million per year for fiber and wireless contract revenue, and $2.7 million per year for other fixed-price contract revenue.

10.3.7 Ancillary and Control Area Services Revenue Risk

BPA models the revenue risk associated with the ancillary service Scheduling, System Control, and Dispatch (SCD), which applies to customers taking both firm and non-firm transmission service. SCD revenue is based on sales of NT, long-term PTP, short-term PTP, long-term IS, and short-term IS. As such, the revenue variability for SCD follows the risk associated with

those services, and SCD revenue risk is not modeled individually. Instead, variations in SCD revenues are assumed to be directly proportional to variations in the revenue from those services. BPA does not model revenue risk associated with the Ancillary Service Reactive Supply and Voltage Control from Generation Sources (GSR) because that rate is a formula rate that is currently set at zero. As a result, it generates no revenue. The formula rate for GSR is calculated for each quarter but has been calculated to be zero in every quarter since 2009.

Generation Inputs services comprise Regulation & Frequency Response (RFR), Dispatchable Energy Resource Balancing Service (DERBS), Variable Energy Resource Balancing Service (VERBS), Energy & Generation Imbalance (EI/GI), and Operating Reserve – Spinning & Supplemental (OR). We sorted these sources of revenue into three categories based on their characteristics and their impact on TS net revenue: 1) variable revenue but fixed expense, 2) essentially fixed revenue and expense, and 3) equivalent variability in both revenue and expense.

TS pays PS a fixed amount for RFR and DERBS during the rate period. The revenue that TS charges to its customers, however, is variable, so the contribution to TS net revenue is variable. For RFR the billing factor is customers' loads in the BPA balancing area. As such the billing factor is variable due to factors that include weather variation from normal and changes in economic conditions. The standard deviation of historical billed RFR loads from FY 2008 through FY 2014 is used in the simulation of the load and associated revenue during the rate period. The resulting variability on revenues for RFR is $0.7M. DERBS is based on the station control error of non-Federal thermal plants. Station control error is the deviation of a generator from its basepoint, which is the generation level to which the plant is planned to operate. The historical standard deviation of the station control area for DERBS plants for INC and DEC reserves is used in simulating DERBS revenue. The resulting variability on revenues for DERBS is $0.4M.

Generation inputs whose revenues and expenses are essentially fixed create no uncertainty in TS net revenue. VERBS is the only generation inputs service in this category. Generation inputs whose revenues and expenses are equally variable and perfectly correlated, that is, any potential change in TS revenue is matched by an equal offsetting change in TS expense, also create no uncertainty in TS net revenue. This category comprises EI/GI and OR. No uncertainty in revenue from VERBS, EI/GI or OR is modeled.

10.3.8 Total Transmission Revenue Risk

The Transmission Revenue Risk worksheets compute the revenue risk and the resulting expected value for transmission revenues from these products. The revenue uncertainty from all transmission services is aggregated; the variability of the total transmission revenues (as measured by the standard deviation) is less than the sum of the variabilities (standard deviations) of the individual services. The standard deviation of the distribution of total transmission revenue for the FY 2016 is $19.9 million and for FY 2017 is $19.7 million. In each game, the total transmission revenue is linked into the income statement in TRAM (worksheet "TS IS").

10.4 Expense Risk

The following expense items were modeled probabilistically in TRAM:

1. Transmission Operations
2. Transmission Maintenance
3. Agency Services General & Administrative
4. Interest on Long-Term Debt Issued to the U.S. Treasury
5. Transmission Engineering

To obtain the data used to develop the probability distributions used by TRAM for these items, BPA analyzed historical data and consulted with subject matter experts for their assessment of

the risks concerning their cost estimates, including the possible range of outcomes and the associated probabilities of occurrence.

10.4.1 Transmission Operations

TRAM models variability in transmission operations expense using PERT distributions for FY 2015 and for each of the two fiscal years in the rate period, FY 2106 and FY 2017. (Again, a PERT distribution is a distribution in which maximum, most-likely (mode), and minimum values are defined for the distribution.) For FY 2015, the most-likely value comes from the start-of-year budget. For the rate case years, the most-likely values come from the revenue requirement. The minimum and maximum values of the distribution come from the historically observed minimum and maximum actual values (from FY 2009–2013) compared to rate case projections. The minimum value is 8.7 percent lower than the level of expense in the revenue requirement; the maximum value is 15.5 percent higher than the expected level of expense in the revenue requirement. The resulting standard deviation of transmission operations expense is $7.1 million per year.

10.4.2 Transmission Maintenance

To model variability in transmission maintenance expense, PERT distributions are used for FY 2015 and for each of the two fiscal years in the rate period. For FY 2015, the most-likely value comes from the start-of-year budget. For the rate case years, the most-likely values come from the revenue requirement. The minimum and maximum values of the distribution come from the historically observed minimum and maximum actuals values (from FY 2009–2013) compared to rate case projections. The minimum value is 10.2 percent lower; the maximum value is 26.3 percent higher. The resulting standard deviation of transmission maintenance expense is $10.8 million each year.

10.4.3 Agency Services General & Administrative

To model variability in agency services general and administrative (G&A) costs, PERT distributions are used for FY 2015 and for each of the two fiscal years in the rate period. For FY 2015, the most-likely value comes from the start-of-year budget. For the rate case years, the most-likely values come from the revenue requirement. The minimum and maximum values come from the historically observed minimum and maximum actuals values (from FY 2009–2013) compared to rate case projections. The minimum value is 20.7 percent lower; the maximum value is 18.1 percent higher. The resulting standard deviation of G&A expense is $6.1 million each year.

10.4.4 Interest on Long-Term Debt Issued to the U.S. Treasury

TRAM models the impact of interest rate uncertainty associated with new debt issuances (borrowings) on interest expense and on TS Reserves. For FYs 2015, 2016, and 2017 the amounts of planned new borrowing are $279million, $558 million, and $557 million respectively (Table 11-2). These planned borrowings and the official interest rates included in chapter 6 are used to calculate anticipated interest expense on long-term debt for the revenue requirement (Transmission Revenue Requirement Study, BP-16-FS-BPA-08, at table 11-2). This analysis assesses the potential difference between actual interest expenses and the interest expenses included in the revenue requirement.

For each fiscal year, new borrowings are planned on a monthly basis, and are for different amounts each month, and with different term lengths (table 11-2 of this documentation). For example, in August of 2015, there are two planned borrowings, for $52 million and $1.3 million, at planned borrowing terms of ten and six years and interest rates of 3.54% and 2.42% respectively (Table 11-2). TRAM models uncertainty in the interest rate BPA will eventually

receive when these borrowings occur, but the analysis does not model uncertainty in the amount borrowed, term length of the borrowing, or timing of the borrowing.

TRAM uses a historical database of interest rates as the basis to forecast future uncertainty in interest rates. We generated the database from 21 years of historical daily data (1994 to 2014) that includes each interest rate term (for example one year, two year …thirty year) for U.S. Agency interest rates (the rate BPA borrows at for Federal borrowings – data source - Bloomberg Curve CO843) and a taxable interest rate index for AA rated utilities (a proxy for the rates BPA borrows for third-party lease financing [Lease Financing], that is, financing BPA obtains from the private sector – Bloomberg Curve 903M). To model the interest expense uncertainty in TRAM, for each game we randomly select a starting date from the historical data set and obtain the interest rate for each term length on the yield curve (for example, one-year interest rate, two-year rate, up to the 30-year rate) on that date. Then we obtain the interest rate for each term length on the yield curve for the date 30 days later. We repeat this process, sampling the interest rates each 30 days, for three years and one month following the starting date, so that we end up with 37 interest rate data points for each term length (37 data points are needed because there are twelve 30-day periods in a year; 12 multiplied by three years is 36; and we need an extra month to capture 36 month-to-month returns, *i.e.,* month-to-month changes). We do this separately for Agency interest rates and for the AA Utility Taxable interest rates (AA Taxable).

We measure the monthly returns by taking the log return, also known as geometric return, which is the natural logarithm of the interest rate from one month less the natural logarithm of the interest rate of the prior month. Monthly returns are calculated for each interest rate product (Agency and AA Taxable), for each term length of that product and for each thirty-day period for a full three years from the sample starting date. We use the 3,200 calculated monthly returns to

create three-year projections of interest rates for each term length and for each interest rate product, all of which start from BPA's official starting interest rates in FY 2015 (chapter 6).

For example, assume the sample starting date selected for game one is June 5, 2001. The interest rate for the Agency product with a 10-year term, in the first month of the 36-month projection, is equal to the FY 2015 Agency 10-year interest rate from the official forecast (3.54 percent, *id*.) multiplied by the calculated return from June 5, 2001 to July 5, 2001 (June 5, 2001 10-year Agency interest rate = 6.02 percent, July 5, 2001 10-year Agency interest rate = 6.19 percent, the log return equals 1.2094 percent (log (6.19) less log (6.02)). Taking the exponent of the log return yields 1.012168, which is the appropriate factor by which to multiply 3.54 percent to get a projection for one month later of the 10-year Agency interest rate for game one, 3.583 percent. To generate the month two projection of the 10-year Agency interest rate for game one, we take the calculated rate from month one, 3.583 percent, and multiply it by the sampled return from August 5, 2001 to July 5, 2001. For the full projection, we repeat the process for all 36 months for each term length on the yield curve and for each interest rate product. In the second game, a new sample starting date is selected from the 20-year dataset, and the process is repeated, but using a different three-year historical window within the dataset.

We run 3,200 games using this methodology, and thus generate 3,200 projections of each term length for each interest rate product. We adjust each projection by the same amount to adjust the average 2017 interest rate from the set of 3,200 games to match the interest rate in BPA's official 2017 interest rate forecast (chapter 6). Thus, this analysis captures the month-to-month uncertainty around the interest expense in the revenue requirement but does not adjust the expected value itself, which was determined in BPA's official interest rate forecast.
We then combine interest rates from each projection with the corresponding timing and term length of anticipated monthly borrowings in the repayment study to generate 3,200 projections of

interest expense (50 percent of each anticipated borrowing in the repayment study is assumed to be financed at the simulated Agency rate and 50 percent at the AA Taxable Utility rate, in line with common agency assumptions of 50 percent lease financing of the transmission capital program). Finally, we incorporate these 3,200 projections of interest expense into the 3,200 games in TRAM. That is, for each game in TRAM, the modeled interest expense on new borrowings replaces the portion of interest expense on long-term debt related to new borrowings from the revenue requirement (Transmission Revenue Requirement Study, BP-16-FS-BPA-08, at table 3). The resulting standard deviations of interest expense for long-term debt are $2.2 million in FY 2016 and $4.3 million in FY 2017.

10.4.5 Transmission Engineering

To model variability in transmission engineering expense, PERT distributions are used for FY 2015 and for each of the two fiscal years in the rate period. For FY 2015, the most-likely value comes from the start-of-year budget. For the rate case years, the most-likely values come from the revenue requirement. The minimum and maximum values of the distribution come from the historically observed minimum and maximum actuals values (from FY 2009–2013) compared to rate case projections. The minimum value is 25.1 percent lower; the maximum value is 23.6 percent higher. The resulting standard deviation of transmission maintenance expense is $5.0 million each year.

10.5 Cash Timing Lags

TRAM uses projections of revenues and expenses to estimate possible changes in TS Reserves. A projected revenue or expense is a projection of when accounting will record that a service has been performed by BPA (revenue) or that a service has been received by BPA (expense). The projection of when accounting records a revenue or expense is typically within one month of when the cash is received or paid. For most revenues and expenses, we start by assuming that

cash is received or paid in the same year as the revenue or expense is recorded, unless we know the revenue or expense has no cash associated with it (that is, it is a non-cash revenue or non-cash expense). We remove these known non-cash revenues and non-cash expenses from the forecast. As we project revenue and expenses for each game in TRAM, we model uncertainty in the timing of when the cash will be received or paid.

For revenues or expenses projected to be recorded by accounting near the end of a fiscal year, there is a potential for the cash transaction to lag sufficiently far behind the accounting transaction that the cash will be received or paid in the following year. If some cash receipts from revenue lag into the next year, TS Reserves at the end of the year will be lower than otherwise, and if some cash payments for recorded expenses lag into the next year, TS Reserves at the end of the year will be higher than otherwise. Timing differences of this kind can be observed in historical data by looking at the year-over-year changes to the accounts payable, accounts receivable, materials, and prepaid expense accounts. These accounts represent revenues or expenses BPA has recorded from an accounting standpoint but for which BPA has not yet received or paid cash.

To model this uncertainty, we looked at the change in BPA's accounts payable (both Power and Transmission), accounts receivable, materials, and prepaid expenses from 2009 to 2014. We assumed that the percentage of each account that is attributed to Transmission Services equaled the percentage of BPA's total revenues that is earned by Transmission Services. Thus, since transmission revenue was 29 percent of total FCRPS revenue in every year of the historical period except one, when it was 28 percent, we assumed that 29 percent of these accounts were attributable to Transmission Services in all years but one, and 28 percent in the other year. For FY 2014 to FY 2009, the changes in accounts payable, accounts receivable, materials and prepaid expenses attributed to Transmission Services were $8.2 million, $10.3 million, $7.4

million, -$18.5 million, $14.9 million, and -$32.1 million respectively. The average over the period was -$5 million and the standard deviation was $18.3 million. Over many years the average will be very close to $0, because the changes to these accounts are merely timing differences between when revenue and expenses are accounted for and when the cash is received or paid. The historical data show that over time, increases in one year are offset by decreases in another.

For example in FY 2014, the change in accounts payable, accounts receivable, materials, and prepaid expenses was $8.2 million, in FY 2013 it was negative -$10.3 million, and the trend continues through FY 2009. We modeled the variability in cash timing lags in TRAM in FY 2015–2017 with a normal distribution (bell-shaped curve), average of $0 (theoretical long-run average) and standard deviation of $18.3 million (observed standard deviation). This means that on average the cash timing lag will be $0, but has the potential to vary on either side of $0. Two thirds of the time the cash lag will be within the range of positive and negative $18.3 million. Because the FY 2014 actual amount was positive we assumed the FY 2015 amount would be negative, FY 2016 amount positive, and FY 2017 amount negative, reflecting the offsetting relationship of these amounts year over year. In each TRAM game, we sampled three values from the earlier-described normal distribution for FY 2015, FY 2016 and FY 2017 and converted the sampled value to the appropriate positive or negative sign if it wasn't the appropriate sign already. The analysis resulted in an average cash lag in FY 2016 and FY 2017 of -$1.7 thousand and standard deviation of $15.3 million.

10.6 Within-year Liquidity Need

The within-year liquidity need is the amount of cash or other liquidity (the temporary availability of cash) BPA needs at the beginning of a fiscal year for dealing with cash flow deficits that result from payments being made before cash receipts. The transmission business unit has over

$900 million in annual expenses. Debt service payments and revenue receipts are the primary drivers of monthly surplus or deficit in TS's cash flow. In the 2002 transmission rate case, BPA determined that its within-year liquidity need for TS was $20 million. This means that BPA determined that, after all expenses are paid at the end of a year, including the Treasury payment, it needed to have at least $20 million of liquidity on hand for use during the next fiscal year in the event cash disbursements were made in advance of cash receipts. BPA has made the same assumption in each rate case since then, until now. TRAM records a Treasury payment miss (that is, TRAM assumes that BPA is unable to make its Treasury payment) if TS Reserves in a game are below the within-year liquidity need at the end of either year in the rate period.

For this rate case, we reexamined the within-year liquidity need. We calculated monthly changes in historical (FY 2010–2014) TS Reserves (TS monthly cash flow) by taking the difference between one month's ending balance and the following month's ending balance. Then we divided the monthly cash flow into two parts: within-year cash flow and strategic cash flow. Within-year cash flow represents the timing difference between when cash is received or paid. It is not a result of permanent gains or losses but instead temporary gains or losses in cash that are largely a function of timing differences in the receipt and disbursement of cash. The annual within-year cash flow is assumed to be $0.

Strategic cash flow represents more or less permanent gains or losses in TS Reserves. Annual strategic cash flow is calculated by taking the year-over-year increase or decrease in TS Reserves. Monthly strategic cash flow is approximated as 1/12 of the annual amount. Cumulative total cash flow in a given month (the sum of year-to-date total cash flows) less cumulative strategic cash flow (the sum of year-to-date strategic cash flows) results in year-to-date within-year cash flow.

Consider an example in which TS had $0 in TS Reserves at the start of a fiscal year, but gained $120 million over the course of that year. Annual strategic cash flow was $120 million, and the approximation of monthly strategic cash flow is $10 million, one twelfth of the annual amount. Suppose the total cash flow in the first month of the year was $8 million, that is, TS Reserves after one month were $8 million higher than at the start of the year. In the first month, total cumulative cash flow was $8 million, and total cumulative strategic cash flow was $10 million, thus cumulative within-year cash flow at this point was -$2 million. Even though TS gained $10 million in strategic cash flow in the first month, within-year cash flow after one month was negative. The negative within-year cash flow will turn positive in a future month when receipts are higher and disbursements lower.

Negative cumulative within-year cash flow requires a use of liquidity, specifically what we term within-year liquidity, in order to be able to make cash disbursements until the timing of receipts and disbursements evens out. We found from the historical data that the annual maximum amount of within-year liquidity used was significantly greater than $20 million in three of the five years. The maximum for FYs 2010 through 2014 was $96 million, $11 million, $17 million, $30 million, and $61 million respectively. Because the purpose of retaining within-year liquidity is to ensure that sufficient liquidity is available in every year, the maximum historical value is appropriate as an indicator of the required amount. Thus, we concluded that the within-year liquidity need for Transmission Services is $100 million (the highest figure rounded to the nearest $10 million) rather than $20 million. For the BP-16 rate period, BPA will meet this need with $100 million in TS Reserves.

10.7 Risk Analysis Results

The transmission risk analysis simulation resulted in 3,200 games out of 3,200 in which end-of-year TS Reserves were sufficient to pay the U.S. Treasury on time and in full in the FY 2016–2017 rate period. Thus, TPP for the BP-16 rate period is above 99.9 percent.

10.8 TS Reserves and PNRR

The expected values of year-end TS Reserves for FY 2015, 2016, and 2017 are $419 million, $407million, and $368million, respectively. Since the TPP is above 95 percent for the rate period, no PNRR was needed.

Table 10-1: TRAM TPP CALCULATION
($000s)

		A	B	C
		FY 2015	FY 2016	FY 2017
1	Starting Reserves for Risk	511,000	419,360	407,129
2				
3	Revenues	1,004,566	1,072,976	1,096,744
4	VERBS Net Revenue Deviations	-	-	-
5	Expenses	(953,464)	(979,758)	(1,016,179)
6	Game specific Interest Credit Adjustment	1,691	1,092	528
7	Adjusted Net Revenue	52,793	94,309	81,094
8				
9				
10	Total Expenses Not Requiring Cash	155,157	189,565	192,754
11	Cash Used for Capital Investment	(639,534)	(655,150)	(590,002)
12	Cash From Borrowing and Appropriations	339,944	359,044	277,087
13	Net Revenue-to-Cash Adjustment	(144,433)	(106,541)	(120,162)
14				
15				
16	Net Adjusted Cash Flow	(91,640)	(12,232)	(39,068)
17				
18	Additional Use of Reserves	-	-	-
19				
20	Ending Reserves for Risk	419,360	407,129	368,061
21				
22	Required EOY Within-Year Liquidity Reserves	100,000	100,000	100,000
23				
24	Count TPP Misses	0	0	0
25	TPP % (3200-Misses/3200)	100%	100%	100%

Table 10-2: TRAM TPP CALCULATION
($000s)

		A	B	C
		FY 2015	FY 2016	FY 2017
1	Total Operating Revenues (Excl. Reimbursable)	1,004,566	1,072,976	1,096,744
2				
3	VERBS Net Revenue Deviations	-	-	-
4				
5	Operating Expenses			
6	Transmission Operations	138,200	157,041	162,629
7	Transmission Maintenance	163,585	166,902	168,669
8	Transmission Engineering	72,511	54,284	54,777
9	Trans Services Transmission Acquisition and Ancillary Services	132,858	140,767	140,782
10	Transmission Reimbursable	9,369	-	-
11	Agency Services G&A	88,123	81,679	84,153
12	Other Income, Expenses & Adjustments	(265)	(2,100)	(2,100)
13	Other	-	-	-
14	Total Transmission Operating Expense	604,381	598,572	608,911
15				
16	Net Operating Margin	400,185	474,404	487,834
17				
18	Federal Projects Depreciation	223,380	234,323	253,850
19				
20	Total Operating Expense & Depreciation	827,761	832,895	862,761
21				
22	Net Operating Revenue	176,805	240,080	233,984
23	Interest on Appropriated Funds	14,482	14,386	8,954
24	Capitalization Adjustment	(18,968)	(18,968)	(18,968)
25	Interest on Long-Term Debt Issued to Treasury	88,453	119,016	143,336
26	Amortization of Capitalized Bond Premiums	-	561	561
27	Debt Reassignment Interest Expense	35,053	31,431	23,072
28	Interest on Customer Advances	6,983	-	-
29	AFUDC	(42,000)	(42,886)	(41,346)
30	Non Federal Interest	48,020	52,520	53,099
31	Interest Credit on Financial Reserves	(6,320)	(9,197)	(15,290)
32	Net Interest Expense	125,703	146,863	153,418
33				
34	Total Operating & Net Interest Expenses	953,464	979,758	1,016,179
35				
36	Simulation NR delta from point estimates	(32,633)	(13,065)	(10,132)
37				
38	Net Revenues	51,102	93,218	80,565

Table 10-3: TRAM TPP CALCULATION
($000s)

		A	B	C
		FY 2015	FY 2016	FY 2017
1	Cash Provided by Current Operations			
2	Adjusted Net Revenues	51,102	93,218	80,565
3	Expenses not Requiring Cash			
4	Depreciation/Amortization	223,380	234,323	253,850
5				
6	Amort of Capitalized Bond Premiums	-	561	561
7	Capitalization Adjustment	(18,968)	(18,968)	(18,968)
8	Cash flow adjustment (reserve)/application	-	-	-
9	Cash lag from FY14	(14,611)	14,604	(14,603)
10	Avista Settlement & B2H Cash Payments	-	-	-
11	Revenue Recognition AC Intertie/Fiber	(3,065)	(6,853)	(6,853)
12	Revenue Recognition (Fiberoptics)	(3,535)	-	-
13	MBS interest accrual net of cash received	-	-	-
14	Fiber Lease Pre Pay	-	-	-
15	Transmission Credit Projects Net Interest (see Int on LGIA…	6,983	5,611	5,263
16	Accrual Revenues (LGIA)	(35,027)	(39,714)	(26,496)
17	Cash Provided by Current Operations	206,260	282,782	273,319
18	Cash Used for Capital Investments			
19	Investment in			
20	Gross Utility Plant and CWIP	(639,534)	(655,150)	(590,002)
21	Cash Used for Capital Investments	(639,534)	(655,150)	(590,002)
22	Cash From Borrowing and Appropriations			
23	Cash from Borrowing & Appropriations	624,534	640,150	575,002
24	DSR Principal Repayment	(185,173)	(185,303)	(199,991)
25	Repayment of Long-term Debt (Plus Advanced Refunding)	-	(1,392)	(1,486)
26	Repayment of Long-term Debt	(1,298)	(19,500)	(40,950)
27	Repayment of Capital Appropriations	(98,119)	(74,910)	(55,489)
28	Subtotal Cash from Borrowing & Approp	339,944	359,044	277,087
29	Annual Change in Cash Balance	(93,330)	(13,323)	(39,596)
30	Plus Beginning Cash Balance	511,000	417,670	404,346
31	Reserves For Risk	417,670	404,346	364,750
32	Reserves For Risk+Incremental Interest Credit	419,360	407,129	368,061

11. REPAYMENT STUDY INPUT DATA

TABLE 11-1
HISTORICAL INVESTMENTS
($000s)

