2012 BPA Final Rate Proposal

Transmission Revenue Requirement Study Documentation

July 2011

BP-12-FS-BPA-07A

REVENUE REQUIREMENT STUDY DOCUMENTATION
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COMMONLY USED ACRONYMS

AGC	Automatic Generation Control
ALF	Agency Load Forecast (computer model)
aMW	average megawatt(s)
AMNR	Accumulated Modified Net Revenues
ANR	Accumulated Net Revenues
ASC	Average System Cost
BiOp	Biological Opinion
BPA	Bonneville Power Administration
Btu	British thermal unit
CDD	cooling degree day(s)
CDQ	Contract Demand Quantity
CGS	Columbia Generating Station
CHWM	Contract High Water Mark
Commission	Federal Energy Regulatory Commission
Corps or COE	U.S. Army Corps of Engineers
COSA	Cost of Service Analysis
COU	consumer-owned utility
Council	Northwest Power and Conservation Council
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
DOE	Department of Energy
DSI	direct-service industrial customer or direct-service industry
DSO	Dispatcher Standing Order
EIA	Energy Information Administration
EIS	Environmental Impact Statement
EN	Energy Northwest, Inc.
EPP	Environmentally Preferred Power
ESA	Endangered Species Act
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 Products and Services (rate)
FY	fiscal year (October through September)
GARD	Generation and Reserves Dispatch (computer model)
GEP	Green Energy Premium

GRSPs	General Rate Schedule Provisions
GTA	General Transfer Agreement
GWh	gigawatthour
HDD	heating degree day(s)
HLH	Heavy Load Hour(s)
HOSS	Hourly Operating and Scheduling Simulator (computer model)
HYDSIM	Hydro Simulation (computer model)
ICE	IntercontinentalExchange
inc	increase, increment, or incremental
IOU	investor-owned utility
IP	Industrial Firm Power (rate)
IPR	Integrated Program Review
IRD	Irrigation Rate Discount
JOE	Joint Operating Entity
kW	kilowatt (1000 watts)
kWh	kilowatthour
LDD	Low Density Discount
LLH	Light Load Hour(s)
LRA	Load Reduction Agreement
Maf	million acre-feet
Mid-C	Mid-Columbia
MMBtu	million British thermal units
MNR	Modified Net Revenues
MRNR	Minimum Required Net Revenue
MW	megawatt (1 million watts)
MWh	megawatthour
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NFB	National Marine Fisheries Service (NMFS) Federal Columbia River Power System (FCRPS) Biological Opinion (BiOp)
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
NPV	net present value
NR	New Resource Firm Power (rate)
NT	Network Transmission
NTSA	Non-Treaty Storage Agreement
NUG	non-utility generation
NWPP	Northwest Power Pool
OATT	Open Access Transmission Tariff
O&M	operation and maintenance
OMB	Office of Management and Budget

OY	operating year (August through July)
PF	Priority Firm Power (rate)
PFp	Priority Firm Public (rate)
PFx	Priority Firm Exchange (rate)
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
POM	Point of Metering
POR	Point of Receipt
Project Act	Bonneville Project Act
PRS	Power Rates Study
PS	BPA Power Services
PSW	Pacific Southwest
PTP	Point to Point Transmission (rate)
PUD	public or people's utility district
RAM	Rate Analysis Model (computer model)
RAS	Remedial Action Scheme
RD	Regional Dialogue
REC	Renewable Energy Certificate
Reclamation or USBR	U.S. Bureau of Reclamation
REP	Residential Exchange Program
RevSim	Revenue Simulation Model (component of RiskMod)
RFA	Revenue Forecast Application (database)
RHWM	Rate Period High Water Mark
RiskMod	Risk Analysis Model (computer model)
RiskSim	Risk Simulation Model (component of RiskMod)
ROD	Record of Decision
RPSA	Residential Purchase and Sale Agreement
RR	Resource Replacement (rate)
RSS	Resource Support Services
RT1SC	RHWM Tier 1 System Capability
RTO	Regional Transmission Operator
SCADA	Supervisory Control and Data Acquisition
SCS	Secondary Crediting Service
Slice	Slice of the System (product)
T1SFCO	Tier 1 System Firm Critical Output
TCMS	Transmission Curtailment Management Service
TOCA	Tier 1 Cost Allocator
TPP	Treasury Payment Probability
Transmission System Act	Federal Columbia River Transmission System Act
TRL	Total Retail Load
TRM	Tiered Rate Methodology
TS	BPA Transmission Services
TSS	Transmission Scheduling Service

UAI	Unauthorized Increase
ULS	Unanticipated Load Service
USACE or Corps	U.S. Army Corps of Engineers
USBR or Reclamation	U.S. Bureau of Reclamation
USFWS	U.S. Fish and Wildlife Service
VERBS	Variable Energy Resources Balancing Service (rate)
VOR	Value of Reserves
WECC	Western Electricity Coordinating Council (formerly WSCC)
WIT	Wind Integration Team
WSPP	Western Systems Power Pool

1. TRANSMISSION REVENUE REQUIREMENTS

1.1 Introduction

This 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 2012 and FY 2013). On the first table, revenue requirements for FY 2012 and FY 2013 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

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 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 Chapter 3.

Transmission Maintenance (Line 3). 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 Engineering (Line 4). This category includes spending on asset management and planning, design of lines/towers/substations, construction planning, construction management, and real property services. *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 (COE) and Bureau of Reclamation (BOR) 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 includes 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. For the purposes of the rate case partial settlement and for convenience, this category includes the adjustment for expenses excluded from rates that was

described in section 2 of the Transmission Revenue Requirement Study, BP-12-FS-BPA-07 (Study).

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* Chapters 3 and 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* Chapter 3.

Capitalization Adjustment (Line 13). Implementation of the BPA Appropriations Refinancing Act (see Study, section 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. *Id.*

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 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 Chapter 8.

Non-Federal Interest (Line 17). Non-Federal interest consists of interest paid on BPA's lease-financing projects and other capital leases, and 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* Chapter 9 and Study, section 2.3.5.

Allowance for Funds Used During Construction (AFUDC) (Line 18). AFUDC for 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* Chapter 3.

Interest Income (Line 19). Interest income is computed on the projected year-end cash balances in the BPA Fund that are attributable 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* Chapter 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 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 Final Rate Proposal. Starting Transmission reserves in FY 2012 are projected to be sufficient to mitigate risk in FYs 2012 and 2013. *See* Study, section 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 Revenues (MRNR) (Line 2). BPA determines whether MRNR are 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 10) will be sufficient to cover the planned amortization payments (the difference between Lines 14 and 20) without causing the Annual Increase (Decrease) in Cash (Line 21) to be negative. The MRNR determined in the Statement of Cash Flows is incorporated in the Income Statement (Table 1-1, Line 21).

Depreciation & Amortization (Line 4). The depreciation amount is from the Income Statement (Table 1-1, Line 8). It, like the following three lines, is added back to net revenues in computing Cash Provided By Current Operations (Table 1-2, Line 10) because it is a non-cash expense.

Transmission Credit Projects Net Interest (Line 5). 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 6). Amortization of Capitalized Bond Premiums, from the Income Statement (Table 1-1, Line 16), is a non-cash expense.

Capitalization Adjustment (Line 7). The Capitalization Adjustment, from the Income Statement (Table 1-1, Line 17), is a negative non-cash expense.

Drawdown of Cash Reserves for Capital Funding (Line 8). 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 Treasury. It is included on this statement to avoid having the amount of this reserve financing included in the calculation of MRNR.

Accrual Revenues (AC Intertie/Fiber/LGIA) (Line 9). 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. In addition, revenue credits associated with customer-funded capital projects are included in this category. These customers provide an upfront cash payment for construction of transmission facilities that is returned to them through the credits for transmission service, resulting in transmission revenues that do not produce cash.

Cash Provided By Current Operations (Line 10). Cash Provided By Current Operations, the sum of lines 2, 4, 5, 6, 7, 8, and 9, is available for the year to satisfy cash requirements.

Investment in Utility Plant (Line 13). Investment in Utility Plant represents the annual increase in capital expenditures for additions and replacements to the transmission system funded by Treasury bonds or available cash reserves. *See* Chapter 3.

Cash Used for Capital Investments (Line 14). Cash Used for Capital Investments is the sum of investments in utility plant.

Increase in Long-Term Debt (Line 16). 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* Chapter 7.

Debt Service Reassignment Principal (Line 17). Debt Service Reassignment Principal is the principal component of the debt service obligation reassigned to TS through the Debt Optimization Program. *See* Chapter 8.

Repayment of Long-Term Debt (Line 18). 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* Chapter 3.

Repayment of Capital Appropriations (Line 19). 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 20). Cash From Treasury Borrowing and Appropriations is the sum of Lines 16 through 19. 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 21). Annual Increase (Decrease) in Cash, the sum of Lines 10, 14, and 20, reflects the annual net cash flow from current operations and 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 22). Planned Net Revenues For Risk reflects the amounts included in revenue requirements to meet BPA's risk mitigation objectives (from Table 1-1, Line 22.)

Total Annual Increase (Decrease) in Cash (Line 23). Total Annual Increase (Decrease) in Cash, the sum of Lines 21 and 22, 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

($000s)

		A FY 2012	B FY 2013
1	OPERATING EXPENSES		
2	TRANSMISSION OPERATIONS	130,050	133,590
3	TRANSMISSION MAINTENANCE	146,712	150,831
4	TRANSMISSION ENGINEERING	31,800	32,803
5	TRANSMISSION ACQ & ANCILLARY SERVICES	139,705	139,840
6	BPA INTERNAL SUPPORT	77,100	78,781
7	OTHER INCOME, EXPENSES & ADJUSTMENTS	**(36,200)**	**(30,599)**
8	DEPRECIATION & AMORTIZATION	198,604	218,124
9	TOTAL OPERATING EXPENSES	687,771	723,370
10	INTEREST EXPENSE		
11	INTEREST EXPENSE		
12	FEDERAL APPROPRIATIONS	23,086	10,396
13	CAPITALIZATION ADJUSTMENT	(18,968)	(18,968)
14	ON LONG-TERM DEBT	101,642	137,021
15	AMORTIZATION OF CAPITALIZED BOND PREMIUMS	561	561
16	DEBT SERVICE REASSIGNMENT INTEREST	54,352	52,556
17	NON-FEDERAL INTEREST	44,842	47,321
18	AFUDC	(30,069)	(32,255)
19	INTEREST INCOME	(17,353)	(21,419)
20	NET INTEREST EXPENSE	158,094	175,213
21	TOTAL EXPENSES	845,865	898,583
22	MINIMUM REQUIRED NET REVENUES 1/	91,700	57,199
23	PLANNED NET REVENUES FOR RISK	0	0
24	TOTAL PLANNED NET REVENUES	91,700	57,199
25	**TOTAL REVENUE REQUIREMENT**	**937,565**	**955,782**

1/ SEE NOTE ON CASH FLOW TABLE.

Table 1-2: Transmission Revenue Requirement Statement of Cash Flows

($000s)

		A FY 2012	B FY 2013
1	CASH FROM CURRENT OPERATIONS:		
2	MINIMUM REQUIRED NET REVENUES 1/	91,700	57,199
3	EXPENSES NOT REQUIRING CASH:		
4	DEPRECIATION & AMORTIZATION	198,604	218,124
5	TRANSMISSION CREDIT PROJECTS NET INTEREST	17,970	20,026
6	AMORTIZATION OF CAPITALIZED BOND PREMIUMS	561	561
7	CAPITALIZATION ADJUSTMENT	(18,968)	(18,968)
8	DRAWDOWN OF CASH RESERVES FOR CAPITAL FUNDING	15,000	15,000
9	ACCRUAL REVENUES (LGIA/AC INTERTIE/FIBER)	(48,616)	(54,851)
10	CASH PROVIDED BY CURRENT OPERATIONS	256,251	237,091
11	CASH USED FOR CAPITAL INVESTMENTS:		
12	INVESTMENT IN:		
13	UTILITY PLANT	(579,415)	(627,722)
14	CASH USED FOR CAPITAL INVESTMENTS	(579,415)	(627,722)
15	CASH FROM TREASURY BORROWING AND APPROPRIATIONS:		
16	INCREASE IN LONG-TERM DEBT	564,415	612,722
17	DEBT SERVICE REASSIGNMENT PRINCIPAL	(41,141)	(165,717)
18	REPAYMENT OF LONG-TERM DEBT	(25,000)	0
19	REPAYMENT OF CAPITAL APPROPRIATIONS	(175,110)	(56,374)
20	CASH FROM TREASURY BORROWING AND APPROPRIATIONS	323,164	390,631
21	ANNUAL INCREASE (DECREASE) IN CASH	0	0
22	PLANNED NET REVENUES FOR RISK	0	0
23	TOTAL ANNUAL INCREASE (DECREASE) IN CASH	0	0

1/ Line 21 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.

2. SEGMENTATION OF TRANSMISSION REVENUE REQUIREMENT

The Transmission Revenue Requirement Study and this Documentation do not include a segmented revenue requirement because the proposed rates were agreed upon and set forth in the Partial Settlement Agreement. As a result, the segmented revenue requirement is not necessary.

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 2-1 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 Study, section 2. Inter-business line expenses, including the cost of redispatch, are the generation inputs for ancillary services and the Corps of Engineers and Bureau of Reclamation annual costs of Network segment facilities and Utility Delivery segment facilities of those agencies. These inter-business line expenses are recovered by rates developed in the Generation Inputs Study, BP-12-FS-BPA-05.

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* Chapter 4.

Interest expense is calculated in the transmission repayment study, using the capital appropriations and BPA revenue bonds issued to 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 2012	B FY 2013
1	**Transmission System Operations**		
2	Information Technology	7,349	7,529
3	Power System Dispatching	12,336	12,748
4	Control Center Support	14,083	14,498
5	Technical Operations	8,385	8,623
6	Substation Operations	21,065	21,735
7	**Sub-Total Transmission System Operations**	**63,218**	**65,133**
8			
9	**Transmission Scheduling**		
10	Management Supervision & Administration	0	0
11	Reservations	1,088	1,109
12	Pre-Scheduling	477	486
13	Real-Time Scheduling	5,090	5,185
14	Scheduling Technical Support	5,665	5,749
15	Scheduling After-The-Fact	453	462
16	**Sub-Total Transmission Scheduling**	**12,772**	**12,991**
17			
18	**Transmission Marketing**		
19	Transmission Sales	3,301	3,362
20	Transmission Finance	303	310
21	Contract Management	4,479	4,572
22	Transmission Billing	2,333	2,382
23	Business Strategy & Assessment	6,552	6,669
26	**Sub-Total Transmission Marketing**	**16,968**	**17,296**
27			
28	**Transmission Business Support**		
29	Executive and Admin Services	13,401	13,764
30	Legal Support	2,984	3,227
31	TS Internal General & Administrative	11,714	11,949
32	Aircraft Services	2,372	2,438
33	Logistics Services	5,644	5,792
34	Security Enhancements	977	1,001
35	**Sub-Total Transmission Business Support**	**37,092**	**38,170**
36			
37	**Transmission Engineering**		
38	Research & Development	7,583	8,000
39	TSD Planning & Analysis	11,531	11,895
40	Capital to Expense Transfer	4,032	4,072
41	Regulatory & Region Association Fees	6,858	7,008
42	Environmental Policy/Planning	1,797	1,828
43	**Sub-Total Transmission Engineering**	**31,800**	**32,803**
44			

Table 3-1: Transmission Program Spending Forecast
($000s)

	Program & Other Operating Costs	A FY 2012	B FY 2013
45	**Transmission System Maintenance**		
46	Non-Electric Maintenance	26,412	27,033
47	Substation Maintenance	29,961	30,825
48	Transmission Line Maintenance	25,882	26,664
49	System Protection Control Maintenance	12,802	13,215
50	Power System Control Maintenance	13,423	13,850
51	Joint Cost Maintenance	206	212
52	System Maintenance Management	6,320	6,516
53	Right Of Way Maintenance	24,631	25,256
54	Heavy Mobile Equipment Maintenance	-17	-18
55	Technical Training	2,894	2,991
56	**Sub-Total Transmission System Maintenance**	**142,513**	**146,546**
57			
58	**Transmission Environmental Operations**		
59	Pollution Prevention & Abatement	4,119	4,204
60	Environmental Analysis	81	82
61	**Sub-Total Transmission Environmental Operations**	**4,199**	**4,286**
62	**Sub-Total Transmission System Operations & Maintenance**	**308,562**	**317,225**
63			
64	**Non-Between Business Line Ancillary Services**		
65	Leased Facilities	3,691	3,753
66	Settlement Agreements	504	509
67	Non-BBL Ancillary Services	6,789	6,857
68	**Sub-Total Non-Between Business Line Ancillary Services**	**10,984**	**11,119**
69			
70	**Corporate Expenses**		
71	Unfunded Retirement Benefits	17,243	17,821
72	Corporate Overhead Distributions	59,657	61,362
73	**Sub-Total Corporate Charges**	**76,900**	**79,182**
74			
75	**Total Transmission IPR Program Levels**	**396,446**	**407,526**

Table 3-2: Summary of Transmission Repayment Study Data
($000s)

		A	B
		2012	**2013**
1	DSR Interest	54,352	52,556
2	Schultz-Wautoma & other capital lease payments	22,074	22,688
3	LGIA Interest	20,268	22,133
4	Appropriation Interest	23,086	10,396
5	Bond Interest	101,642	137,021
6	**Total Gross Interest**	**221,423**	**244,794**
5	DSR Principal	41,141	165,717
6	Appropriation Principal	175,110	56,374
7	Bond Principal	25,000	-
8	**Total Principal**	**241,251**	**222,091**

Table 3-3: Allowance for Funds Used During Construction
($000s)

		A	B
	Plant Funded from BPA Borrowing		
		2012	**2013**
1	Capital expenditures	611,319	665,408
2	Plant-in-service	507,983	627,700
3	SOY CWIP Balance	725,589	828,925
4	EOY CWIP Balance	828,925	866,634
5	Average CWIP Balance	777,257	847,780
6	AFUDC Rate	4.35%	4.35%
7	AFUDC for Federal Projects	26,920	29,374
8	Corporate Capital (1/2 of total)	19,558	17,792
9	Corporate AFUDC	851	774
10	Total AFUDC for BPA Borrowing	27,771	30,148
	Plant Funded from Revenues & by Third Parties		
8	Capital expenditures	35,267	36,450
	Plant-in-service	48,285	36,820
	SOY CWIP Balance	59,343	48,623
9	EOY CWIP Balance	46,325	48,253
10	Average CWIP Balance	42,834	48,438
11	AFUDC Rate	4.35%	4.35%
12	AFUDC for Non-Federal Projects	2,298	2,107
13	Total AFUDC	30,069	32,255

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 2011	2012	2013	2014	2015
1	1/0/1998	2,556,947		156	16,391	Construction	May-2011	131	-	-	-	-
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**			**692**	**561**	**561**	**561**	**561**

Table 3-5 Between Business Line Costs
($000s)

		A	B	C
		2010	**2011**	**Average**
1	Ancillary Services	114,588	118,159	116,374
2	Synchronous Condensing	1,891	1,891	1,891
3	Generation Dropping	777	777	777
4	COE/Reclamation Network/Delivery Facilities Segmentation	7,183	7,183	7,183
5	Station Service	2,950	2,950	2,950
6	**Total**	**127,389**	**130,960**	**129,175**

Table 3-6 Summary of Depreciation

($000s)

		A	B
		2012	**2013**
1	**TRANSMISSION PLANT**		
2	LINES	55,798	60,788
3	SUBSTATION	72,097	78,533
4	STATION EQUIPMENT	3,774	4,514
5	GENERAL PLANT	65,208	72,562
6	INTANGIBLE ASSETS	1,727	1,727
7	**TOTAL**	**198,604**	**218,124**

Table 3-7 TRANSMISSION REGULATORY ASSETS

($000s)

		A FY 2012	B FY 2013
1	Spacer Dampers		
2	Additions	-	-
3	Amortization	1,727	1,727
4	Capitalized Bond Premiums	561	561

4. FCRTS INVESTMENT BASE

4.1 Introduction

This chapter documents the development of the FCRTS investment for the rate period. In this proposal the investment data are the primary source of depreciation calculations.