	A	G	E	D	B	C
	PROJECT	IN SERVICE DATE	DUE DATE	INTEREST RATE	ORIGINAL PRINCIPAL	CURRENT PRINCIPAL
1	Bonneville Power Administration	09/1940	09/1985	2.500%	6,812	0
2	Bonneville Power Administration	09/1941	09/1986	2.500%	18,906	0
3	Bonneville Power Administration	09/1941	09/1986	2.500%	461	0
4	Bonneville Power Administration	09/1942	09/1987	2.500%	8,446	0
5	Bonneville Power Administration	09/1942	09/1987	2.500%	1,052	0
6	Bonneville Power Administration	09/1943	09/1988	2.500%	16,083	0
7	Bonneville Power Administration	09/1943	09/1988	2.500%	4,538	0
8	Bonneville Power Administration	09/1944	09/1989	2.500%	583	0
9	Bonneville Power Administration	09/1944	09/1989	2.500%	249	0
10	Bonneville Power Administration	09/1945	09/1990	2.500%	1,306	0
11	Bonneville Power Administration	09/1945	09/1990	2.500%	3,366	0
12	Bonneville Power Administration	09/1946	09/1991	2.500%	2,488	0
13	Bonneville Power Administration	09/1946	09/1991	2.500%	732	0
14	Bonneville Power Administration	09/1947	09/1992	2.500%	1,330	0
15	Bonneville Power Administration	09/1947	09/1992	2.500%	1,773	0
16	Bonneville Power Administration	09/1948	09/1993	2.500%	7,468	0
17	Bonneville Power Administration	09/1948	09/1993	2.500%	2,290	0
18	Bonneville Power Administration	09/1949	09/1994	2.500%	6,809	0
19	Bonneville Power Administration	09/1949	09/1994	2.500%	2,719	0
20	Bonneville Power Administration	09/1950	09/1995	2.500%	24,111	0
21	Bonneville Power Administration	09/1950	09/1995	2.500%	6,124	0
22	Bonneville Power Administration	09/1951	09/1996	2.500%	7,040	0
23	Bonneville Power Administration	09/1951	09/1996	2.500%	13,266	0
24	Bonneville Power Administration	09/1952	09/1997	2.500%	18,610	0
25	Bonneville Power Administration	09/1952	09/1997	2.500%	8,979	0
26	Bonneville Power Administration	09/1953	09/1998	6.330%	11,605	0
27	Bonneville Power Administration	09/1953	09/1998	6.330%	23,550	0
28	Bonneville Power Administration	09/1954	09/1999	6.510%	23,614	0
29	Bonneville Power Administration	09/1954	09/1999	6.510%	17,370	0
30	Bonneville Power Administration	09/1955	09/2000	6.620%	11,827	0
31	Bonneville Power Administration	09/1955	09/2000	6.620%	10,283	0
32	Bonneville Power Administration	09/1956	09/2001	6.710%	14,573	0
33	Bonneville Power Administration	09/1956	09/2001	6.710%	32,221	0
34	Bonneville Power Administration	09/1957	09/2002	6.790%	7,933	0
35	Bonneville Power Administration	09/1957	09/2002	6.790%	15,980	0
36	Bonneville Power Administration	09/1958	09/2003	6.840%	15,593	0
37	Bonneville Power Administration	09/1958	09/2003	6.840%	10,654	0
38	Bonneville Power Administration	09/1959	09/2004	6.880%	8,157	0
39	Bonneville Power Administration	09/1959	09/2004	6.880%	8,863	0
40	Bonneville Power Administration	09/1960	09/2005	6.910%	3,598	0
41	Bonneville Power Administration	09/1960	09/2005	6.910%	4,218	0
42	Bonneville Power Administration	09/1961	09/2006	6.950%	4,468	0
43	Bonneville Power Administration	09/1961	09/2006	6.950%	11,271	0
44	Bonneville Power Administration	09/1962	09/2007	6.980%	19,597	0
45	Bonneville Power Administration	09/1962	09/2007	6.980%	4,877	0

TABLE 11-1
HISTORICAL INVESTMENTS
($000s)

	A	G	E	D	B	C
	PROJECT	IN SERVICE DATE	DUE DATE	INTEREST RATE	ORIGINAL PRINCIPAL	CURRENT PRINCIPAL
46	Bonneville Power Administration	09/1963	09/2008	7.020%	4,876	0
47	Bonneville Power Administration	09/1963	09/2008	7.020%	4,330	0
48	Bonneville Power Administration	09/1963	09/2008	7.020%	904	0
49	Bonneville Power Administration	09/1963	09/2008	7.020%	803	0
50	Bonneville Power Administration	09/1964	09/2009	7.060%	4,151	0
51	Bonneville Power Administration	09/1964	09/2009	7.060%	5,738	0
52	Bonneville Power Administration	09/1965	09/2010	7.090%	3,706	0
53	Bonneville Power Administration	09/1965	09/2010	7.090%	7,248	0
54	Bonneville Power Administration	09/1965	09/2010	7.090%	5,202	0
55	Bonneville Power Administration	09/1965	09/2010	7.090%	10,171	0
56	Bonneville Power Administration	09/1966	09/2011	7.130%	11,830	0
57	Bonneville Power Administration	09/1966	09/2011	7.130%	3,049	0
58	Bonneville Power Administration	09/1966	09/2011	7.130%	6,647	0
59	Bonneville Power Administration	09/1966	09/2011	7.130%	1,714	0
60	Bonneville Power Administration	09/1967	09/2012	7.160%	19,003	0
61	Bonneville Power Administration	09/1967	09/2012	7.160%	4,566	0
62	Bonneville Power Administration	09/1967	09/2012	7.160%	14,300	0
63	Bonneville Power Administration	09/1967	09/2012	7.160%	3,436	0
64	Bonneville Power Administration	09/1968	09/2013	7.200%	41,070	0
65	Bonneville Power Administration	09/1968	09/2013	7.200%	8,076	0
66	Bonneville Power Administration	09/1968	09/2013	7.200%	23,202	0
67	Bonneville Power Administration	09/1968	09/2013	7.200%	4,562	0
68	Bonneville Power Administration	09/1969	09/2014	7.230%	42,237	0
69	Bonneville Power Administration	09/1969	09/2014	7.230%	22,537	0
70	Bonneville Power Administration	09/1969	09/2014	7.230%	384	0
71	Bonneville Power Administration	09/1969	09/2014	7.230%	205	0
72	Bonneville Power Administration	09/1970	09/2015	7.270%	64,977	0
73	Bonneville Power Administration	09/1970	09/2015	7.270%	7,995	0
74	Bonneville Power Administration	09/1970	09/2015	7.270%	24,412	0
75	Bonneville Power Administration	09/1970	09/2015	7.270%	3,003	0
76	Bonneville Power Administration	09/1971	09/2016	7.290%	12,025	0
77	Bonneville Power Administration	09/1971	09/2016	7.290%	17,766	0
78	Bonneville Power Administration	09/1971	09/2016	7.290%	12,051	0
79	Bonneville Power Administration	09/1971	09/2016	7.290%	17,805	0
80	Bonneville Power Administration	09/1972	09/2017	7.290%	29,326	0
81	Bonneville Power Administration	09/1972	09/2017	7.290%	21,170	0
82	Bonneville Power Administration	09/1972	09/2017	7.290%	3,980	0
83	Bonneville Power Administration	09/1972	09/2017	7.290%	2,873	0
84	Bonneville Power Administration	09/1973	09/2018	7.280%	33,788	0
85	Bonneville Power Administration	09/1973	09/2018	7.280%	21,656	0
86	Bonneville Power Administration	09/1973	09/2018	7.280%	16,368	0
87	Bonneville Power Administration	09/1973	09/2018	7.280%	10,491	0
88	Bonneville Power Administration	09/1974	09/2019	7.270%	12,563	6,087
89	Bonneville Power Administration	09/1974	09/2019	7.270%	12,079	0
90	Bonneville Power Administration	09/1974	09/2019	7.270%	20,984	0

TABLE 11-1
HISTORICAL INVESTMENTS
($000s)

	A	G	E	D	B	C
	PROJECT	IN SERVICE DATE	DUE DATE	INTEREST RATE	ORIGINAL PRINCIPAL	CURRENT PRINCIPAL
91	Bonneville Power Administration	09/1974	09/2019	7.270%	21,826	0
92	Bonneville Power Administration	09/1975	09/2020	7.250%	32,026	32,026
93	Bonneville Power Administration	09/1975	09/2020	7.250%	21,916	21,916
94	Bonneville Power Administration	09/1975	09/2020	7.250%	17,158	17,158
95	Bonneville Power Administration	09/1975	09/2020	7.250%	11,742	11,742
96	Bonneville Power Administration	09/1976	09/2021	7.230%	61,025	61,025
97	Bonneville Power Administration	09/1976	09/2021	7.230%	2,212	2,212
98	Bonneville Power Administration	09/1977	09/2022	7.210%	3,948	3,948
99	Bonneville Power Administration	09/1977	09/2022	7.210%	5,380	5,380
100	Bonneville Power Administration	09/1977	09/2022	7.210%	33,702	33,702
101	Bonneville Power Administration	09/1977	09/2022	7.210%	4,981	4,981
102	Construction	09/1978	09/2013	8.950%	17,770	0
103	Construction	09/1978	09/2013	8.950%	24,222	0
104	Construction	09/1978	09/2013	8.950%	3,389	0
105	Construction	09/1978	09/2013	8.950%	4,619	0
106	Construction	06/1979	06/2014	9.450%	7,010	0
107	Construction	06/1979	06/2014	9.450%	9,804	0
108	Construction	06/1979	06/2014	9.450%	26,690	0
109	Construction	06/1979	06/2014	9.450%	21,977	0
110	Construction	06/1979	06/2014	9.450%	6,026	0
111	Construction	06/1979	06/2014	9.450%	1,371	0
112	Construction	06/1979	06/2014	9.450%	1,870	0
113	Construction	06/1979	06/2014	9.450%	150	0
114	Construction	06/1979	06/2014	9.450%	102	0
115	Construction	09/1979	09/2014	9.900%	21,228	0
116	Construction	09/1979	09/2014	9.900%	14,340	0
117	Construction	09/1979	09/2014	9.900%	10,610	0
118	Construction	09/1979	09/2014	9.900%	2,888	0
119	Construction	09/1979	09/2014	9.900%	98	0
120	Construction	09/1979	09/2014	9.900%	66	0
121	Construction	09/1979	09/2014	9.900%	605	0
122	Construction	09/1979	09/2014	9.900%	165	0
123	Construction	09/1980	09/2015	13.000%	39,696	0
124	Construction	09/1980	09/2015	13.000%	10,806	0
125	Construction	09/1980	09/2015	13.000%	44,811	0
126	Construction	09/1980	09/2015	13.000%	1,469	0
127	Construction	09/1980	09/2015	13.000%	9,292	0
128	Construction	09/1980	09/2015	13.000%	4,253	0
129	Construction	09/1980	09/2015	13.000%	2,263	0
130	Construction	09/1980	09/2015	13.000%	616	0
131	Construction	09/1980	09/2015	13.000%	1,707	0
132	Construction	09/1980	09/2015	13.000%	56	0
133	Construction	09/1980	09/2015	13.000%	21	0
134	Construction	09/1980	09/2015	13.000%	10	0
135	Construction	09/1981	09/2016	16.600%	119,775	0

TABLE 11-1
HISTORICAL INVESTMENTS
($000s)

	A	G	E	D	B	C
	PROJECT	IN SERVICE DATE	DUE DATE	INTEREST RATE	ORIGINAL PRINCIPAL	CURRENT PRINCIPAL
136	Construction	09/1981	09/2016	16.600%	54,821	0
137	Construction	09/1981	09/2016	16.600%	277	0
138	Construction	09/1981	09/2016	16.600%	127	0
139	Construction	12/1981	12/2016	14.400%	34,221	0
140	Construction	12/1981	12/2016	14.400%	15,663	0
141	Construction	12/1981	12/2016	14.400%	80	0
142	Construction	12/1981	12/2016	14.400%	36	0
143	Construction	04/1982	04/2017	14.400%	9,975	0
144	Construction	04/1982	04/2017	14.400%	4,566	0
145	Construction	04/1982	04/2017	14.400%	46,980	0
146	Construction	04/1982	04/2017	14.400%	37,455	0
147	Construction	04/1982	04/2017	14.400%	23	0
148	Construction	04/1982	04/2017	14.400%	11	0
149	Construction	04/1982	04/2017	14.400%	551	0
150	Construction	04/1982	04/2017	14.400%	439	0
151	Construction	07/1982	07/2017	14.150%	3,677	0
152	Construction	07/1982	07/2017	14.150%	2,932	0
153	Construction	07/1982	07/2017	14.150%	77,807	0
154	Construction	07/1982	07/2017	14.150%	43	0
155	Construction	07/1982	07/2017	14.150%	34	0
156	Construction	07/1982	07/2017	14.150%	402	0
157	Construction	07/1982	07/2017	14.150%	105	0
158	Construction	11/1982	11/2017	10.850%	205	0
159	Construction	11/1982	11/2017	10.850%	54	0
160	Construction	11/1982	11/2017	10.850%	39,741	0
161	Construction	06/1983	06/2018	11.700%	154	0
162	Construction	06/1983	06/2018	11.700%	29,806	0
163	Construction	06/1983	06/2018	11.700%	40	0
164	Construction	09/1983	09/2018	12.250%	814	0
165	Construction	09/1983	09/2018	12.250%	37,235	0
166	Construction	09/1983	09/2018	12.250%	6,708	0
167	Construction	09/1983	09/2018	12.250%	4	0
168	Construction	09/1983	09/2018	12.250%	1	0
169	Construction	09/1983	09/2018	12.250%	203	0
170	Construction	09/1983	09/2018	12.250%	35	0
171	Construction	11/1983	11/2018	12.300%	25,283	0
172	Construction	11/1983	11/2018	12.300%	4,555	0
173	Construction	11/1983	11/2018	12.300%	138	0
174	Construction	11/1983	11/2018	12.300%	24	0
175	Construction	09/1984	09/2019	13.050%	50,567	0
176	Construction	09/1984	09/2019	13.050%	9,109	0
177	Construction	09/1984	09/2019	13.050%	276	0
178	Construction	09/1984	09/2019	13.050%	48	0
179	Construction	06/1985	06/2029	11.250%	15,182	0
180	Construction	06/1985	06/2029	11.250%	460	0

TABLE 11-1
HISTORICAL INVESTMENTS
($000s)

	A	G	E	D	B	C
	PROJECT	IN SERVICE DATE	DUE DATE	INTEREST RATE	ORIGINAL PRINCIPAL	CURRENT PRINCIPAL
181	Construction	06/1985	06/2029	11.250%	80	0
182	Construction	06/1985	06/2030	11.250%	84,278	0
183	Construction	03/1986	03/1996	8.150%	870	0
184	Construction	03/1986	03/1996	8.150%	157	0
185	Construction	03/1986	03/1996	8.150%	30,161	0
186	Construction	03/1986	03/1996	8.150%	68,194	0
187	Construction	03/1986	03/1996	8.150%	5	0
188	Construction	03/1986	03/1996	8.150%	1	0
189	Construction	03/1986	03/1996	8.150%	443	0
190	Construction	03/1986	03/1996	8.150%	169	0
191	Construction	06/1986	06/2031	8.950%	5,161	0
192	Construction	06/1986	06/2031	8.950%	11,668	0
193	Construction	06/1986	06/2031	8.950%	180,054	0
194	Construction	06/1986	06/2031	8.950%	3,117	0
195	Construction	06/1986	06/2031	8.950%	40,000	0
196	Construction	06/1986	06/2031	8.950%	57,354	0
197	Construction	06/1986	06/2031	8.950%	76	0
198	Construction	06/1986	06/2031	8.950%	29	0
199	Construction	06/1986	06/2031	8.950%	1,819	0
200	Construction	06/1986	06/2031	8.950%	722	0
201	Construction	04/1987	04/2032	9.300%	43,236	0
202	Construction	04/1987	04/2032	9.300%	54,409	0
203	Construction	04/1987	04/2032	9.300%	111	0
204	Construction	04/1987	04/2032	9.300%	281	0
205	Construction	04/1987	04/2032	9.300%	554	0
206	Construction	04/1987	04/2032	9.300%	1,409	0
207	Construction	06/1987	06/1992	8.350%	96,519	0
208	Construction	06/1987	06/1992	8.350%	2,498	0
209	Construction	06/1987	06/1992	8.350%	983	0
210	Construction	07/1987	07/2017	9.550%	4,113	0
211	Construction	07/1987	07/2017	9.550%	86,958	0
212	Construction	07/1987	07/2017	9.550%	569	0
213	Construction	07/1987	07/2017	9.550%	38	0
214	Construction	07/1987	07/2017	9.550%	3,274	0
215	Construction	07/1987	07/2017	9.550%	48	0
216	Construction	07/1987	07/2032	9.550%	618	0
217	Construction	07/1987	07/2032	9.550%	112	0
218	Construction	07/1987	07/2032	9.550%	7,903	0
219	Construction	07/1987	07/2032	9.550%	3,109	0
220	Construction	07/1987	07/2032	9.550%	37,342	0
221	Construction	07/1987	07/2032	9.550%	285	0
222	Construction	07/1987	07/2032	9.550%	631	0
223	Construction	02/1988	02/2018	9.500%	283	0
224	Construction	02/1988	02/2018	9.500%	43,417	0
225	Construction	02/1988	02/2033	9.500%	28,513	0

TABLE 11-1
HISTORICAL INVESTMENTS
($000s)

	A	G	E	D	B	C
	PROJECT	IN SERVICE DATE	DUE DATE	INTEREST RATE	ORIGINAL PRINCIPAL	CURRENT PRINCIPAL
226	Construction	02/1988	02/2033	9.500%	27,887	0
227	Construction	02/1988	02/2033	9.500%	20,677	0
228	Construction	02/1988	02/2033	9.500%	22,923	0
229	Construction	02/1988	02/2033	9.500%	45,870	0
230	Construction	02/1988	02/2033	9.500%	954	0
231	Construction	02/1988	02/2033	9.500%	933	0
232	Construction	02/1988	02/2033	9.500%	518	0
233	Construction	02/1988	02/2033	9.500%	1,725	0
234	Construction	06/1988	06/2033	9.900%	9,018	0
235	Construction	06/1988	06/2033	9.900%	30,004	0
236	Construction	06/1988	06/2033	9.900%	226	0
237	Construction	06/1988	06/2033	9.900%	752	0
238	Construction	05/1989	05/1999	8.950%	16,909	0
239	Construction	05/1989	05/1999	8.950%	56,257	0
240	Construction	05/1989	05/1999	8.950%	424	0
241	Construction	05/1989	05/1999	8.950%	1,410	0
242	Construction	01/1990	01/2030	9.250%	41,894	0
243	Construction	01/1990	01/2030	9.250%	1,149	0
244	Construction	01/1990	01/2030	9.250%	3,824	0
245	Construction	01/1990	01/2030	9.250%	29	0
246	Construction	01/1990	01/2030	9.250%	96	0
247	Construction	01/1990	01/2030	9.250%	3,008	0
248	Construction	02/1991	02/1995	7.550%	54,145	0
249	Construction	02/1991	02/1995	7.550%	5,855	0
250	Construction	04/1992	04/1995	6.200%	80,000	0
251	Construction	04/1992	04/1997	7.000%	50,000	0
252	Construction	04/1992	04/1997	7.000%	28,300	0
253	Construction	04/1992	04/2032	8.800%	147,521	0
254	Construction	04/1992	04/2032	8.800%	2,479	0
255	Construction	07/1992	07/2032	8.130%	150,000	0
256	Construction	08/1992	08/2000	6.600%	107,800	0
257	Construction	08/1992	08/2007	7.250%	107,700	0
258	Construction	10/1992	10/1997	6.050%	50,000	0
259	Construction	02/1993	02/2033	7.800%	130,000	0
260	Construction	04/1993	04/2033	7.500%	100,000	0
261	Construction	08/1993	08/2033	6.950%	110,000	0
262	Construction	10/1993	10/2033	6.850%	50,000	0
263	Construction	10/1993	10/2033	6.850%	108,400	0
264	Construction	01/1994	01/2034	7.050%	50,000	0
265	Construction	05/1994	05/1998	7.100%	43,155	0
266	Construction	05/1994	05/1998	7.100%	49,489	0
267	Construction	05/1994	05/1998	7.100%	4,456	0
268	Construction	05/1994	05/2034	8.200%	50,000	0
269	Construction	09/1994	09/1999	7.650%	55,000	0
270	Construction	01/1995	01/2001	8.350%	55,000	0

TABLE 11-1
HISTORICAL INVESTMENTS
($000s)

	A	G	E	D	B	C
	PROJECT	IN SERVICE DATE	DUE DATE	INTEREST RATE	ORIGINAL PRINCIPAL	CURRENT PRINCIPAL
271	Construction	08/1995	08/2025	7.700%	65,000	0
272	Construction	08/1996	08/2006	7.050%	70,000	0
273	Construction	05/1997	05/2005	6.900%	80,000	0
274	Construction	08/1997	08/2007	6.650%	111,254	0
275	Construction	04/1998	04/2008	6.000%	75,300	0
276	Construction	04/1998	04/2028	6.650%	50,000	0
277	Construction	05/1998	05/2009	6.000%	72,700	0
278	Construction	05/1998	05/2011	6.200%	40,000	0
279	Construction	05/1998	05/2032	6.700%	98,900	0
280	Construction	08/1998	08/2028	5.850%	106,500	106,500
281	Construction	08/1998	08/2028	5.850%	112,300	112,300
282	Construction	05/1999	05/2004	5.950%	26,200	0
283	Construction	09/1999	09/2002	6.200%	40,000	0
284	Construction	11/1999	11/2002	6.400%	40,000	0
285	Construction	01/2000	01/2005	7.150%	53,500	0
286	Construction	08/2000	08/2003	6.850%	15,300	0
287	Construction	09/2000	09/2006	6.750%	40,000	0
288	Construction	01/2001	01/2005	5.650%	20,000	0
289	Construction	06/2001	06/2011	5.950%	25,000	0
290	Construction	08/2001	08/2011	5.750%	50,000	0
291	Construction	06/2002	06/2005	3.750%	60,000	0
292	Construction	09/2002	09/2006	3.050%	100,000	0
293	Construction	11/2002	11/2005	2.800%	40,000	0
294	Construction	04/2003	04/2007	2.900%	40,000	0
295	Construction	04/2003	04/2033	5.550%	40,000	0
296	Construction	07/2003	07/2006	2.300%	75,000	0
297	Construction	07/2003	07/2007	2.950%	25,000	0
298	Construction	09/2003	09/2006	2.500%	20,000	0
299	Construction	01/2004	01/2008	2.950%	65,000	0
300	Construction	04/2004	04/2007	2.950%	65,000	0
301	Construction	07/2004	07/2007	3.450%	50,000	0
302	Construction	07/2004	07/2008	3.800%	25,000	0
303	Construction	09/2004	09/2007	3.100%	30,000	0
304	Construction	09/2004	09/2034	5.600%	40,000	0
305	Construction	01/2005	01/2035	5.400%	40,000	0
306	Construction	04/2005	04/2035	5.500%	40,000	0
307	Construction	06/2005	06/2009	4.000%	40,000	0
308	Construction	09/2005	09/2035	5.250%	45,000	0
309	Construction	03/2006	03/2009	5.050%	20,000	0
310	Construction	07/2006	07/2009	5.350%	70,000	0
311	Construction	09/2006	09/2010	4.950%	20,000	0
312	Construction	01/2007	01/2010	5.100%	25,000	0
313	Construction	03/2007	03/2012	4.850%	40,000	0
314	Construction	06/2007	06/2037	6.400%	35,000	0
315	Construction	07/2007	07/2010	5.200%	50,000	0

TABLE 11-1
HISTORICAL INVESTMENTS
($000s)

	A	G	E	D	B	C
	PROJECT	IN SERVICE DATE	DUE DATE	INTEREST RATE	ORIGINAL PRINCIPAL	CURRENT PRINCIPAL
316	Construction	05/2008	05/2011	3.358%	40,000	0
317	Construction	07/2008	07/2012	3.913%	30,000	0
318	Construction	09/2008	09/2011	3.151%	25,000	0
319	Construction	01/2009	01/2020	3.830%	50,000	50,000
320	Construction	01/2009	01/2022	4.200%	20,000	20,000
321	Construction	04/2009	04/2022	4.253%	35,000	35,000
322	Construction	06/2009	06/2039	5.192%	35,000	35,000
323	Construction	07/2009	07/2028	4.026%	46,940	46,940
324	Construction	09/2009	09/2028	3.699%	35,000	35,000
325	Construction	10/2009	10/2019	3.842%	43,000	43,000
326	Construction	10/2009	10/2028	3.719%	23,000	23,000
327	Construction	11/2009	11/2028	3.533%	15,000	15,000
328	Construction	12/2009	12/2028	4.069%	13,000	13,000
329	Construction	01/2010	01/2028	3.714%	30,000	30,000
330	Construction	02/2010	02/2019	0.165%	10,000	0
331	Construction	03/2010	03/2021	4.188%	15,000	15,000
332	Construction	04/2010	04/2021	4.094%	22,000	22,000
333	Construction	05/2010	05/2021	3.694%	22,000	22,000
334	Construction	06/2010	06/2021	3.374%	22,000	22,000
335	Construction	07/2010	07/2020	3.118%	50,000	50,000
336	Construction	07/2010	07/2022	3.372%	30,000	30,000
337	Construction	08/2010	08/2022	0.165%	5,000	0
338	Construction	08/2010	08/2022	3.029%	20,000	20,000
339	Construction	09/2010	09/2023	3.161%	46,000	46,000
340	Construction	10/2010	10/2025	3.494%	45,000	45,000
341	Construction	01/2011	01/2036	4.952%	50,000	50,000
342	Construction	02/2011	02/2038	4.935%	55,000	55,000
343	Construction	04/2011	04/2039	4.794%	40,000	40,000
344	Construction	05/2011	09/2011	0.076%	40,000	0
345	Construction	05/2011	09/2011	0.076%	40,000	0
346	Construction	06/2011	06/2036	4.629%	50,000	50,000
347	Construction	06/2011	06/2040	4.775%	25,000	25,000
348	Construction	06/2011	09/2011	0.072%	25,000	0
349	Construction	08/2011	08/2029	4.238%	50,000	50,000
350	Construction	08/2011	08/2032	4.355%	98,900	98,900
351	Construction	08/2011	08/2033	4.386%	40,000	40,000
352	Construction	08/2011	08/2034	4.416%	40,000	40,000
353	Construction	08/2011	08/2035	4.446%	40,000	40,000
354	Construction	08/2011	08/2035	4.446%	40,000	40,000
355	Construction	08/2011	08/2035	4.446%	45,000	45,000
356	Construction	08/2011	08/2039	4.295%	50,000	0
357	Construction	09/2011	09/2040	3.796%	35,000	0
358	Construction	10/2011	10/2039	0.069%	45,000	0
359	Construction	01/2012	01/2040	1.010%	30,000	30,000
360	Construction	01/2012	09/2012	0.146%	30,000	0

TABLE 11-1
HISTORICAL INVESTMENTS
($000s)

	A	G	E	D	B	C
	PROJECT	IN SERVICE DATE	DUE DATE	INTEREST RATE	ORIGINAL PRINCIPAL	CURRENT PRINCIPAL
361	Construction	03/2012	09/2012	0.210%	40,000	0
362	Construction	03/2012	03/2024	1.010%	45,000	45,000
363	Construction	05/2012	05/2027	1.010%	17,000	17,000

TABLE 11-2
PROJECTED FEDERAL INVESTMENTS
($000s)

	A	B	C	D	F	E
	PROJECT	ORIGINAL PRINCIPAL	CURRENT PRINCIPAL	INTEREST RATE	IN SERVICE DATE	DUE DATE
1	Environment	3,000	3,000	3.920%	9/30/2015	9/30/2030
2	Construction	3,000	3,000	3.600%	4/30/2015	4/30/2023
3	Construction	12,000	12,000	3.660%	4/30/2015	4/30/2023
4	Construction	20,000	20,000	3.600%	4/30/2015	6/30/2031
5	Construction	48,000	48,000	3.540%	5/31/2015	5/31/2022
6	Construction	38,000	38,000	3.540%	6/30/2015	6/30/2023
7	Construction	38,000	38,000	3.540%	7/31/2015	7/31/2026
8	Construction	52,000	52,000	3.540%	8/31/2015	8/31/2025
9	Construction	56,000	56,000	3.660%	9/30/2015	9/30/2030
10	Construction (AS)	1,300	1,300	2.419%	5/31/2015	5/31/2021
11	Construction (AS)	1,950	1,950	2.419%	6/30/2015	6/30/2021
12	Construction (AS)	1,300	1,300	2.099%	7/31/2015	7/31/2020
13	Construction (AS)	1,300	1,300	2.419%	8/31/2015	8/31/2021
14	Construction (AS)	3,250	3,250	2.419%	9/30/2015	9/30/2021
15	**2015 TOTAL:**	**279,100**	**279,100**			
16	Environment	6,000	6,000	3.695%	3/31/2016	3/31/2024
17	Construction	34,000	34,000	3.470%	10/31/2015	10/31/2022
18	Construction	21,000	21,000	3.700%	11/30/2015	11/30/2023
19	Construction	40,000	40,000	3.920%	12/31/2015	12/31/2024
20	Construction	28,000	28,000	4.140%	1/31/2016	1/31/2026
21	Construction	33,000	33,000	4.180%	2/28/2016	2/28/2027
22	Construction	58,000	58,000	4.220%	3/31/2016	3/31/2028
23	Construction	45,000	45,000	4.260%	4/30/2016	4/30/2029
24	Construction	47,000	47,000	4.300%	5/31/2016	5/31/2030
25	Construction	42,000	42,000	4.340%	6/30/2016	6/30/2031
26	Construction	40,000	40,000	4.380%	7/31/2016	7/31/2032
27	Construction	54,000	54,000	4.420%	8/31/2016	8/31/2033
28	Construction	92,000	92,000	4.460%	9/30/2016	9/30/2034
29	Construction (AS)	9,100	9,100	3.248%	3/31/2016	3/31/2022
30	Construction (AS)	9,100	9,100	3.248%	9/30/2016	9/30/2022
31	**2016 TOTAL:**	**558,200**	**558,200**			
32	Environment	6,000	6,000	4.411%	3/31/2017	3/31/2025
33	Construction	34,000	34,000	4.830%	10/31/2016	10/31/2034
34	Construction	21,000	21,000	4.880%	11/30/2016	11/30/2036
35	Construction	40,000	40,000	4.910%	12/31/2016	12/31/2037
36	Construction	28,000	28,000	4.930%	1/31/2017	1/31/2039
37	Construction	33,000	33,000	4.960%	2/28/2017	2/28/2040
38	Construction	58,000	58,000	4.980%	3/31/2017	3/31/2041
39	Construction	45,000	45,000	5.010%	4/30/2017	4/30/2042
40	Construction	48,000	48,000	5.040%	5/31/2017	5/31/2043
41	Construction	42,000	42,000	5.060%	6/30/2017	6/30/2044
42	Construction	40,000	40,000	5.090%	7/31/2017	7/31/2045
43	Construction	55,000	55,000	5.110%	8/31/2017	8/31/2046
44	Construction	93,000	93,000	5.140%	9/30/2017	9/30/2047
45	Construction (AS)	7,150	7,150	4.200%	3/31/2017	3/31/2023
46	Construction (AS)	7,150	7,150	4.200%	9/30/2017	9/30/2023
47	**2017 TOTAL:**	**557,300**	**557,300**			

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12. REPAYMENT STUDY RESULTS

TABLE 12-1
SUMMARY OF INTEREST ($000S) (FY 2016)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
1	**Obligation Type**	**General Project**	**Specific Project**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
2	**Appropriation**	**Bonneville Power Administration**	Bonneville Power Administration	14,482	14,386	8,954	6,061	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3			**Bonneville Power Administration Subtotal:**	14,482	14,386	8,954	6,061	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4		**Appropriation Subtotal:**		14,482	14,386	8,954	6,061	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5			(Less Interest Income)	(877)	(1,264)	(1,162)	(1,237)	(2,586)	(2,467)	(2,344)	(2,325)	(2,296)	(2,065)	(1,984)	(2,422)	(1,877)	(2,466)	(2,460)	(2,457)	(2,447)	(2,429)	(1,738)
6			Construction	84,128	106,123	124,371	123,891	120,983	111,536	102,048	94,987	84,663	75,818	70,011	61,146	52,433	44,189	36,193	26,206	17,149	7,978	1,152
7			Interest Accrual	19,260	23,129	23,129	23,103	20,709	18,991	17,130	14,774	13,421	12,793	11,558	10,390	9,841	8,875	7,017	4,643	2,233	437	-
8			Interest Accrual Reversal	(15,246)	(19,260)	(23,129)	(23,129)	(23,103)	(20,709)	(18,991)	(17,130)	(14,774)	(13,421)	(12,793)	(11,558)	(10,390)	(9,841)	(8,875)	(7,017)	(4,643)	(2,233)	(437)
9			Construction (Agency Services)	1,358	1,467	1,564	1,536	1,482	1,133	862	443	-	-	-	-	-	-	-	-	-	-	-
10			Interest Accrual	303	232	220	220	154	63	-	-	-	-	-	-	-	-	-	-	-	-	-
11			Interest Accrual Reversal	(256)	(303)	(232)	(220)	(220)	(154)	(63)	-	-	-	-	-	-	-	-	-	-	-	-
12		**BPA Borrowing**	Environment	1,175	1,441	1,552	1,552	1,552	1,552	1,552	1,552	1,552	1,403	1,040	827	827	597	323	118	-	-	-
13	**Treasury**		Interest Accrual	280	280	280	280	280	280	280	280	280	267	231	231	187	121	-	-	-	-	-
14			Interest Accrual Reversal	(267)	(280)	(280)	(280)	(280)	(280)	(280)	(280)	(280)	(280)	(267)	(231)	(231)	(187)	(121)	-	-	-	-
15			Technology (T)	203	404	404	404	404	404	201	-	-	-	-	-	-	-	-	-	-	-	-
16			Interest Accrual	34	34	34	34	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-
17			Interest Accrual Reversal	-	(34)	(34)	(34)	(34)	(34)	(34)	-	-	-	-	-	-	-	-	-	-	-	-
18			**BPA Borrowing Subtotal:**	90,096	111,968	126,716	126,119	119,374	110,350	100,361	92,301	82,566	74,516	67,796	58,384	50,790	41,287	32,077	21,493	12,292	3,753	(1,024)
19		**Federal Transmission Replacement**	Replacements	-	-	4,465	13,596	23,104	32,968	43,138	53,614	64,427	75,556	86,981	98,674	110,619	122,806	135,218	147,854	160,716	173,801	187,035
20			**Federal Transmission Replacement Subtotal:**	-	-	4,465	13,596	23,104	32,968	43,138	53,614	64,427	75,556	86,981	98,674	110,619	122,806	135,218	147,854	160,716	173,801	187,035
21		**Treasury Subtotal:**		90,096	111,968	131,181	139,715	142,477	143,317	143,499	145,915	146,992	150,072	154,777	157,057	161,410	164,093	167,294	169,347	173,008	177,554	186,011
22	**Grand Total:**			**$104,578**	**$126,354**	**$140,136**	**$145,776**	**$142,477**	**$143,317**	**$143,499**	**$145,915**	**$146,992**	**$150,072**	**$154,777**	**$157,057**	**$161,410**	**$164,093**	**$167,294**	**$169,347**	**$173,008**	**$177,554**	**$186,011**
23																						
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TABLE 12-1
SUMMARY OF INTEREST ($000S) (FY 2016)

	A	B	C	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO
1	**Obligation Type**	**General Project**	**Specific Project**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**	**2042**	**2043**	**2044**	**2045**	**2046**	**2047**	**2048**	**2049**	**2050**	**2051**	**Total**
2	**Appropriation**	**Bonneville Power Administration**	Bonneville Power Administration	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	43,884
3			**Bonneville Power Administration Subtotal:**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	43,884
4		**Appropriation Subtotal:**		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	43,884
5			(Less Interest Income)	(2,174)	(2,396)	(1,816)	(1,999)	(1,410)	(1,286)	(1,454)	(1,141)	(1,441)	(1,064)	(1,317)	(2,565)	(2,542)	(2,517)	(2,491)	(2,463)	(2,432)	(2,398)	(73,810)
6			Construction	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,345,005
7			Interest Accrual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	241,436
8			Interest Accrual Reversal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(256,682)
9			Construction (Agency Services)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9,845
10			Interest Accrual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,193
11			Interest Accrual Reversal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(1,448)
12		**BPA Borrowing**	Environment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18,614
13	**Treasury**		Interest Accrual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3,559
14			Interest Accrual Reversal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(3,827)
15			Technology (T)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,423
16			Interest Accrual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	205
17			Interest Accrual Reversal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(205)
18			**BPA Borrowing Subtotal:**	(2,174)	(2,396)	(1,816)	(1,999)	(1,410)	(1,286)	(1,454)	(1,141)	(1,441)	(1,064)	(1,317)	(2,565)	(2,542)	(2,517)	(2,491)	(2,463)	(2,432)	(2,398)	1,286,308
19		**Federal Transmission Replacement**	Replacements	195,638	199,004	203,955	210,621	219,055	230,376	242,047	254,683	267,853	281,836	296,819	307,240	313,925	321,124	328,868	337,227	346,225	355,849	6,446,915
20			**Federal Transmission Replacement Subtotal:**	195,638	199,004	203,955	210,621	219,055	230,376	242,047	254,683	267,853	281,836	296,819	307,240	313,925	321,124	328,868	337,227	346,225	355,849	6,446,915
21		**Treasury Subtotal:**		193,464	196,607	202,139	208,622	217,645	229,090	240,593	253,542	266,412	280,772	295,502	304,676	311,383	318,607	326,377	334,764	343,793	353,450	7,733,223
22	**Grand Total:**			**$193,464**	**$196,607**	**$202,139**	**$208,622**	**$217,645**	**$229,090**	**$240,593**	**$253,542**	**$266,412**	**$280,772**	**$295,502**	**$304,676**	**$311,383**	**$318,607**	**$326,377**	**$334,764**	**$343,793**	**$353,450**	**7,777,107**
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TABLE 12-2
INTEREST CALCULATION SUMMARY ($000S)
(FY 2016)

	A	C	D	E	F	G	H	I	J
	Fiscal Year	Project	Type	Principal	Rate	Interest	Premium	Accrual	Total
1	2015	Bonneville Power Administration	Historical	200,177	7.235%	14,482	-	-	14,482
2	2015	Construction	Historical	2,392,040	3.457%	82,692	-	923	83,615
3	2015	Construction	New	431,000	0.333%	1,436	-	3,092	4,528
4	2015	Construction (Agency Services)	Historical	88,000	1.449%	1,275	-	(19)	1,256
5	2015	Construction (Agency Services)	New	14,950	0.553%	83	-	67	150
6	2015	Environment	Historical	40,000	2.841%	1,136	-	-	1,136
7	2015	Environment	New	4,000	0.954%	38	-	13	51
8	2015	Technology (T)	New	23,000	0.881%	203	-	34	237
9	2015	Float	Historical	-	-	(877)	-	-	(877)
10	**FY 2015**	**Subtotal:**		**3,193,167**		**100,469**	**-**	**4,109**	**104,578**
11	2016	Bonneville Power Administration	Historical	198,858	7.234%	14,386	-	-	14,386
12	2016	Construction	Historical	2,816,040	3.617%	101,867	-	-	101,867
13	2016	Construction	New	442,000	0.963%	4,256	-	3,869	8,124
14	2016	Construction (Agency Services)	Historical	76,900	1.716%	1,319	-	(71)	1,248
15	2016	Construction (Agency Services)	New	9,100	1.624%	148	-	-	148
16	2016	Environment	Historical	47,000	2.830%	1,330	-	-	1,330
17	2016	Environment	New	6,000	1.848%	111	-	-	111
18	2016	Technology (T)	Historical	23,000	1.756%	404	-	-	404
19	2016	Float	Historical	-	-	(1,264)	-	-	(1,264)
20	**FY 2016**	**Subtotal:**		**3,618,898**		**122,557**	**-**	**3,797**	**126,354**
21	2017	Bonneville Power Administration	Historical	123,948	7.224%	8,954	-	-	8,954
22	2017	Construction	Historical	3,350,040	3.713%	124,371	-	-	124,371
23	2017	Construction (Agency Services)	Historical	75,600	2.069%	1,564	-	(12)	1,552
24	2017	Environment	Historical	53,000	2.928%	1,552	-	-	1,552
25	2017	Replacements	New	181,144	2.465%	4,465	-	-	4,465
26	2017	Technology (T)	Historical	23,000	1.756%	404	-	-	404
27	2017	Float	Historical	-	-	(1,162)	-	-	(1,162)
28	**FY 2017**	**Subtotal:**		**3,806,731**		**140,148**	**-**	**(12)**	**140,136**
29	2018	Bonneville Power Administration	Historical	83,960	7.219%	6,061	-	-	6,061
30	2018	Construction	Historical	3,313,640	3.739%	123,891	-	(26)	123,865
31	2018	Construction (Agency Services)	Historical	71,050	2.161%	1,536	-	-	1,536
32	2018	Environment	Historical	53,000	2.928%	1,552	-	-	1,552
33	2018	Replacements	Historical	181,144	4.930%	8,930	-	-	8,930
34	2018	Replacements	New	189,269	2.465%	4,665	-	-	4,665
35	2018	Technology (T)	Historical	23,000	1.756%	404	-	-	404
36	2018	Float	Historical	-	-	(1,237)	-	-	(1,237)
37	**FY 2018**	**Subtotal:**		**3,915,063**		**145,802**	**-**	**(26)**	**145,776**
38	2019	Construction	Historical	3,308,346	3.657%	120,983	-	(2,394)	118,589
39	2019	Construction (Agency Services)	Historical	71,050	2.085%	1,482	-	(67)	1,415
40	2019	Environment	Historical	53,000	2.928%	1,552	-	-	1,552
41	2019	Replacements	Historical	370,413	4.930%	18,261	-	-	18,261
42	2019	Replacements	New	196,441	2.465%	4,842	-	-	4,842
43	2019	Technology (T)	Historical	23,000	1.756%	404	-	-	404
44	2019	Float	Historical	-	-	(2,586)	-	-	(2,586)
45	**FY 2019**	**Subtotal:**		**4,022,250**		**144,938**	**-**	**(2,460)**	**142,477**
46	2020	Construction	Historical	3,056,411	3.649%	111,536	-	(1,718)	109,818
47	2020	Construction (Agency Services)	Historical	53,300	2.126%	1,133	-	(91)	1,042
48	2020	Environment	Historical	53,000	2.928%	1,552	-	-	1,552
49	2020	Replacements	Historical	566,854	4.930%	27,946	-	-	27,946
50	2020	Replacements	New	203,726	2.465%	5,022	-	-	5,022
51	2020	Technology (T)	Historical	23,000	1.756%	404	-	-	404
52	2020	Float	Historical	-	-	(2,467)	-	-	(2,467)
53	**FY 2020**	**Subtotal:**		**3,956,291**		**145,126**	**-**	**(1,809)**	**143,317**

TABLE 12-2
INTEREST CALCULATION SUMMARY ($000S)
(FY 2016)

	A	C	D	E	F	G	H	I	J
	Fiscal Year	Project	Type	Principal	Rate	Interest	Premium	Accrual	Total
54	2021	Construction	Historical	2,820,514	3.618%	102,048	-	(1,861)	100,187
55	2021	Construction (Agency Services)	Historical	35,100	2.456%	862	-	(63)	799
56	2021	Environment	Historical	53,000	2.928%	1,552	-	-	1,552
57	2021	Replacements	Historical	770,580	4.930%	37,990	-	-	37,990
58	2021	Replacements	New	208,847	2.465%	5,148	-	-	5,148
59	2021	Technology (T)	Historical	23,000	0.876%	201	-	(34)	167
60	2021	Float	Historical	-	-	(2,344)	-	-	(2,344)
61	**FY 2021**	**Subtotal:**		**3,911,041**		**145,457**	**-**	**(1,958)**	**143,499**
62	2022	Construction	Historical	2,615,922	3.631%	94,987	-	(2,356)	92,631
63	2022	Construction (Agency Services)	Historical	18,200	2.436%	443	-	-	443
64	2022	Environment	Historical	53,000	2.928%	1,552	-	-	1,552
65	2022	Replacements	Historical	979,427	4.930%	48,286	-	-	48,286
66	2022	Replacements	New	216,173	2.465%	5,329	-	-	5,329
67	2022	Float	Historical	-	-	(2,325)	-	-	(2,325)
68	**FY 2022**	**Subtotal:**		**3,882,722**		**148,272**	**-**	**(2,356)**	**145,915**
69	2023	Construction	Historical	2,392,939	3.538%	84,663	-	(1,353)	83,310
70	2023	Environment	Historical	53,000	2.928%	1,552	-	-	1,552
71	2023	Replacements	Historical	1,195,600	4.930%	58,943	-	-	58,943
72	2023	Replacements	New	222,464	2.465%	5,484	-	-	5,484
73	2023	Float	Historical	-	-	(2,296)	-	-	(2,296)
74	**FY 2023**	**Subtotal:**		**3,864,003**		**148,346**	**-**	**(1,353)**	**146,992**
75	2024	Construction	Historical	2,155,493	3.517%	75,818	-	(628)	75,191
76	2024	Environment	Historical	53,000	2.647%	1,403	-	(13)	1,390
77	2024	Replacements	Historical	1,418,064	4.930%	69,911	-	-	69,911
78	2024	Replacements	New	229,015	2.465%	5,645	-	-	5,645
79	2024	Float	Historical	-	-	(2,065)	-	-	(2,065)
80	**FY 2024**	**Subtotal:**		**3,855,573**		**150,712**	**-**	**(640)**	**150,072**
81	2025	Construction	Historical	1,961,338	3.570%	70,011	-	(1,235)	68,776
82	2025	Environment	Historical	43,000	2.419%	1,040	-	(36)	1,004
83	2025	Replacements	Historical	1,647,079	4.930%	81,201	-	-	81,201
84	2025	Replacements	New	234,493	2.465%	5,780	-	-	5,780
85	2025	Float	Historical	-	-	(1,984)	-	-	(1,984)
86	**FY 2025**	**Subtotal:**		**3,885,911**		**156,048**	**-**	**(1,271)**	**154,777**
87	2026	Construction	Historical	1,780,545	3.434%	61,146	-	(1,168)	59,978
88	2026	Environment	Historical	33,000	2.507%	827	-	-	827
89	2026	Replacements	Historical	1,881,573	4.930%	92,762	-	-	92,762
90	2026	Replacements	New	239,850	2.465%	5,912	-	-	5,912
91	2026	Float	Historical	-	-	(2,422)	-	-	(2,422)
92	**FY 2026**	**Subtotal:**		**3,934,967**		**158,225**	**-**	**(1,168)**	**157,057**
93	2027	Construction	Historical	1,530,312	3.426%	52,433	-	(549)	51,884
94	2027	Environment	Historical	33,000	2.507%	827	-	(44)	783
95	2027	Replacements	Historical	2,121,422	4.930%	104,586	-	-	104,586
96	2027	Replacements	New	244,746	2.465%	6,033	-	-	6,033
97	2027	Float	Historical	-	-	(1,877)	-	-	(1,877)
98	**FY 2027**	**Subtotal:**		**3,929,480**		**162,003**	**-**	**(593)**	**161,410**
99	2028	Construction	Historical	1,369,533	3.227%	44,189	-	(966)	43,223
100	2028	Environment	Historical	20,000	2.984%	597	-	(66)	530
101	2028	Replacements	Historical	2,366,168	4.930%	116,652	-	-	116,652
102	2028	Replacements	New	249,638	2.465%	6,154	-	-	6,154
103	2028	Float	Historical	-	-	(2,466)	-	-	(2,466)
104	**FY 2028**	**Subtotal:**		**4,005,340**		**165,125**	**-**	**(1,033)**	**164,093**
105	2029	Construction	Historical	1,121,863	3.226%	36,193	-	(1,858)	34,335
106	2029	Environment	Historical	15,000	2.152%	323	-	(121)	202
107	2029	Replacements	Historical	2,615,807	4.930%	128,959	-	-	128,959
108	2029	Replacements	New	253,884	2.465%	6,258	-	-	6,258
109	2029	Float	Historical	-	-	(2,460)	-	-	(2,460)
110	**FY 2029**	**Subtotal:**		**4,006,554**		**169,273**	**-**	**(1,979)**	**167,294**