4.2 Methodology

The historical investment information is prepared from BPA's plant investment records. The general plant investment is identified according to different types of facilities (for example, communications, supervisory control, and buildings) by FERC Account.

Forecast plant additions have been adjusted to take into account the investment associated with Delivery segment facilities projected to be sold prior to the rate period.

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 group that composes these facilities. The substations category is made up of land and land rights, structures and improvements, and station equipment. Both historical investment and forecast additions are depreciated according to their group rates. Gross plant investment is the sum of the historical investment and forecast additions.

Table 4-1: BPA Transmission Plant Depreciation and Accumulated Depreciation
($000s)

		A	B	C	D	E	F	G	H	I	J	K	L
		2010 PLANT INVEST	2010 DEPREC EXPEN	2010 ACCUM DEPREC	2011 PLANT INVEST	2011 DEPREC EXPEN	2011 ACCUM DEPREC	2012 PLANT INVEST	2012 DEPREC EXPEN	2012 ACCUM DEPREC	2013 PLANT INVEST	2013 DEPREC EXPEN	2013 ACCUM DEPREC
1	**LINES:**												
2	GENERATION-INTEGRATION	18,332	396	10,068	19,548	410	10,478	20,164	429	10,907	20,773	443	11,350
3	NETWORK	2,092,402	44,753	1,124,493	2,194,022	46,349	1,170,842	2,353,084	49,168	1,220,010	2,650,951	54,109	1,274,119
4	SOUTHERN INTERTIE	188,896	4,065	102,775	190,761	4,105	106,880	192,862	4,148	111,028	194,031	4,183	115,211
5	EASTERN INERTIE	94,271	2,039	51,779	94,271	2,039	53,818	94,271	2,039	55,857	94,271	2,039	57,896
6	UTILITY DELIVERY	642	14	353	642	14	367	642	14	381	642	14	395
7	DSI DELIVERY	0	0	0	0	0	0	0	0	0	0	0	0
8	**TOTAL LINES**	**2,394,543**	**51,267**	**1,289,468**	**2,499,244**	**52,917**	**1,342,385**	**2,661,023**	**55,798**	**1,398,183**	**2,960,668**	**60,788**	**1,458,971**
9	**SUBSTATIONS:**												
10	GENERATION-INTEGRATION	43,204	1,077	17,665	49,659	1,158	18,823	53,153	1,282	20,105	57,260	1,377	21,482
11	NETWORK	1,938,120	47,847	777,028	2,133,281	50,766	827,794	2,387,238	56,366	884,160	2,612,074	62,336	946,496
12	SOUTHERN INTERTIE	499,375	12,437	203,667	504,403	12,516	216,183	524,684	12,832	229,015	533,294	13,192	242,207
13	EASTERN INERTIE	23,866	595	9,758	23,866	595	10,353	23,866	595	10,948	23,866	595	11,543
14	UTILITY DELIVERY	24,907	621	10,172	25,228	625	10,797	25,647	634	11,431	26,115	645	12,076
15	DSI DELIVERY	15,557	388	6,361	15,557	388	6,749	15,557	388	7,137	15,557	388	7,525
16	**TOTAL SUBSTATIONS**	**2,545,029**	**62,965**	**1,024,651**	**2,751,994**	**66,048**	**1,090,699**	**3,030,145**	**72,097**	**1,162,796**	**3,268,166**	**78,533**	**1,241,329**

Table 4-2: BPA Projected Transmission Plant Investment
($000s)

		A TOTAL 2010 INVEST	B 2011 ADDITIONS	C TOTAL 2011 INVEST	D 2012 ADDITIONS	E TOTAL 2012 INVEST	F 2013 ADDITIONS	G TOTAL 2013 INVEST
1	GENERATION-INTEGRATION	61536	7671	69207	4110	73317	4716	78033
2	NETWORK	4030522	296781	4327303	413019	4740322	522703	5263025
3	SOUTHERN INTERTIE	688271	6893	695164	22382	717546	9779	727325
4	EASTERN INERTIE	118137	0	118137	0	118137	0	118137
5	UTILITY DELIVERY	25549	321	25870	419	26289	468	26757
6	DSI DELIVERY	15557	0	15557	0	15557	0	15557
7	INTANGIBLE - SPACER DAMPERS	32440	10000	42440	0	42440	0	42440
8	GENERAL PLANT	981170	124342	1105512	141764	1247276	149985	1397261
9	**TOTAL BPA**	**5953182**	**446008**	**6399190**	**581694**	**6980884**	**687651**	**7668535**

Table 4-3: BPA Transmission Plant Investment Additions
($000s)

		A	B	C	D	E	F	G	H
					TOTAL 2010				TOTAL 2011
		LINES	SUBS	OTHER	ADDITIONS	LINES	SUBS	OTHER	ADDITIONS
1	GENERATION-INTEGRATION	0	0		0	1,216	6,455		7,671
2	NETWORK	45,992	38,935		84,927	101,620	195,161		296,781
3	SOUTHERN INTERTIE	1,812	1,309		3,121	1,865	5,028		6,893
4	EASTERN INERTIE	0	0		0	0	0		0
5	UTILITY DELIVERY	0	31		31	0	321		321
6	DSI DELIVERY	0	0		0	0	0		0
7	INTANGIBLE - SPACER DAMPERS			9,432	9,432			10,000	10,000
8	INTANGIBLE - NON WIRES SOLUTIONS			0	0			0	0
9	GENERAL PLANT			17,874	17,874			124,342	124,342
10	**TOTAL BPA**	**47,804**	**40,275**	**27,306**	**115,385**	**104,701**	**206,965**	**134,342**	**446,008**

Table 4-3: BPA Transmission Plant Investment Additions
($000s)

		I	J	K	L	M	N	O	P
					TOTAL 2012				TOTAL 2013
		LINES	SUBS	OTHER	ADDITIONS	LINES	SUBS	OTHER	ADDITIONS
1	GENERATION-INTEGRATION	616	3,494		4,110	609	4,107		4,716
2	NETWORK	159,062	253,957		413,019	297,867	224,836		522,703
3	SOUTHERN INTERTIE	2,101	20,281		22,382	1,169	8,610		9,779
4	EASTERN INERTIE	0	0		0	0	0		0
5	UTILITY DELIVERY	0	419		419	0	468		468
6	DSI DELIVERY	0	0		0	0	0		0
7	INTANGIBLE - SPACER DAMPERS			0	0			0	0
8	INTANGIBLE - NON WIRES SOLUTIONS			0	0			0	0
9	GENERAL PLANT			141,764	141,764			149,985	149,985
10	**TOTAL BPA**	**161,779**	**278,151**	**141,764**	**581,694**	**299,645**	**238,021**	**149,985**	**687,651**

Table 4-4: BPA General Plant Cumulative Investment

($000s)

		A	B	C	D	E	F	G	H	I	J	K
		FERC ACCT	FY 2010 TOTAL INVEST	FY 2011 DEPR EXP	FY 2011 ACCUM DEPR	FY 2011 TOTAL INVEST	FY 2012 DEPR EXP	FY 2012 ACCUM DEPR	FY 2012 TOTAL INVEST	FY 2013 DEPR EXP	FY 2013 ACCUM DEPR	FY 2013 TOTAL INVEST
1	LAND & LAND RIGHTS	389	103	-	4,835	4,835	-	9,652	9,652	-	10,744	10,744
2	STRUCTURES & IMPROVEMENTS	390	180,781	3,925	54,022	205,899	4,504	58,526	237,875	5,167	63,693	271,166
3	OFFICE FURNITURE & FIXTURES	391.1	1,663	166	1,276	1,663	166	1,442	1,663	100	1,542	1,663
4	DATA PROCESSING -EQUIPMENT	391.2	15,264	887	11,192	15,264	-	11,192	15,264	-	11,192	15,264
5	DATA PROCESSING -SOFTWARE	391.3	18,127	4,057	12,795	26,144	3,843	16,638	32,723	4,106	20,744	39,509
6	TRANSPORT EQUIPMENT	392.1	40,527	619	24,646	40,959	626	25,272	41,431	634	25,906	41,940
7	HELICOPTERS	392.2	10,481	377	573	10,481	377	950	10,481	377	1,327	10,481
8	AIRPLANES	392.3	8,656	274	(1,689)	8,656	274	(1,415)	8,656	274	(1,141)	8,656
9	STORES EQUIPMENT	393	560	15	60	815	20	80	1,094	26	106	1,395
10	TOOLS, SHOP & GARAGE EQUIPMENT	394	7,324	358	2,139	20,899	672	2,811	31,989	970	3,781	44,413
11	LAB EQUIPMENT	395	32,763	1,690	19,545	33,116	1,709	21,254	33,502	1,729	22,983	33,918
12	POWER OPERATED EQUIPMENT	396	27,265	1,589	19,827	27,618	1,610	21,437	28,004	1,633	23,070	28,420
13	COMMUNICATIONS EQUIPMENT	397	487,418	39,343	233,136	517,505	42,229	275,365	561,135	45,865	321,230	610,379
14	MISC EQUIPMENT	398	32,599	2,187	8,659	32,599	2,187	10,846	32,599	2,187	13,033	32,599
15	SUBTOTAL GENERAL PLANT		863,531	55,487	440,646	946,453	58,217	454,050	1,046,068	63,068	518,210	1,150,547
16	STATION EQUIPMENT	353	76,840	3,184	39,918	91,203	3,774	43,692	107,927	4,514	48,206	130,303
17	TOTAL GENERAL PLANT		940,371	58,671	480,564	1,037,656	61,991	497,742	1,153,995	67,582	566,416	1,280,850
	Corporate Assignment											
18	OFFICE FURNITURE & FIXTURES	391.1	987	99	836	987	99	935	987	3	938	987
19	DATA PROCESSING -EQUIPMENT	391.2	13,463	2,921	9,417	18,862	4,148	13,565	27,049	5,380	18,945	32,499
20	DATA PROCESSING -SOFTWARE	391.3	24,540	-	6,939	24,540	-	6,939	24,540	-	6,939	24,540
21	COMMUNICATIONS EQUIPMENT	397	-	848	865	21,658	2,371	3,236	38,896	3,738	6,974	56,576
22	MISC EQUIPMENT	398	5,560	373	1,574	5,560	373	1,947	5,560	373	2,320	5,560
23	TOTAL CORPORATE ASSIGNMENT		44,550	4,241	19,631	71,607	6,991	26,622	97,032	9,494	36,116	120,162

Table 4-5: BPA Transmission General Plant Projected Plant Additions
($000s)

		A	B	C	D	E
		FERC ACCT	2010 ADDTNS	2011 ADDTNS	2012 ADDTNS	2013 ADDTNS
1	LAND & LAND RIGHTS	389	56	4,732	4,817	1,092
2	STRUCTURES & IMPROVEMENTS	390	6,017	25,118	31,976	33,291
3	OFFICE FURNITURE & FIXTURES	391	52	0	0	0
4	DATA PROCESSING -EQUIPMENT	391	(633)	0	0	0
5	DATA PROCESSING -SOFTWARE	391	3,380	8,017	6,579	6,786
6	TRANSPORT EQUIPMENT	392	5,299	432	472	509
7	HELICOPTERS	392	5,210	0	0	0
8	AIRPLANES	392	(1,591)	0	0	0
9	STORES EQUIPMENT	393	(1,354)	255	279	301
10	TOOLS, SHOP & GARAGE EQUIPMENT	394	1,493	13,575	11,090	12,424
11	LAB EQUIPMENT	395	(406)	353	386	416
12	POWER OPERATED EQUIPMENT	396	(4,407)	353	386	416
13	COMMUNICATIONS EQUIPMENT	397	5,954	30,087	43,630	49,244
14	MISC EQUIPMENT	398	9,526	0	0	0
15	SUBTOTAL GENERAL PLANT		28,596	82,922	99,615	104,479
16	STATION EQUIPMENT	353	(10,722)	14,363	16,724	22,376
17	TOTAL GENERAL PLANT		17,874	97,285	116,339	126,855
	Corporate Assignment					
18	OFFICE FURNITURE & FIXTURES	391	0	5,399	8,187	5,450
19	DATA PROCESSING -EQUIPMENT	391	0	0	0	0
20	DATA PROCESSING -SOFTWARE	391	0	21,658	17,238	17,680
21	COMMUNICATIONS EQUIPMENT	397	0	0	0	0
22	MISC EQUIPMENT	398	0	0	0	0
23	TOTAL CORPORATE ASSIGNMENT		0	27,057	25,425	23,130

Table 4-6: Depreciation of Customer-Funded Investments
($000s)

	A	B	C	D	E	F	G	H	I	J
	Large Generator Interconnection Agreements									
			Total					Accumulated		
		Cumulative	Annual			Depreciation		Depreciation		
	In-Service	Investment	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	192,270	63,810	8,880	54,930	402	3,536	787	7,124	7,911
6	2011	250,055	57,785	8,562	49,223	590	4,835	1,377	11,959	13,336
7	2012	285,322	35,267	5,111	30,156	738	5,825	2,115	17,784	19,899
8	2013	321,772	36,450	5,412	31,038	852	6,588	2,967	24,372	27,339
	California-Oregion Intertie (COI)									
			Total					Accumulated		
		Cumulative	Annual			Depreciation		Depreciation		
	In-Service	Investment	Investment	Lines	Substations	Lines	Substations	Lines	Substations	Total
9	2012	11,238	11,238	0	11,238	0	140	0	140	140
10	2013	11,238	0	0	0	0	280	0	420	420

Table 4-7 Ancillary Services

Scheduling, System Control, and Dispatch Services

($000s)

		A	B	C	D
	Plant Additions				
	FERC ACCOUNT	**2010**	**2011**	**2012**	**2013**
1	**353**	15,905	14,324	16,681	22,330
2	**391.2**	-	-	-	-
3	**391.3**	606	8,017	6,579	6,786
4	**397**	8,713	9,026	13,089	14,773
5	**Total**	25,224	31,367	36,349	43,889

		A	B	C	D	E	F	G	H	I	J	K
	FERC ACCOUNT	**DEPR ACCRL RATE**	**2010 TOTAL INVEST**	**2011 DEPR EXP**	**2011 ACCUM DEPR**	**2011 TOTAL INVEST**	**2012 DEPR EXP**	**2012 ACCUM DEPR**	**2012 TOTAL INVEST**	**2013 DEPR EXP**	**2013 ACCUM DEPR**	**2013 TOTAL INVEST**
6	**353**	0.0379	61,020	2,584	32,645	75,344	3,172	35,817	92,025	3,911	39,728	114,355
7	**391.2**	0.1807	17,238	3,115	17,230	17,238	8	17,238	17,238	-	17,238	17,238
8	**391.3**	0.1833	16,825	1,879	17,290	24,842	2,371	19,661	31,421	3,563	23,224	38,207
9	**397**	0.0783	148,682	11,995	79,225	157,708	12,861	92,086	170,797	13,952	106,038	185,570
10	**Total**		243,765	19,573	146,390	275,132	18,412	164,802	311,481	21,426	186,228	355,370

		A	B	C	D	E	F
	FERC ACCOUNT	**2011**	**2012**	**Average 2012**	**2012**	**2013**	**Average 2013**
	Plant Investment						
11	**353**	75,344	92,025	83,684	92,025	114,355	103,190
12	**391.2**	17,238	17,238	17,238	17,238	17,238	17,238
13	**391.3**	24,842	31,421	28,132	31,421	38,207	34,814
14	**397**	157,708	170,797	164,253	170,797	185,570	178,184
15	**Total**	275,132	311,481	293,307	311,481	355,370	333,426
	Accumulated Depreciation						
16	**353**	32,645	35,817	34,231	35,817	39,728	37,773
17	**391.2**	17,230	17,238	17,234	17,238	17,238	17,238
18	**391.3**	17,290	19,661	18,476	19,661	23,224	21,443
19	**397**	79,225	92,086	85,656	92,086	106,038	99,062
20	**Total**	146,390	164,802	155,597	164,802	186,228	175,516
	Net Plant Investment						
21	**353**	42,699	56,208	49,453	56,208	74,627	65,417
22	**391.2**	8	-	4	-	-	-
23	**391.3**	7,552	11,760	9,656	11,760	14,983	13,371
24	**397**	78,483	78,711	78,597	78,711	79,532	79,122
25	**Total**	128,742	146,679	137,710	146,679	169,142	157,910

Table 4-8: Amortization of Spacer Dampers
($000s)

		A	B	C	D	E	F	G
	FY	Investment	Partial Year Amortization	Full year Amortization	Annual Amortization	Accumulated Amortization	Cumulative Investment	Deferred Investment
1	2006	2,728	45	91	45	45	2,728	5,696
2	2007	2,800	46	93	137	182	5,528	6,630
3	2008	24,091	575	803	759	941	29,619	
4	2009	2,790	93	93	1,031	1,972	32,409	
5	2010	9,432	66	314	1,146	3,118	39,113	
6	2011	10,000	167	333	1,561	4,679	49,113	
7	2012	-	-	-	1,727	6,406	49,113	
8	2013	-	-	-	1,727	8,133	49,113	
9	2014	-	-	-	1,727	9,860	49,113	
10	2015	-	-	-	1,727	11,587	49,113	

FY 2008 investment = 9,617 plus total deferred investment from 2006 and 2007.

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 Treasury. Included in Transmission Services' projected cash balances are proceeds from the sale of Delivery segment facilities projected to be sold prior to the FY 2012–2013 rate period.

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 FY 2010 and from current forecasts of transmission revenues, expenses, and cash flows for FY 2011. 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 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 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 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 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	C
		2011	**2012**	**2013**
1	Annual Cash Surplus/(Deficit)		-	-
2	Adjustments to Cash		-51,000	-46,000
3	SOY Cash Balance		579,000	528,000
4	EOY Cash Balance	579,000	528,000	482,000
5	Average Cash Balance		553,500	505,000
6	Interest Income Rate		2.24%	3.60%
7	Annual Interest Income *		17,353	21,419
8	* included from repayment study		4,955	3,239

Table 5-2: Interest Income from Projected Cash Balances
Revenues from Current Rates
($000s)

		A	B	C	D
					Repayment
		2011	2012	2013	Period
1	Annual Cash Surplus/(Deficit)		(15,365)	(12,404)	
2	Adjustments to Cash		(51,000)	(46,000)	
3	SOY Cash Balance		579,000	512,635	471,635
4	EOY Cash Balance	579,000	512,635	454,231	471,635
5	Average Cash Balance		545,818	483,433	471,635
6	Interest Income Rate		2.24%	3.60%	3.60%
7	Annual Interest Income *		17,181	20,643	16,979
8	* included from repayment study		4,955	3,239	

Table 5-3: Interest Income from Projected Cash Balances
Revenues from Proposed Rates
($000s)

		A	B	C	D
		2011	2012	2013	Repayment Period
1	Annual Cash Surplus/(Deficit)		723	1,238	
2	Adjustments to Cash		-51,000	-46,000	
3	SOY Cash Balance		579,000	528,723	502,189
4	EOY Cash Balance	579,000	528,723	483,961	502,189
5	Average Cash Balance		553,862	506,342	502,189
6	Interest Income Rate		2.24%	3.60%	3.60%
7	Annual Interest Income *		17,362	21,467	18,079
8	* included from repayment study		4,955	3,239	

6. INTEREST RATES AND PRICE DEFLATORS

6.1 Introduction

Interest rates on bonds issued by BPA to 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 Treasury, BPA uses 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 Treasury are based on GI's yield curve projections of Treasury market rates, plus a markup of 32 to 150 basis points, depending on the length of time to maturity. The markup estimate reflects an interagency agreement that 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. For the FY 2012–2013 period, the 30-year rate reflects a markup of 90 basis points.