TABLE 12-2
INTEREST CALCULATION SUMMARY ($000S)
(FY 2016)

	A		C	D	E	F	G	H	I	J
	Fiscal Year		Project	Type	Principal	Rate	Interest	Premium	Accrual	Total
111		2030	Construction	Historical	885,327	2.960%	26,206	-	(2,374)	23,832
112		2030	Environment	Historical	3,000	3.920%	118	-	-	118
113		2030	Replacements	Historical	2,869,691	4.930%	141,476	-	-	141,476
114		2030	Replacements	New	258,751	2.465%	6,378	-	-	6,378
115		2030	Float	Historical	-	-	(2,457)	-	-	(2,457)
116	**FY 2030**		**Subtotal:**		**4,016,769**		**171,720**	**-**	**(2,374)**	**169,347**
117		2031	Construction	Historical	641,378	2.674%	17,149	-	(2,410)	14,739
118		2031	Replacements	Historical	3,128,442	4.930%	154,232	-	-	154,232
119		2031	Replacements	New	263,033	2.465%	6,484	-	-	6,484
120		2031	Float	Historical	-	-	(2,447)	-	-	(2,447)
121	**FY 2031**		**Subtotal:**		**4,032,853**		**175,418**	**-**	**(2,410)**	**173,008**
122		2032	Construction	Historical	393,215	2.029%	7,978	-	(1,796)	6,181
123		2032	Replacements	Historical	3,391,475	4.930%	167,200	-	-	167,200
124		2032	Replacements	New	267,807	2.465%	6,601	-	-	6,601
125		2032	Float	Historical	-	-	(2,429)	-	-	(2,429)
126	**FY 2032**		**Subtotal:**		**4,052,497**		**179,350**	**-**	**(1,796)**	**177,554**
127		2033	Construction	Historical	137,191	0.840%	1,152	-	(437)	715
128		2033	Replacements	Historical	3,659,282	4.928%	180,316	-	-	180,316
129		2033	Replacements	New	272,570	2.465%	6,719	-	-	6,719
130		2033	Float	Historical	-	-	(1,738)	-	-	(1,738)
131	**FY 2033**		**Subtotal:**		**4,069,043**		**186,448**	**-**	**(437)**	**186,011**
132		2034	Construction	Historical		-	-	-	-	-
133		2034	Replacements	Historical	3,928,331	4.806%	188,797	-	-	188,797
134		2034	Replacements	New	277,538	2.465%	6,841	-	-	6,841
135		2034	Float	Historical	-	-	(2,174)	-	-	(2,174)
136	**FY 2034**		**Subtotal:**		**4,205,869**		**193,464**	**-**	**-**	**193,464**
137		2035	Replacements	Historical	4,008,314	4.791%	192,038	-	-	192,038
138		2035	Replacements	New	282,584	2.465%	6,966	-	-	6,966
139		2035	Float	Historical	-	-	(2,396)	-	-	(2,396)
140	**FY 2035**		**Subtotal:**		**4,290,898**		**196,607**	**-**	**-**	**196,607**
141		2036	Replacements	Historical	4,064,859	4.843%	196,862	-	-	196,862
142		2036	Replacements	New	287,736	2.465%	7,093	-	-	7,093
143		2036	Float	Historical	-	-	(1,816)	-	-	(1,816)
144	**FY 2036**		**Subtotal:**		**4,352,595**		**202,139**	**-**	**-**	**202,139**
145		2037	Replacements	Historical	4,209,181	4.833%	203,437	-	-	203,437
146		2037	Replacements	New	291,452	2.465%	7,184	-	-	7,184
147		2037	Float	Historical	-	-	(1,999)	-	-	(1,999)
148	**FY 2037**		**Subtotal:**		**4,500,633**		**208,622**	**-**	**-**	**208,622**
149		2038	Replacements	Historical	4,335,298	4.885%	211,764	-	-	211,764
150		2038	Replacements	New	295,766	2.465%	7,291	-	-	7,291
151		2038	Float	Historical	-	-	(1,410)	-	-	(1,410)
152	**FY 2038**		**Subtotal:**		**4,631,063**		**217,645**	**-**	**-**	**217,645**
153		2039	Replacements	Historical	4,551,319	4.899%	222,979	-	-	222,979
154		2039	Replacements	New	300,074	2.465%	7,397	-	-	7,397
155		2039	Float	Historical	-	-	(1,286)	-	-	(1,286)
156	**FY 2039**		**Subtotal:**		**4,851,393**		**229,090**	**-**	**-**	**229,090**
157		2040	Replacements	Historical	4,794,564	4.892%	234,547	-	-	234,547
158		2040	Replacements	New	304,271	2.465%	7,500	-	-	7,500
159		2040	Float	Historical	-	-	(1,454)	-	-	(1,454)
160	**FY 2040**		**Subtotal:**		**5,098,835**		**240,593**	**-**	**-**	**240,593**

TABLE 12-2
INTEREST CALCULATION SUMMARY ($000S)
(FY 2016)

	A	C	D	E	F	G	H	I	J
	Fiscal Year	Project	Type	Principal	Rate	Interest	Premium	Accrual	Total
161	2041	Replacements	Historical	5,024,786	4.918%	247,117	-	-	247,117
162	2041	Replacements	New	306,942	2.465%	7,566	-	-	7,566
163	2041	Float	Historical	-	-	(1,141)	-	-	(1,141)
164	**FY 2041**	**Subtotal:**		**5,331,727**		**253,542**	**-**	**-**	**253,542**
165	2042	Replacements	Historical	5,307,177	4.903%	260,185	-	-	260,185
166	2042	Replacements	New	311,080	2.465%	7,668	-	-	7,668
167	2042	Float	Historical	-	-	(1,441)	-	-	(1,441)
168	**FY 2042**	**Subtotal:**		**5,618,257**		**266,412**	**-**	**-**	**266,412**
169	2043	Replacements	Historical	5,559,078	4.930%	274,063	-	-	274,063
170	2043	Replacements	New	315,353	2.465%	7,773	-	-	7,773
171	2043	Float	Historical	-	-	(1,064)	-	-	(1,064)
172	**FY 2043**	**Subtotal:**		**5,874,431**		**280,772**	**-**	**-**	**280,772**
173	2044	Replacements	Historical	5,874,431	4.919%	288,936	-	-	288,936
174	2044	Replacements	New	319,790	2.465%	7,883	-	-	7,883
175	2044	Float	Historical	-	-	(1,317)	-	-	(1,317)
176	**FY 2044**	**Subtotal:**		**6,194,220**		**295,502**	**-**	**-**	**295,502**
177	2045	Replacements	Historical	6,166,913	4.852%	299,249	-	-	299,249
178	2045	Replacements	New	324,180	2.465%	7,991	-	-	7,991
179	2045	Float	Historical	-	-	(2,565)	-	-	(2,565)
180	**FY 2045**	**Subtotal:**		**6,491,093**		**304,676**	**-**	**-**	**304,676**
181	2046	Replacements	Historical	6,297,198	4.857%	305,834	-	-	305,834
182	2046	Replacements	New	328,247	2.465%	8,091	-	-	8,091
183	2046	Float	Historical	-	-	(2,542)	-	-	(2,542)
184	**FY 2046**	**Subtotal:**		**6,625,445**		**311,383**	**-**	**-**	**311,383**
185	2047	Replacements	Historical	6,438,089	4.861%	312,954	-	-	312,954
186	2047	Replacements	New	331,445	2.465%	8,170	-	-	8,170
187	2047	Float	Historical	-	-	(2,517)	-	-	(2,517)
188	**FY 2047**	**Subtotal:**		**6,769,534**		**318,607**	**-**	**-**	**318,607**
189	2048	Replacements	Historical	6,589,270	4.865%	320,595	-	-	320,595
190	2048	Replacements	New	335,607	2.465%	8,273	-	-	8,273
191	2048	Float	Historical	-	-	(2,491)	-	-	(2,491)
192	**FY 2048**	**Subtotal:**		**6,924,878**		**326,377**	**-**	**-**	**326,377**
193	2049	Replacements	Historical	6,752,213	4.870%	328,830	-	-	328,830
194	2049	Replacements	New	340,653	2.465%	8,397	-	-	8,397
195	2049	Float	Historical	-	-	(2,463)	-	-	(2,463)
196	**FY 2049**	**Subtotal:**		**7,092,866**		**334,764**	**-**	**-**	**334,764**
197	2050	Replacements	Historical	6,928,381	4.875%	337,733	-	-	337,733
198	2050	Replacements	New	344,483	2.465%	8,491	-	-	8,491
199	2050	Float	Historical	-	-	(2,432)	-	-	(2,432)
200	**FY 2050**	**Subtotal:**		**7,272,863**		**343,793**	**-**	**-**	**343,793**
201	2051	Replacements	Historical	7,117,250	4.879%	347,279	-	-	347,279
202	2051	Replacements	New	347,640	2.465%	8,569	-	-	8,569
203	2051	Float	Historical	-	-	(2,398)	-	-	(2,398)
204	**FY 2051**	**Subtotal:**		**7,464,889**		**353,450**	**-**	**-**	**353,450**
205	**Grand Total:**			**$177,550,643**		**$7,792,875**	**-**	**($15,769)**	**$7,777,107**

TABLE 12-3:
SUMMARY OF AMORTIZATION ($000S) (FY 2016)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1	**Obligation Type**	**General Project**	**Specific Project**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**
2	**Appropriation**	**Bonneville Power Administration**	**Bonneville Power Administration**	1,319	74,910	39,987	83,960	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3			**Bonneville Power Administration Subtotal:**	1,319	74,910	39,987	83,960	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4		**Appropriation Subtotal:**		1,319	74,910	39,987	83,960	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	**Bond**	**BPA Borrowing**	**Construction**	63,000	-	36,400	5,294	251,935	235,823	203,850	222,541	237,445	193,171	180,544	248,523	159,610	246,761	236,422	243,720	243,322	239,054
6			Principal Accrual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7			Principal Accrual Reversal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8			**Construction (Agency Services)**	29,300	19,500	4,550	-	17,750	18,200	16,900	18,200	-	-	-	-	-	-	-	-	-	-
9			Principal Accrual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10			Principal Accrual Reversal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11			**Environment**	-	-	-	-	-	-	-	-	-	10,000	10,000	-	13,000	5,000	12,000	3,000	-	-
12			Principal Accrual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13			Principal Accrual Reversal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14			**Technology (T)**	-	-	-	-	-	-	23,000	-	-	-	-	-	-	-	-	-	-	-
15			Principal Accrual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16			Principal Accrual Reversal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17			**BPA Borrowing Subtotal:**	92,300	19,500	40,950	5,294	269,685	254,023	243,750	240,741	237,445	203,171	190,544	248,523	172,610	251,761	248,422	246,720	243,322	239,054
18		**Federal Transmission Replacement**	**Replacements**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19			Principal Accrual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20			Principal Accrual Reversal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21			**Federal Transmission Replacement Subtotal:**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22		**Make Whole Call**	**Discounts**	-	-	-	-	-	-	(74)	(742)	(442)	-	(984)	(250)	(1,710)	(1,169)	(909)	(113)	(229)	(4,840)
23			**Premiums**	-	-	-	471	9,422	7,661	2,084	1	-	-	-	-	-	-	359	212	122	37
24			**Make Whole Call Subtotal:**	-	-	-	471	9,422	7,661	2,011	(741)	(442)	-	(984)	(250)	(1,710)	(1,169)	(551)	99	(107)	(4,804)
25		**Bond Subtotal:**		92,300	19,500	40,950	5,294	269,685	254,023	243,824	241,483	237,887	203,171	191,528	248,773	174,320	252,930	249,332	246,833	243,551	243,895
26	**Grand Total:**			$93,619	$94,410	$80,937	$89,254	$269,685	$254,023	$243,824	$241,483	$237,887	$203,171	$191,528	$248,773	$174,320	$252,930	$249,332	$246,833	$243,551	$243,895

TABLE 12-3:
SUMMARY OF AMORTIZATION ($000S) (FY 2016)

	A	B	C	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO
1	**Obligation Type**	**General Project**	**Specific Project**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**	**2042**	**2043**	**2044**	**2045**	**2046**	**2047**	**2048**	**2049**	**2050**	**2051**	**Total**
2	**Appropriation**	**Bonneville Power Administration**	**Bonneville Power Administration**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200,177
3			**Bonneville Power Administration Subtotal:**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200,177
4		**Appropriation Subtotal:**		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200,177
5	**Bond**	**BPA Borrowing**	**Construction**	137,191		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3,384,607
6			Principal Accrual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7			Principal Accrual Reversal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8			**Construction (Agency Services)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	124,400
9			Principal Accrual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10			Principal Accrual Reversal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11			**Environment**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	53,000
12			Principal Accrual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13			Principal Accrual Reversal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14			**Technology (T)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23,000
15			Principal Accrual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16			Principal Accrual Reversal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17			**BPA Borrowing Subtotal:**	137,191		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3,585,007
18		**Federal Transmission Replacement**	**Replacements**	3,521	197,554	226,039	143,414	165,335	79,745	56,829	74,050	24,550	59,179	-	27,307	193,896	187,356	180,263	172,665	164,485	155,614	146,086	2,257,889
19			Principal Accrual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20			Principal Accrual Reversal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21			**Federal Transmission Replacement Subtotal:**	3,521	197,554	226,039	143,414	165,335	79,745	56,829	74,050	24,550	59,179	-	27,307	193,896	187,356	180,263	172,665	164,485	155,614	146,086	2,257,889
22		**Make Whole Call**	**Discounts**	(16,971)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(28,433)
23			**Premiums**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20,369
24			**Make Whole Call Subtotal:**	(16,971)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(8,064)
25		**Bond Subtotal:**		157,682	197,554	226,039	143,414	165,335	79,745	56,829	74,050	24,550	59,179	-	27,307	193,896	187,356	180,263	172,665	164,485	155,614	146,086	5,871,329
26	**Grand Total:**			$157,682	$197,554	$226,039	$143,414	$165,335	$79,745	$56,829	$74,050	$24,550	$59,179	-	$27,307	$193,896	$187,356	$180,263	$172,665	$164,485	$155,614	$146,086	6,071,506

TABLE 12-4
APPLICATION OF AMORTIZATION ($000S) (FY 2016)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
	Fiscal Year	Project	Debt Type	In Service	Bond Due Date	Initial Principal	Current Principal	Original Rate	Effective Rate	Refinance Type	Refinanced Date	Rolled Maturity Date	Roll Rate	Principal Paid	Premium	Discount	Accrual	Reversal
1	2015	Construction (Agency Services)	-	8/31/2010	8/31/2015	15,000	15,000	1.619%	1.619%					15,000				
2	2015	Construction	-	8/20/2012	8/31/2015	37,000	37,000	0.589%	0.589%					37,000				
3	2015	Construction	-	6/20/2012	9/30/2015	26,000	26,000	0.671%	0.671%					26,000				
4	2015	Construction (Agency Services)	-	6/20/2012	9/30/2015	14,300	14,300	0.671%	0.671%					14,300				
5	2015	Bonneville Power Administration	Bonneville Power Administration	9/30/1974	9/30/2019	12,563	6,087	7.270%	7.270%					1,319				
6		**FY 2015 Subtotal:**	**-**	**-**	**-**	**104,863**	**98,387**	**-**						**93,619**				
7	2016	Construction (Agency Services)	-	6/22/2011	6/30/2016	13,000	13,000	1.957%	1.957%					13,000				
8	2016	Construction (Agency Services)	-	8/12/2011	8/31/2016	6,500	6,500	1.423%	1.423%					6,500				
9	2016	Bonneville Power Administration	Bonneville Power Administration	9/30/1974	9/30/2019	12,563	4,768	7.270%	7.270%					4,768				
10	2016	Bonneville Power Administration	Bonneville Power Administration	9/30/1975	9/30/2020	32,026	32,026	7.250%	7.250%					19,326				
11	2016	Bonneville Power Administration	Bonneville Power Administration	9/30/1975	9/30/2020	21,916	21,916	7.250%	7.250%					21,916				
12	2016	Bonneville Power Administration	Bonneville Power Administration	9/30/1975	9/30/2020	17,158	17,158	7.250%	7.250%					17,158				
13	2016	Bonneville Power Administration	Bonneville Power Administration	9/30/1975	9/30/2020	11,742	11,742	7.250%	7.250%					11,742				
14		**FY 2016 Subtotal:**	**-**	**-**	**-**	**114,905**	**107,110**	**-**						**94,410**				
15	2017	Construction (Agency Services)	-	4/30/2013	4/30/2017	4,550	4,550	0.622%	0.622%					4,550				
16	2017	Construction	-	9/30/2012	9/30/2017	36,400	36,400	0.891%	0.891%					36,400				
17	2017	Bonneville Power Administration	Bonneville Power Administration	9/30/1975	9/30/2020	32,026	12,700	7.250%	7.250%					12,700				
18	2017	Bonneville Power Administration	Bonneville Power Administration	9/30/1976	9/30/2021	61,025	61,025	7.230%	7.230%					25,076				
19	2017	Bonneville Power Administration	Bonneville Power Administration	9/30/1976	9/30/2021	2,212	2,212	7.230%	7.230%					2,212				
20		**FY 2017 Subtotal:**	**-**	**-**	**-**	**136,213**	**116,887**	**-**						**80,937**				
21	2018	Bonneville Power Administration	Bonneville Power Administration	9/30/1976	9/30/2021	61,025	35,949	7.230%	7.230%					35,949				
22	2018	Bonneville Power Administration	Bonneville Power Administration	9/30/1977	9/30/2022	3,948	3,948	7.210%	7.210%					3,948				
23	2018	Bonneville Power Administration	Bonneville Power Administration	9/30/1977	9/30/2022	5,380	5,380	7.210%	7.210%					5,380				
24	2018	Bonneville Power Administration	Bonneville Power Administration	9/30/1977	9/30/2022	33,702	33,702	7.210%	7.210%					33,702				
25	2018	Bonneville Power Administration	Bonneville Power Administration	9/30/1977	9/30/2022	4,981	4,981	7.210%	7.210%					4,981				
26	2018	Construction	-	8/31/1998	8/31/2028	112,300	112,300	5.850%	5.850%					5,294	471			
27		**FY 2018 Subtotal:**	**-**	**-**	**-**	**221,336**	**196,260**	**-**						**89,254**	**471**			
28	2019	Construction (Agency Services)	-	11/30/2012	11/30/2018	9,750	9,750	1.109%	1.109%					9,750				
29	2019	Construction	-	1/16/2014	12/31/2018	33,000	33,000	1.943%	1.943%					33,000				
30	2019	Construction	-	1/16/2014	12/31/2018	30,000	30,000	1.943%	1.943%					30,000				
31	2019	Construction	-	1/16/2014	12/31/2018	31,000	31,000	1.943%	1.943%					31,000				
32	2019	Construction	-	1/16/2014	12/31/2018	48,000	48,000	1.943%	1.943%					48,000				
33	2019	Construction (Agency Services)	-	6/30/2013	6/30/2019	5,000	5,000	1.962%	1.962%					5,000				
34	2019	Construction (Agency Services)	-	8/31/2013	8/31/2019	3,000	3,000	2.279%	2.279%					3,000				
35	2019	Construction	-	8/31/1998	8/31/2028	106,500	106,500	5.850%	5.850%					2,929	251			
36	2019	Construction	-	8/31/1998	8/31/2028	112,300	107,006	5.850%	5.850%					107,006	9,171			
37		**FY 2019 Subtotal:**	**-**	**-**	**-**	**378,550**	**373,256**	**-**						**269,685**	**9,422**			

TABLE 12-4
APPLICATION OF AMORTIZATION ($000S) (FY 2016)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
	Fiscal Year	Project	Debt Type	In Service	Bond Due Date	Initial Principal	Current Principal	Original Rate	Effective Rate	Refinance Type	Refinanced Date	Rolled Maturity Date	Roll Rate	Principal Paid	Premium	Discount	Accrual	Reversal
38	2020	Construction (Agency Services)	-	10/31/2013	10/31/2019	7,800	7,800	2.039%	2.039%					7,800				
39	2020	Construction	-	10/31/2009	10/31/2019	43,000	43,000	3.842%	3.842%					43,000				
40	2020	Construction (Agency Services)	-	1/31/2014	1/31/2020	3,250	3,250	2.183%	2.183%					3,250				
41	2020	Construction	-	1/31/2009	1/31/2020	50,000	50,000	3.830%	3.830%					50,000				
42	2020	Construction (Agency Services)	-	4/30/2014	3/31/2020	2,600	2,600	1.010%	1.010%					2,600				
43	2020	Construction (Agency Services)	-	5/31/2014	4/30/2020	1,300	1,300	1.010%	1.010%					1,300				
44	2020	Construction (Agency Services)	-	7/31/2015	7/31/2020	1,300	1,300	2.099%	2.099%					1,300				
45	2020	Construction	-	7/31/2010	7/31/2020	50,000	50,000	3.118%	3.118%					50,000				
46	2020	Construction (Agency Services)	-	7/31/2014	7/31/2020	1,950	1,950	1.010%	1.010%					1,950				
47	2020	Construction	-	8/31/1998	8/31/2028	106,500	103,571	5.850%	5.850%					92,823	7,661			
48		**FY 2020 Subtotal:**	**-**	**-**	**-**	**267,700**	**264,771**	**-**						**254,023**	**7,661**			
49	2021	Construction (Agency Services)	-	11/30/2014	11/30/2020	3,900	3,900	1.809%	1.809%					3,900				
50	2021	Construction (Agency Services)	-	12/31/2014	12/31/2020	1,950	1,950	1.922%	1.922%					1,950				
51	2021	Technology (T)	-	2/28/2015	2/28/2021	23,000	23,000	1.761%	1.761%					23,000				
52	2021	Construction (Agency Services)	-	2/28/2015	2/28/2021	3,250	3,250	1.761%	1.761%					3,250				
53	2021	Construction	-	3/31/2010	3/31/2021	15,000	15,000	4.188%	4.188%					15,000				
54	2021	Construction	-	4/30/2010	4/30/2021	22,000	22,000	4.094%	4.094%					22,000				
55	2021	Construction	-	5/31/2010	5/31/2021	22,000	22,000	3.694%	3.694%					22,000				
56	2021	Construction (Agency Services)	-	5/31/2015	5/31/2021	1,300	1,300	2.419%	2.419%					1,300				
57	2021	Construction (Agency Services)	-	6/30/2015	6/30/2021	1,950	1,950	2.419%	2.419%					1,950				
58	2021	Construction	-	6/30/2010	6/30/2021	22,000	22,000	3.374%	3.374%					22,000				
59	2021	Construction (Agency Services)	-	8/31/2015	8/31/2021	1,300	1,300	2.419%	2.419%					1,300				
60	2021	Construction (Agency Services)	-	9/30/2015	9/30/2021	3,250	3,250	2.419%	2.419%					3,250				
61	2021	Construction	-	8/31/1998	8/31/2028	106,500	10,748	5.850%	5.850%					10,748	840			
62	2021	Construction	-	1/31/2011	1/31/2036	50,000	50,000	4.952%	4.952%					50,000	299			
63	2021	Construction	-	2/28/2011	2/28/2038	55,000	55,000	4.935%	4.935%					27,102		74		
64	2021	Construction	-	6/30/2009	6/30/2039	35,000	35,000	5.192%	5.192%					35,000	945			
65		**FY 2021 Subtotal:**	**-**	**-**	**-**	**367,400**	**271,648**	**-**						**243,750**	**2,084**	**74**		
66	2022	Construction	-	1/31/2009	1/31/2022	20,000	20,000	4.200%	4.200%					20,000				
67	2022	Construction (Agency Services)	-	3/31/2016	3/31/2022	9,100	9,100	3.248%	3.248%					9,100				
68	2022	Construction	-	4/30/2009	4/30/2022	35,000	35,000	4.253%	4.253%					35,000				
69	2022	Construction	-	5/31/2015	5/31/2022	48,000	48,000	2.740%	2.740%					48,000				
70	2022	Construction	-	7/31/2010	7/31/2022	30,000	30,000	3.372%	3.372%					30,000				
71	2022	Construction	-	8/31/2010	8/31/2022	20,000	20,000	3.029%	3.029%					20,000				
72	2022	Construction (Agency Services)	-	9/30/2016	9/30/2022	9,100	9,100	3.248%	3.248%					9,100				
73	2022	Construction	-	2/28/2011	2/28/2038	55,000	27,824	4.935%	4.935%					27,824	1			
74	2022	Construction	-	4/30/2011	4/30/2039	40,000	40,000	4.794%	4.794%					39,315		685		
75	2022	Construction	-	6/22/2011	6/30/2040	25,000	25,000	4.775%	4.775%					2,402		57		
76		**FY 2022 Subtotal:**	**-**	**-**	**-**	**291,200**	**264,024**	**-**						**240,741**	**1**	**742**		

TABLE 12-4
APPLICATION OF AMORTIZATION ($000S) (FY 2016)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
	Fiscal Year	Project	Debt Type	In Service	Bond Due Date	Initial Principal	Current Principal	Original Rate	Effective Rate	Refinance Type	Refinanced Date	Rolled Maturity Date	Roll Rate	Principal Paid	Premium	Discount	Accrual	Reversal
77	2023	Construction	-	10/31/2009	10/31/2018	23,000	23,000	3.719%	4.715%	Global	10/31/2018	10/31/2028	4.715%	23,000				
78	2023	Construction	-	11/30/2009	11/30/2018	15,000	15,000	3.533%	4.715%	Global	11/30/2018	11/30/2028	4.715%	15,000				
79	2023	Construction	-	12/31/2009	12/31/2018	13,000	13,000	4.069%	4.715%	Global	12/31/2018	12/31/2028	4.715%	13,000				
80	2023	Construction	-	1/31/2010	1/31/2019	30,000	30,000	3.714%	4.715%	Global	1/31/2019	1/31/2028	4.715%	11,347				
81	2023	Construction	-	10/31/2015	10/31/2022	34,000	34,000	3.470%	3.470%					34,000				
82	2023	Construction	-	12/31/2014	12/31/2022	16,000	16,000	2.274%	2.274%					16,000				
83	2023	Construction	-	12/31/2014	12/31/2022	4,000	4,000	2.274%	2.274%					4,000				
84	2023	Construction	-	4/30/2015	4/30/2023	12,000	12,000	3.057%	3.057%					12,000				
85	2023	Construction	-	4/30/2015	4/30/2023	3,000	3,000	3.057%	3.057%					3,000				
86	2023	Construction	-	6/30/2015	6/30/2023	38,000	38,000	3.057%	3.057%					38,000				
87	2023	Construction	-	9/30/2010	9/30/2023	46,000	46,000	3.161%	3.161%					46,000				
88	2023	Construction	-	6/22/2011	6/30/2040	25,000	22,541	4.775%	4.775%					22,099		442		
89		**FY 2023 Subtotal:**	**-**	**-**	**-**	**259,000**	**256,541**	**-**						**237,445**		**442**		
90	2024	Construction	-	1/31/2010	1/31/2019	30,000	18,653	3.714%	4.715%	Global	1/31/2019	1/31/2028	4.715%	18,653				
91	2024	Construction	-	7/31/2009	7/31/2019	46,940	46,940	4.026%	4.715%	Global	7/31/2019	7/31/2028	4.715%	46,940				
92	2024	Construction	-	9/30/2009	9/30/2019	35,000	35,000	3.699%	4.715%	Global	9/30/2019	9/30/2028	4.715%	4,578				
93	2024	Construction	-	10/31/2014	10/31/2023	20,000	20,000	2.521%	2.521%					20,000				
94	2024	Construction	-	11/30/2014	11/30/2023	20,000	20,000	2.361%	2.361%					20,000				
95	2024	Construction	-	11/30/2015	11/30/2023	21,000	21,000	3.700%	3.700%					21,000				
96	2024	Environment	-	1/31/2015	1/31/2024	4,000	4,000	1.908%	1.908%					4,000				
97	2024	Construction	-	3/31/2015	3/31/2024	17,000	17,000	2.200%	2.200%					17,000				
98	2024	Environment	-	3/31/2016	3/31/2024	6,000	6,000	3.695%	3.695%					6,000				
99	2024	Construction	-	3/31/2012	3/31/2024	45,000	45,000	1.010%	1.010%					45,000				
100		**FY 2024 Subtotal:**	**-**	**-**	**-**	**244,940**	**233,593**	**-**						**203,171**				
101	2025	Construction	-	9/30/2009	9/30/2019	35,000	30,422	3.699%	4.715%	Global	9/30/2019	9/30/2028	4.715%	30,422				
102	2025	Construction	-	12/31/2015	12/31/2024	40,000	40,000	3.920%	3.920%					40,000				
103	2025	Environment	-	2/28/2010	2/28/2025	10,000	10,000	4.279%	4.279%					10,000				
104	2025	Construction	-	8/31/2015	8/31/2025	52,000	52,000	3.696%	3.696%					52,000				
105	2025	Construction	-	12/31/2013	12/31/2035	10,000	10,000	4.472%	4.472%					8,858		247		
106	2025	Construction	-	6/22/2011	6/30/2036	50,000	50,000	4.629%	4.629%					49,263		737		
107		**FY 2025 Subtotal:**	**-**	**-**	**-**	**197,000**	**192,422**	**-**						**190,544**		**984**		
108	2026	Construction	-	10/31/2010	10/31/2025	45,000	45,000	3.494%	3.494%					45,000				
109	2026	Construction	-	1/31/2016	1/31/2026	28,000	28,000	4.140%	4.140%					28,000				
110	2026	Construction	-	2/28/2015	2/28/2026	19,000	19,000	2.416%	2.416%					19,000				
111	2026	Construction	-	3/31/2015	3/31/2026	15,000	15,000	2.370%	2.370%					15,000				
112	2026	Construction	-	7/31/2015	7/31/2026	38,000	38,000	3.741%	3.741%					38,000				
113	2026	Construction	-	9/30/2016	9/30/2034	92,000	92,000	4.460%	4.460%					92,000				
114	2026	Construction	-	8/2/2011	8/31/2035	45,000	45,000	4.446%	4.446%					10,649		229		
115	2026	Construction	-	12/31/2013	12/31/2035	10,000	894	4.472%	4.472%					873		21		
116		**FY 2026 Subtotal:**	**-**	**-**	**-**	**292,000**	**282,894**	**-**						**248,523**		**250**		

TABLE 12-4
APPLICATION OF AMORTIZATION ($000S) (FY 2016)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
	Fiscal Year	Project	Debt Type	In Service	Bond Due Date	Initial Principal	Current Principal	Original Rate	Effective Rate	Refinance Type	Refinanced Date	Rolled Maturity Date	Roll Rate	Principal Paid	Premium	Discount	Accrual	Reversal
117	2027	Construction	-	2/28/2016	2/28/2027	33,000	33,000	4.180%	4.180%					33,000				
118	2027	Construction	-	5/3/2012	5/31/2027	17,000	17,000	1.010%	1.010%					17,000				
119	2027	Environment	-	5/3/2012	5/31/2027	13,000	13,000	1.010%	1.010%					13,000				
120	2027	Construction	-	8/2/2011	8/31/2035	40,000	40,000	4.446%	4.446%					36,627		571		
121	2027	Construction	-	8/2/2011	8/31/2035	40,000	40,000	4.446%	4.446%					39,386		614		
122	2027	Construction	-	8/2/2011	8/31/2035	45,000	34,122	4.446%	4.446%					33,598		524		
123		**FY 2027 Subtotal:**	**-**	**-**	**-**	**188,000**	**177,122**	**-**						**172,610**		**1,710**		
124	2028	Environment	-	11/20/2013	11/30/2027	5,000	5,000	3.967%	3.967%					5,000				
125	2028	Construction	-	3/31/2016	3/31/2028	58,000	58,000	4.220%	4.220%					58,000				
126	2028	Construction	-	9/30/2014	4/30/2028	17,000	17,000	1.010%	1.010%					17,000				
127	2028	Construction	-	9/30/2014	9/30/2028	3,000	3,000	3.094%	3.094%					3,000				
128	2028	Construction	-	8/2/2011	8/31/2033	40,000	40,000	4.386%	4.386%					36,936		192		
129	2028	Construction	-	8/31/2016	8/31/2033	54,000	54,000	4.420%	4.420%					54,000				
130	2028	Construction	-	8/2/2011	8/31/2034	40,000	40,000	4.416%	4.416%					39,696		304		
131	2028	Construction	-	8/2/2011	8/31/2035	40,000	2,802	4.446%	4.446%					2,773		29		
132	2028	Construction	-	11/20/2013	6/30/2036	36,000	36,000	4.397%	4.397%					35,356		644		
133		**FY 2028 Subtotal:**	**-**	**-**	**-**	**293,000**	**255,802**	**-**						**251,761**		**1,169**		
134	2029	Environment	-	10/31/2013	10/31/2028	6,000	6,000	3.880%	3.880%					6,000				
135	2029	Environment	-	1/31/2014	1/31/2029	3,000	3,000	3.896%	3.896%					3,000				
136	2029	Construction	-	4/30/2016	4/30/2029	45,000	45,000	4.260%	4.260%					45,000				
137	2029	Environment	-	7/31/2014	7/31/2029	3,000	3,000	1.010%	1.010%					3,000				
138	2029	Construction	-	8/2/2011	8/31/2029	50,000	50,000	4.238%	4.238%					50,000				
139	2029	Construction	-	7/31/2016	7/31/2032	40,000	40,000	4.380%	4.380%					40,000				
140	2029	Construction	-	8/2/2011	8/31/2032	98,900	98,900	4.355%	4.355%					69,459	354			
141	2029	Construction	-	8/2/2011	8/31/2033	40,000	2,872	4.386%	4.386%					2,872	5			
142	2029	Construction	-	11/30/2013	11/30/2035	15,000	15,000	4.365%	4.365%					14,806		194		
143	2029	Construction	-	1/31/2014	1/31/2043	15,000	15,000	4.380%	4.380%					14,285		715		
144		**FY 2029 Subtotal:**	**-**	**-**	**-**	**315,900**	**278,772**	**-**						**248,422**	**359**	**909**		
145	2030	Construction	-	11/20/2013	10/31/2029	55,000	55,000	4.093%	4.093%					55,000				
146	2030	Construction	-	3/31/2015	3/31/2030	3,000	3,000	2.626%	2.626%					3,000				
147	2030	Construction	-	5/31/2016	5/31/2030	47,000	47,000	4.300%	4.300%					47,000				
148	2030	Construction	-	9/30/2015	9/30/2030	56,000	56,000	3.922%	3.922%					56,000				
149	2030	Environment	-	9/30/2015	9/30/2030	3,000	3,000	3.920%	3.920%					3,000				
150	2030	Construction	-	6/30/2016	6/30/2031	42,000	42,000	4.340%	4.340%					33,393				
151	2030	Construction	-	8/2/2011	8/31/2032	98,900	29,441	4.355%	4.355%					29,441	212			
152	2030	Construction	-	11/20/2013	5/31/2035	20,000	20,000	4.354%	4.354%					19,887		113		
153		**FY 2030 Subtotal:**	**-**	**-**	**-**	**324,900**	**255,441**	**-**						**246,720**	**212**	**113**		

TABLE 12-4
APPLICATION OF AMORTIZATION ($000S) (FY 2016)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
	Fiscal Year	Project	Debt Type	In Service	Bond Due Date	Initial Principal	Current Principal	Original Rate	Effective Rate	Refinance Type	Refinanced Date	Rolled Maturity Date	Roll Rate	Principal Paid	Premium	Discount	Accrual	Reversal
154	2031	Construction	-	4/30/2015	6/30/2015	20,000	20,000	0.140%	3.967%	Global	6/30/2015	6/30/2031	3.967%	20,000				
155	2031	Construction	-	8/31/2014	6/30/2015	14,000	14,000	0.262%	3.967%	Global	6/30/2015	6/30/2031	3.967%	14,000				
156	2031	Construction	-	2/28/2015	6/30/2015	30,000	30,000	0.149%	3.967%	Global	6/30/2015	6/30/2031	3.967%	30,000				
157	2031	Construction	-	6/30/2014	6/30/2015	11,000	11,000	0.303%	3.967%	Global	6/30/2015	6/30/2031	3.967%	11,000				
158	2031	Construction	-	11/30/2014	6/30/2015	18,000	18,000	0.168%	3.967%	Global	6/30/2015	6/30/2031	3.967%	18,000				
159	2031	Construction	-	10/31/2014	6/30/2015	23,000	23,000	0.180%	3.967%	Global	6/30/2015	6/30/2031	3.967%	23,000				
160	2031	Construction	-	11/20/2013	1/31/2031	30,000	30,000	4.162%	4.162%					30,000				
161	2031	Construction	-	11/20/2013	2/28/2031	15,000	15,000	4.166%	4.166%					15,000				
162	2031	Construction	-	11/20/2013	3/31/2031	18,000	18,000	4.171%	4.171%					18,000				
163	2031	Construction	-	6/30/2016	6/30/2031	42,000	8,607	4.340%	4.340%					8,607				
164	2031	Construction	-	11/20/2013	4/30/2034	28,000	28,000	4.311%	4.311%					28,000	97			
165	2031	Construction	-	11/20/2013	8/31/2034	6,000	6,000	4.324%	4.324%					6,000	25			
166	2031	Construction	-	10/31/2013	10/31/2035	64,000	64,000	4.222%	4.222%					21,715		229		
167		**FY 2031 Subtotal:**	**-**	**-**	**-**	**319,000**	**285,607**	**-**						**243,322**	**122**	**229**		
168	2032	Construction	-	1/31/2015	6/30/2015	35,000	35,000	0.151%	4.013%	Global	6/30/2015	6/30/2032	4.013%	35,000				
169	2032	Construction	-	6/30/2014	6/30/2015	63,000	63,000	0.303%	4.013%	Global	6/30/2015	6/30/2032	4.013%	63,000				
170	2032	Construction	-	7/31/2014	4/30/2032	9,000	9,000	1.010%	1.010%					9,000				
171	2032	Construction	-	4/30/2014	2/28/2034	45,000	45,000	1.010%	1.010%					42,542		2,458		
172	2032	Construction	-	4/30/2014	3/31/2034	45,000	45,000	1.010%	1.010%					38,610		2,229		
173	2032	Construction	-	9/30/2013	9/30/2034	9,000	9,000	4.214%	4.214%					9,000	37			
174	2032	Construction	-	10/31/2013	10/31/2035	64,000	42,056	4.222%	4.222%					41,903		153		
175		**FY 2032 Subtotal:**	**-**	**-**	**-**	**270,000**	**248,056**	**-**						**239,054**	**37**	**4,840**		
176	2033	Construction	-	6/30/2014	11/30/2032	21,000	21,000	1.010%	1.010%					21,000				
177	2033	Construction	-	4/30/2014	3/31/2034	45,000	4,161	1.010%	1.010%					4,049		112		
178	2033	Construction	-	8/31/2014	7/31/2035	10,000	10,000	1.010%	1.010%					9,333		667		
179	2033	Construction	-	8/31/2014	8/31/2035	15,000	15,000	1.010%	1.010%					13,999		1,001		
180	2033	Construction	-	5/31/2014	5/31/2036	29,000	29,000	1.010%	1.010%					26,634		2,366		
181	2033	Construction	-	4/30/2014	10/31/2039	45,000	45,000	1.010%	1.010%					37,470		7,530		
182	2033	Construction	-	1/27/2012	1/31/2040	30,000	30,000	1.010%	1.010%					24,705		5,295		
183	2033	Replacements	-	3/31/2017	3/31/2052	181,144	181,144	4.930%	4.930%					3,521				
184		**FY 2033 Subtotal:**	**-**	**-**	**-**	**376,144**	**335,305**	**-**						**140,712**		**16,971**		
185	2034	Construction	-	1/27/2012	1/31/2040	30,000		1.010%	1.010%									
186	2034	Replacements	-	3/31/2017	3/31/2052	181,144	177,623	4.930%	4.930%					177,623				
187	2034	Replacements	-	3/31/2018	3/31/2053	189,269	189,269	4.930%	4.930%					19,932				
188		**FY 2034 Subtotal:**	**-**	**-**	**-**	**400,413**	**366,892**	**-**						**197,554**				

TABLE 12-4
APPLICATION OF AMORTIZATION ($000S) (FY 2016)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
	Fiscal Year	Project	Debt Type	In Service	Bond Due Date	Initial Principal	Current Principal	Original Rate	Effective Rate	Refinance Type	Refinanced Date	Rolled Maturity Date	Roll Rate	Principal Paid	Premium	Discount	Accrual	Reversal
189	2035	Replacements	-	3/31/2018	3/31/2053	189,269	169,337	4.930%	4.930%					169,337				
190	2035	Replacements	-	3/31/2019	3/31/2054	196,441	196,441	4.930%	4.930%					56,702				
191		**FY 2035 Subtotal:**	**-**	**-**	**-**	**385,710**	**365,779**	**-**						**226,039**				
192	2036	Replacements	-	3/31/2019	3/31/2054	196,441	139,740	4.930%	4.930%					139,740				
193	2036	Replacements	-	3/31/2020	3/31/2055	203,726	203,726	4.930%	4.930%					3,675				
194		**FY 2036 Subtotal:**	**-**	**-**	**-**	**400,167**	**343,465**	**-**						**143,414**				
195	2037	Replacements	-	3/31/2020	3/31/2055	203,726	200,051	4.930%	4.930%					165,335				
196		**FY 2037 Subtotal:**	**-**	**-**	**-**	**203,726**	**200,051**	**-**						**165,335**				
197	2038	Replacements	-	3/31/2020	3/31/2055	203,726	34,716	4.930%	4.930%					34,716				
198	2038	Replacements	-	3/31/2021	3/31/2056	208,847	208,847	4.930%	4.930%					45,028				
199		**FY 2038 Subtotal:**	**-**	**-**	**-**	**412,573**	**243,564**	**-**						**79,745**				
200	2039	Replacements	-	3/31/2021	3/31/2056	208,847	163,819	4.930%	4.930%					56,829				
201		**FY 2039 Subtotal:**	**-**	**-**	**-**	**208,847**	**163,819**	**-**						**56,829**				
202	2040	Replacements	-	3/31/2021	3/31/2056	208,847	106,990	4.930%	4.930%					74,050				
203		**FY 2040 Subtotal:**	**-**	**-**	**-**	**208,847**	**106,990**	**-**						**74,050**				
204	2041	Replacements	-	3/31/2021	3/31/2056	208,847	32,940	4.930%	4.930%					24,550				
205		**FY 2041 Subtotal:**	**-**	**-**	**-**	**208,847**	**32,940**	**-**						**24,550**				
206	2042	Replacements	-	3/31/2021	3/31/2056	208,847	8,390	4.930%	4.930%					8,390				
207	2042	Replacements	-	3/31/2022	3/31/2057	216,173	216,173	4.930%	4.930%					50,790				
208		**FY 2042 Subtotal:**	**-**	**-**	**-**	**425,021**	**224,563**	**-**						**59,179**				
209	2044	Replacements	-	3/31/2022	3/31/2057	216,173	165,384	4.930%	4.930%					27,307				
210		**FY 2044 Subtotal:**	**-**	**-**	**-**	**216,173**	**165,384**	**-**						**27,307**				
211	2045	Replacements	-	3/31/2022	3/31/2057	216,173	138,076	4.930%	4.930%					138,076				
212	2045	Replacements	-	3/31/2023	3/31/2058	222,464	222,464	4.930%	4.930%					55,820				
213		**FY 2045 Subtotal:**	**-**	**-**	**-**	**438,637**	**360,540**	**-**						**193,896**				
214	2046	Replacements	-	3/31/2023	3/31/2058	222,464	166,644	4.930%	4.930%					166,644				
215	2046	Replacements	-	3/31/2024	3/31/2059	229,015	229,015	4.930%	4.930%					20,712				
216		**FY 2046 Subtotal:**	**-**	**-**	**-**	**451,479**	**395,660**	**-**						**187,356**				
217	2047	Replacements	-	3/31/2024	3/31/2059	229,015	208,303	4.930%	4.930%					180,263				
218		**FY 2047 Subtotal:**	**-**	**-**	**-**	**229,015**	**208,303**	**-**						**180,263**				
219	2048	Replacements	-	3/31/2024	3/31/2059	229,015	28,040	4.930%	4.930%					28,040				
220	2048	Replacements	-	3/31/2025	3/31/2060	234,493	234,493	4.930%	4.930%					144,625				
221		**FY 2048 Subtotal:**	**-**	**-**	**-**	**463,508**	**262,533**	**-**						**172,665**				
222	2049	Replacements	-	3/31/2025	3/31/2060	234,493	89,868	4.930%	4.930%					89,868				
223	2049	Replacements	-	3/31/2026	3/31/2061	239,850	239,850	4.930%	4.930%					74,617				
224		**FY 2049 Subtotal:**	**-**	**-**	**-**	**474,343**	**329,718**	**-**						**164,485**				
225	2050	Replacements	-	3/31/2026	3/31/2061	239,850	165,233	4.930%	4.930%					155,614				
226		**FY 2050 Subtotal:**	**-**	**-**	**-**	**239,850**	**165,233**	**-**						**155,614**				
227	2051	Replacements	-	3/31/2026	3/31/2061	239,850	9,619	4.930%	4.930%					9,619				
228	2051	Replacements	-	3/31/2027	3/31/2062	244,746	244,746	4.930%	4.930%					136,467				
229		**FY 2051 Subtotal:**	**-**	**-**	**-**	**484,595**	**254,365**	**-**						**146,086**				
230	**Grand Total**					**$10,813,803**	**$8,683,696**	**-**						**$6,043,073**	**$20,369**	**$28,433**		

TABLE 12-5
SUMMARY OF INTEREST ($000S) (FY 2017)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
1	**Obligation Type**	**General Project**	**Specific Project**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
2	**Appropriation**	**Bonneville Power Administration**	Bonneville Power Administration	14,482	14,386	8,954	4,940	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3			**Bonneville Power Administration Subtotal:**	14,482	14,386	8,954	4,940	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4		**Appropriation Subtotal:**		14,482	14,386	8,954	4,940	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	**Treasury**	**BPA Borrowing**	(Less Interest Income)	(877)	(1,264)	(2,341)	(2,477)	(4,916)	(4,700)	(4,478)	(4,444)	(4,407)	(3,951)	(3,825)	(4,619)	(3,636)	(4,674)	(4,691)	(4,689)	(4,672)	(4,647)	(3,412)
6			Construction	84,128	106,123	129,639	150,108	146,144	136,107	125,994	117,237	109,294	98,680	91,764	82,312	74,562	66,985	54,238	43,473	33,925	25,368	13,547
7			Interest Accrual	19,260	23,129	27,862	27,712	25,263	23,217	22,182	19,965	17,445	16,390	15,246	13,121	10,991	10,662	9,163	7,194	5,202	3,515	2,722
8			Interest Accrual Reversal	(15,246)	(19,260)	(23,129)	(27,862)	(27,712)	(25,263)	(23,217)	(22,182)	(19,965)	(17,445)	(16,390)	(15,246)	(13,121)	(10,991)	(10,662)	(9,163)	(7,194)	(5,202)	(3,515)
9			Construction (Agency Services)	1,358	1,467	1,714	2,136	2,082	1,734	1,463	1,044	450	-	-	-	-	-	-	-	-	-	-
10			Interest Accrual	303	232	220	220	154	63	-	-	-	-	-	-	-	-	-	-	-	-	-
11			Interest Accrual Reversal	(256)	(303)	(232)	(220)	(220)	(154)	(63)	-	-	-	-	-	-	-	-	-	-	-	-
12			Environment	1,175	1,441	1,684	1,817	1,817	1,817	1,817	1,817	1,817	1,668	1,172	827	827	597	323	118	-	-	-
13			Interest Accrual	280	280	280	280	280	280	280	280	280	267	231	231	187	121	-	-	-	-	-
14			Interest Accrual Reversal	(267)	(280)	(280)	(280)	(280)	(280)	(280)	(280)	(280)	(280)	(267)	(231)	(231)	(187)	(121)	-	-	-	-
15			Technology (T)	203	404	404	404	404	404	201	-	-	-	-	-	-	-	-	-	-	-	-
16			Interest Accrual	34	34	34	34	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-
17			Interest Accrual Reversal	-	(34)	(34)	(34)	(34)	(34)	(34)	-	-	-	-	-	-	-	-	-	-	-	-
18			**BPA Borrowing Subtotal:**	90,096	111,968	135,822	151,838	143,015	133,224	123,866	113,436	104,634	95,330	87,931	76,395	69,580	62,511	48,250	36,933	27,261	19,033	9,342
19		**Federal Transmission Replacement**	Replacements	-	-	-	4,969	15,096	25,601	36,431	47,587	59,099	70,971	83,181	95,676	108,441	121,486	134,797	148,350	162,143	176,199	190,531
20			**Federal Transmission Replacement Subtotal:**	-	-	-	4,969	15,096	25,601	36,431	47,587	59,099	70,971	83,181	95,676	108,441	121,486	134,797	148,350	162,143	176,199	190,531
21		**Treasury Subtotal:**		90,096	111,968	135,822	156,808	158,111	158,825	160,297	161,023	163,733	166,301	171,113	172,071	178,020	183,997	183,047	185,282	189,404	195,233	199,873
22	**Grand Total:**			**$104,578**	**$126,354**	**$144,776**	**$161,748**	**$158,111**	**$158,825**	**$160,297**	**$161,023**	**$163,733**	**$166,301**	**$171,113**	**$172,071**	**$178,020**	**$183,997**	**$183,047**	**$185,282**	**$189,404**	**$195,233**	**$199,873**