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 the each successive year.

When deflators are used in developing the FY 2012–2013 spending levels, they are based on the price deflators from the Third Quarter 2010 GI forecast.

United States Government **Department of Energy**

Bonneville Power Administration

memorandum

DATE: DEC 2 0 2010

REPLY TO ATTN OF: FTC-2

SUBJECT: FY 2011 Common Agency Assumptions

TO: See Attached "cc:" List

Please see the attached BPA borrowing rate and inflation assumptions for the period FY 2011 through 2040.

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 2011 forecast is summarized in the following tables:

- Table 1: 30-year Treasury Borrowing Rate
- Table 2: 30-year Rate Comparison (FY 2011 vs. FY 2010 Forecast)
- Table 3: 20-year Treasury Borrowing Rate
- Table 4: 15-year Treasury Borrowing Rate
- Table 5: Appropriation Term Rates
- Table 6: BPA Treasury Term Rates
- Table 7: Third-party taxable Term Rates
- Table 8: Third-party tax-exempt Term Rates
- Table 9: FERC (Prime Rate)
- Table 10: LIBOR 3-Month Rate
- Table 11: Projected change in the GDP price deflator
- Table 12: Summary of equivalent cumulative discount rates

BPA's 30-year Treasury borrowing rate is projected to be 50 basis points (bp) less than the FY 2010 forecast in 2011. The FY 2011 inflation rate projection is essentially the same as the FY 2010 forecast. Inflation is only 0.14 percentage points lower than the FY 2010 forecast in 2011.

Borrowing Rate Forecast Methodology

The FY 2011 forecast is based on the Global Insight (GI) Third Quarter September 2010 Long-Term Economic Outlook.

Table 1 illustrates the components of BPA's Treasury borrowing rate forecast. GI calendar year (CY) projections of 30-year Treasury bond yields are shown in Column A. BPA fiscal year projections are shown in Column B. Column C reflects BPA's Treasury borrowing rate.

BPA borrowing rates from the U.S. Treasury reflect a mark-up over the Treasury yield curve. The markup is based upon the Government Agency borrowing rate spread over the Treasury

yield curve, and where appropriate, an adder for call option premiums embedded in BPA Treasury borrowings.

Beyond FY 2011, BPA's Treasury borrowing rate spread over the U.S. Treasury yield curve is projected to generally narrow.

BPA Borrowing Forecasts

The FY 2011 forecast begins in an environment of recovery from financial crisis of historical proportions. Major uncertainties surrounding BPA borrowing rate projections now focus on the pace of economic recovery.

The Agency FY 2011 outlook suggests that BPA borrowing rates will increase significantly in 2012 and 2013 as they converge to a long-term equilibrium in 2016.

The borrowing rate on FCRPS Appropriations over a 2-year term is projected to increase 2.97 percentage points, from a prescribed rate of 0.65 percent in FY 2011 to 3.62 percent in 2013. The Appropriation borrowing rate over a 10-year term is projected to increase 1.80 percentage points from 2.74 percent in FY 2011 to 4.54 percent in 2013. Note: Appropriation borrowing rates in FY 2011 are set by the U.S. Treasury at the beginning of the fiscal year and do not reflect the full extent of decline reflected in other sources of financing.

The 10-year rate on BPA's Treasury borrowing is expected to increase 1.37 percentage points from 3.80 percent in FY 2011 to 5.17 percent in FY 2013. The Third-party taxable 10-year rate is expected to increase 1.90 percentage points from 4.16 percent to 6.06 percent in 2013, and the Third-party tax-exempt 10-year rate increases 1.38 percentage points from 3.04 percent to 4.42 percent in FY 2013. Beyond 2015, BPA borrowing rates reflect a long-term equilibrium rate.

The FY 2011 forecast includes borrowing rates based on the Prime rate and a short-term LIBOR. The Prime rate increases 2.90 percentage points over the next three years from 3.29 percent in FY 2011 to 6.19 percent in FY 2013. LIBOR rates are projected to increase 3.14 percentage points from 0.78 percent in FY 2011 to 3.92 percent in FY 2013.

The FY 2011 outlook expects rates across the yield curve to remain low through FY 2011. This expectation reflects a lower trajectory for interest rates than was assumed in FY 2010.

Inflation Forecast

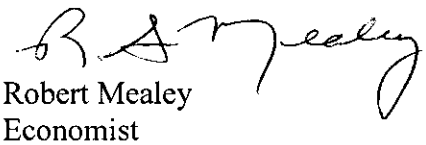
BPA inflation assumptions reflect projected changes in the U.S. Gross Domestic Product (GDP) Price Deflator. The GDP Price Deflator is the broadest measure of inflation in the U.S. economy. GDP reflects the value of all goods and services produced by domestic and foreign capital and labor within the 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 2005. The projected change in the GDP price deflator and comparison with the FY 2010 inflation forecast is summarized in Table 11. Column A shows the projected trend in GDP inflation rates between 2011-2040 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.

The GI September 2010 Base Case forecast assumes inflation will remain subdued over the long-term. Slower growth and greater slack in the economy reduces inflationary pressures.

Inflationary pressures remain relatively stable throughout the forecast period. Inflation slows to a 1.15 percent annual rate in FY 2011. The pace of inflation increases to 1.36 percent in FY 2012 compared to an FY 2010 estimate of 1.49 percent. Inflation reaches an annual rate of 1.84 percent in FY 2015 and remains relatively steady. The FY 2011 inflation outlook is essentially the same as the FY 2010 outlook. Within its historical context, inflation is expected to remain low (See Table 11).

If you have questions or suggestions concerning the FY 2011 Agency borrowing rate and inflation forecasts, please contact Robert Mealey at (503) 230-5389. Also, please forward this to the appropriate people in your group. Your assistance in identifying addressees for future forecasts is appreciated.



Robert Mealey
Economist

Attachments

Table 1

30 YEAR TREASURY YIELDS

FY 2011 FORECAST OF BPA TREASURY BORROWING RATES

Calendar/Fiscal Years 2011 - 2040

YEAR	(A) BOND RATE 1/ Calendar Year	(B) BOND RATE Fiscal Year	(C) BPA RATE 2/ Fiscal Year
2011	4.02	4.07	5.97
2012	4.67	4.51	6.01
2013	5.08	4.98	6.28
2014	5.57	5.45	6.85
2015	6.03	5.91	6.87
2016	6.03	6.03	6.99
2017	6.03	6.03	6.99
2018	6.03	6.03	6.99
2019	6.03	6.03	6.99
2020	6.03	6.03	6.99
2021	6.03	6.03	6.99
2022	6.03	6.03	6.99
2023	6.03	6.03	6.99
2024	6.03	6.03	6.99
2025	6.03	6.03	6.99
2026	6.03	6.03	6.99
2027	6.03	6.03	6.99
2028	6.03	6.03	6.99
2029	6.03	6.03	6.99
2030	6.03	6.03	6.99
2031	6.03	6.03	6.99
2032	6.03	6.03	6.99
2033	6.03	6.03	6.99
2034	6.03	6.03	6.99
2035	6.03	6.03	6.99
2036	6.03	6.03	6.99
2037	6.03	6.03	6.99
2038	6.03	6.03	6.99
2039	6.03	6.03	6.99
2040	6.03	6.03	6.99

1/ BPA Forecast FY 2011; Global Insight CY 2010.Q3 long-term outlook.
The U.S. Economy: 30-Year Focus, September 2010 Forecast, Base Case

2/ Column C = Column B + U.S. Treasury borrowing markup.

Table 2

FORECAST COMPARISON - 30 YEAR TREASURY YIELDS

BPA FY 2011 vs. BPA FY 2010

Fiscal Years 2011 - 2040

YEAR	(A) FY 2011 FORECAST BPA RATE 1/	(B) FY 2010 FORECAST BPA RATE 2/	(C) DIFFERENCE (A-B)
2011	5.97	6.47	-0.50
2012	6.01	6.49	-0.49
2013	6.28	6.63	-0.36
2014	6.85	6.93	-0.08
2015	6.87	6.94	-0.07
2016	6.99	6.84	0.15
2017	6.99	6.84	0.15
2018	6.99	6.84	0.15
2019	6.99	6.84	0.15
2020	6.99	6.84	0.15
2021	6.99	6.84	0.15
2022	6.99	6.84	0.15
2023	6.99	6.84	0.15
2024	6.99	6.84	0.15
2025	6.99	6.84	0.15
2026	6.99	6.84	0.15
2027	6.99	6.84	0.15
2028	6.99	6.84	0.15
2029	6.99	6.84	0.15
2030	6.99	6.84	0.15
2031	6.99	6.84	0.15
2032	6.99	6.84	0.15
2033	6.99	6.84	0.15
2034	6.99	6.84	0.15
2035	6.99	6.84	0.15
2036	6.99	6.84	0.15
2037	6.99	6.84	0.15
2038	6.99	6.84	0.15
2039	6.99	6.84	0.15
2040	6.99		

1/ BPA Forecast FY 2011; Global Insight CY 2010.Q3 long-term outlook.
The U.S. Economy: 30-Year Focus, September 2010 Forecast, Base Case

2/ BPA Forecast FY 2010; Global Insight CY 2009.Q4 long-term outlook.
The U.S. Economy: 30-Year Focus

Table 3

20 YEAR TREASURY YIELDS

FY 2011 FORECAST OF BPA TREASURY BORROWING RATES

Calendar/Fiscal Years 2011 - 2040

YEAR	(A) BOND RATE 1/ Calendar Year	(B) BOND RATE Fiscal Year	(C) BPA RATE Fiscal Year
2011	3.57	3.62	4.88
2012	4.40	4.19	5.26
2013	4.88	4.76	5.73
2014	5.38	5.26	6.16
2015	5.85	5.73	6.41
2016	5.85	5.85	6.53
2017	5.85	5.85	6.53
2018	5.85	5.85	6.53
2019	5.85	5.85	6.53
2020	5.85	5.85	6.53
2021	5.85	5.85	6.53
2022	5.85	5.85	6.53
2023	5.85	5.85	6.53
2024	5.85	5.85	6.53
2025	5.85	5.85	6.53
2026	5.85	5.85	6.53
2027	5.85	5.85	6.53
2028	5.85	5.85	6.53
2029	5.85	5.85	6.53
2030	5.85	5.85	6.53
2031	5.85	5.85	6.53
2032	5.85	5.85	6.53
2033	5.85	5.85	6.53
2034	5.85	5.85	6.53
2035	5.85	5.85	6.53
2036	5.85	5.85	6.53
2037	5.85	5.85	6.53
2038	5.85	5.85	6.53
2039	5.85	5.85	6.53
2040	5.85	5.85	6.53

1/ BPA Forecast FY 2011; Global Insight CY 2010.Q3 long-term outlook.
The U.S. Economy: 30-Year Focus, September 2010 Forecast, Base Case

2/ Column C = Column B + U.S. Treasury borrowing markup.

Table 4

15 YEAR TREASURY YIELDS

FY 2011 FORECAST OF BPA TREASURY BORROWING RATES

Calendar/Fiscal Years 2011 - 2040

YEAR	(A) BOND RATE 1/ Calendar Year	(B) BOND RATE Fiscal Year	(C) BPA RATE Fiscal Year
2011	3.35	3.39	4.34
2012	4.26	4.04	4.88
2013	4.78	4.65	5.45
2014	5.29	5.16	5.81
2015	5.76	5.65	6.19
2016	5.76	5.76	6.30
2017	5.76	5.76	6.30
2018	5.76	5.76	6.30
2019	5.76	5.76	6.30
2020	5.76	5.76	6.30
2021	5.76	5.76	6.30
2022	5.76	5.76	6.30
2023	5.76	5.76	6.30
2024	5.76	5.76	6.30
2025	5.76	5.76	6.30
2026	5.76	5.76	6.30
2027	5.76	5.76	6.30
2028	5.76	5.76	6.30
2029	5.76	5.76	6.30
2030	5.76	5.76	6.30
2031	5.76	5.76	6.30
2032	5.76	5.76	6.30
2033	5.76	5.76	6.30
2034	5.76	5.76	6.30
2035	5.76	5.76	6.30
2036	5.76	5.76	6.30
2037	5.76	5.76	6.30
2038	5.76	5.76	6.30
2039	5.76	5.76	6.30
2040	5.76	5.76	6.30

1/ BPA Forecast FY 2011; Global Insight CY 2010.Q3 long-term outlook.
The U.S. Economy: 30-Year Focus, September 2010 Forecast, Base Case

Table 5

BPA FY 2011 APPROPRIATION BORROWING RATE FORECAST 1/

BPA Fiscal Years 2011 - 2040

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	16 Year	17 Year	18 Year
2011 2/	0.40	0.65	0.96	1.28	1.63	1.93	2.23	2.45	2.59	2.74	2.86	2.98	3.07	3.13	3.24	3.25	3.38	3.38
2012	2.12	2.37	2.63	2.89	3.15	3.29	3.44	3.59	3.73	3.88	3.91	3.94	3.97	4.00	4.04	4.07	4.10	4.13
2013	3.42	3.62	3.79	3.96	4.13	4.21	4.29	4.38	4.46	4.54	4.56	4.59	4.61	4.63	4.65	4.67	4.69	4.72
2014	4.16	4.33	4.46	4.60	4.73	4.80	4.86	4.93	5.00	5.07	5.09	5.11	5.13	5.14	5.16	5.18	5.20	5.22
2015	4.71	4.88	5.00	5.11	5.22	5.29	5.36	5.42	5.49	5.56	5.57	5.59	5.61	5.63	5.65	5.66	5.68	5.70
2016	4.85	5.02	5.13	5.24	5.35	5.41	5.48	5.54	5.61	5.68	5.69	5.71	5.73	5.75	5.76	5.78	5.80	5.82
2017	4.85	5.02	5.13	5.24	5.35	5.41	5.48	5.54	5.61	5.68	5.69	5.71	5.73	5.75	5.76	5.78	5.80	5.82
2018	4.85	5.02	5.13	5.24	5.35	5.41	5.48	5.54	5.61	5.68	5.69	5.71	5.73	5.75	5.76	5.78	5.80	5.82
2019	4.85	5.02	5.13	5.24	5.35	5.41	5.48	5.54	5.61	5.68	5.69	5.71	5.73	5.75	5.76	5.78	5.80	5.82
2020	4.85	5.02	5.13	5.24	5.35	5.41	5.48	5.54	5.61	5.68	5.69	5.71	5.73	5.75	5.76	5.78	5.80	5.82
2021	4.85	5.02	5.13	5.24	5.35	5.41	5.48	5.54	5.61	5.68	5.69	5.71	5.73	5.75	5.76	5.78	5.80	5.82
2022	4.85	5.02	5.13	5.24	5.35	5.41	5.48	5.54	5.61	5.68	5.69	5.71	5.73	5.75	5.76	5.78	5.80	5.82
2023	4.85	5.02	5.13	5.24	5.35	5.41	5.48	5.54	5.61	5.68	5.69	5.71	5.73	5.75	5.76	5.78	5.80	5.82
2024	4.85	5.02	5.13	5.24	5.35	5.41	5.48	5.54	5.61	5.68	5.69	5.71	5.73	5.75	5.76	5.78	5.80	5.82
2025	4.85	5.02	5.13	5.24	5.35	5.41	5.48	5.54	5.61	5.68	5.69	5.71	5.73	5.75	5.76	5.78	5.80	5.82
2026	4.85	5.02	5.13	5.24	5.35	5.41	5.48	5.54	5.61	5.68	5.69	5.71	5.73	5.75	5.76	5.78	5.80	5.82
2027	4.85	5.02	5.13	5.24	5.35	5.41	5.48	5.54	5.61	5.68	5.69	5.71	5.73	5.75	5.76	5.78	5.80	5.82
2028	4.85	5.02	5.13	5.24	5.35	5.41	5.48	5.54	5.61	5.68	5.69	5.71	5.73	5.75	5.76	5.78	5.80	5.82
2029	4.85	5.02	5.13	5.24	5.35	5.41	5.48	5.54	5.61	5.68	5.69	5.71	5.73	5.75	5.76	5.78	5.80	5.82
2030	4.85	5.02	5.13	5.24	5.35	5.41	5.48	5.54	5.61	5.68	5.69	5.71	5.73	5.75	5.76	5.78	5.80	5.82
2031	4.85	5.02	5.13	5.24	5.35	5.41	5.48	5.54	5.61	5.68	5.69	5.71	5.73	5.75	5.76	5.78	5.80	5.82
2032	4.85	5.02	5.13	5.24	5.35	5.41	5.48	5.54	5.61	5.68	5.69	5.71	5.73	5.75	5.76	5.78	5.80	5.82
2033	4.85	5.02	5.13	5.24	5.35	5.41	5.48	5.54	5.61	5.68	5.69	5.71	5.73	5.75	5.76	5.78	5.80	5.82
2034	4.85	5.02	5.13	5.24	5.35	5.41	5.48	5.54	5.61	5.68	5.69	5.71	5.73	5.75	5.76	5.78	5.80	5.82
2035	4.85	5.02	5.13	5.24	5.35	5.41	5.48	5.54	5.61	5.68	5.69	5.71	5.73	5.75	5.76	5.78	5.80	5.82
2036	4.85	5.02	5.13	5.24	5.35	5.41	5.48	5.54	5.61	5.68	5.69	5.71	5.73	5.75	5.76	5.78	5.80	5.82
2037	4.85	5.02	5.13	5.24	5.35	5.41	5.48	5.54	5.61	5.68	5.69	5.71	5.73	5.75	5.76	5.78	5.80	5.82
2038	4.85	5.02	5.13	5.24	5.35	5.41	5.48	5.54	5.61	5.68	5.69	5.71	5.73	5.75	5.76	5.78	5.80	5.82
2039	4.85	5.02	5.13	5.24	5.35	5.41	5.48	5.54	5.61	5.68	5.69	5.71	5.73	5.75	5.76	5.78	5.80	5.82
2040	4.85	5.02	5.13	5.24	5.35	5.41	5.48	5.54	5.61	5.68	5.69	5.71	5.73	5.75	5.76	5.78	5.80	5.82

1/ Global Insight: The U.S. Economy: 30-Year Focus, September 2010 Forecast, Base Case

2/ FY 2011 Appropriation rates are determined in accordance with BPA Appropriations Refinancing Act, 16 U.S.C. 838l enacted on April 26, 1996, and are independent of the Global Insight Treasury Yield forecasts.