TABLE 12-5
SUMMARY OF INTEREST ($000S) (FY 2017)

	A	B	C	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP
1	**Obligation Type**	**General Project**	**Specific Project**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**	**2042**	**2043**	**2044**	**2045**	**2046**	**2047**	**2048**	**2049**	**2050**	**2051**	**2052**	**Total**
2		**Bonneville Power Administration**	Bonneville Power Administration	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**42,763**
3	**Appropriation**		**Bonneville Power Administration Subtotal:**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**42,763**
4		**Appropriation Subtotal:**		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**42,763**
5			(Less Interest Income)	(4,217)	(4,562)	(3,502)	(3,824)	(2,757)	(2,528)	(2,826)	(2,257)	(2,792)	(2,103)	(2,552)	(4,795)	(4,748)	(4,696)	(4,641)	(4,582)	(4,518)	(4,448)	(4,373)	**(143,443)**
6			Construction	8,264	2,853	851	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**1,701,596**
7			Interest Accrual	1,073	706	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**302,020**
8			Interest Accrual Reversal	(2,722)	(1,073)	(706)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**(317,265)**
9			Construction (Agency Services)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**13,449**
10			Interest Accrual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**1,193**
11			Interest Accrual Reversal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**(1,448)**
12		**BPA Borrowing**	Environment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**20,731**
13	**Treasury**		Interest Accrual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**3,559**
14			Interest Accrual Reversal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**(3,827)**
15			Technology (T)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**2,423**
16			Interest Accrual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**205**
17			Interest Accrual Reversal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**(205)**
18			**BPA Borrowing Subtotal:**	2,397	(2,076)	(3,357)	(3,824)	(2,757)	(2,528)	(2,826)	(2,257)	(2,792)	(2,103)	(2,552)	(4,795)	(4,748)	(4,696)	(4,641)	(4,582)	(4,518)	(4,448)	(4,373)	**1,578,988**
19		**Federal Transmission Replacement**	Replacements	205,119	216,962	226,238	234,374	243,403	255,498	268,005	281,591	295,810	310,938	327,177	338,713	346,406	354,694	363,610	373,239	383,629	394,768	406,658	**7,307,391**
20			**Federal Transmission Replacement Subtotal:**	205,119	216,962	226,238	234,374	243,403	255,498	268,005	281,591	295,810	310,938	327,177	338,713	346,406	354,694	363,610	373,239	383,629	394,768	406,658	**7,307,391**
21		**Treasury Subtotal:**		207,516	214,887	222,881	230,550	240,646	252,970	265,178	279,333	293,019	308,835	324,625	333,918	341,658	349,998	358,969	368,657	379,111	390,321	402,285	**8,886,379**
22	**Grand Total:**			**$207,516**	**$214,887**	**$222,881**	**$230,550**	**$240,646**	**$252,970**	**$265,178**	**$279,333**	**$293,019**	**$308,835**	**$324,625**	**$333,918**	**$341,658**	**$349,998**	**$358,969**	**$368,657**	**$379,111**	**$390,321**	**$402,285**	**8,929,142**

TABLE 12-6
INTEREST CALCULATION SUMMARY ($000S) (FY 2017)

	A	B	C	D	E	F	G	H	I
1	Fiscal Year	Project	Type	Current Principal	Rate	Interest	Premium	Net Interest Accrual	Total
2	2015	Bonneville Power Administration	Historical	200,177	7.235%	14,482	-	-	14,482
3	2015	Construction	Historical	2,392,040	3.457%	82,692	-	923	83,615
4	2015	Construction	New	431,000	0.333%	1,436	-	3,092	4,528
5	2015	Construction (Agency Services)	Historical	88,000	1.449%	1,275	-	(19)	1,256
6	2015	Construction (Agency Services)	New	14,950	0.553%	83	-	67	150
7	2015	Environment	Historical	40,000	2.841%	1,136	-	-	1,136
8	2015	Environment	New	4,000	0.954%	38	-	13	51
9	2015	Technology (T)	New	23,000	0.881%	203	-	34	237
10	2015	Float	Historical	-	-	(877)	-	-	(877)
11	**FY 2015**	**Subtotal:**		**3,193,167**		**100,469**	**-**	**4,109**	**104,578**
12	2016	Bonneville Power Administration	Historical	198,858	7.234%	14,386	-	-	14,386
13	2016	Construction	Historical	2,816,040	3.617%	101,867	-	-	101,867
14	2016	Construction	New	442,000	0.963%	4,256	-	3,869	8,124
15	2016	Construction (Agency Services)	Historical	76,900	1.716%	1,319	-	(71)	1,248
16	2016	Construction (Agency Services)	New	9,100	1.624%	148	-	-	148
17	2016	Environment	Historical	47,000	2.830%	1,330	-	-	1,330
18	2016	Environment	New	6,000	1.848%	111	-	-	111
19	2016	Technology (T)	Historical	23,000	1.756%	404	-	-	404
20	2016	Float	Historical	-	-	(1,264)	-	-	(1,264)
21	**FY 2016**	**Subtotal:**		**3,618,898**		**122,557**	**-**	**3,797**	**126,354**
22	2017	Bonneville Power Administration	Historical	123,948	7.224%	8,954	-	-	8,954
23	2017	Construction	Historical	3,350,040	3.713%	124,371	-	-	124,371
24	2017	Construction	New	444,000	1.187%	5,268	-	4,733	10,001
25	2017	Construction (Agency Services)	Historical	75,600	2.069%	1,564	-	(12)	1,552
26	2017	Construction (Agency Services)	New	7,150	2.100%	150	-	-	150
27	2017	Environment	Historical	53,000	2.928%	1,552	-	-	1,552
28	2017	Environment	New	6,000	2.206%	132	-	-	132
29	2017	Technology (T)	Historical	23,000	1.756%	404	-	-	404
30	2017	Float	Historical	-	-	(2,341)	-	-	(2,341)
31	**FY 2017**	**Subtotal:**		**4,082,738**		**140,055**	**-**	**4,721**	**144,776**
32	2018	Bonneville Power Administration	Historical	68,458	7.216%	4,940	-	-	4,940
33	2018	Construction	Historical	3,850,640	3.898%	150,108	-	(150)	149,958
34	2018	Construction (Agency Services)	Historical	85,350	2.503%	2,136	-	-	2,136
35	2018	Environment	Historical	59,000	3.079%	1,817	-	-	1,817
36	2018	Replacements	New	193,362	2.570%	4,969	-	-	4,969
37	2018	Technology (T)	Historical	23,000	1.756%	404	-	-	404
38	2018	Float	Historical	-	-	(2,477)	-	-	(2,477)
39	**FY 2018**	**Subtotal:**		**4,279,810**		**161,898**	**-**	**(150)**	**161,748**
40	2019	Construction	Historical	3,820,287	3.825%	146,144	-	(2,449)	143,695
41	2019	Construction (Agency Services)	Historical	85,350	2.440%	2,082	-	(67)	2,016
42	2019	Environment	Historical	59,000	3.079%	1,817	-	-	1,817
43	2019	Replacements	Historical	193,362	5.140%	9,939	-	-	9,939
44	2019	Replacements	New	200,668	2.570%	5,157	-	-	5,157
45	2019	Technology (T)	Historical	23,000	1.756%	404	-	-	404
46	2019	Float	Historical	-	-	(4,916)	-	-	(4,916)
47	**FY 2019**	**Subtotal:**		**4,381,667**		**160,627**	**-**	**(2,516)**	**158,111**

TABLE 12-6
INTEREST CALCULATION SUMMARY ($000S) (FY 2017)

	A	B	C	D	E	F	G	H	I
1	Fiscal Year	Project	Type	Current Principal	Rate	Interest	Premium	Net Interest Accrual	Total
48	2020	Construction	Historical	3,557,178	3.826%	136,107	-	(2,046)	134,061
49	2020	Construction (Agency Services)	Historical	67,600	2.565%	1,734	-	(91)	1,643
50	2020	Environment	Historical	59,000	3.079%	1,817	-	-	1,817
51	2020	Replacements	Historical	394,031	5.140%	20,253	-	-	20,253
52	2020	Replacements	New	208,088	2.570%	5,348	-	-	5,348
53	2020	Technology (T)	Historical	23,000	1.756%	404	-	-	404
54	2020	Float	Historical	-	-	(4,700)	-	-	(4,700)
55	**FY 2020**	**Subtotal:**		**4,308,897**		**160,962**	**-**	**(2,137)**	**158,825**
56	2021	Construction	Historical	3,307,858	3.809%	125,994	-	(1,034)	124,960
57	2021	Construction (Agency Services)	Historical	49,400	2.961%	1,463	-	(63)	1,400
58	2021	Environment	Historical	59,000	3.079%	1,817	-	-	1,817
59	2021	Replacements	Historical	602,119	5.140%	30,949	-	-	30,949
60	2021	Replacements	New	213,309	2.570%	5,482	-	-	5,482
61	2021	Technology (T)	Historical	23,000	0.876%	201	-	(34)	167
62	2021	Float	Historical	-	-	(4,478)	-	-	(4,478)
63	**FY 2021**	**Subtotal:**		**4,254,686**		**161,428**	**-**	**(1,131)**	**160,297**
64	2022	Construction	Historical	3,090,946	3.793%	117,237	-	(2,217)	115,020
65	2022	Construction (Agency Services)	Historical	32,500	3.212%	1,044	-	-	1,044
66	2022	Environment	Historical	59,000	3.079%	1,817	-	-	1,817
67	2022	Replacements	Historical	815,428	5.140%	41,913	-	-	41,913
68	2022	Replacements	New	220,766	2.570%	5,674	-	-	5,674
69	2022	Float	Historical	-	-	(4,444)	-	-	(4,444)
70	**FY 2022**	**Subtotal:**		**4,218,640**		**163,240**	**-**	**(2,217)**	**161,023**
71	2023	Construction	Historical	2,855,731	3.827%	109,294	-	(2,520)	106,774
72	2023	Construction (Agency Services)	Historical	14,300	3.150%	450	-	-	450
73	2023	Environment	Historical	59,000	3.079%	1,817	-	-	1,817
74	2023	Replacements	Historical	1,036,194	5.140%	53,260	-	-	53,260
75	2023	Replacements	New	227,182	2.570%	5,839	-	-	5,839
76	2023	Float	Historical	-	-	(4,407)	-	-	(4,407)
77	**FY 2023**	**Subtotal:**		**4,192,406**		**166,253**	**-**	**(2,520)**	**163,733**
78	2024	Construction	Historical	2,621,541	3.764%	98,680	-	(1,054)	97,626
79	2024	Environment	Historical	59,000	2.826%	1,668	-	(13)	1,655
80	2024	Replacements	Historical	1,263,375	5.140%	64,938	-	-	64,938
81	2024	Replacements	New	234,754	2.570%	6,033	-	-	6,033
82	2024	Float	Historical	-	-	(3,951)	-	-	(3,951)
83	**FY 2024**	**Subtotal:**		**4,178,670**		**167,368**	**-**	**(1,067)**	**166,301**
84	2025	Construction	Historical	2,416,771	3.797%	91,764	-	(1,144)	90,620
85	2025	Environment	Historical	49,000	2.392%	1,172	-	(36)	1,136
86	2025	Replacements	Historical	1,498,129	5.140%	77,004	-	-	77,004
87	2025	Replacements	New	240,370	2.570%	6,178	-	-	6,178
88	2025	Float	Historical	-	-	(3,825)	-	-	(3,825)
89	**FY 2025**	**Subtotal:**		**4,204,270**		**172,293**	**-**	**(1,180)**	**171,113**
90	2026	Construction	Historical	2,231,492	3.689%	82,312	-	(2,125)	80,186
91	2026	Environment	Historical	33,000	2.507%	827	-	-	827
92	2026	Replacements	Historical	1,738,499	5.140%	89,359	-	-	89,359
93	2026	Replacements	New	245,815	2.570%	6,317	-	-	6,317
94	2026	Float	Historical	-	-	(4,619)	-	-	(4,619)
95	**FY 2026**	**Subtotal:**		**4,248,806**		**174,196**	**-**	**(2,125)**	**172,071**
96	2027	Construction	Historical	1,970,229	3.784%	74,562	-	(2,130)	72,432
97	2027	Environment	Historical	33,000	2.507%	827	-	(44)	783
98	2027	Replacements	Historical	1,984,314	5.140%	101,994	-	-	101,994
99	2027	Replacements	New	250,852	2.570%	6,447	-	-	6,447
100	2027	Float	Historical	-	-	(3,636)	-	-	(3,636)
101	**FY 2027**	**Subtotal:**		**4,238,395**		**180,194**	**-**	**(2,174)**	**178,020**

TABLE 12-6
INTEREST CALCULATION SUMMARY ($000S) (FY 2017)

	A	B	C	D	E	F	G	H	I
1	Fiscal Year	Project	Type	Current Principal	Rate	Interest	Premium	Net Interest Accrual	Total
102	2028	Construction	Historical	1,799,343	3.723%	66,985	-	(329)	66,655
103	2028	Environment	Historical	20,000	2.984%	597	-	(66)	530
104	2028	Replacements	Historical	2,235,166	5.140%	114,888	-	-	114,888
105	2028	Replacements	New	256,754	2.570%	6,599	-	-	6,599
106	2028	Float	Historical	-	-	(4,674)	-	-	(4,674)
107	**FY 2028**	**Subtotal:**		**4,311,263**		**184,393**	**-**	**(396)**	**183,997**
108	2029	Construction	Historical	1,544,383	3.512%	54,238	-	(1,499)	52,739
109	2029	Environment	Historical	15,000	2.152%	323	-	(121)	202
110	2029	Replacements	Historical	2,491,920	5.140%	128,085	-	-	128,085
111	2029	Replacements	New	261,191	2.570%	6,713	-	-	6,713
112	2029	Float	Historical	-	-	(4,691)	-	-	(4,691)
113	**FY 2029**	**Subtotal:**		**4,312,494**		**184,667**	**-**	**(1,620)**	**183,047**
114	2030	Construction	Historical	1,295,298	3.356%	43,473	-	(1,969)	41,504
115	2030	Environment	Historical	3,000	3.920%	118	-	-	118
116	2030	Replacements	Historical	2,753,111	5.140%	141,510	-	-	141,510
117	2030	Replacements	New	266,136	2.570%	6,840	-	-	6,840
118	2030	Float	Historical	-	-	(4,689)	-	-	(4,689)
119	**FY 2030**	**Subtotal:**		**4,317,546**		**187,251**	**-**	**(1,969)**	**185,282**
120	2031	Construction	Historical	1,039,407	3.264%	33,925	-	(1,992)	31,934
121	2031	Replacements	Historical	3,019,247	5.140%	155,189	-	-	155,189
122	2031	Replacements	New	270,572	2.570%	6,954	-	-	6,954
123	2031	Float	Historical	-	-	(4,672)	-	-	(4,672)
124	**FY 2031**	**Subtotal:**		**4,329,227**		**191,396**	**-**	**(1,992)**	**189,404**
125	2032	Construction	Historical	784,480	3.234%	25,368	-	(1,687)	23,681
126	2032	Replacements	Historical	3,289,820	5.140%	169,097	-	-	169,097
127	2032	Replacements	New	276,362	2.570%	7,102	-	-	7,102
128	2032	Float	Historical	-	-	(4,647)	-	-	(4,647)
129	**FY 2032**	**Subtotal:**		**4,350,662**		**196,920**	**-**	**(1,687)**	**195,233**
130	2033	Construction	Historical	535,125	2.532%	13,547	-	(794)	12,754
131	2033	Replacements	Historical	3,566,181	5.140%	183,302	-	-	183,302
132	2033	Replacements	New	281,294	2.570%	7,229	-	-	7,229
133	2033	Float	Historical	-	-	(3,412)	-	-	(3,412)
134	**FY 2033**	**Subtotal:**		**4,382,600**		**200,666**	**-**	**(794)**	**199,873**
135	2034	Construction	Historical	380,497	2.172%	8,264	-	(1,649)	6,615
136	2034	Replacements	Historical	3,847,475	5.140%	197,760	-	-	197,760
137	2034	Replacements	New	286,347	2.570%	7,359	-	-	7,359
138	2034	Float	Historical	-	-	(4,217)	-	-	(4,217)
139	**FY 2034**	**Subtotal:**		**4,514,320**		**209,166**	**-**	**(1,649)**	**207,516**
140	2035	Construction	Historical	158,951	1.795%	2,853	-	(366)	2,487
141	2035	Replacements	Historical	4,133,822	5.067%	209,470	-	-	209,470
142	2035	Replacements	New	291,548	2.570%	7,493	-	-	7,493
143	2035	Float	Historical	-	-	(4,562)	-	-	(4,562)
144	**FY 2035**	**Subtotal:**		**4,584,322**		**215,253**	**-**	**(366)**	**214,887**
145	2036	Construction	Historical	40,312	2.111%	851	-	(706)	145
146	2036	Replacements	Historical	4,308,290	5.074%	218,611	-	-	218,611
147	2036	Replacements	New	296,784	2.570%	7,627	-	-	7,627
148	2036	Float	Historical	-	-	(3,502)	-	-	(3,502)
149	**FY 2036**	**Subtotal:**		**4,645,386**		**223,587**	**-**	**(706)**	**222,881**
150	2037	Replacements	Historical	4,494,750	5.042%	226,625	-	-	226,625
151	2037	Replacements	New	301,537	2.570%	7,749	-	-	7,749
152	2037	Float	Historical	-	-	(3,824)	-	-	(3,824)
153	**FY 2037**	**Subtotal:**		**4,796,287**		**230,550**	**-**	**-**	**230,550**
154	2038	Replacements	Historical	4,624,874	5.093%	235,540	-	-	235,540
155	2038	Replacements	New	305,947	2.570%	7,863	-	-	7,863
156	2038	Float	Historical	-	-	(2,757)	-	-	(2,757)
157	**FY 2038**	**Subtotal:**		**4,930,821**		**240,646**	**-**	**-**	**240,646**
158	2039	Replacements	Historical	4,846,067	5.108%	247,521	-	-	247,521
159	2039	Replacements	New	310,405	2.570%	7,977	-	-	7,977
160	2039	Float	Historical	-	-	(2,528)	-	-	(2,528)
161	**FY 2039**	**Subtotal:**		**5,156,473**		**252,970**	**-**	**-**	**252,970**

TABLE 12-6
INTEREST CALCULATION SUMMARY ($000S) (FY 2017)

	A	B	C	D	E	F	G	H	I
1	Fiscal Year	Project	Type	Current Principal	Rate	Interest	Premium	Net Interest Accrual	Total
162	2040	Replacements	Historical	5,095,507	5.101%	259,918	-	-	259,918
163	2040	Replacements	New	314,665	2.570%	8,087	-	-	8,087
164	2040	Float	Historical	-	-	(2,826)	-	-	(2,826)
165	**FY 2040**	**Subtotal:**		**5,410,172**		**265,178**	**-**	**-**	**265,178**
166	2041	Replacements	Historical	5,332,689	5.127%	273,411	-	-	273,411
167	2041	Replacements	New	318,274	2.570%	8,180	-	-	8,180
168	2041	Float	Historical	-	-	(2,257)	-	-	(2,257)
169	**FY 2041**	**Subtotal:**		**5,650,963**		**279,333**	**-**	**-**	**279,333**
170	2042	Replacements	Historical	5,624,147	5.112%	287,523	-	-	287,523
171	2042	Replacements	New	322,462	2.570%	8,287	-	-	8,287
172	2042	Float	Historical	-	-	(2,792)	-	-	(2,792)
173	**FY 2042**	**Subtotal:**		**5,946,609**		**293,019**	**-**	**-**	**293,019**
174	2043	Replacements	Historical	5,885,977	5.140%	302,539	-	-	302,539
175	2043	Replacements	New	326,815	2.570%	8,399	-	-	8,399
176	2043	Float	Historical	-	-	(2,103)	-	-	(2,103)
177	**FY 2043**	**Subtotal:**		**6,212,792**		**308,835**	**-**	**-**	**308,835**
178	2044	Replacements	Historical	6,212,792	5.129%	318,663	-	-	318,663
179	2044	Replacements	New	331,288	2.570%	8,514	-	-	8,514
180	2044	Float	Historical	-	-	(2,552)	-	-	(2,552)
181	**FY 2044**	**Subtotal:**		**6,544,080**		**324,625**	**-**	**-**	**324,625**
182	2045	Replacements	Historical	6,517,831	5.064%	330,063	-	-	330,063
183	2045	Replacements	New	336,586	2.570%	8,650	-	-	8,650
184	2045	Float	Historical	-	-	(4,795)	-	-	(4,795)
185	**FY 2045**	**Subtotal:**		**6,854,417**		**333,918**	**-**	**-**	**333,918**
186	2046	Replacements	Historical	6,661,663	5.069%	337,650	-	-	337,650
187	2046	Replacements	New	340,690	2.570%	8,756	-	-	8,756
188	2046	Float	Historical	-	-	(4,748)	-	-	(4,748)
189	**FY 2046**	**Subtotal:**		**7,002,352**		**341,658**	**-**	**-**	**341,658**
190	2047	Replacements	Historical	6,817,169	5.073%	345,854	-	-	345,854
191	2047	Replacements	New	343,949	2.570%	8,839	-	-	8,839
192	2047	Float	Historical	-	-	(4,696)	-	-	(4,696)
193	**FY 2047**	**Subtotal:**		**7,161,118**		**349,998**	**-**	**-**	**349,998**
194	2048	Replacements	Historical	6,984,140	5.078%	354,663	-	-	354,663
195	2048	Replacements	New	348,152	2.570%	8,948	-	-	8,948
196	2048	Float	Historical	-	-	(4,641)	-	-	(4,641)
197	**FY 2048**	**Subtotal:**		**7,332,292**		**358,969**	**-**	**-**	**358,969**
198	2049	Replacements	Historical	7,164,112	5.083%	364,157	-	-	364,157
199	2049	Replacements	New	353,397	2.570%	9,082	-	-	9,082
200	2049	Float	Historical	-	-	(4,582)	-	-	(4,582)
201	**FY 2049**	**Subtotal:**		**7,517,509**		**368,657**	**-**	**-**	**368,657**
202	2050	Replacements	Historical	7,358,801	5.088%	374,427	-	-	374,427
203	2050	Replacements	New	358,025	2.570%	9,201	-	-	9,201
204	2050	Float	Historical	-	-	(4,518)	-	-	(4,518)
205	**FY 2050**	**Subtotal:**		**7,716,827**		**379,111**	**-**	**-**	**379,111**
206	2051	Replacements	Historical	7,568,383	5.093%	385,485	-	-	385,485
207	2051	Replacements	New	361,241	2.570%	9,284	-	-	9,284
208	2051	Float	Historical	-	-	(4,448)	-	-	(4,448)
209	**FY 2051**	**Subtotal:**		**7,929,623**		**390,321**	**-**	**-**	**390,321**
210	2052	Replacements	Historical	7,792,257	5.099%	397,296	-	-	397,296
211	2052	Replacements	New	364,275	2.570%	9,362	-	-	9,362
212	2052	Float	Historical	-	-	(4,373)	-	-	(4,373)
213	**FY 2052**	**Subtotal:**		**8,156,532**		**402,285**	**-**	**-**	**402,285**
214	**Grand Total:**			**$197,467,734**		**$8,944,911**	**-**	**($15,769)**	**$8,929,142**

TABLE 12-7
SUMMARY OF AMORTIZATION ($000S) (FY 2017)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
1	**Obligation Type**	**General Project**	**Specific Project**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
2		**Bonneville Power Administration**	**Bonneville Power Administration**	1,319	74,910	55,489	68,458	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	**Appropriation**		**Bonneville Power Administration Subtotal:**	1,319	74,910	55,489	68,458	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4		**Appropriation Subtotal:**		1,319	74,910	55,489	68,458	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5			**Construction**	63,000	-	36,400	30,353	263,109	249,320	216,912	235,215	234,190	204,770	185,279	260,980	170,842	254,740	248,867	255,891	254,927	249,356	154,268
6			Principal Accrual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7			Principal Accrual Reversal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8			**Construction (Agency Services)**	29,300	19,500	4,550	-	17,750	18,200	16,900	18,200	14,300	-	-	-	-	-	-	-	-	-	-
9			Principal Accrual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10			Principal Accrual Reversal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11		**BPA Borrowing**	**Environment**	-	-	-	-	-	-	-	-	-	10,000	16,000	-	13,000	5,000	12,000	3,000	-	-	-
12			Principal Accrual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13			Principal Accrual Reversal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14			**Technology (T)**	-	-	-	-	-	-	23,000	-	-	-	-	-	-	-	-	-	-	-	-
15	**Bond**		Principal Accrual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16			Principal Accrual Reversal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17			**BPA Borrowing Subtotal:**	92,300	19,500	40,950	30,353	280,859	267,520	256,812	253,415	248,490	214,770	201,279	260,980	183,842	259,740	260,867	258,891	254,927	249,356	154,268
18			**Replacements**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19		**Federal Transmission Replacement**	Principal Accrual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20			Principal Accrual Reversal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21			**Federal Transmission Replacement Subtotal:**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22			**Discounts**	-	-	-	-	-	-	-	-	-	-	-	-	(283)	(44)	(220)	(218)	-	-	-
23		**Make Whole Call**	**Premiums**	-	-	-	2,702	10,379	6,427	-	-	-	-	763	365	-	-	53	-	22	-	532
24			**Make Whole Call Subtotal:**	-	-	-	2,702	10,379	6,427	-	-	-	-	763	365	(283)	(44)	(167)	(218)	22	-	532
25		**Bond Subtotal:**		92,300	19,500	40,950	30,353	280,859	267,520	256,812	253,415	248,490	214,770	201,279	260,980	184,125	259,784	261,087	259,109	254,927	249,356	154,268
26	**Grand Total:**			$93,619	$94,410	$96,439	$98,811	$280,859	$267,520	$256,812	$253,415	$248,490	$214,770	$201,279	$260,980	$184,125	$259,784	$261,087	$259,109	$254,927	$249,356	$154,268

TABLE 12-7
SUMMARY OF AMORTIZATION ($000S) (FY 2017)

	A	B	C	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP
1	**Obligation Type**	**General Project**	**Specific Project**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**	**2042**	**2043**	**2044**	**2045**	**2046**	**2047**	**2048**	**2049**	**2050**	**2051**	**2052**	**Total**
2		**Bonneville Power Administration**	**Bonneville Power Administration**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200,177
3	**Appropriation**		**Bonneville Power Administration Subtotal:**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200,177
4		**Appropriation Subtotal:**		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200,177
5			**Construction**	211,185	118,639	40,312	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3,938,555
6			Principal Accrual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7			Principal Accrual Reversal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8			**Construction (Agency Services)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	138,700
9			Principal Accrual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10			Principal Accrual Reversal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11		**BPA Borrowing**	**Environment**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	59,000
12			Principal Accrual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13			Principal Accrual Reversal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14			**Technology (T)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23,000
15	**Bond**		Principal Accrual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16			Principal Accrual Reversal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17			**BPA Borrowing Subtotal:**	211,185	118,639	40,312	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4,159,255
18			**Replacements**	-	117,081	110,324	171,412	84,754	60,966	77,483	26,816	60,632	-	26,249	192,755	185,183	176,978	168,180	158,708	148,444	137,366	125,527	2,028,858
19		**Federal Transmission Replacement**	Principal Accrual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20			Principal Accrual Reversal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21			**Federal Transmission Replacement Subtotal:**	-	117,081	110,324	171,412	84,754	60,966	77,483	26,816	60,632	-	26,249	192,755	185,183	176,978	168,180	158,708	148,444	137,366	125,527	2,028,858
22			**Discounts**	(360)	(10,361)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(11,485)
23		**Make Whole Call**	**Premiums**	271	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21,514
24			**Make Whole Call Subtotal:**	(89)	(10,361)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10,029
25		**Bond Subtotal:**		211,545	246,081	150,636	171,412	84,754	60,966	77,483	26,816	60,632	-	26,249	192,755	185,183	176,978	168,180	158,708	148,444	137,366	125,527	6,199,598
26	**Grand Total:**			$211,545	$246,081	$150,636	$171,412	$84,754	$60,966	$77,483	$26,816	$60,632	-	$26,249	$192,755	$185,183	$176,978	$168,180	$158,708	$148,444	$137,366	$125,527	6,399,775

TABLE 12-8
APPLICATION OF AMORTIZATION ($000S) (FY 2017)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
	Fiscal Year	Project	Debt Type	In Service	Bond Due Date	Initial Principal	Current Principal	Original Rate	Effective Rate	Refinance Type	Refinanced Date	Rolled Maturity	Roll Rate	Principal Paid	Premium	Discount	Accrual	Reversal
1	2015	Construction (Agency Services)	-	8/31/2010	8/31/2015	15,000	15,000	1.619%	1.619%					15,000				
2	2015	Construction	-	8/20/2012	8/31/2015	37,000	37,000	0.589%	0.589%					37,000				
3	2015	Construction	-	6/20/2012	9/30/2015	26,000	26,000	0.671%	0.671%					26,000				
4	2015	Construction (Agency Services)	-	6/20/2012	9/30/2015	14,300	14,300	0.671%	0.671%					14,300				
5	2015	Bonneville Power Administration	Bonneville Power Administration	9/30/1974	9/30/2019	12,563	6,087	7.270%	7.270%					1,319				
6		**FY 2015 Subtotal:**	**-**	**-**	**-**	**104,863**	**98,387**	**-**						**93,619**				
7	2016	Construction (Agency Services)	-	6/22/2011	6/30/2016	13,000	13,000	1.957%	1.957%					13,000				
8	2016	Construction (Agency Services)	-	8/12/2011	8/31/2016	6,500	6,500	1.423%	1.423%					6,500				
9	2016	Bonneville Power Administration	Bonneville Power Administration	9/30/1974	9/30/2019	12,563	4,768	7.270%	7.270%					4,768				
10	2016	Bonneville Power Administration	Bonneville Power Administration	9/30/1975	9/30/2020	32,026	32,026	7.250%	7.250%					19,326				
11	2016	Bonneville Power Administration	Bonneville Power Administration	9/30/1975	9/30/2020	21,916	21,916	7.250%	7.250%					21,916				
12	2016	Bonneville Power Administration	Bonneville Power Administration	9/30/1975	9/30/2020	17,158	17,158	7.250%	7.250%					17,158				
13	2016	Bonneville Power Administration	Bonneville Power Administration	9/30/1975	9/30/2020	11,742	11,742	7.250%	7.250%					11,742				
14		**FY 2016 Subtotal:**	**-**	**-**	**-**	**114,905**	**107,110**	**-**						**94,410**				
15	2017	Construction (Agency Services)	-	4/30/2013	4/30/2017	4,550	4,550	0.622%	0.622%					4,550				
16	2017	Construction	-	9/30/2012	9/30/2017	36,400	36,400	0.891%	0.891%					36,400				
17	2017	Bonneville Power Administration	Bonneville Power Administration	9/30/1975	9/30/2020	32,026	12,700	7.250%	7.250%					12,700				
18	2017	Bonneville Power Administration	Bonneville Power Administration	9/30/1976	9/30/2021	61,025	61,025	7.230%	7.230%					40,578				
19	2017	Bonneville Power Administration	Bonneville Power Administration	9/30/1976	9/30/2021	2,212	2,212	7.230%	7.230%					2,212				
20		**FY 2017 Subtotal:**	**-**	**-**	**-**	**136,213**	**116,887**	**-**						**96,439**				
21	2018	Bonneville Power Administration	Bonneville Power Administration	9/30/1976	9/30/2021	61,025	20,447	7.230%	7.230%					20,447				
22	2018	Bonneville Power Administration	Bonneville Power Administration	9/30/1977	9/30/2022	3,948	3,948	7.210%	7.210%					3,948				
23	2018	Bonneville Power Administration	Bonneville Power Administration	9/30/1977	9/30/2022	5,380	5,380	7.210%	7.210%					5,380				
24	2018	Bonneville Power Administration	Bonneville Power Administration	9/30/1977	9/30/2022	33,702	33,702	7.210%	7.210%					33,702				
25	2018	Bonneville Power Administration	Bonneville Power Administration	9/30/1977	9/30/2022	4,981	4,981	7.210%	7.210%					4,981				
26	2018	Construction	-	8/31/1998	8/31/2028	112,300	112,300	5.850%	5.850%					30,353	2,702			
27		**FY 2018 Subtotal:**	**-**	**-**	**-**	**221,336**	**180,758**	**-**						**98,811**	**2,702**			
28	2019	Construction (Agency Services)	-	11/30/2012	11/30/2018	9,750	9,750	1.109%	1.109%					9,750				
29	2019	Construction	-	1/16/2014	12/31/2018	33,000	33,000	1.943%	1.943%					33,000				
30	2019	Construction	-	1/16/2014	12/31/2018	30,000	30,000	1.943%	1.943%					30,000				
31	2019	Construction	-	1/16/2014	12/31/2018	31,000	31,000	1.943%	1.943%					31,000				
32	2019	Construction	-	1/16/2014	12/31/2018	48,000	48,000	1.943%	1.943%					48,000				
33	2019	Construction (Agency Services)	-	6/30/2013	6/30/2019	5,000	5,000	1.962%	1.962%					5,000				
34	2019	Construction (Agency Services)	-	8/31/2013	8/31/2019	3,000	3,000	2.279%	2.279%					3,000				
35	2019	Construction	-	8/31/1998	8/31/2028	106,500	106,500	5.850%	5.850%					39,162	3,356			
36	2019	Construction	-	8/31/1998	8/31/2028	112,300	81,947	5.850%	5.850%					81,947	7,023			
37		**FY 2019 Subtotal:**	**-**	**-**	**-**	**378,550**	**348,197**	**-**						**280,859**	**10,379**			

TABLE 12-8
APPLICATION OF AMORTIZATION ($000S) (FY 2017)

	A		B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
	Fiscal Year	Project	Debt Type	In Service	Bond Due Date	Initial Principal	Current Principal	Original Rate	Effective Rate	Refinance Type	Refinanced Date	Rolled Maturity	Roll Rate	Principal Paid	Premium	Discount	Accrual	Reversal
38	2020	Construction (Agency Services)	-	10/31/2013	10/31/2019	7,800	7,800	2.039%	2.039%					7,800				
39	2020	Construction	-	10/31/2009	10/31/2019	43,000	43,000	3.842%	3.842%					43,000				
40	2020	Construction (Agency Services)	-	1/31/2014	1/31/2020	3,250	3,250	2.183%	2.183%					3,250				
41	2020	Construction	-	1/31/2009	1/31/2020	50,000	50,000	3.830%	3.830%					50,000				
42	2020	Construction (Agency Services)	-	4/30/2014	3/31/2020	2,600	2,600	1.010%	1.010%					2,600				
43	2020	Construction (Agency Services)	-	5/31/2014	4/30/2020	1,300	1,300	1.010%	1.010%					1,300				
44	2020	Construction (Agency Services)	-	7/31/2015	7/31/2020	1,300	1,300	2.099%	2.099%					1,300				
45	2020	Construction	-	7/31/2010	7/31/2020	50,000	50,000	3.118%	3.118%					50,000				
46	2020	Construction (Agency Services)	-	7/31/2014	7/31/2020	1,950	1,950	1.010%	1.010%					1,950				
47	2020	Construction	-	8/31/1998	8/31/2028	106,500	67,338	5.850%	5.850%					67,338	5,558			
48	2020	Construction	-	6/30/2009	6/30/2039	35,000	35,000	5.192%	5.192%					35,000	869			
49	2020	Construction	-	9/30/2017	9/30/2047	93,000	93,000	5.140%	5.140%					3,982				
50		**FY 2020 Subtotal:**	**-**	**-**	**-**	**395,700**	**356,538**	**-**						**267,520**	**6,427**			
51	2021	Construction (Agency Services)	-	11/30/2014	11/30/2020	3,900	3,900	1.809%	1.809%					3,900				
52	2021	Construction (Agency Services)	-	12/31/2014	12/31/2020	1,950	1,950	1.922%	1.922%					1,950				
53	2021	Technology (T)	-	2/28/2015	2/28/2021	23,000	23,000	1.761%	1.761%					23,000				
54	2021	Construction (Agency Services)	-	2/28/2015	2/28/2021	3,250	3,250	1.761%	1.761%					3,250				
55	2021	Construction	-	3/31/2010	3/31/2021	15,000	15,000	4.188%	4.188%					15,000				
56	2021	Construction	-	4/30/2010	4/30/2021	22,000	22,000	4.094%	4.094%					22,000				
57	2021	Construction	-	5/31/2010	5/31/2021	22,000	22,000	3.694%	3.694%					22,000				
58	2021	Construction (Agency Services)	-	5/31/2015	5/31/2021	1,300	1,300	2.419%	2.419%					1,300				
59	2021	Construction (Agency Services)	-	6/30/2015	6/30/2021	1,950	1,950	2.419%	2.419%					1,950				
60	2021	Construction	-	6/30/2010	6/30/2021	22,000	22,000	3.374%	3.374%					22,000				
61	2021	Construction (Agency Services)	-	8/31/2015	8/31/2021	1,300	1,300	2.419%	2.419%					1,300				
62	2021	Construction (Agency Services)	-	9/30/2015	9/30/2021	3,250	3,250	2.419%	2.419%					3,250				
63	2021	Construction	-	8/31/2017	8/31/2046	55,000	55,000	5.110%	5.110%					46,894				
64	2021	Construction	-	9/30/2017	9/30/2047	93,000	89,018	5.140%	5.140%					89,018				
65		**FY 2021 Subtotal:**	**-**	**-**	**-**	**268,900**	**264,918**	**-**						**256,812**				
66	2022	Construction	-	1/31/2009	1/31/2022	20,000	20,000	4.200%	4.200%					20,000				
67	2022	Construction (Agency Services)	-	3/31/2016	3/31/2022	9,100	9,100	3.248%	3.248%					9,100				
68	2022	Construction	-	4/30/2009	4/30/2022	35,000	35,000	4.253%	4.253%					35,000				
69	2022	Construction	-	5/31/2015	5/31/2022	48,000	48,000	2.740%	2.740%					48,000				
70	2022	Construction	-	7/31/2010	7/31/2022	30,000	30,000	3.372%	3.372%					30,000				
71	2022	Construction	-	8/31/2010	8/31/2022	20,000	20,000	3.029%	3.029%					20,000				
72	2022	Construction (Agency Services)	-	9/30/2016	9/30/2022	9,100	9,100	3.248%	3.248%					9,100				
73	2022	Construction	-	6/30/2017	6/30/2044	42,000	42,000	5.060%	5.060%					34,109				
74	2022	Construction	-	7/31/2017	7/31/2045	40,000	40,000	5.090%	5.090%					40,000				
75	2022	Construction	-	8/31/2017	8/31/2046	55,000	8,106	5.110%	5.110%					8,106				
76		**FY 2022 Subtotal:**	**-**	**-**	**-**	**308,200**	**261,306**	**-**						**253,415**				

TABLE 12-8
APPLICATION OF AMORTIZATION ($000S) (FY 2017)

	A		B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
	Fiscal Year	Project	Debt Type	In Service	Bond Due Date	Initial Principal	Current Principal	Original Rate	Effective Rate	Refinanc e Type	Refinanced Date	Rolled Maturity	Roll Rate	Principal Paid	Premium	Discount	Accrual	Reversal
77	2023	Construction	-	10/31/2015	10/31/2022	34,000	34,000	3.470%	3.470%					34,000				
78	2023	Construction	-	12/31/2014	12/31/2022	16,000	16,000	2.274%	2.274%					16,000				
79	2023	Construction	-	12/31/2014	12/31/2022	4,000	4,000	2.274%	2.274%					4,000				
80	2023	Construction (Agency Services)	-	3/31/2017	3/31/2023	7,150	7,150	4.200%	4.200%					7,150				
81	2023	Construction	-	4/30/2015	4/30/2023	12,000	12,000	3.057%	3.057%					12,000				
82	2023	Construction	-	4/30/2015	4/30/2023	3,000	3,000	3.057%	3.057%					3,000				
83	2023	Construction	-	6/30/2015	6/30/2023	38,000	38,000	3.057%	3.057%					38,000				
84	2023	Construction (Agency Services)	-	9/30/2017	9/30/2023	7,150	7,150	4.200%	4.200%					7,150				
85	2023	Construction	-	9/30/2010	9/30/2023	46,000	46,000	3.161%	3.161%					46,000				
86	2023	Construction	-	4/30/2017	4/30/2042	45,000	45,000	5.010%	5.010%					25,299				
87	2023	Construction	-	5/31/2017	5/31/2043	48,000	48,000	5.040%	5.040%					48,000				
88	2023	Construction	-	6/30/2017	6/30/2044	42,000	7,891	5.060%	5.060%					7,891				
89		**FY 2023 Subtotal:**	**-**	**-**	**-**	**302,300**	**268,191**	**-**						**248,490**				
90	2024	Construction	-	10/31/2014	10/31/2023	20,000	20,000	2.521%	2.521%					20,000				
91	2024	Construction	-	11/30/2014	11/30/2023	20,000	20,000	2.361%	2.361%					20,000				
92	2024	Construction	-	11/30/2015	11/30/2023	21,000	21,000	3.700%	3.700%					21,000				
93	2024	Environment	-	1/31/2015	1/31/2024	4,000	4,000	1.908%	1.908%					4,000				
94	2024	Construction	-	3/31/2015	3/31/2024	17,000	17,000	2.200%	2.200%					17,000				
95	2024	Environment	-	3/31/2016	3/31/2024	6,000	6,000	3.695%	3.695%					6,000				
96	2024	Construction	-	3/31/2012	3/31/2024	45,000	45,000	1.010%	1.010%					45,000				
97	2024	Construction	-	2/28/2017	2/28/2040	33,000	33,000	4.960%	4.960%					4,069				
98	2024	Construction	-	3/31/2017	3/31/2041	58,000	58,000	4.980%	4.980%					58,000				
99	2024	Construction	-	4/30/2017	4/30/2042	45,000	19,701	5.010%	5.010%					19,701				
100		**FY 2024 Subtotal:**	**-**	**-**	**-**	**269,000**	**243,701**	**-**						**214,770**				
101	2025	Construction	-	12/31/2015	12/31/2024	40,000	40,000	3.920%	3.920%					40,000				
102	2025	Environment	-	2/28/2010	2/28/2025	10,000	10,000	4.279%	4.279%					10,000				
103	2025	Environment	-	3/31/2017	3/31/2025	6,000	6,000	4.411%	4.411%					6,000				
104	2025	Construction	-	8/31/2015	8/31/2025	52,000	52,000	3.696%	3.696%					52,000				
105	2025	Construction	-	1/31/2011	1/31/2036	50,000	50,000	4.952%	4.952%					50,000	659			
106	2025	Construction	-	2/28/2011	2/28/2038	55,000	55,000	4.935%	4.935%					14,348	103			
107	2025	Construction	-	2/28/2017	2/28/2040	33,000	28,931	4.960%	4.960%					28,931				
108		**FY 2025 Subtotal:**	**-**	**-**	**-**	**246,000**	**241,931**	**-**						**201,279**	**763**			
109	2026	Construction	-	10/31/2010	10/31/2025	45,000	45,000	3.494%	3.494%					45,000				
110	2026	Construction	-	1/31/2016	1/31/2026	28,000	28,000	4.140%	4.140%					28,000				
111	2026	Construction	-	2/28/2015	2/28/2026	19,000	19,000	2.416%	2.416%					19,000				
112	2026	Construction	-	3/31/2015	3/31/2026	15,000	15,000	2.370%	2.370%					15,000				
113	2026	Construction	-	7/31/2015	7/31/2026	38,000	38,000	3.741%	3.741%					38,000				
114	2026	Construction	-	11/30/2016	11/30/2036	21,000	21,000	4.880%	4.880%					7,328				
115	2026	Construction	-	12/31/2016	12/31/2037	40,000	40,000	4.910%	4.910%					40,000				
116	2026	Construction	-	2/28/2011	2/28/2038	55,000	40,652	4.935%	4.935%					40,652	365			
117	2026	Construction	-	1/31/2017	1/31/2039	28,000	28,000	4.930%	4.930%					28,000				
118		**FY 2026 Subtotal:**	**-**	**-**	**-**	**289,000**	**274,652**	**-**						**260,980**	**365**			