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
3.46	3.50	3.50	3.53	3.63	3.63	3.63	3.67	3.75	3.75	3.75	3.75	3.75	**2011 2/**
4.16	4.19	4.22	4.26	4.29	4.32	4.35	4.38	4.41	4.44	4.48	4.51	4.51	**2012**
4.74	4.76	4.78	4.80	4.83	4.85	4.87	4.89	4.91	4.93	4.96	4.98	4.98	**2013**
5.24	5.26	5.28	5.30	5.31	5.33	5.35	5.37	5.39	5.41	5.43	5.45	5.45	**2014**
5.72	5.73	5.75	5.77	5.79	5.81	5.82	5.84	5.86	5.88	5.89	5.91	5.91	**2015**
5.83	5.85	5.87	5.89	5.90	5.92	5.94	5.96	5.97	5.99	6.01	6.03	6.03	**2016**
5.83	5.85	5.87	5.89	5.90	5.92	5.94	5.96	5.97	5.99	6.01	6.03	6.03	**2017**
5.83	5.85	5.87	5.89	5.90	5.92	5.94	5.96	5.97	5.99	6.01	6.03	6.03	**2018**
5.83	5.85	5.87	5.89	5.90	5.92	5.94	5.96	5.97	5.99	6.01	6.03	6.03	**2019**
5.83	5.85	5.87	5.89	5.90	5.92	5.94	5.96	5.97	5.99	6.01	6.03	6.03	**2020**
5.83	5.85	5.87	5.89	5.90	5.92	5.94	5.96	5.97	5.99	6.01	6.03	6.03	**2021**
5.83	5.85	5.87	5.89	5.90	5.92	5.94	5.96	5.97	5.99	6.01	6.03	6.03	**2022**
5.83	5.85	5.87	5.89	5.90	5.92	5.94	5.96	5.97	5.99	6.01	6.03	6.03	**2023**
5.83	5.85	5.87	5.89	5.90	5.92	5.94	5.96	5.97	5.99	6.01	6.03	6.03	**2024**
5.83	5.85	5.87	5.89	5.90	5.92	5.94	5.96	5.97	5.99	6.01	6.03	6.03	**2025**
5.83	5.85	5.87	5.89	5.90	5.92	5.94	5.96	5.97	5.99	6.01	6.03	6.03	**2026**
5.83	5.85	5.87	5.89	5.90	5.92	5.94	5.96	5.97	5.99	6.01	6.03	6.03	**2027**
5.83	5.85	5.87	5.89	5.90	5.92	5.94	5.96	5.97	5.99	6.01	6.03	6.03	**2028**
5.83	5.85	5.87	5.89	5.90	5.92	5.94	5.96	5.97	5.99	6.01	6.03	6.03	**2029**
5.83	5.85	5.87	5.89	5.90	5.92	5.94	5.96	5.97	5.99	6.01	6.03	6.03	**2030**
5.83	5.85	5.87	5.89	5.90	5.92	5.94	5.96	5.97	5.99	6.01	6.03	6.03	**2031**
5.83	5.85	5.87	5.89	5.90	5.92	5.94	5.96	5.97	5.99	6.01	6.03	6.03	**2032**
5.83	5.85	5.87	5.89	5.90	5.92	5.94	5.96	5.97	5.99	6.01	6.03	6.03	**2033**
5.83	5.85	5.87	5.89	5.90	5.92	5.94	5.96	5.97	5.99	6.01	6.03	6.03	**2034**
5.83	5.85	5.87	5.89	5.90	5.92	5.94	5.96	5.97	5.99	6.01	6.03	6.03	**2035**
5.83	5.85	5.87	5.89	5.90	5.92	5.94	5.96	5.97	5.99	6.01	6.03	6.03	**2036**
5.83	5.85	5.87	5.89	5.90	5.92	5.94	5.96	5.97	5.99	6.01	6.03	6.03	**2037**
5.83	5.85	5.87	5.89	5.90	5.92	5.94	5.96	5.97	5.99	6.01	6.03	6.03	**2038**
5.83	5.85	5.87	5.89	5.90	5.92	5.94	5.96	5.97	5.99	6.01	6.03	6.03	**2039**
5.83	5.85	5.87	5.89	5.90	5.92	5.94	5.96	5.97	5.99	6.01	6.03	6.03	**2040**

Table 6

BPA FY 2011 TREASURY BORROWING YIELD CURVE FORECAST 1/

BPA Fiscal Years 2011 - 2040

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	16 Year	17 Year	18 Year
2011	0.96	1.34	1.76	2.18	2.60	2.85	3.10	3.34	3.59	3.80	3.91	4.02	4.12	4.23	4.34	4.45	4.56	4.67
2012	2.52	2.82	3.12	3.43	3.73	3.89	4.05	4.22	4.38	4.51	4.58	4.66	4.73	4.81	4.88	4.96	5.03	5.11
2013	3.82	4.07	4.29	4.50	4.71	4.81	4.91	5.01	5.11	5.17	5.23	5.28	5.34	5.39	5.45	5.50	5.56	5.61
2014	4.44	4.54	4.70	4.85	5.01	5.12	5.22	5.33	5.44	5.47	5.54	5.61	5.68	5.74	5.81	5.88	5.95	6.02
2015	4.99	5.09	5.23	5.37	5.50	5.61	5.72	5.82	5.93	5.96	6.00	6.05	6.09	6.14	6.19	6.23	6.28	6.32
2016	5.13	5.23	5.36	5.49	5.63	5.73	5.84	5.94	6.05	6.08	6.12	6.17	6.21	6.26	6.30	6.35	6.40	6.44
2017	5.13	5.23	5.36	5.49	5.63	5.73	5.84	5.94	6.05	6.08	6.12	6.17	6.21	6.26	6.30	6.35	6.40	6.44
2018	5.13	5.23	5.36	5.49	5.63	5.73	5.84	5.94	6.05	6.08	6.12	6.17	6.21	6.26	6.30	6.35	6.40	6.44
2019	5.13	5.23	5.36	5.49	5.63	5.73	5.84	5.94	6.05	6.08	6.12	6.17	6.21	6.26	6.30	6.35	6.40	6.44
2020	5.13	5.23	5.36	5.49	5.63	5.73	5.84	5.94	6.05	6.08	6.12	6.17	6.21	6.26	6.30	6.35	6.40	6.44
2021	5.13	5.23	5.36	5.49	5.63	5.73	5.84	5.94	6.05	6.08	6.12	6.17	6.21	6.26	6.30	6.35	6.40	6.44
2022	5.13	5.23	5.36	5.49	5.63	5.73	5.84	5.94	6.05	6.08	6.12	6.17	6.21	6.26	6.30	6.35	6.40	6.44
2023	5.13	5.23	5.36	5.49	5.63	5.73	5.84	5.94	6.05	6.08	6.12	6.17	6.21	6.26	6.30	6.35	6.40	6.44
2024	5.13	5.23	5.36	5.49	5.63	5.73	5.84	5.94	6.05	6.08	6.12	6.17	6.21	6.26	6.30	6.35	6.40	6.44
2025	5.13	5.23	5.36	5.49	5.63	5.73	5.84	5.94	6.05	6.08	6.12	6.17	6.21	6.26	6.30	6.35	6.40	6.44
2026	5.13	5.23	5.36	5.49	5.63	5.73	5.84	5.94	6.05	6.08	6.12	6.17	6.21	6.26	6.30	6.35	6.40	6.44
2027	5.13	5.23	5.36	5.49	5.63	5.73	5.84	5.94	6.05	6.08	6.12	6.17	6.21	6.26	6.30	6.35	6.40	6.44
2028	5.13	5.23	5.36	5.49	5.63	5.73	5.84	5.94	6.05	6.08	6.12	6.17	6.21	6.26	6.30	6.35	6.40	6.44
2029	5.13	5.23	5.36	5.49	5.63	5.73	5.84	5.94	6.05	6.08	6.12	6.17	6.21	6.26	6.30	6.35	6.40	6.44
2030	5.13	5.23	5.36	5.49	5.63	5.73	5.84	5.94	6.05	6.08	6.12	6.17	6.21	6.26	6.30	6.35	6.40	6.44
2031	5.13	5.23	5.36	5.49	5.63	5.73	5.84	5.94	6.05	6.08	6.12	6.17	6.21	6.26	6.30	6.35	6.40	6.44
2032	5.13	5.23	5.36	5.49	5.63	5.73	5.84	5.94	6.05	6.08	6.12	6.17	6.21	6.26	6.30	6.35	6.40	6.44
2033	5.13	5.23	5.36	5.49	5.63	5.73	5.84	5.94	6.05	6.08	6.12	6.17	6.21	6.26	6.30	6.35	6.40	6.44
2034	5.13	5.23	5.36	5.49	5.63	5.73	5.84	5.94	6.05	6.08	6.12	6.17	6.21	6.26	6.30	6.35	6.40	6.44
2035	5.13	5.23	5.36	5.49	5.63	5.73	5.84	5.94	6.05	6.08	6.12	6.17	6.21	6.26	6.30	6.35	6.40	6.44
2036	5.13	5.23	5.36	5.49	5.63	5.73	5.84	5.94	6.05	6.08	6.12	6.17	6.21	6.26	6.30	6.35	6.40	6.44
2037	5.13	5.23	5.36	5.49	5.63	5.73	5.84	5.94	6.05	6.08	6.12	6.17	6.21	6.26	6.30	6.35	6.40	6.44
2038	5.13	5.23	5.36	5.49	5.63	5.73	5.84	5.94	6.05	6.08	6.12	6.17	6.21	6.26	6.30	6.35	6.40	6.44
2039	5.13	5.23	5.36	5.49	5.63	5.73	5.84	5.94	6.05	6.08	6.12	6.17	6.21	6.26	6.30	6.35	6.40	6.44
2040	5.13	5.23	5.36	5.49	5.63	5.73	5.84	5.94	6.05	6.08	6.12	6.17	6.21	6.26	6.30	6.35	6.40	6.44

1/ Global Insight: The U.S. Economy: 30-Year Focus, September 2010 Forecast, Base Case

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
4.78	4.88	4.99	5.10	5.21	5.32	5.43	5.53	5.64	5.75	5.86	5.97	5.97	**2011**
5.18	5.26	5.33	5.41	5.48	5.56	5.63	5.71	5.78	5.86	5.93	6.01	6.01	**2012**
5.67	5.73	5.78	5.84	5.89	5.95	6.00	6.06	6.11	6.17	6.22	6.28	6.28	**2013**
6.09	6.16	6.23	6.30	6.36	6.43	6.50	6.57	6.64	6.71	6.78	6.85	6.85	**2014**
6.37	6.41	6.46	6.51	6.55	6.60	6.64	6.69	6.74	6.78	6.83	6.87	6.87	**2015**
6.49	6.53	6.58	6.62	6.67	6.71	6.76	6.80	6.85	6.90	6.94	6.99	6.99	**2016**
6.49	6.53	6.58	6.62	6.67	6.71	6.76	6.80	6.85	6.90	6.94	6.99	6.99	**2017**
6.49	6.53	6.58	6.62	6.67	6.71	6.76	6.80	6.85	6.90	6.94	6.99	6.99	**2018**
6.49	6.53	6.58	6.62	6.67	6.71	6.76	6.80	6.85	6.90	6.94	6.99	6.99	**2019**
6.49	6.53	6.58	6.62	6.67	6.71	6.76	6.80	6.85	6.90	6.94	6.99	6.99	**2020**
6.49	6.53	6.58	6.62	6.67	6.71	6.76	6.80	6.85	6.90	6.94	6.99	6.99	**2021**
6.49	6.53	6.58	6.62	6.67	6.71	6.76	6.80	6.85	6.90	6.94	6.99	6.99	**2022**
6.49	6.53	6.58	6.62	6.67	6.71	6.76	6.80	6.85	6.90	6.94	6.99	6.99	**2023**
6.49	6.53	6.58	6.62	6.67	6.71	6.76	6.80	6.85	6.90	6.94	6.99	6.99	**2024**
6.49	6.53	6.58	6.62	6.67	6.71	6.76	6.80	6.85	6.90	6.94	6.99	6.99	**2025**
6.49	6.53	6.58	6.62	6.67	6.71	6.76	6.80	6.85	6.90	6.94	6.99	6.99	**2026**
6.49	6.53	6.58	6.62	6.67	6.71	6.76	6.80	6.85	6.90	6.94	6.99	6.99	**2027**
6.49	6.53	6.58	6.62	6.67	6.71	6.76	6.80	6.85	6.90	6.94	6.99	6.99	**2028**
6.49	6.53	6.58	6.62	6.67	6.71	6.76	6.80	6.85	6.90	6.94	6.99	6.99	**2029**
6.49	6.53	6.58	6.62	6.67	6.71	6.76	6.80	6.85	6.90	6.94	6.99	6.99	**2030**
6.49	6.53	6.58	6.62	6.67	6.71	6.76	6.80	6.85	6.90	6.94	6.99	6.99	**2031**
6.49	6.53	6.58	6.62	6.67	6.71	6.76	6.80	6.85	6.90	6.94	6.99	6.99	**2032**
6.49	6.53	6.58	6.62	6.67	6.71	6.76	6.80	6.85	6.90	6.94	6.99	6.99	**2033**
6.49	6.53	6.58	6.62	6.67	6.71	6.76	6.80	6.85	6.90	6.94	6.99	6.99	**2034**
6.49	6.53	6.58	6.62	6.67	6.71	6.76	6.80	6.85	6.90	6.94	6.99	6.99	**2035**
6.49	6.53	6.58	6.62	6.67	6.71	6.76	6.80	6.85	6.90	6.94	6.99	6.99	**2036**
6.49	6.53	6.58	6.62	6.67	6.71	6.76	6.80	6.85	6.90	6.94	6.99	6.99	**2037**
6.49	6.53	6.58	6.62	6.67	6.71	6.76	6.80	6.85	6.90	6.94	6.99	6.99	**2038**
6.49	6.53	6.58	6.62	6.67	6.71	6.76	6.80	6.85	6.90	6.94	6.99	6.99	**2039**
6.49	6.53	6.58	6.62	6.67	6.71	6.76	6.80	6.85	6.90	6.94	6.99	6.99	**2040**

Table 7

BPA FY 2011 THIRD-PARTY TAXABLE BORROWING RATE FORECAST 1/

BPA Fiscal Years 2011 - 2040

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	16 Year	17 Year	18 Year
2011	0.96	1.32	1.79	2.26	2.73	3.01	3.30	3.58	3.87	4.16	4.22	4.27	4.33	4.39	4.45	4.51	4.57	4.63
2012	3.24	3.33	3.65	3.97	4.29	4.47	4.66	4.84	5.02	5.20	5.24	5.29	5.33	5.37	5.42	5.46	5.50	5.55
2013	5.08	4.98	5.18	5.37	5.57	5.67	5.76	5.86	5.96	6.06	6.09	6.12	6.15	6.18	6.21	6.24	6.27	6.30
2014	4.98	5.05	5.24	5.43	5.62	5.72	5.82	5.92	6.02	6.12	6.14	6.17	6.20	6.23	6.26	6.29	6.32	6.35
2015	5.24	5.38	5.57	5.76	5.95	6.05	6.16	6.27	6.37	6.48	6.51	6.54	6.57	6.60	6.62	6.65	6.68	6.71
2016	5.39	5.52	5.71	5.89	6.08	6.19	6.29	6.40	6.51	6.61	6.64	6.67	6.70	6.73	6.76	6.79	6.82	6.85
2017	5.39	5.52	5.71	5.89	6.08	6.19	6.29	6.40	6.51	6.61	6.64	6.67	6.70	6.73	6.76	6.79	6.82	6.85
2018	5.39	5.52	5.71	5.89	6.08	6.19	6.29	6.40	6.51	6.61	6.64	6.67	6.70	6.73	6.76	6.79	6.82	6.85
2019	5.39	5.52	5.71	5.89	6.08	6.19	6.29	6.40	6.51	6.61	6.64	6.67	6.70	6.73	6.76	6.79	6.82	6.85
2020	5.39	5.52	5.71	5.89	6.08	6.19	6.29	6.40	6.51	6.61	6.64	6.67	6.70	6.73	6.76	6.79	6.82	6.85
2021	5.39	5.52	5.71	5.89	6.08	6.19	6.29	6.40	6.51	6.61	6.64	6.67	6.70	6.73	6.76	6.79	6.82	6.85
2022	5.39	5.52	5.71	5.89	6.08	6.19	6.29	6.40	6.51	6.61	6.64	6.67	6.70	6.73	6.76	6.79	6.82	6.85
2023	5.39	5.52	5.71	5.89	6.08	6.19	6.29	6.40	6.51	6.61	6.64	6.67	6.70	6.73	6.76	6.79	6.82	6.85
2024	5.39	5.52	5.71	5.89	6.08	6.19	6.29	6.40	6.51	6.61	6.64	6.67	6.70	6.73	6.76	6.79	6.82	6.85
2025	5.39	5.52	5.71	5.89	6.08	6.19	6.29	6.40	6.51	6.61	6.64	6.67	6.70	6.73	6.76	6.79	6.82	6.85
2026	5.39	5.52	5.71	5.89	6.08	6.19	6.29	6.40	6.51	6.61	6.64	6.67	6.70	6.73	6.76	6.79	6.82	6.85
2027	5.39	5.52	5.71	5.89	6.08	6.19	6.29	6.40	6.51	6.61	6.64	6.67	6.70	6.73	6.76	6.79	6.82	6.85
2028	5.39	5.52	5.71	5.89	6.08	6.19	6.29	6.40	6.51	6.61	6.64	6.67	6.70	6.73	6.76	6.79	6.82	6.85
2029	5.39	5.52	5.71	5.89	6.08	6.19	6.29	6.40	6.51	6.61	6.64	6.67	6.70	6.73	6.76	6.79	6.82	6.85
2030	5.39	5.52	5.71	5.89	6.08	6.19	6.29	6.40	6.51	6.61	6.64	6.67	6.70	6.73	6.76	6.79	6.82	6.85
2031	5.39	5.52	5.71	5.89	6.08	6.19	6.29	6.40	6.51	6.61	6.64	6.67	6.70	6.73	6.76	6.79	6.82	6.85
2032	5.39	5.52	5.71	5.89	6.08	6.19	6.29	6.40	6.51	6.61	6.64	6.67	6.70	6.73	6.76	6.79	6.82	6.85
2033	5.39	5.52	5.71	5.89	6.08	6.19	6.29	6.40	6.51	6.61	6.64	6.67	6.70	6.73	6.76	6.79	6.82	6.85
2034	5.39	5.52	5.71	5.89	6.08	6.19	6.29	6.40	6.51	6.61	6.64	6.67	6.70	6.73	6.76	6.79	6.82	6.85
2035	5.39	5.52	5.71	5.89	6.08	6.19	6.29	6.40	6.51	6.61	6.64	6.67	6.70	6.73	6.76	6.79	6.82	6.85
2036	5.39	5.52	5.71	5.89	6.08	6.19	6.29	6.40	6.51	6.61	6.64	6.67	6.70	6.73	6.76	6.79	6.82	6.85
2037	5.39	5.52	5.71	5.89	6.08	6.19	6.29	6.40	6.51	6.61	6.64	6.67	6.70	6.73	6.76	6.79	6.82	6.85
2038	5.39	5.52	5.71	5.89	6.08	6.19	6.29	6.40	6.51	6.61	6.64	6.67	6.70	6.73	6.76	6.79	6.82	6.85
2040	5.39	5.52	5.71	5.89	6.08	6.19	6.29	6.40	6.51	6.61	6.64	6.67	6.70	6.73	6.76	6.79	6.82	6.85

1/ Global Insight: The U.S. Economy: 30-Year Focus, September 2010 Forecast, Base Case