TABLE 12-8
APPLICATION OF AMORTIZATION ($000S) (FY 2017)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
	Fiscal Year	Project	Debt Type	In Service	Bond Due Date	Initial Principal	Current Principal	Original Rate	Effective Rate	Refinance Type	Refinanced Date	Rolled Maturity	Roll Rate	Principal Paid	Premium	Discount	Accrual	Reversal
119	2027	Construction	-	10/31/2009	10/31/2018	23,000	23,000	3.719%	4.715%	Global	10/31/2018	10/31/2028	4.715%	8,453				
120	2027	Construction	-	2/28/2016	2/28/2027	33,000	33,000	4.180%	4.180%					33,000				
121	2027	Construction	-	5/3/2012	5/31/2027	17,000	17,000	1.010%	1.010%					17,000				
122	2027	Environment	-	5/3/2012	5/31/2027	13,000	13,000	1.010%	1.010%					13,000				
123	2027	Construction	-	10/31/2016	10/31/2034	34,000	34,000	4.830%	4.830%					34,000				
124	2027	Construction	-	11/30/2016	11/30/2036	21,000	13,672	4.880%	4.880%					13,672				
125	2027	Construction	-	4/30/2011	4/30/2039	40,000	40,000	4.794%	4.794%					39,895		105		
126	2027	Construction	-	6/22/2011	6/30/2040	25,000	25,000	4.775%	4.775%					24,823		177		
127		**FY 2027 Subtotal:**	**-**	**-**	**-**	**206,000**	**198,672**	**-**						**183,842**		**283**		
128	2028	Construction	-	10/31/2009	10/31/2018	23,000	14,547	3.719%	4.715%	Global	10/31/2018	10/31/2028	4.715%	14,547				
129	2028	Construction	-	11/30/2009	11/30/2018	15,000	15,000	3.533%	4.715%	Global	11/30/2018	11/30/2028	4.715%	15,000				
130	2028	Construction	-	12/31/2009	12/31/2018	13,000	13,000	4.069%	4.715%	Global	12/31/2018	12/31/2028	4.715%	13,000				
131	2028	Construction	-	1/31/2010	1/31/2019	30,000	30,000	3.714%	4.715%	Global	1/31/2019	1/31/2028	4.715%	30,000				
132	2028	Construction	-	7/31/2009	7/31/2019	46,940	46,940	4.026%	4.715%	Global	7/31/2019	7/31/2028	4.715%	46,940				
133	2028	Construction	-	9/30/2009	9/30/2019	35,000	35,000	3.699%	4.715%	Global	9/30/2019	9/30/2028	4.715%	35,000				
134	2028	Environment	-	11/20/2013	11/30/2027	5,000	5,000	3.967%	3.967%					5,000				
135	2028	Construction	-	3/31/2016	3/31/2028	58,000	58,000	4.220%	4.220%					58,000				
136	2028	Construction	-	9/30/2014	4/30/2028	17,000	17,000	1.010%	1.010%					17,000				
137	2028	Construction	-	9/30/2014	9/30/2028	3,000	3,000	3.094%	3.094%					3,000				
138	2028	Construction	-	6/22/2011	6/30/2036	50,000	50,000	4.629%	4.629%					22,253		44		
139		**FY 2028 Subtotal:**	**-**	**-**	**-**	**295,940**	**287,487**	**-**						**259,740**		**44**		
140	2029	Environment	-	10/31/2013	10/31/2028	6,000	6,000	3.880%	3.880%					6,000				
141	2029	Environment	-	1/31/2014	1/31/2029	3,000	3,000	3.896%	3.896%					3,000				
142	2029	Construction	-	4/30/2016	4/30/2029	45,000	45,000	4.260%	4.260%					45,000				
143	2029	Environment	-	7/31/2014	7/31/2029	3,000	3,000	1.010%	1.010%					3,000				
144	2029	Construction	-	8/2/2011	8/31/2029	50,000	50,000	4.238%	4.238%					50,000				
145	2029	Construction	-	9/30/2016	9/30/2034	92,000	92,000	4.460%	4.460%					92,000				
146	2029	Construction	-	8/2/2011	8/31/2035	45,000	45,000	4.446%	4.446%					24,239		145		
147	2029	Construction	-	12/31/2013	12/31/2035	10,000	10,000	4.472%	4.472%					9,925		75		
148	2029	Construction	-	6/22/2011	6/30/2036	50,000	27,703	4.629%	4.629%					27,703	53			
149		**FY 2029 Subtotal:**	**-**	**-**	**-**	**304,000**	**281,703**	**-**						**260,867**	**53**	**220**		
150	2030	Construction	-	11/20/2013	10/31/2029	55,000	55,000	4.093%	4.093%					55,000				
151	2030	Construction	-	3/31/2015	3/31/2030	3,000	3,000	2.626%	2.626%					3,000				
152	2030	Construction	-	5/31/2016	5/31/2030	47,000	47,000	4.300%	4.300%					47,000				
153	2030	Construction	-	9/30/2015	9/30/2030	56,000	56,000	3.922%	3.922%					56,000				
154	2030	Environment	-	9/30/2015	9/30/2030	3,000	3,000	3.920%	3.920%					3,000				
155	2030	Construction	-	8/2/2011	8/31/2035	40,000	40,000	4.446%	4.446%					34,414		79		
156	2030	Construction	-	8/2/2011	8/31/2035	40,000	40,000	4.446%	4.446%					39,909		91		
157	2030	Construction	-	8/2/2011	8/31/2035	45,000	20,616	4.446%	4.446%					20,569		47		
158		**FY 2030 Subtotal:**	**-**	**-**	**-**	**289,000**	**264,616**	**-**						**258,891**		**218**		

TABLE 12-8
APPLICATION OF AMORTIZATION ($000S) (FY 2017)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
	Fiscal Year	Project	Debt Type	In Service	Bond Due Date	Initial Principal	Current Principal	Original Rate	Effective Rate	Refinance Type	Refinanced Date	Rolled Maturity	Roll Rate	Principal Paid	Premium	Discount	Accrual	Reversal
159	2031	Construction	-	4/30/2015	6/30/2015	20,000	20,000	0.140%	3.967%	Global	6/30/2015	6/30/2031	3.967%	20,000				
160	2031	Construction	-	8/31/2014	6/30/2015	14,000	14,000	0.262%	3.967%	Global	6/30/2015	6/30/2031	3.967%	14,000				
161	2031	Construction	-	2/28/2015	6/30/2015	30,000	30,000	0.149%	3.967%	Global	6/30/2015	6/30/2031	3.967%	30,000				
162	2031	Construction	-	6/30/2014	6/30/2015	11,000	11,000	0.303%	3.967%	Global	6/30/2015	6/30/2031	3.967%	11,000				
163	2031	Construction	-	11/30/2014	6/30/2015	18,000	18,000	0.168%	3.967%	Global	6/30/2015	6/30/2031	3.967%	18,000				
164	2031	Construction	-	10/31/2014	6/30/2015	23,000	23,000	0.180%	3.967%	Global	6/30/2015	6/30/2031	3.967%	23,000				
165	2031	Construction	-	11/20/2013	1/31/2031	30,000	30,000	4.162%	4.162%					30,000				
166	2031	Construction	-	11/20/2013	2/28/2031	15,000	15,000	4.166%	4.166%					15,000				
167	2031	Construction	-	11/20/2013	3/31/2031	18,000	18,000	4.171%	4.171%					18,000				
168	2031	Construction	-	6/30/2016	6/30/2031	42,000	42,000	4.340%	4.340%					42,000				
169	2031	Construction	-	8/31/2016	8/31/2033	54,000	54,000	4.420%	4.420%					28,420				
170	2031	Construction	-	8/2/2011	8/31/2035	40,000	5,507	4.446%	4.446%					5,507	22			
171		**FY 2031 Subtotal:**	**-**	**-**	**-**	**315,000**	**280,507**	**-**						**254,927**	**22**			
172	2032	Construction	-	1/31/2015	6/30/2015	35,000	35,000	0.151%	4.013%	Global	6/30/2015	6/30/2032	4.013%	35,000				
173	2032	Construction	-	6/30/2014	6/30/2015	63,000	63,000	0.303%	4.013%	Global	6/30/2015	6/30/2032	4.013%	63,000				
174	2032	Construction	-	7/31/2014	4/30/2032	9,000	9,000	1.010%	1.010%					9,000				
175	2032	Construction	-	7/31/2016	7/31/2032	40,000	40,000	4.380%	4.380%					40,000				
176	2032	Construction	-	8/2/2011	8/31/2032	98,900	98,900	4.355%	4.355%					98,900				
177	2032	Construction	-	8/31/2016	8/31/2033	54,000	25,580	4.420%	4.420%					3,456				
178		**FY 2032 Subtotal:**	**-**	**-**	**-**	**299,900**	**271,480**	**-**						**249,356**				
179	2033	Construction	-	6/30/2014	11/30/2032	21,000	21,000	1.010%	1.010%					21,000				
180	2033	Construction	-	8/2/2011	8/31/2033	40,000	40,000	4.386%	4.386%					40,000				
181	2033	Construction	-	8/31/2016	8/31/2033	54,000	22,125	4.420%	4.420%					22,125				
182	2033	Construction	-	8/2/2011	8/31/2034	40,000	40,000	4.416%	4.416%					40,000	320			
183	2033	Construction	-	11/20/2013	6/30/2036	36,000	36,000	4.397%	4.397%					31,143	211			
184		**FY 2033 Subtotal:**	**-**	**-**	**-**	**191,000**	**159,125**	**-**						**154,268**	**532**			
185	2034	Construction	-	4/30/2014	2/28/2034	45,000	45,000	1.010%	1.010%					45,000				
186	2034	Construction	-	4/30/2014	3/31/2034	45,000	45,000	1.010%	1.010%					45,000				
187	2034	Construction	-	11/20/2013	4/30/2034	28,000	28,000	4.311%	4.311%					28,000				
188	2034	Construction	-	11/20/2013	8/31/2034	6,000	6,000	4.324%	4.324%					6,000				
189	2034	Construction	-	9/30/2013	9/30/2034	9,000	9,000	4.214%	4.214%					9,000				
190	2034	Construction	-	11/20/2013	5/31/2035	20,000	20,000	4.354%	4.354%					20,000	97			
191	2034	Construction	-	10/31/2013	10/31/2035	64,000	64,000	4.222%	4.222%					23,688	62			
192	2034	Construction	-	11/30/2013	11/30/2035	15,000	15,000	4.365%	4.365%					15,000	70			
193	2034	Construction	-	11/20/2013	6/30/2036	36,000	4,857	4.397%	4.397%					4,857	41			
194	2034	Construction	-	1/31/2014	1/31/2043	15,000	15,000	4.380%	4.380%					14,640		360		
195		**FY 2034 Subtotal:**	**-**	**-**	**-**	**283,000**	**251,857**	**-**						**211,185**	**271**	**360**		
196	2035	Construction	-	8/31/2014	7/31/2035	10,000	10,000	1.010%	1.010%					10,000				
197	2035	Construction	-	8/31/2014	8/31/2035	15,000	15,000	1.010%	1.010%					15,000				
198	2035	Construction	-	5/31/2014	5/31/2036	29,000	29,000	1.010%	1.010%					28,220		780		
199	2035	Construction	-	4/30/2014	10/31/2039	45,000	45,000	1.010%	1.010%					39,445		5,555		
200	2035	Construction	-	1/27/2012	1/31/2040	30,000	30,000	1.010%	1.010%					25,974		4,026		
201	2035	Replacements	-	3/31/2018	3/31/2053	193,362	193,362	5.140%	5.140%					117,081				
202		**FY 2035 Subtotal:**	**-**	**-**	**-**	**322,362**	**322,362**	**-**						**235,720**		**10,361**		

TABLE 12-8
APPLICATION OF AMORTIZATION ($000S) (FY 2017)

	A		B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
	Fiscal Year	Project	Debt Type	In Service	Bond Due Date	Initial Principal	Current Principal	Original Rate	Effective Rate	Refinance Type	Refinanced Date	Rolled Maturity	Roll Rate	Principal Paid	Premium	Discount	Accrual	Reversal
203	2036	Construction	-	10/31/2013	10/31/2035	64,000	40,312	4.222%	4.222%					40,312				
204	2036	Replacements	-	3/31/2018	3/31/2053	193,362	76,281	5.140%	5.140%					76,281				
205	2036	Replacements	-	3/31/2019	3/31/2054	200,668	200,668	5.140%	5.140%					34,043				
206		**FY 2036 Subtotal:**	**-**	**-**	**-**	**458,031**	**317,262**	**-**						**150,636**				
207	2037	Replacements	-	3/31/2019	3/31/2054	200,668	166,626	5.140%	5.140%					166,626				
208	2037	Replacements	-	3/31/2020	3/31/2055	208,088	208,088	5.140%	5.140%					4,787				
209		**FY 2037 Subtotal:**	**-**	**-**	**-**	**408,757**	**374,714**	**-**						**171,412**				
210	2038	Replacements	-	3/31/2020	3/31/2055	208,088	203,302	5.140%	5.140%					84,754				
211		**FY 2038 Subtotal:**	**-**	**-**	**-**	**208,088**	**203,302**	**-**						**84,754**				
212	2039	Replacements	-	3/31/2020	3/31/2055	208,088	118,548	5.140%	5.140%					60,966				
213		**FY 2039 Subtotal:**	**-**	**-**	**-**	**208,088**	**118,548**	**-**						**60,966**				
214	2040	Replacements	-	3/31/2020	3/31/2055	208,088	57,582	5.140%	5.140%					57,582				
215	2040	Replacements	-	3/31/2021	3/31/2056	213,309	213,309	5.140%	5.140%					19,901				
216		**FY 2040 Subtotal:**	**-**	**-**	**-**	**421,398**	**270,891**	**-**						**77,483**				
217	2041	Replacements	-	3/31/2021	3/31/2056	213,309	193,408	5.140%	5.140%					26,816				
218		**FY 2041 Subtotal:**	**-**	**-**	**-**	**213,309**	**193,408**	**-**						**26,816**				
219	2042	Replacements	-	3/31/2021	3/31/2056	213,309	166,593	5.140%	5.140%					60,632				
220		**FY 2042 Subtotal:**	**-**	**-**	**-**	**213,309**	**166,593**	**-**						**60,632**				
221	2044	Replacements	-	3/31/2021	3/31/2056	213,309	105,960	5.140%	5.140%					26,249				
222		**FY 2044 Subtotal:**	**-**	**-**	**-**	**213,309**	**105,960**	**-**						**26,249**				
223	2045	Replacements	-	3/31/2021	3/31/2056	213,309	79,712	5.140%	5.140%					79,712				
224	2045	Replacements	-	3/31/2022	3/31/2057	220,766	220,766	5.140%	5.140%					113,043				
225		**FY 2045 Subtotal:**	**-**	**-**	**-**	**434,075**	**300,477**	**-**						**192,755**				
226	2046	Replacements	-	3/31/2022	3/31/2057	220,766	107,722	5.140%	5.140%					107,722				
227	2046	Replacements	-	3/31/2023	3/31/2058	227,182	227,182	5.140%	5.140%					77,461				
228		**FY 2046 Subtotal:**	**-**	**-**	**-**	**447,947**	**334,904**	**-**						**185,183**				
229	2047	Replacements	-	3/31/2023	3/31/2058	227,182	149,721	5.140%	5.140%					149,721				
230	2047	Replacements	-	3/31/2024	3/31/2059	234,754	234,754	5.140%	5.140%					27,258				
231		**FY 2047 Subtotal:**	**-**	**-**	**-**	**461,935**	**384,474**	**-**						**176,978**				
232	2048	Replacements	-	3/31/2024	3/31/2059	234,754	207,496	5.140%	5.140%					168,180				
233		**FY 2048 Subtotal:**	**-**	**-**	**-**	**234,754**	**207,496**	**-**						**168,180**				
234	2049	Replacements	-	3/31/2024	3/31/2059	234,754	39,316	5.140%	5.140%					39,316				
235	2049	Replacements	-	3/31/2025	3/31/2060	240,370	240,370	5.140%	5.140%					119,392				
236		**FY 2049 Subtotal:**	**-**	**-**	**-**	**475,123**	**279,686**	**-**						**158,708**				
237	2050	Replacements	-	3/31/2025	3/31/2060	240,370	120,978	5.140%	5.140%					120,978				
238	2050	Replacements	-	3/31/2026	3/31/2061	245,815	245,815	5.140%	5.140%					27,466				
239		**FY 2050 Subtotal:**	**-**	**-**	**-**	**486,185**	**366,794**	**-**						**148,444**				
240	2051	Replacements	-	3/31/2026	3/31/2061	245,815	218,350	5.140%	5.140%					137,366				
241		**FY 2051 Subtotal:**	**-**	**-**	**-**	**245,815**	**218,350**	**-**						**137,366**				
242	2052	Replacements	-	3/31/2026	3/31/2061	245,815	80,983	5.140%	5.140%					80,983				
243	2052	Replacements	-	3/31/2027	3/31/2062	250,852	250,852	5.140%	5.140%					44,543				
244		**FY 2052 Subtotal:**	**-**	**-**	**-**	**496,667**	**331,835**	**-**						**125,527**				
245	**Grand Total**					**$11,167,961**	**$9,255,077**	**-**						**$6,388,290**	**$21,514**	**$11,485**		

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13. REPAYMENT THEORY OF OPERATION

13.1 Introduction

BPA is required to collect revenues sufficient to meet BPA's annual transmission expenses and cover the long-term obligations of the Federal Columbia River Transmission System.

The repayment program is used to determine whether a given set of annual revenues is sufficient to meet a given set of annual expenses and cover a given set of long-term obligations when applied in accordance with the requirements of Department of Energy Order RA 6120.2. The program is also used to determine the minimum factor by which future revenues can be multiplied to obtain a new set of revenues that will be sufficient to recover amortization costs.

The revenues and the expenses of the cost evaluation year will be assigned to all future years, in effect assigning the net operating revenue of the cost evaluation year to all future years and levelizing the long-term obligations over all future years.

13.2 Repayment Program Logic

The diagrams on the following pages show the flow of logic in BPA's repayment program. The first diagram shows the logic of the binary search used to locate minimum sufficient revenues. A necessary part of this search is the test for sufficiency. The logic of the test for sufficiency is shown on the remaining two diagrams.

The equations referred to are:

Revenue Equation: Net revenues of each year are expended on interest and payments on the principals.

Investment equation: The payments on each investment are less than or equal to the principal of that investment (and equal to the principal of that investment after the investment is due).

Predictor equation: For each future year, the accumulated revenues less the accumulated interest less the accumulated investments due is equal to the accumulated payments on high interest rate investments which are not due.

13.3 Bond Rollover Feature

Since the 2004 transmission rate case, BPA has incorporated a data manipulation feature associated with the repayment program. This feature does not change any methodology of the model but allows the user to assume that any short-term bonds associated with assets with average service lives longer than the bond maturity date are refinanced on the original maturity date, and recognizes replacement bonds with new maturity dates and corresponding interest rates. This feature reflects BPA's practice of rolling over a bond when it comes due if funds are not available to pay it at that time or if market conditions justify refinancing such bonds within the allowable repayment period of the associated assets. Reflecting this practice in the model allows a more realistic calculation of interest expense.

FIGURES

Figure 13-1 Repayment Program (Test for Sufficiency)

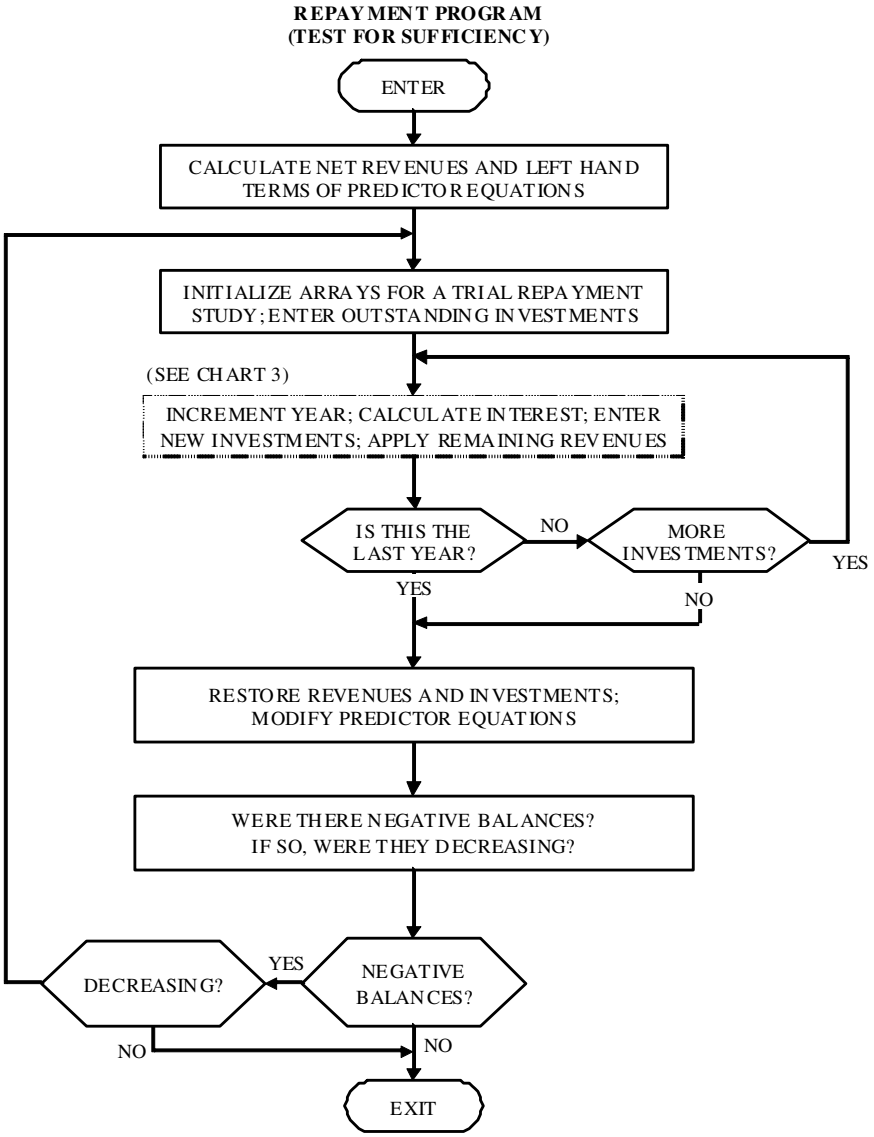
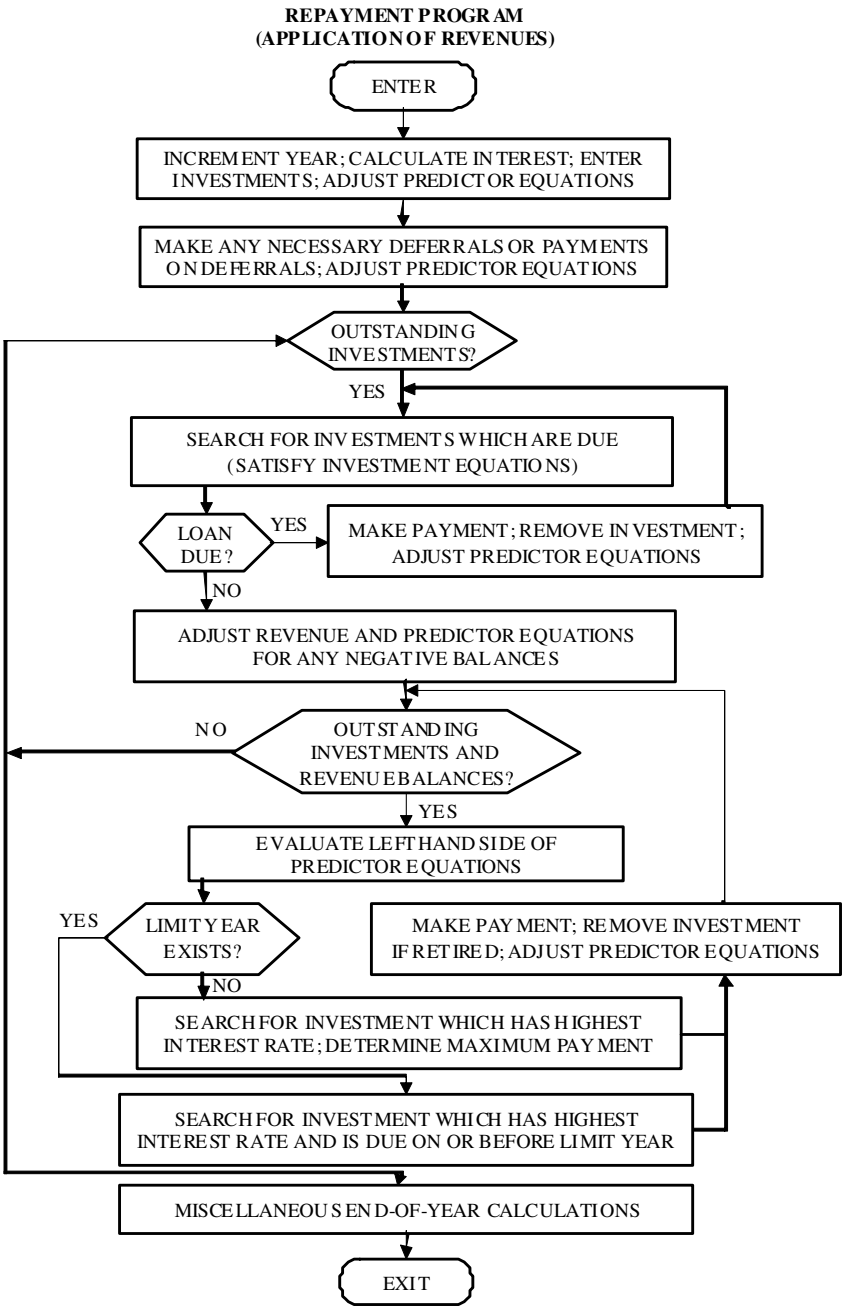


Figure 13-2 Repayment Program (Application of Revenues)



BONNEVILLE POWER ADMINISTRATION
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