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
4.69	4.75	4.81	4.87	4.93	4.99	5.04	5.10	5.16	5.22	5.28	5.34	5.34	**2011**
5.59	5.63	5.67	5.72	5.76	5.80	5.85	5.89	5.93	5.97	6.02	6.06	6.06	**2012**
6.33	6.37	6.40	6.43	6.46	6.49	6.52	6.55	6.58	6.61	6.64	6.67	6.67	**2013**
6.38	6.41	6.43	6.46	6.49	6.52	6.55	6.58	6.61	6.64	6.67	6.70	6.70	**2014**
6.74	6.77	6.80	6.83	6.86	6.88	6.91	6.94	6.97	7.00	7.03	7.06	7.06	**2015**
6.87	6.90	6.93	6.96	6.99	7.02	7.05	7.08	7.10	7.13	7.16	7.19	7.19	**2016**
6.87	6.90	6.93	6.96	6.99	7.02	7.05	7.08	7.10	7.13	7.16	7.19	7.19	**2017**
6.87	6.90	6.93	6.96	6.99	7.02	7.05	7.08	7.10	7.13	7.16	7.19	7.19	**2018**
6.87	6.90	6.93	6.96	6.99	7.02	7.05	7.08	7.10	7.13	7.16	7.19	7.19	**2019**
6.87	6.90	6.93	6.96	6.99	7.02	7.05	7.08	7.10	7.13	7.16	7.19	7.19	**2020**
6.87	6.90	6.93	6.96	6.99	7.02	7.05	7.08	7.10	7.13	7.16	7.19	7.19	**2021**
6.87	6.90	6.93	6.96	6.99	7.02	7.05	7.08	7.10	7.13	7.16	7.19	7.19	**2022**
6.87	6.90	6.93	6.96	6.99	7.02	7.05	7.08	7.10	7.13	7.16	7.19	7.19	**2023**
6.87	6.90	6.93	6.96	6.99	7.02	7.05	7.08	7.10	7.13	7.16	7.19	7.19	**2024**
6.87	6.90	6.93	6.96	6.99	7.02	7.05	7.08	7.10	7.13	7.16	7.19	7.19	**2025**
6.87	6.90	6.93	6.96	6.99	7.02	7.05	7.08	7.10	7.13	7.16	7.19	7.19	**2026**
6.87	6.90	6.93	6.96	6.99	7.02	7.05	7.08	7.10	7.13	7.16	7.19	7.19	**2027**
6.87	6.90	6.93	6.96	6.99	7.02	7.05	7.08	7.10	7.13	7.16	7.19	7.19	**2028**
6.87	6.90	6.93	6.96	6.99	7.02	7.05	7.08	7.10	7.13	7.16	7.19	7.19	**2029**
6.87	6.90	6.93	6.96	6.99	7.02	7.05	7.08	7.10	7.13	7.16	7.19	7.19	**2030**
6.87	6.90	6.93	6.96	6.99	7.02	7.05	7.08	7.10	7.13	7.16	7.19	7.19	**2031**
6.87	6.90	6.93	6.96	6.99	7.02	7.05	7.08	7.10	7.13	7.16	7.19	7.19	**2032**
6.87	6.90	6.93	6.96	6.99	7.02	7.05	7.08	7.10	7.13	7.16	7.19	7.19	**2033**
6.87	6.90	6.93	6.96	6.99	7.02	7.05	7.08	7.10	7.13	7.16	7.19	7.19	**2034**
6.87	6.90	6.93	6.96	6.99	7.02	7.05	7.08	7.10	7.13	7.16	7.19	7.19	**2035**
6.87	6.90	6.93	6.96	6.99	7.02	7.05	7.08	7.10	7.13	7.16	7.19	7.19	**2036**
6.87	6.90	6.93	6.96	6.99	7.02	7.05	7.08	7.10	7.13	7.16	7.19	7.19	**2037**
6.87	6.90	6.93	6.96	6.99	7.02	7.05	7.08	7.10	7.13	7.16	7.19	7.19	**2038**
6.87	6.90	6.93	6.96	6.99	7.02	7.05	7.08	7.10	7.13	7.16	7.19	7.19	**2040**

Table 8

BPA FY 2011 THIRD-PARTY TAX-EXEMPT BORROWING RATE FORECAST 1/

BPA Fiscal Years 2011 - 2040

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	16 Year	17 Year	18 Year
2011	0.66	0.92	1.25	1.57	1.89	2.12	2.35	2.58	2.81	3.04	3.09	3.15	3.20	3.25	3.31	3.36	3.41	3.47
2012	2.01	2.22	2.46	2.70	2.94	3.11	3.29	3.46	3.63	3.81	3.85	3.90	3.94	3.99	4.03	4.08	4.12	4.17
2013	3.10	3.28	3.45	3.62	3.79	3.92	4.05	4.17	4.30	4.42	4.46	4.50	4.54	4.57	4.61	4.65	4.69	4.73
2014	3.21	3.38	3.53	3.69	3.84	3.95	4.07	4.18	4.29	4.41	4.44	4.47	4.50	4.53	4.56	4.59	4.62	4.65
2015	3.45	3.62	3.77	3.92	4.07	4.18	4.30	4.41	4.53	4.65	4.67	4.70	4.73	4.76	4.79	4.82	4.85	4.88
2016	3.54	3.71	3.86	4.01	4.16	4.27	4.39	4.51	4.62	4.74	4.77	4.80	4.83	4.86	4.89	4.92	4.94	4.97
2017	3.54	3.71	3.86	4.01	4.16	4.27	4.39	4.51	4.62	4.74	4.77	4.80	4.83	4.86	4.89	4.92	4.94	4.97
2018	3.54	3.71	3.86	4.01	4.16	4.27	4.39	4.51	4.62	4.74	4.77	4.80	4.83	4.86	4.89	4.92	4.94	4.97
2019	3.54	3.71	3.86	4.01	4.16	4.27	4.39	4.51	4.62	4.74	4.77	4.80	4.83	4.86	4.89	4.92	4.94	4.97
2020	3.54	3.71	3.86	4.01	4.16	4.27	4.39	4.51	4.62	4.74	4.77	4.80	4.83	4.86	4.89	4.92	4.94	4.97
2021	3.54	3.71	3.86	4.01	4.16	4.27	4.39	4.51	4.62	4.74	4.77	4.80	4.83	4.86	4.89	4.92	4.94	4.97
2022	3.54	3.71	3.86	4.01	4.16	4.27	4.39	4.51	4.62	4.74	4.77	4.80	4.83	4.86	4.89	4.92	4.94	4.97
2023	3.54	3.71	3.86	4.01	4.16	4.27	4.39	4.51	4.62	4.74	4.77	4.80	4.83	4.86	4.89	4.92	4.94	4.97
2024	3.54	3.71	3.86	4.01	4.16	4.27	4.39	4.51	4.62	4.74	4.77	4.80	4.83	4.86	4.89	4.92	4.94	4.97
2025	3.54	3.71	3.86	4.01	4.16	4.27	4.39	4.51	4.62	4.74	4.77	4.80	4.83	4.86	4.89	4.92	4.94	4.97
2026	3.54	3.71	3.86	4.01	4.16	4.27	4.39	4.51	4.62	4.74	4.77	4.80	4.83	4.86	4.89	4.92	4.94	4.97
2027	3.54	3.71	3.86	4.01	4.16	4.27	4.39	4.51	4.62	4.74	4.77	4.80	4.83	4.86	4.89	4.92	4.94	4.97
2028	3.54	3.71	3.86	4.01	4.16	4.27	4.39	4.51	4.62	4.74	4.77	4.80	4.83	4.86	4.89	4.92	4.94	4.97
2029	3.54	3.71	3.86	4.01	4.16	4.27	4.39	4.51	4.62	4.74	4.77	4.80	4.83	4.86	4.89	4.92	4.94	4.97
2030	3.54	3.71	3.86	4.01	4.16	4.27	4.39	4.51	4.62	4.74	4.77	4.80	4.83	4.86	4.89	4.92	4.94	4.97
2031	3.54	3.71	3.86	4.01	4.16	4.27	4.39	4.51	4.62	4.74	4.77	4.80	4.83	4.86	4.89	4.92	4.94	4.97
2032	3.54	3.71	3.86	4.01	4.16	4.27	4.39	4.51	4.62	4.74	4.77	4.80	4.83	4.86	4.89	4.92	4.94	4.97
2033	3.54	3.71	3.86	4.01	4.16	4.27	4.39	4.51	4.62	4.74	4.77	4.80	4.83	4.86	4.89	4.92	4.94	4.97
2034	3.54	3.71	3.86	4.01	4.16	4.27	4.39	4.51	4.62	4.74	4.77	4.80	4.83	4.86	4.89	4.92	4.94	4.97
2035	3.54	3.71	3.86	4.01	4.16	4.27	4.39	4.51	4.62	4.74	4.77	4.80	4.83	4.86	4.89	4.92	4.94	4.97
2036	3.54	3.71	3.86	4.01	4.16	4.27	4.39	4.51	4.62	4.74	4.77	4.80	4.83	4.86	4.89	4.92	4.94	4.97
2037	3.54	3.71	3.86	4.01	4.16	4.27	4.39	4.51	4.62	4.74	4.77	4.80	4.83	4.86	4.89	4.92	4.94	4.97
2038	3.54	3.71	3.86	4.01	4.16	4.27	4.39	4.51	4.62	4.74	4.77	4.80	4.83	4.86	4.89	4.92	4.94	4.97
2039	3.54	3.71	3.86	4.01	4.16	4.27	4.39	4.51	4.62	4.74	4.77	4.80	4.83	4.86	4.89	4.92	4.94	4.97
2040	3.54	3.71	3.86	4.01	4.16	4.27	4.39	4.51	4.62	4.74	4.77	4.80	4.83	4.86	4.89	4.92	4.94	4.97

1/ Global Insight: The U.S. Economy: 30-Year Focus, September 2010 Forecast, Base Case

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
3.52	3.57	3.63	3.68	3.74	3.79	3.84	3.90	3.95	4.00	4.06	4.11	4.11	**2011**
4.21	4.26	4.30	4.35	4.39	4.44	4.48	4.53	4.57	4.62	4.66	4.71	4.71	**2012**
4.76	4.80	4.84	4.88	4.91	4.95	4.99	5.03	5.06	5.10	5.14	5.18	5.18	**2013**
4.68	4.71	4.74	4.78	4.81	4.84	4.87	4.90	4.93	4.96	4.99	5.02	5.02	**2014**
4.91	4.94	4.96	4.99	5.02	5.05	5.08	5.11	5.14	5.17	5.20	5.23	5.23	**2015**
5.00	5.03	5.06	5.09	5.12	5.15	5.18	5.21	5.24	5.26	5.29	5.32	5.32	**2016**
5.00	5.03	5.06	5.09	5.12	5.15	5.18	5.21	5.24	5.26	5.29	5.32	5.32	**2017**
5.00	5.03	5.06	5.09	5.12	5.15	5.18	5.21	5.24	5.26	5.29	5.32	5.32	**2018**
5.00	5.03	5.06	5.09	5.12	5.15	5.18	5.21	5.24	5.26	5.29	5.32	5.32	**2019**
5.00	5.03	5.06	5.09	5.12	5.15	5.18	5.21	5.24	5.26	5.29	5.32	5.32	**2020**
5.00	5.03	5.06	5.09	5.12	5.15	5.18	5.21	5.24	5.26	5.29	5.32	5.32	**2021**
5.00	5.03	5.06	5.09	5.12	5.15	5.18	5.21	5.24	5.26	5.29	5.32	5.32	**2022**
5.00	5.03	5.06	5.09	5.12	5.15	5.18	5.21	5.24	5.26	5.29	5.32	5.32	**2023**
5.00	5.03	5.06	5.09	5.12	5.15	5.18	5.21	5.24	5.26	5.29	5.32	5.32	**2024**
5.00	5.03	5.06	5.09	5.12	5.15	5.18	5.21	5.24	5.26	5.29	5.32	5.32	**2025**
5.00	5.03	5.06	5.09	5.12	5.15	5.18	5.21	5.24	5.26	5.29	5.32	5.32	**2026**
5.00	5.03	5.06	5.09	5.12	5.15	5.18	5.21	5.24	5.26	5.29	5.32	5.32	**2027**
5.00	5.03	5.06	5.09	5.12	5.15	5.18	5.21	5.24	5.26	5.29	5.32	5.32	**2028**
5.00	5.03	5.06	5.09	5.12	5.15	5.18	5.21	5.24	5.26	5.29	5.32	5.32	**2029**
5.00	5.03	5.06	5.09	5.12	5.15	5.18	5.21	5.24	5.26	5.29	5.32	5.32	**2030**
5.00	5.03	5.06	5.09	5.12	5.15	5.18	5.21	5.24	5.26	5.29	5.32	5.32	**2031**
5.00	5.03	5.06	5.09	5.12	5.15	5.18	5.21	5.24	5.26	5.29	5.32	5.32	**2032**
5.00	5.03	5.06	5.09	5.12	5.15	5.18	5.21	5.24	5.26	5.29	5.32	5.32	**2033**
5.00	5.03	5.06	5.09	5.12	5.15	5.18	5.21	5.24	5.26	5.29	5.32	5.32	**2034**
5.00	5.03	5.06	5.09	5.12	5.15	5.18	5.21	5.24	5.26	5.29	5.32	5.32	**2035**
5.00	5.03	5.06	5.09	5.12	5.15	5.18	5.21	5.24	5.26	5.29	5.32	5.32	**2036**
5.00	5.03	5.06	5.09	5.12	5.15	5.18	5.21	5.24	5.26	5.29	5.32	5.32	**2037**
5.00	5.03	5.06	5.09	5.12	5.15	5.18	5.21	5.24	5.26	5.29	5.32	5.32	**2038**
5.00	5.03	5.06	5.09	5.12	5.15	5.18	5.21	5.24	5.26	5.29	5.32	5.32	**2039**
5.00	5.03	5.06	5.09	5.12	5.15	5.18	5.21	5.24	5.26	5.29	5.32	5.32	**2040**

Table 9

BPA FY 2011 FERC BORROWING RATE (Bank Prime) FORECAST 1/

Calendar/Fiscal Years 2011 - 2040

YEAR	(A) FERC RATE Calendar Year	(B) FERC RATE Fiscal Year
2011	3.31	3.29
2012	5.28	4.79
2013	6.50	6.19
2014	7.13	6.98
2015	7.75	7.60
2016	7.75	7.75
2017	7.75	7.75
2018	7.75	7.75
2019	7.75	7.75
2020	7.75	7.75
2021	7.75	7.75
2022	7.75	7.75
2023	7.75	7.75
2024	7.75	7.75
2025	7.75	7.75
2026	7.75	7.75
2027	7.75	7.75
2028	7.75	7.75
2029	7.75	7.75
2030	7.75	7.75
2031	7.75	7.75
2032	7.75	7.75
2033	7.75	7.75
2034	7.75	7.75
2035	7.75	7.75
2036	7.75	7.75
2037	7.75	7.75
2038	7.75	7.75
2039	7.75	7.75
2040	7.75	7.75

1/ BPA Forecast FY 2011; Global Insight CY 2010.Q3 long-term outlook.
The U.S. Economy: 30-Year Focus, September 2010 Forecast, Base Case

Table 10

BPA FY 2011 MAY 3-MONTH LIBOR RATE FORECAST 1/

Calendar/Fiscal Years 2011 - 2039

YEAR	(A) 3-Mo LIBOR Calendar Year	(B) 3-Mo LIBOR Fiscal Year
2011	0.89	0.78
2012	3.10	2.55
2013	4.20	3.92
2014	4.77	4.63
2015	5.28	5.15
2016	5.28	5.28
2017	5.28	5.28
2018	5.28	5.28
2019	5.28	5.28
2020	5.28	5.28
2021	5.28	5.28
2022	5.28	5.28
2023	5.28	5.28
2024	5.28	5.28
2025	5.28	5.28
2026	5.28	5.28
2027	5.28	5.28
2028	5.28	5.28
2029	5.28	5.28
2030	5.28	5.28
2031	5.28	5.28
2032	5.28	5.28
2033	5.28	5.28
2034	5.28	5.28
2035	5.28	5.28
2036	5.28	5.28
2037	5.28	5.28
2038	5.28	5.28
2039	5.28	5.28
2040	5.28	5.28

1/ BPA Forecast FY 2011; Global Insight CY 2010.Q3 long-term outlook.
The U.S. Economy: 30-Year Focus, September 2010 Forecast, Base Case

TABLE 11

COMPARISON OF FY 2011 INFLATION FORECAST COMPONENTS

CALENDAR/FISCAL YEAR FORECASTS BPA 2010 vs. 2009.Q2

BPA Fiscal Years 2011 - 2040

	A FY 2011 1/ CALENDAR YEAR GDP PRICE DEFLATOR (%)	B FY 2011 1/ FISCAL YEAR GDP PRICE DEFLATOR (%)	C FY 2011 2/ FISCAL YEAR CUMULATIVE PRICE DEFLATOR (Base Year 2011)	D FY 2010 3/ FISCAL YEAR FY PRICE DEFLATOR (%)	E FY 2010 3/ FISCAL YEAR FY CUMULATIVE PRICE DEFLATOR (Base Year 2010)	F CHANGE IN THE FY PRICE DEFLATOR (%)	G CHANGE IN THE FY CUMULATIVE PRICE DEFLATOR
2011	1.24%	1.15%	1.006	1.38%	1.019	-0.23%	-0.014
2012	1.40%	1.36%	1.019	1.49%	1.035	-0.13%	-0.015
2013	1.65%	1.59%	1.036	1.61%	1.051	-0.02%	-0.016
2014	1.87%	1.82%	1.054	1.73%	1.070	0.09%	-0.015
2015	1.83%	1.84%	1.074	1.72%	1.088	0.12%	-0.014
2016	1.78%	1.79%	1.093	1.72%	1.107	0.08%	-0.013
2017	1.85%	1.83%	1.113	1.75%	1.126	0.08%	-0.013
2018	1.90%	1.89%	1.134	1.78%	1.146	0.11%	-0.012
2019	1.86%	1.87%	1.155	1.73%	1.166	0.14%	-0.010
2020	1.89%	1.88%	1.177	1.70%	1.186	0.18%	-0.009
2021	1.82%	1.84%	1.199	1.72%	1.206	0.12%	-0.007
2022	1.71%	1.74%	1.220	1.70%	1.227	0.04%	-0.007
2023	1.71%	1.71%	1.240	1.68%	1.247	0.03%	-0.007
2024	1.72%	1.72%	1.262	1.69%	1.268	0.03%	-0.006
2025	1.71%	1.71%	1.283	1.69%	1.290	0.03%	-0.006
2026	1.73%	1.72%	1.305	1.70%	1.312	0.02%	-0.006
2027	1.77%	1.76%	1.328	1.72%	1.334	0.04%	-0.006
2028	1.80%	1.80%	1.352	1.71%	1.357	0.08%	-0.005
2029	1.79%	1.79%	1.377	1.75%	1.381	0.05%	-0.004
2030	1.78%	1.78%	1.401	1.75%	1.405	0.03%	-0.004
2031	1.77%	1.77%	1.426	1.75%	1.429	0.02%	-0.003
2032	1.79%	1.79%	1.451	1.72%	1.454	0.06%	-0.003
2033	1.78%	1.78%	1.477	1.70%	1.479	0.08%	-0.001
2034	1.77%	1.77%	1.503	1.71%	1.504	0.06%	-0.001
2035	1.75%	1.75%	1.530	1.72%	1.530	0.03%	0.000
2036	1.77%	1.77%	1.557	1.72%	1.556	0.05%	0.001
2037	1.81%	1.80%	1.585	1.71%	1.583	0.09%	0.002
2038	1.88%	1.86%	1.614	1.72%	1.610	0.15%	0.004
2039	1.82%	1.81%	1.644	1.81%	1.639	0.00%	0.004
2040	1.82%	1.81%	1.673	0.00%	0.000	0.00%	

1/ BPA FY 2011 Forecast; Global Insight CY 2010.Q3 long-term outlook. The U.S. Economy: 30-Year Focus, September 2010 Forecast, Base Case; The U.S. Economy: 30-Year Focus, September 2010 Forecast, Base Case.

2/ Fiscal Year Cumulative Price Deflator escalates to midyear dollars. The first year, 2011, is determined as follows: 1.006 = [(1.15/100)*.5] + 1. An example of subsequent year cumulative growth such as in 2012 is found as: 1.019 = [1+ (1.36/100)]*1.006.

3/ BPA Forecast FY 2010; Global Insight CY 2009.Q3 long-term outlook. The U.S. Economy: 30-Year Focus Forecast, Base Case.

TABLE 12

FY 2011 INFLATION FORECAST COMPARISONS 1/
GROSS DOMESTIC PRODUCT PRICE DEFLATOR INDEXES

BPA Fiscal Years 2011 - 2040

YEAR	(A) FY 2011 2/ CUMULATIVE PRICE DEFLATOR INDEX (Base Year 2011)	(B) FY 2010 3/ CUMULATIVE PRICE DEFLATOR INDEX (Base Year 2010)	(C) (A - B) DIFFERENCE
2011	1.006	1.019	-0.014
2012	1.019	1.035	-0.015
2013	1.036	1.051	-0.016
2014	1.054	1.070	-0.015
2015	1.074	1.088	-0.014
2016	1.093	1.107	-0.013
2017	1.113	1.126	-0.013
2018	1.134	1.146	-0.012
2019	1.155	1.166	-0.010
2020	1.177	1.186	-0.009
2021	1.199	1.206	-0.007
2022	1.220	1.227	-0.007
2023	1.240	1.247	-0.007
2024	1.262	1.268	-0.006
2025	1.283	1.290	-0.006
2026	1.305	1.312	-0.006
2027	1.328	1.334	-0.006
2028	1.352	1.357	-0.005
2029	1.377	1.381	-0.004
2030	1.401	1.405	-0.004
2031	1.426	1.429	-0.003
2032	1.451	1.454	-0.003
2033	1.477	1.479	-0.001
2034	1.503	1.504	-0.001
2035	1.530	1.530	0.000
2036	1.557	1.556	0.001
2037	1.585	1.583	0.002
2038	1.614	1.610	0.004
2039	1.644	1.639	0.004
2040	1.673		

1/ Fiscal Year Cumulative Price Deflator escalates to midyear dollars. The first year, 2011, is determined as follows: 1.006 = [(1.151/100)*.5] + 1. An example of subsequent year cumulative growth such as in 2012 is found as 1.019 = [1+ (1.136/100)]*1.006

21/ BPA FY 2011 Forecast; Global Insight CY 2010.Q3 long-term outlook. The U.S. Economy: 30-Year Focus, September 2010 Forecast, Base Case; The U.S. Economy: 30-Year Focus, September 2010 Forecast, Base Case.

3/ BPA Forecast FY 2010; Global Insight CY 2009.Q3 long-term outlook. The U.S. Economy: 30-Year Focus 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 Treasury reflecting projected outlays for BPA transmission, construction, and environmental programs during the cost evaluation period (FY 2011-2013). 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 2011 - 2013
($000s)

	A	B	C	D	E
	Fiscal Year	Description	Interest Rate	Term	Total Borrowing
1	2011	Construction	2.60%	5	26,000
2		Construction	3.49%	15	45,000
3		Construction	4.34%	15	20,000
4		Construction	4.95%	25	50,000
5		Construction	5.43%	25	50,000
6		Construction	4.94%	27	55,000
7		Construction	4.79%	28	40,000
8		Construction	5.75%	28	20,000
9		Construction	5.86%	29	40,000
10		Construction	5.86%	29	20,000
11					**366,000**
12					
13	2012	Environment	4.88%	15	4,989
14		Construction	3.89%	16	26,775
15		Construction	6.01%	35	532,651
16					**564,415**
17					
18	2013	Environment	5.45%	15	5,086
19		Construction	4.81%	6	24,416
20		Construction	6.28%	35	583,220
21					**612,722**

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 that are typically recovered in power rates. This is known as Debt Service Reassignment.

8.2 Lease-Purchase Agreements

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 for other capital projects. The resulting payment streams are treated as debt service in the repayment study. Table 8-1 displays the consolidated payment stream.

Table 8-1: Lease-Purchase Payment Stream

	BPA FY	Principal	Interest	Expenses	CIF	Total
1	2011	-	21,560,368	682,182	(2,653,596)	19,588,954
2	2012	-	22,097,399	697,101	(1,200,909)	21,593,591
3	2013	-	22,181,401	712,819	(136,463)	22,757,756
4	2014	-	22,466,478	618,697	-	23,085,175
5	2015	-	27,703,135	269,179	-	27,972,314
6	2016	-	30,903,135	57,984	-	30,961,119
7	2017	-	31,472,499	59,823	-	31,532,322
8	2018	-	31,468,767	61,736	-	31,530,503
9	2019	-	31,468,767	63,725	-	31,532,492
10	2020	-	31,479,963	65,794	-	31,545,756
11	2021	-	31,472,499	67,946	-	31,540,445
12	2022	-	31,468,767	70,184	-	31,538,951
13	2023	-	31,468,767	72,512	-	31,541,279
14	2024	-	31,479,963	74,932	-	31,554,895
15	2025	-	31,472,499	77,449	-	31,549,948
16	2026	-	31,468,767	80,067	-	31,548,834
17	2027	-	31,468,767	82,790	-	31,551,557
18	2028	-	31,479,963	85,621	-	31,565,584
19	2029	-	31,472,499	88,566	-	31,561,065
20	2030	-	31,468,767	91,629	-	31,560,396
21	2031	-	31,468,767	94,814	-	31,563,581
22	2032	-	31,479,963	98,126	-	31,578,089
23	2033	89,688,750	31,472,499	101,571	-	121,262,820
24	2034	29,896,250	26,644,409	25,610	-	56,566,270
25	2035	-	25,036,290	-	-	25,036,290
26	2036	15,255,349	25,047,485	-	-	40,302,834
27	2037	134,996,919	24,049,950	-	-	159,046,869
28	2038	174,735,516	14,979,395	-	-	189,714,912
29	2039	41,890,942	2,921,898	-	-	44,812,839
30	**Total**	**486,463,726**	**800,623,826**	**4,400,854**	**(3,990,968)**	**1,287,497,438**

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.

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 in 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 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.

The next section is an explanation of how the debt service stream associated with DSR is calculated. The allocation of DOP cash flows to transmission and generation can be different each fiscal year. For illustration purposes, the following explanation of the process for determining the transmission payment obligation uses data from the 2008 EN bond issuance.

8.4 Calculation of Debt Service Reassignment

Prior to calculating the transmission DSR obligation, two sets of data are required. First, the final pricing data from the EN refunding forms the basis of all calculations. Second, the amount of debt service assigned to the transmission function for repayment is determined based on the allocation of the Federal principal payment between transmission and generation.

Step 1: Determine the Total Base Debt Service.

The total debt service is the sum of the debt service on the newly issued EN bonds assigned to Transmission plus the transaction costs associated with the issuance of the bonds, as shown on Table 8-2.

Table 8-2: Base Debt Service for Transmission

		A	B	C	D	E	F	G
	EN	New EN Bonds		Transaction Costs		Total		
	Fiscal Year	Principal	Interest	Principal	Interest	Principal	Interest	Total
1	2010	-	8,033,890	-	107,845	-	8,141,735	8,141,735
2	2011	-	6,633,488	-	89,046	-	6,722,534	6,722,534
3	2012	-	6,633,488	-	89,046	-	6,722,534	6,722,534
4	2013	-	6,633,488	-	89,046	-	6,722,534	6,722,534
5	2014	41,650,000	6,633,488	1,940,000	89,046	43,590,000	6,722,534	50,312,534
6	2015	79,175,000	4,908,088	-	-	79,175,000	4,908,088	84,083,088
7	2016	10,000,000	1,098,950	-	-	10,000,000	1,098,950	11,098,950
8	2017	5,000,000	662,200	-	-	5,000,000	662,200	5,662,200
9	2018	10,000,000	412,200	-	-	10,000,000	412,200	10,412,200
10	**Total**	**145,825,000**	**41,649,278**	**1,940,000**	**464,029**	**147,765,000**	**42,113,307**	**189,878,307**

Step 2: Convert the Base Debt Service to BPA Fiscal Years

The debt service on the newly issued EN bonds is based on the EN July-June fiscal year. The debt service stream is converted into BPA's October–September fiscal year, as shown on Table 8-3.

Table 8-3: Convert to BPA Fiscal Year

		A	B	C
	EN	BPA FY Conversion		
	Fiscal Year	Principal	Interest	Total
1	2010	-	2,288,538	2,288,538
2	2011	-	1,234,621	1,234,621
3	2012	-	1,234,621	1,234,621
4	2013	1,912,118	1,234,621	3,146,739
5	2014	7,046,351	1,228,800	8,275,151
6	2015	6,429,992	1,183,240	7,613,233
7	2016	8,750,000	989,763	9,739,763
8	2017	6,250,000	599,700	6,849,700
9	2018	7,500,000	309,150	7,809,150
10	**Total**	**37,888,462**	**10,303,054**	**48,191,516**

Step 3: Calculate the "Carrying Charge" and "Taxable Note Charge"

The "carrying charge" and "taxable note charge" are necessary because the debt service expense on the newly issued EN bonds begins on July 1, but Transmission's Federal principal payment is not made until September 30. On October 1, the day after the Federal payment has been made, all debt service and other costs associated with DSR are assigned to Transmission. The carrying charge is the interest accrued and debt service payments made from July 1 to October 1. The interest accrued portion of the carrying charge is calculated by multiplying the sum of the Federal Transmission principal retired and the EN transaction costs by one-twelfth of BPA's weighted average cost of capital, then compounding this monthly amount for three months. The carrying charge is treated like a bond with interest at BPA's weighted average cost of capital and spread on a pro-rata basis through the final maturities of the newly issued EN bonds. The

taxable note charge represents the interest costs associated with a loan taken out by EN in order to facilitate the refinancing of EN debt on a tax-exempt basis. The taxable note charge is spread using the same methodology as is used for the carrying charge. The carrying charge and taxable note charge are reflected in Table 8-4.

Step 4: Calculate the Total Payment Obligation for Transmission

The total payment obligation for Transmission is the sum of the base debt service converted from an EN fiscal year to a BPA fiscal year in Table 8-3, the carrying charge, and the taxable note charge, as shown on Table 8-4.

Table 8-4: Total Payment Obligation

		A	B	C	D	E	F	G
	EN	Carrying Charge		Taxable Note Charge		Total Payment Obligation		
	Fiscal Year	Principal	Interest	Principal	Interest	Principal	Interest	Total
1	2010	-	30,636	-	-	-	2,319,174	2,319,174
2	2011	-	30,636	-	-	-	1,265,257	1,265,257
3	2012	-	30,636	-	-	-	1,265,257	1,265,257
4	2013	28,213	30,636	-	-	1,940,331	1,265,257	3,205,588
5	2014	103,969	29,090	-	-	7,150,320	1,257,890	8,408,210
6	2015	94,875	23,392	-	-	6,524,867	1,206,632	7,731,499
7	2016	129,107	18,193	-	-	8,879,107	1,007,955	9,887,062
8	2017	92,219	11,118	-	-	6,342,219	610,818	6,953,037
9	2018	110,663	6,064	-	-	7,610,663	315,214	7,925,877
10	**Total**	**559,045**	**210,400**	**-**	**-**	**38,447,507**	**10,513,454**	**48,960,961**

Step 5: Reshape the Debt Service

The total principal payment obligation is reshaped to equal the total Federal Transmission principal retired in advance due to DSR. The EN principal maturing can differ from the principal on the newly issued EN bonds because municipal bonds are often sold at a premium or discount, based on the market conditions at the time of the sale. With premium bonds, a lower aggregate par amount is issued to pay off the maturing bonds. The opposite is true with discount bonds. BPA made a policy decision that requires the DSR-related Transmission principal obligation to equal the amount of Federal Transmission principal repaid due to DSR.

The calculation of the EN bonds increases or decreases the total principal payments, with corresponding changes to interest. The principal is proportionately recalculated using the ratio of annual principal payments to the total, displayed previously in Table 8-4. The EN principal maturities that were issued at a premium or a discount are adjusted on a pro-rata basis to equal the total amount of Federal Transmission principal repaid. The Solver function in Microsoft Excel 2003® (Excel) is used to calculate the new interest stream for the adjusted principal. The total debt service does not change. *See* Table 8-5.

Table 8-5: Calculate the Debt Service

		A	B	C
	EN	Transmission DSR		
	Fiscal Year	Principal	Interest	Total
1	2010	-	1,304,780	1,304,780
2	2011	-	1,304,780	1,304,780
3	2012	-	1,304,780	1,304,780
4	2013	2,018,681	1,304,780	3,323,461
5	2014	7,439,047	1,238,932	8,677,979
6	2015	6,788,338	996,274	7,784,612
7	2016	9,237,641	774,841	10,012,482
8	2017	6,598,315	473,514	7,071,829
9	2018	7,917,978	258,280	8,176,258
10	**Total**	**40,000,000**	**8,960,961**	**48,960,961**

Refinancing for Savings. EN/BPA in April 2011 closed on the 2011-A bond deal that involved a traditional refinancing for savings. The refinancing for savings included bonds that had been issued as part of the DOP, providing a benefit to both Power and Transmission through debt service savings. A small taxable piece with a 2019 maturity was attributed to Transmission to pay for the bond issuance costs incurred through the financing. The savings to Transmission from the refinancing for savings are shown in Table 8-6.

Table 8-6: Refinancing for Savings Impact to Transmission's DSR Obligation

		A	B	C
	EN	Refinancing for Savings Impact		
	Fiscal Year	Principal	Interest	Total
1	2011	-	(2,421,259)	(2,421,259)
2	2012	23,173	(2,421,259)	(2,398,085)
3	2013	88,951	(2,311,766)	(2,222,815)
4	2014	46,965	(1,843,497)	(1,796,532)
5	2015	(145,363)	(1,287,744)	(1,433,107)
6	2016	(384,883)	(816,112)	(1,200,995)
7	2017	(275,049)	(469,005)	(744,054)
8	2018	261,590	(117,644)	143,947
9	2019	384,616	15,530	400,145
	Total	**(0)**	**(11,672,755)**	**(11,672,755)**

Transmission's total DSR payment obligation and the related relief of Generation's payment obligations are shown in Table 8-6. Transmission's total principal obligation can be higher or lower than the total principal relief for Generation if premium or discount bonds are issued.

Table 8-7: FY 2003–2009 Relief of Generation & Transmission's DSR Obligation

		A	B	C	D	E	F
		Relief of Generation Obligation			Transmission DSR Payment Obligation		
	BPA FY	Principal	Interest	Total	Principal	Interest	Total
	2004	-	16,418,815	16,418,815	-	15,227,105	15,227,105
1	2005	-	27,558,861	27,558,861	-	25,380,111	25,380,111
2	2006	-	35,834,302	35,834,302	-	32,802,639	32,802,639
3	2007	674,279	45,866,305	46,540,584	715,562	42,574,359	43,289,921
4	2008	4,270,748	57,123,915	61,394,663	4,510,058	51,137,080	55,647,138
5	2009	9,949,905	61,873,003	71,822,908	10,407,168	55,971,071	66,378,239
6	2010	11,769	62,518,250	62,530,019	11,965	56,780,635	56,792,600
7	2011	147,244	61,618,043	61,765,286	153,700	54,358,804	54,512,504
8	2012	39,369,233	60,957,241	100,326,474	41,140,856	54,352,072	95,492,928
9	2013	158,322,815	58,287,568	216,610,383	165,716,674	52,555,758	218,272,431
10	2014	166,564,788	48,594,862	215,159,650	175,140,455	45,419,019	220,559,474
11	2015	176,371,927	41,562,741	217,934,667	185,027,562	38,162,980	223,190,542
12	2016	176,913,938	33,671,320	210,585,258	184,985,572	30,380,189	215,365,760
13	2017	191,304,464	24,647,786	215,952,250	199,777,833	22,457,257	222,235,090
14	2018	184,839,124	14,797,165	199,636,289	191,910,093	13,779,903	205,689,997
15	2019	5,121,159	5,264,102	10,385,260	5,221,236	5,128,339	10,349,574
16	2020	19,267,636	5,011,368	24,279,004	19,588,444	4,881,472	24,469,916
17	2021	20,230,102	4,049,516	24,279,619	20,566,936	3,944,552	24,511,488
18	2022	21,238,338	3,039,618	24,277,956	21,591,959	2,960,830	24,552,789
19	2023	22,302,805	1,979,388	24,282,193	22,674,149	1,928,082	24,602,231
20	2024	17,347,934	866,019	18,213,953	17,636,779	843,571	18,480,350
21	**Total**	**1,214,248,207**	**671,540,187**	**1,885,788,394**	**1,266,777,000**	**611,025,828**	**1,877,802,828**

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 midyear 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. In this proposal, BPA has made a similar assumption for substation transformers (BPA sub-account 353.9 to FERC Account 353). After reviewing industry literature available publicly on the Internet, BPA has assigned substation transformers an expected service life of 45 years to match their expected physical life, instead of the 37 years identified by the depreciation study. BPA has assumed that the expected physical life is the service life, rather than the service life identified in the depreciation study, because BPA has found that the expected physical life more accurately represents the lives of these assets. Because transformers step up or step down the voltages that the lines conduct, if BPA upgrades a line the transformers have to be upgraded as well. As a result, it is appropriate to assume that the service life is the expected physical life for both assets.

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. Repayment period replacements for the AC Intertie facilities were calculated separately so that the contributions made toward those replacements by non-Federal capacity owners could be properly credited in the repayment studies. For historical plant, the plant investment in each of the lines and substations composing the AC Intertie System was apportioned among the years on the basis of data for the same line or substation in a recent plant investment file. These investments by year were accumulated for all lines and substations to

obtain historical plant investment by year. These annual investments were apportioned among land and the major FERC accounts on the same basis as the total lines and substations.

The cost evaluation period data for the AC Intertie was then processed by the replacement methodology described above. The results are the future replacements for the total AC Intertie. 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 upfront 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 2012

($000s)

		A	B	C
	FY	Amount	Rate	Due
1	2013	138,091	6.010%	2048
2	2014	141,230	6.010%	2049
3	2015	143,918	6.010%	2050
4	2016	147,341	6.010%	2051
5	2017	150,869	6.010%	2052
6	2018	153,885	6.010%	2053
7	2019	156,476	6.010%	2054
8	2020	159,889	6.010%	2055
9	2021	164,358	6.010%	2056
10	2022	167,849	6.010%	2057
11	2023	171,638	6.010%	2058
12	2024	175,385	6.010%	2059
13	2025	178,838	6.010%	2060
14	2026	183,118	6.010%	2061
15	2027	186,688	6.010%	2062
16	2028	190,462	6.010%	2063
17	2029	193,831	6.010%	2064
18	2030	198,274	6.010%	2065
19	2031	202,592	6.010%	2066
20	2032	206,196	6.010%	2067
21	2033	210,495	6.010%	2068
22	2034	214,143	6.010%	2069
23	2035	218,472	6.010%	2070
24	2036	221,762	6.010%	2071
25	2037	225,613	6.010%	2072
26	2038	228,932	6.010%	2073
27	2039	232,724	6.010%	2074
28	2040	236,218	6.010%	2075
29	2041	240,101	6.010%	2076
30	2042	243,498	6.010%	2077
31	2043	247,716	6.010%	2078
32	2044	252,186	6.010%	2079
33	2045	254,827	6.010%	2080
34	2046	258,437	6.010%	2081
35	2047	262,238	6.010%	2080

Table 9-2: Future Replacements for FY 2013

($000s)

		A	B	C
	FY	Amount	Rate	Due
1	2014	144,288	6.280%	2049
2	2015	147,019	6.280%	2050
3	2016	150,497	6.280%	2051
4	2017	154,079	6.280%	2052
5	2018	157,269	6.280%	2053
6	2019	159,903	6.280%	2054
7	2020	163,370	6.280%	2055
8	2021	167,909	6.280%	2056
9	2022	171,584	6.280%	2057
10	2023	175,474	6.280%	2058
11	2024	179,281	6.280%	2059
12	2025	182,790	6.280%	2060
13	2026	187,135	6.280%	2061
14	2027	190,900	6.280%	2062
15	2028	194,735	6.280%	2063
16	2029	198,158	6.280%	2064
17	2030	202,669	6.280%	2065
18	2031	207,219	6.280%	2066
19	2032	210,880	6.280%	2067
20	2033	215,333	6.280%	2068
21	2034	219,039	6.280%	2069
22	2035	223,434	6.280%	2070
23	2036	226,976	6.280%	2071
24	2037	230,889	6.280%	2072
25	2038	234,261	6.280%	2073
26	2039	238,110	6.280%	2074
27	2040	241,894	6.280%	2075
28	2041	245,840	6.280%	2076
29	2042	249,290	6.280%	2077
30	2043	253,722	6.280%	2078
31	2044	258,259	6.280%	2079
32	2045	261,205	6.280%	2080
33	2046	264,873	6.280%	2081
34	2047	268,735	6.280%	2082
35	2048	273,109	6.280%	2083

Table 9-3: Replacement Credits
($000s)

		A	B	C	D	E	F
		AC Intertie		PFIA		Total	
		2012 Study	2013 Study	2012 Study	2013 Study	2012 Study	2013 Study
1	2013	(1,582,261)	-	(2,549,245)	-	(4,131,506)	-
2	2014	(1,604,002)	(1,629,603)	(2,606,583)	(2,663,690)	(4,210,584)	(4,293,293)
3	2015	(1,669,200)	(1,695,851)	(2,658,089)	(2,716,026)	(4,327,290)	(4,411,877)
4	2016	(1,692,010)	(1,719,028)	(2,720,074)	(2,779,009)	(4,412,084)	(4,498,037)
5	2017	(1,752,576)	(1,780,533)	(2,783,456)	(2,843,360)	(4,536,032)	(4,623,892)
6	2018	(1,812,529)	(1,841,451)	(2,840,097)	(2,903,331)	(4,652,626)	(4,744,782)
7	2019	(1,878,821)	(1,908,810)	(2,890,741)	(2,954,791)	(4,769,562)	(4,863,601)
8	2020	(1,907,297)	(1,937,744)	(2,953,721)	(3,018,784)	(4,861,017)	(4,956,528)
9	2021	(1,970,104)	(2,001,525)	(3,040,813)	(3,107,225)	(5,010,916)	(5,108,750)
10	2022	(2,007,569)	(2,039,593)	(3,103,371)	(3,173,257)	(5,110,940)	(5,212,850)
11	2023	(2,028,563)	(2,060,930)	(3,176,162)	(3,248,111)	(5,204,725)	(5,309,042)
12	2024	(2,100,178)	(2,133,699)	(3,248,996)	(3,322,118)	(5,349,174)	(5,455,817)
13	2025	(2,121,143)	(2,155,001)	(3,311,999)	(3,386,135)	(5,433,142)	(5,541,137)
14	2026	(2,188,214)	(2,223,112)	(3,395,332)	(3,470,754)	(5,583,546)	(5,693,866)
15	2027	(2,210,799)	(2,246,060)	(3,461,159)	(3,540,274)	(5,671,958)	(5,786,335)
16	2028	(2,340,505)	(2,377,854)	(3,533,018)	(3,613,291)	(5,873,523)	(5,991,145)
17	2029	(2,365,217)	(2,402,964)	(3,591,242)	(3,672,452)	(5,956,459)	(6,075,416)
18	2030	(2,427,228)	(2,465,927)	(3,675,308)	(3,757,805)	(6,102,536)	(6,223,732)
19	2031	(2,451,813)	(2,490,908)	(3,762,899)	(3,849,924)	(6,214,712)	(6,340,832)
20	2032	(2,470,825)	(2,510,225)	(3,831,071)	(3,919,178)	(6,301,896)	(6,429,403)
21	2033	(2,550,652)	(2,591,350)	(3,915,458)	(4,006,820)	(6,466,110)	(6,598,170)
22	2034	(2,571,007)	(2,612,032)	(3,985,786)	(4,078,280)	(6,556,793)	(6,690,313)
23	2035	(2,630,992)	(2,672,925)	(4,065,309)	(4,159,003)	(6,696,301)	(6,831,928)
24	2036	(2,648,213)	(2,690,423)	(4,128,755)	(4,227,286)	(6,776,968)	(6,917,710)
25	2037	(2,706,497)	(2,749,646)	(4,204,169)	(4,303,915)	(6,910,666)	(7,053,561)
26	2038	(2,805,278)	(2,850,018)	(4,271,534)	(4,372,364)	(7,076,812)	(7,222,382)
27	2039	(2,861,653)	(2,907,232)	(4,346,579)	(4,448,521)	(7,208,232)	(7,355,753)
28	2040	(2,873,408)	(2,919,176)	(4,410,867)	(4,518,359)	(7,284,275)	(7,437,535)
29	2041	(2,875,818)	(2,921,624)	(4,490,368)	(4,599,141)	(7,366,186)	(7,520,765)
30	2042	(2,935,993)	(2,982,767)	(4,558,440)	(4,668,281)	(7,494,433)	(7,651,048)
31	2043	(2,967,235)	(3,014,536)	(4,645,074)	(4,759,588)	(7,612,309)	(7,774,125)
32	2044	(3,009,302)	(3,057,204)	(4,738,654)	(4,854,567)	(7,747,957)	(7,911,772)
33	2045	(3,019,836)	(3,067,908)	(4,792,476)	(4,914,309)	(7,812,312)	(7,982,217)
34	2046	(3,056,578)	(3,105,242)	(4,866,491)	(4,989,515)	(7,923,069)	(8,094,757)
35	2047	(3,060,400)	(3,109,124)	(4,940,280)	(5,064,492)	(8,000,680)	(8,173,616)
36	2048		(3,262,228)		(5,157,637)	-	(8,419,864)

Table 9-4: Summary of Historical Plant Investment
As of 9/30/2009

	A	B	C	D	E
	FERC Account	**Account Name**	**Total Plant**	**AC Intertie**	**All Other**
1	352	Structures & Improvements	274,920,606	17,169,041	257,751,564
2	353.9	Substation equipment	2,397,128,338	194,890,194	2,202,238,144
3	353.93	Metering Station	57,243,677	2,289,601	54,954,075
4	353.94	Control Equipment	82,537,826	5,381	82,532,445
5	354	Towers & Fixtures	979,318,976	34,417,791	944,901,185
6	355	Poles & Fixtures	227,184,629	1,728,256	225,456,373
7	356	Conductor & Clearing Row	1,055,338,424	43,132,103	1,012,206,321
8	358	Underground Conductor & Devices	21,816,189	-	21,816,189
9	359	Roads & Trails	100,244,947	5,801,644	94,443,303
10		**Total**	**5,195,733,612**	**299,434,012**	**4,896,299,600**

Table 9-5: Plant Investment by Account and Year of Investment

	A	B	C	D	E	F	G	H	I	J	K
1	Account	352	353.9	353.93	353.94	354	355	356	358	359	
2	**Name**	**Structures & Improvements**	**Substation equipment**	**Metering Station**	**Control Equipment**	**Towers & Fixtures**	**Poles & Fixtures**	**Conductor & Clearing Row**	**Underground Conductor & Devices**	**Roads & Trails**	**Total**
3	Curve	R2	R1	R0.5	R2	R3	R2.5	R4	S3	R3	
4	Service Life	65	45	40	17	100	55	100	35	75	
5	1940	476,062	1,812,502			926,103	25,606	1,079,234		91,782	4,361,528
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	268,264	431		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	20,736	154		9,107	183,835	547,687		112,439	938,704
13	1948	282,743	1,347,019	4,828		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	1,795,687	1,673		3,994,408	707,803	5,500,526		949,689	13,606,867
16	1951	420,867	2,702,340	3,113		2,043,375	713,559	4,276,588		11,879	10,171,722
17	1952	355,096	2,048,041	6,007		7,179,525	479,848	7,133,967	193,932	9,140	17,405,556
18	1953	1,394,228	8,746,773	30,899		9,406,359	3,090,439	10,927,304		231,375	33,827,378
19	1954	835,601	2,849,330	26,697		13,091,368	1,303,062	12,296,500		1,581,255	31,983,813
20	1955	841,817	4,910,750	7,330		2,126,071	386,867	2,605,388		49,245	10,927,468
21	1956	711,374	7,160,163	24,666		16,294,005	349,009	12,765,653		355,213	37,660,084
22	1957	1,039,728	7,207,891	1,305		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	6,716,621	39,265		2,159,559	1,035,953	3,358,277		236,348	13,854,086
25	1960	121,487	2,510,651	6,852		756,488	336,802	1,104,808		38,778	4,875,865
26	1961	378,023	3,640,523	42,014		3,183,277	717,643	4,168,609		283,261	12,413,350
27	1962	513,912	2,515,852	16,824		11,358,446	1,232,702	9,760,967		529,044	25,927,747
28	1963	257,014	1,744,193	87,624		1,222,631	411,811	1,840,281		405,707	5,969,261
29	1964	545,408	2,283,175	12,073		12,142,615	193,118	1,538,415		52,736	16,767,540
30	1965	164,570	2,570,650	4,269		8,881,139	277,461	23,513,104		538,436	35,949,629
31	1966	534,437	6,412,409	35,980		4,065,177	1,078,563	6,173,805		264,808	18,565,178
32	1967	1,082,426	7,601,629	60,518		11,213,131	775,955	11,962,679	284,507	235,346	33,216,190
33	1968	2,586,901	14,579,802	52,170		34,619,212	398,131	36,706,310		1,035,661	89,978,187
34	1969	1,929,033	14,850,041	52,860		25,131,430	1,128,553	27,655,524		487,407	71,234,847
35	1970	11,392,850	37,707,622	87,553	212,206	26,607,338	1,132,938	28,490,386		943,394	106,574,287
36	1971	1,339,043	8,776,063	112,887		15,948,455	724,414	14,206,774		328,307	41,435,943
37	1972	2,187,552	12,438,675	51,701		14,909,761	1,182,298	18,851,150		878,608	50,499,745
38	1973	2,032,890	11,732,027	128,817		28,621,272	507,773	26,205,327	1,493,582	1,613,013	72,334,701
39	1974	955,300	12,423,388	52,256		6,503,689	1,527,927	7,245,614		1,101,600	29,809,774
40	1975	3,411,759	21,611,530	95,891		20,932,602	1,555,515	14,493,367		1,319,642	63,420,306
41	1976	1,730,520	19,817,526	190,774	11,099	32,771,629	2,029,686	29,176,322	1,317,799	860,285	87,905,640
42	1977	2,211,926	21,552,496	367,422	368,847	52,128,905	1,432,076	57,076,176	64,799	946,696	136,149,343
43	1978	1,156,144	33,302,599	127,254	23,355	7,713,140	1,381,584	7,584,533	43,378	50,708	51,382,695
44	1979	829,125	13,707,504	192,983		9,161,554	1,970,345	12,018,086		1,336,894	39,216,491
45	1980	1,553,847	17,170,972	194,588	634,756	14,400,660	780,350	16,022,767		201,487	50,959,427

Table 9-5: Plant Investment by Account and Year of Investment

	A	B	C	D	E	F	G	H	I	J	K
1	Account	352	353.9	353.93	353.94	354	355	356	358	359	
2	**Name**	**Structures & Improvements**	**Substation equipment**	**Metering Station**	**Control Equipment**	**Towers & Fixtures**	**Poles & Fixtures**	**Conductor & Clearing Row**	**Underground Conductor & Devices**	**Roads & Trails**	**Total**
3	Curve	R2	R1	R0.5	R2	R3	R2.5	R4	S3	R3	
4	Service Life	65	45	40	17	100	55	100	35	75	
46	1981	2,361,683	33,649,472	286,646		61,360,719	1,234,848	64,049,936		526,795	163,470,099
47	1982	1,831,205	31,111,148	124,042		3,575,782	662,029	5,060,449		355,871	42,720,526
48	1983	4,938,306	36,848,398	155,380		28,577,207	2,931,584	28,663,225		826,879	102,940,979
49	1984	6,818,386	49,427,766	284,459	2,383,207	76,260,479	3,244,293	78,997,002		8,388,752	225,804,344
50	1985	7,875,754	48,221,373	1,007,064		286,797	1,929,796	1,561,203	4,573,403	59,347	65,514,737
51	1986	4,967,389	20,700,505	883,098	64,440	7,491,442	8,485,733	16,210,096		742,455	59,545,158
52	1987	7,506,190	31,244,242	523,564	572,798	100,490,771	13,847,331	145,470,634		40,286,606	339,942,136
53	1988	8,268,167	17,200,096	1,576,979	595,038	4,837,575	2,508,510	6,810,774		309,066	42,106,205
54	1989	25,777,277	104,169,698	1,139,863	527,862	2,055,601	3,645,863	2,294,160		141,340	139,751,664
55	1990	3,704,482	48,924,339	1,473,818	1,532,427	3,377,301	1,341,163	2,590,241			62,943,771
56	1991	6,621,529	65,822,403	2,125,284	25,239,189	1,304,831	1,493,504	3,257,771			105,864,511
57	1992	3,157,930	101,371,650	1,210,388	16,360,895	11,015,954	2,025,109	20,029,162		2,021,035	157,192,123
58	1993	8,269,431	72,930,078	3,188,702	1,148,215	14,158,498	2,859,084	23,645,239		4,253,512	130,452,759
59	1994	28,174,069	228,643,602	1,699,020	1,138,927	5,806,581	3,641,305	4,863,220		117,722	274,084,446
60	1995	11,104,797	60,279,123	2,235,237	4,170,939	825,569	996,873	5,071,877		201,091	106,090,892
61	1996	6,766,302	76,942,484	3,163,845	475,415	1,685,145	198,282	3,844,738		1,925	132,869,114
62	1997	7,022,574	80,859,767	2,423,534	2,774,348	15,093,318	2,160,086	12,029,703	13,996	2,634,641	171,470,007
63	1998	11,205,585	49,453,122	2,314,419	528,546	8,932,174	2,860,997	12,737,573	7,328	1,782,782	138,918,988
64	1999	5,425,683	55,144,403	11,953,016	8,703,996	(644,635)	7,715,074	121,378		416,353	167,847,392
65	2000	1,548,591	39,010,866	454,884	364,562	89,833	2,071,939	654,477		428	52,007,564
66	2001	2,901,840	55,574,007	1,360,509	1,991,256	1,404,165	4,261,666	2,921,401		1,197,852	79,255,825
67	2002	6,639,600	80,962,337	1,642,360	2,889,130	1,956,554	23,741,448	14,693,786	5,548,135	806,409	168,840,362
68	2003	7,172,199	112,130,211	998,957	258,216	23,211,669	7,159,904	19,106,084	9,405	1,152,777	204,922,337
69	2004	6,305,985	144,574,471	2,155,316	586,159	44,017,733	12,557,226	16,120,192	26,853	1,148,355	255,079,382
70	2005	6,785,951	97,015,134	1,535,649	-	65,512,047	18,608,221	49,892,215		14,830	263,665,415
71	2006	12,062,449	77,020,809	1,018,437	4,535,537	74,122,412	9,641,185	45,701,248	8,218,798	697,144	281,736,963
72	2007	8,059,402	70,277,058	3,190,949		1,340,875	15,000,211	9,620,210	20,273	5,069,935	136,179,863
73	2008	6,165,343	90,367,979	2,652,781	118,081	4,094,580	28,467,955	13,219,453		4,455,860	175,353,920
74	2009	8,144,329	90,876,253	2,345,800	4,328,381	482,741	7,908,823	3,621,393		3,120,294	132,082,050
75	**Total**	**274,920,606**	**2,397,128,338**	**57,243,677**	**82,537,826**	**979,318,976**	**227,184,629**	**1,055,338,424**	**21,816,189**	**100,244,947**	**5,671,176,430**

Table 9-6: Plant Investment by Account
($000s)

	Accounts		A 2010	B 2011	C 2012	D 2013
1	Lines		47,884	106,146	162,887	300,674
2		354	22,644	50,197	77,029	142,189
3		356	25,240	55,950	85,858	158,485
4	Subs					
5		353.9	233,342	215,162	284,428	243,856
6	Total		281,226	321,309	447,316	544,530

Table 9-7: Proportion of Plant that is PFIA

		A FERC Account	B ENDING BALANCE FY 2009	C Includes PFIA of	D Percent PFIA Investment
1	STATION EQUIPMENT	353	2,528,374,336	48,597,530	1.922%
2	TOWERS & FIXTURES	354	912,058,112	20,483,788	2.246%
3	POLES & FIXTURES	355	222,451,748	4,996,013	2.246%
4	OVERHEAD CONDUCTOR	356	1,018,173,808	22,867,026	2.246%
5	MISC EQUIP	398	23,073,086	1,302,681	5.646%

	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 9-8: "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**
5	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
6	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
7	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
8	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
9	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
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
11	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
12	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
13	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
14	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
15	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
16	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
17	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
18	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
19	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
20	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
21	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
22	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
23	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
24	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
25	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
26	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
27	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
28	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
29	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
30	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
31	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
32	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
33	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
34	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
35	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
36	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
37	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
38	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
39	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
40	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
41	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
42	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
43	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
44	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
45	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
46	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
47	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
48	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
49	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
50	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
51	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
52	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
53	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
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

	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 9-8: "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**
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
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

	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 9-8: "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**
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 9-9: Handy-Whitman Index - Pacific Region - July 1, 2009

	A	B	C	D	E	F	G
	Year	Total Plant	Station Equipment	Towers & Fixtures	Poles & Fixtures	Overhead Conductor	Underground Conductor
	Account	300	353	354	355	356	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
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

Table 9-9: Handy-Whitman Index - Pacific Region - July 1, 2009

	A	B	C	D	E	F	G
	Year	Total Plant	Station Equipment	Towers & Fixtures	Poles & Fixtures	Overhead Conductor	Underground Conductor
	Account	300	353	354	355	356	358
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	401	421	377	432	403	447
63	2002	411	434	385	448	406	466
64	2003	413	432	389	456	412	475
65	2004	449	477	422	470	445	528
66	2005	478	507	437	503	489	550
67	2006	520	548	459	522	568	594
68	2007	561	597	498	534	608	608
69	2008	613	641	517	576	716	818
70	2009	574	657	502	596	525	832

Table 9-10: 2012 Replacements by Account

		A	B	C	D	E	F	G	H	I	J
		352	353.9	353.93	353.94	354	355	356	358	359	Total
1	2013	6,512,691	88,804,824	1,638,331	10,805,088	10,744,474	8,804,195	7,165,944	1,647,447	1,967,860	138,090,853
2	2014	6,747,856	90,603,300	1,670,880	10,621,190	11,285,938	9,012,833	7,548,316	1,647,468	2,092,120	141,229,901
3	2015	6,971,181	92,683,601	1,738,327	10,202,892	11,540,719	9,176,347	7,932,423	1,521,659	2,150,926	143,918,075
4	2016	7,284,521	94,713,861	1,776,743	10,095,275	12,039,799	9,358,184	8,323,368	1,532,395	2,217,266	147,341,412
5	2017	7,405,998	97,130,426	1,822,791	9,749,051	12,494,133	9,482,009	8,747,003	1,633,149	2,404,407	150,868,967
6	2018	7,571,419	98,861,353	1,854,698	9,671,082	12,933,093	9,545,389	9,316,447	1,571,760	2,559,461	153,884,702
7	2019	7,719,579	100,858,426	1,920,939	9,333,405	13,215,942	9,642,608	9,707,384	1,477,815	2,600,390	156,476,487
8	2020	7,939,744	102,952,114	1,958,142	9,053,563	13,693,024	9,790,994	10,295,485	1,571,566	2,634,197	159,888,830
9	2021	8,115,127	105,551,506	2,003,019	8,891,329	14,367,370	9,862,228	11,298,623	1,571,743	2,697,134	164,358,079
10	2022	8,526,425	107,262,568	2,034,543	8,898,832	14,883,533	9,964,142	11,963,678	1,451,123	2,863,762	167,848,607
11	2023	8,672,121	109,005,689	2,100,851	8,819,267	15,754,836	10,005,601	12,808,737	1,546,896	2,924,019	171,638,017
12	2024	8,824,769	110,932,073	2,137,340	9,032,852	16,488,885	10,055,410	13,402,538	1,539,971	2,970,919	175,384,756
13	2025	8,935,168	112,861,508	2,180,523	9,300,903	16,828,337	9,988,406	14,017,042	1,502,025	3,224,303	178,838,216
14	2026	9,046,786	115,430,231	2,211,167	9,443,558	17,508,738	10,063,237	14,624,793	1,487,664	3,301,685	183,117,859
15	2027	9,285,662	117,015,428	2,277,631	9,534,154	18,100,307	10,163,559	15,373,967	1,591,610	3,345,477	186,687,797
16	2028	9,500,565	118,904,254	2,312,478	9,630,283	18,662,473	10,186,539	16,260,614	1,592,039	3,412,840	190,462,085
17	2029	9,841,882	120,636,902	2,353,172	9,736,434	19,020,482	10,205,792	16,869,928	1,615,518	3,551,010	193,831,120
18	2030	9,978,166	123,254,972	2,381,980	9,759,301	19,621,128	10,184,722	17,750,688	1,727,246	3,615,656	198,273,860
19	2031	10,097,813	124,760,338	2,445,520	9,850,511	20,440,955	10,279,861	19,318,563	1,732,432	3,665,982	202,591,974
20	2032	10,195,064	126,259,627	2,478,238	9,876,049	21,140,407	10,312,874	20,291,327	1,754,589	3,887,338	206,195,513
21	2033	10,387,549	127,772,176	2,515,019	9,929,901	22,217,218	10,372,640	21,543,737	1,806,415	3,950,719	210,495,374
22	2034	10,534,553	129,371,728	2,540,955	9,854,150	23,199,037	10,344,364	22,398,041	1,914,511	3,985,173	214,142,511
23	2035	10,925,295	131,831,763	2,600,730	9,858,286	23,647,363	10,383,021	23,294,475	1,914,885	4,015,951	218,471,768
24	2036	11,061,604	133,090,079	2,629,675	9,782,040	24,548,471	10,414,547	24,152,094	2,000,800	4,083,115	221,762,425
25	2037	11,218,029	134,618,139	2,661,291	9,664,271	25,309,256	10,568,335	25,362,208	2,010,396	4,201,485	225,613,410
26	2038	11,279,978	135,740,337	2,683,273	9,589,814	26,073,545	10,625,657	26,625,256	2,068,345	4,245,460	228,931,666
27	2039	11,348,779	138,027,910	2,735,509	9,557,767	26,557,280	10,630,437	27,502,419	2,102,742	4,261,627	232,724,471
28	2040	11,559,901	139,096,252	2,759,629	9,523,646	27,274,439	10,668,758	28,703,989	2,138,585	4,492,507	236,217,705
29	2041	11,751,508	140,107,608	2,784,079	9,466,649	28,151,151	10,809,211	30,387,949	2,136,107	4,506,517	240,100,780
30	2042	11,964,323	140,971,495	2,800,690	9,451,788	29,031,544	10,905,451	31,701,254	2,136,040	4,535,584	243,498,169
31	2043	12,083,077	142,098,525	2,844,253	9,444,943	30,185,118	10,974,231	33,339,157	2,171,948	4,574,874	247,716,125
32	2044	12,162,942	143,935,376	2,861,931	9,455,570	31,377,193	11,039,320	34,651,712	2,086,583	4,615,412	252,186,040
33	2045	12,246,126	144,700,937	2,878,520	9,443,834	31,943,960	11,054,133	35,806,012	2,100,032	4,653,702	254,827,256
34	2046	12,405,071	145,593,311	2,889,142	9,491,978	33,011,152	11,203,031	37,070,249	2,107,629	4,665,598	258,437,161
35	2047	12,504,427	145,981,823	2,921,416	9,495,371	34,007,440	11,366,926	38,831,535	2,100,388	5,028,582	262,237,907

Table 9-11: 2013 Replacements by Account

		A	B	C	D	E	F	G	H	I	J
		352	353.9	353.93	353.94	354	355	356	358	359	Total
1	2014	6,856,497	92,822,869	1,697,781	10,792,192	11,487,625	9,157,939	7,672,897	1,673,992	2,125,803	144,287,594
2	2015	7,083,417	94,936,662	1,766,314	10,367,158	11,746,507	9,324,086	8,063,188	1,546,158	2,185,556	147,019,047
3	2016	7,401,802	96,999,610	1,805,349	10,257,809	12,253,623	9,508,851	8,460,427	1,557,067	2,252,964	150,497,500
4	2017	7,525,234	99,452,392	1,852,138	9,906,011	12,715,272	9,634,670	8,890,882	1,659,443	2,443,118	154,079,159
5	2018	7,693,319	101,337,037	1,884,559	9,826,787	13,161,299	9,699,070	9,469,494	1,597,065	2,600,668	157,269,298
6	2019	7,843,864	103,366,262	1,951,866	9,483,673	13,448,702	9,797,854	9,866,726	1,501,607	2,642,257	159,902,810
7	2020	8,067,574	105,493,658	1,989,668	9,199,326	13,933,465	9,948,629	10,464,295	1,596,869	2,676,608	163,370,092
8	2021	8,245,781	108,132,151	2,035,268	9,034,480	14,618,668	10,021,010	11,483,584	1,597,048	2,740,558	167,908,546
9	2022	8,663,701	109,999,407	2,067,299	9,042,104	15,142,867	10,124,564	12,159,295	1,474,486	2,909,869	171,583,593
10	2023	8,811,742	111,770,594	2,134,675	8,961,257	16,061,777	10,166,691	13,024,116	1,571,801	2,971,096	175,473,748
11	2024	8,966,848	113,727,992	2,171,751	9,178,281	16,807,644	10,217,302	13,627,477	1,564,765	3,018,750	179,280,809
12	2025	9,079,025	115,688,491	2,215,629	9,450,648	17,152,562	10,149,220	14,251,875	1,526,207	3,276,214	182,789,870
13	2026	9,192,439	118,295,641	2,246,767	9,595,600	17,843,917	10,225,255	14,869,410	1,511,616	3,354,842	187,135,486
14	2027	9,435,162	120,043,396	2,314,301	9,687,654	18,445,010	10,327,193	15,630,646	1,617,235	3,399,339	190,899,937
15	2028	9,653,524	121,962,633	2,349,709	9,785,331	19,016,227	10,350,543	16,531,568	1,617,671	3,467,787	194,734,992
16	2029	10,000,336	123,723,176	2,391,058	9,893,190	19,380,000	10,370,106	17,150,692	1,641,528	3,608,181	198,158,268
17	2030	10,138,815	126,379,930	2,420,330	9,916,425	19,990,317	10,348,696	18,045,632	1,755,054	3,673,868	202,669,069
18	2031	10,260,388	128,071,739	2,484,893	10,009,105	20,823,342	10,445,367	19,638,750	1,760,324	3,725,004	207,218,911
19	2032	10,359,204	129,595,166	2,518,138	10,035,053	21,533,530	10,478,912	20,627,008	1,782,838	3,949,924	210,879,773
20	2033	10,554,789	131,132,068	2,555,510	10,089,773	22,692,149	10,539,639	21,919,592	1,835,499	4,014,325	215,333,344
21	2034	10,704,159	132,757,373	2,581,865	10,012,802	23,689,776	10,510,908	22,787,650	1,945,335	4,049,334	219,039,200
22	2035	11,101,193	135,252,770	2,642,602	10,017,004	24,145,319	10,550,187	23,698,517	1,945,714	4,080,608	223,433,914
23	2036	11,239,696	136,729,908	2,672,012	9,939,531	25,060,936	10,582,222	24,569,943	2,033,013	4,148,854	226,976,113
24	2037	11,398,639	138,282,570	2,704,137	9,819,866	25,833,969	10,738,486	25,799,540	2,042,763	4,269,129	230,889,100
25	2038	11,461,586	139,422,836	2,726,474	9,744,210	26,610,563	10,796,730	27,082,923	2,101,645	4,313,812	234,260,780
26	2039	11,531,494	141,742,217	2,779,551	9,711,647	27,102,087	10,801,587	27,974,209	2,136,596	4,330,239	238,109,628
27	2040	11,746,015	143,062,680	2,804,059	9,676,976	27,830,792	10,840,525	29,195,124	2,173,016	4,564,837	241,894,023
28	2041	11,940,707	144,090,318	2,828,903	9,619,062	28,721,619	10,983,239	30,906,196	2,170,499	4,579,072	245,839,615
29	2042	12,156,949	144,968,114	2,845,781	9,603,962	29,615,396	11,081,028	32,240,232	2,170,431	4,608,607	249,290,500
30	2043	12,277,615	146,113,289	2,890,045	9,597,006	30,884,251	11,150,916	33,953,761	2,206,916	4,648,530	253,722,329
31	2044	12,358,766	147,974,094	2,908,008	9,607,805	32,095,519	11,217,053	35,287,448	2,120,177	4,689,721	258,258,590
32	2045	12,443,289	149,014,867	2,924,864	9,595,879	32,671,411	11,232,105	36,460,332	2,133,842	4,728,627	261,205,216
33	2046	12,604,792	149,921,609	2,935,657	9,644,799	33,755,784	11,383,400	37,744,924	2,141,562	4,740,714	264,873,241
34	2047	12,705,748	150,316,376	2,968,450	9,648,247	34,768,112	11,549,933	39,534,566	2,134,204	5,109,542	268,735,179
35	2048	12,902,110	151,850,791	2,979,307	9,697,881	35,765,710	11,690,317	41,177,825	2,020,339	5,025,036	273,109,315

Table 9-12: 2012 AC Intertie Replacements

		A	B	C	D	E	F	G	H	I	J
		352	353.9	353.93	353.94	354	355	356	358	359	Total
1	2013	308,229	6,454,283	71,929	511	212,681	11,963	95,633	-	36,865	7,192,095
2	2014	329,817	6,524,079	75,308	511	216,158	11,963	96,216	-	36,865	7,290,917
3	2015	347,647	6,792,782	76,761	605	216,328	16,943	96,216	-	39,992	7,587,274
4	2016	358,821	6,877,315	78,320	687	216,328	16,943	96,242	-	46,300	7,690,956
5	2017	360,652	7,149,454	79,648	687	216,328	16,943	96,242	-	46,300	7,966,254
6	2018	378,423	7,223,775	83,173	738	301,127	16,943	188,290	-	46,300	8,238,768
7	2019	379,312	7,522,768	84,613	738	301,127	16,943	188,294	-	46,300	8,540,095
8	2020	406,589	7,623,482	85,958	740	301,181	16,943	188,339	-	46,300	8,669,531
9	2021	423,470	7,874,374	87,227	740	301,236	23,168	188,359	-	56,442	8,955,016
10	2022	436,570	8,002,760	90,893	688	314,832	23,168	195,662	-	60,742	9,125,314
11	2023	439,185	8,063,555	92,264	605	327,718	23,168	204,832	-	69,415	9,220,741
12	2024	447,039	8,373,343	93,498	605	332,933	23,168	206,265	-	69,415	9,546,266
13	2025	457,537	8,456,802	94,696	532	333,146	23,168	206,265	-	69,415	9,641,561
14	2026	461,533	8,746,335	98,346	532	333,146	30,800	206,320	-	69,415	9,946,427
15	2027	490,991	8,818,332	99,597	483	333,146	30,800	206,322	-	69,415	10,049,086
16	2028	505,116	9,122,912	100,774	448	438,461	30,800	357,077	-	83,068	10,638,657
17	2029	520,811	9,218,513	101,800	448	438,461	30,800	357,083	-	83,068	10,750,985
18	2030	523,287	9,488,762	105,339	456	438,564	30,800	357,196	-	88,453	11,032,856
19	2031	537,562	9,574,144	106,398	456	438,670	30,800	357,258	-	99,317	11,144,605
20	2032	538,908	9,614,168	107,561	499	457,402	40,598	372,568	-	99,317	11,231,022
21	2033	573,531	9,904,628	108,381	539	475,120	40,598	391,761	-	99,317	11,593,875
22	2034	580,540	9,976,759	111,591	539	482,291	40,598	394,761	-	99,317	11,686,396
23	2035	597,832	10,231,039	112,380	571	482,556	40,598	394,761	-	99,317	11,959,054
24	2036	600,947	10,289,579	113,587	571	482,556	40,598	394,865	-	114,628	12,037,331
25	2037	608,627	10,527,217	114,144	592	482,556	52,940	394,869	-	121,316	12,302,261
26	2038	613,044	10,595,381	116,876	592	628,219	52,940	609,406	-	134,807	12,751,266
27	2039	618,428	10,845,734	117,369	602	628,219	52,940	609,415	-	134,807	13,007,514
28	2040	651,306	10,864,619	118,642	601	628,373	52,940	609,656	-	134,807	13,060,944
29	2041	651,654	10,874,646	118,913	601	628,533	52,940	609,805	-	134,807	13,071,898
30	2042	669,399	11,075,794	121,003	590	652,028	52,940	638,860	-	134,807	13,345,421
31	2043	672,279	11,131,106	121,159	590	674,221	66,094	675,226	-	146,756	13,487,432
32	2044	678,637	11,300,144	122,328	574	683,203	66,094	680,911	-	146,756	13,678,647
33	2045	680,506	11,336,619	122,266	558	683,569	66,094	680,911	-	156,006	13,726,528
34	2046	714,987	11,449,012	123,570	558	683,569	66,094	681,081	-	174,667	13,893,538
35	2047	707,151	11,474,421	123,371	544	683,569	66,094	681,090	-	174,667	13,910,907

Table 9-13: 2013 AC Intertie Replacements

		A	B	C	D	E	F	G	H	I	J
		352	353.9	353.93	353.94	354	355	356	358	359	Total
1	2014	335,127	6,628,090	76,521	520	219,646	12,156	97,769	-	37,458	7,407,286
2	2015	353,244	6,901,119	77,996	615	219,819	17,216	97,769	-	40,636	7,708,414
3	2016	364,598	6,987,013	79,581	698	219,819	17,216	97,795	-	47,045	7,813,765
4	2017	366,459	7,263,367	80,930	698	219,819	17,216	97,796	-	47,045	8,093,330
5	2018	384,515	7,338,885	84,512	750	305,983	17,216	191,326	-	47,045	8,370,231
6	2019	385,419	7,642,692	85,976	750	305,983	17,216	191,330	-	47,045	8,676,409
7	2020	413,135	7,745,027	87,342	751	306,038	17,216	191,375	-	47,045	8,807,929
8	2021	430,288	7,999,789	88,631	751	306,094	23,541	191,396	-	57,351	9,097,841
9	2022	443,599	8,130,241	92,357	699	319,907	23,541	198,816	-	61,719	9,270,880
10	2023	446,256	8,192,015	93,749	615	333,015	23,541	208,142	-	70,532	9,367,865
11	2024	454,237	8,506,791	95,003	615	338,314	23,541	209,598	-	70,532	9,698,631
12	2025	464,903	8,591,594	96,221	541	338,531	23,541	209,598	-	70,532	9,795,460
13	2026	468,964	8,885,607	99,930	541	338,531	31,296	209,654	-	70,532	10,105,054
14	2027	498,896	8,958,763	101,200	491	338,531	31,296	209,656	-	70,532	10,209,366
15	2028	513,248	9,268,247	102,397	456	445,541	31,296	362,839	-	84,406	10,808,429
16	2029	529,196	9,365,388	103,439	456	445,541	31,296	362,845	-	84,406	10,922,566
17	2030	531,712	9,639,773	107,035	463	445,646	31,296	362,959	-	89,877	11,208,760
18	2031	546,217	9,726,530	108,111	463	445,754	31,296	363,022	-	100,916	11,322,308
19	2032	547,584	9,767,199	109,293	507	464,785	41,252	378,578	-	100,916	11,410,113
20	2033	582,765	10,062,334	110,126	547	482,816	41,252	398,107	-	100,916	11,778,863
21	2034	589,886	10,135,627	113,388	547	490,102	41,252	401,155	-	100,916	11,872,874
22	2035	607,457	10,393,739	114,190	580	490,371	41,252	401,155	-	100,916	12,149,660
23	2036	610,622	10,453,221	115,416	580	490,371	41,252	401,261	-	116,473	12,229,197
24	2037	618,426	10,694,685	115,981	602	490,371	53,792	401,265	-	123,269	12,498,392
25	2038	622,914	10,763,947	118,758	602	638,379	53,792	619,256	-	136,977	12,954,626
26	2039	628,385	11,018,020	119,259	611	638,379	53,792	619,265	-	136,977	13,214,689
27	2040	661,792	11,037,209	120,552	610	638,536	53,792	619,510	-	136,977	13,268,980
28	2041	662,145	11,047,397	120,827	610	638,698	53,792	619,662	-	136,977	13,280,110
29	2042	680,176	11,251,784	122,951	600	662,569	53,792	649,182	-	136,977	13,558,032
30	2043	683,103	11,307,987	123,110	600	685,160	67,158	686,201	-	149,119	13,702,437
31	2044	689,563	11,479,398	124,297	584	694,286	67,158	691,978	-	149,119	13,896,384
32	2045	691,462	11,516,461	124,234	567	694,658	67,158	691,978	-	158,518	13,945,036
33	2046	726,498	11,630,664	125,560	567	694,658	67,158	692,151	-	177,479	14,114,734
34	2047	718,537	11,656,482	125,357	553	694,658	67,158	692,160	-	177,479	14,132,383
35	2048	734,871	11,848,902	126,409	553	894,782	77,718	967,594	-	177,479	14,828,307

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 Treasury payment during the rate period. Financial reserve levels at the end of a fiscal year determine whether BPA is able to meet its Treasury payment obligation in that year. The model is one workbook with individual worksheets including an input matrix of revenues and expenses, an income statement, a cash flow statement, and worksheets for the risks analyzed using the model.

TRAM is a Monte Carlo model that produces 3,500 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 financial reserves. In each iteration, or "game", the calculation of financial reserves starts with historical data on financial reserves available for risk attributed to Transmission Services at the end of FY 2010 (which is the amount of reserves at the beginning of FY 2011). Cash flow for FY 2011 is built on the values from the Income Statement in the Study, and is modified by drawing randomly from probability distributions over possible values of the risk variables defined in it.

The structure of the income statement and cash flow statement used in the risk analysis is similar to the statements contained in the Study, but does not match precisely because the revenue requirement test includes $15 million per year of the rate period added back to cash from current operations for drawdown of financial reserves for capital financing. TRAM excludes the $15 million because it will be drawn upon for capital financing. The net cash flow, added to the start-of-year reserves balance, yields the year-end reserves balance. This flow of computations is repeated sequentially for each year from FY 2011 through FY 2013.

Simulating transmission cash flows in this manner allows forecasting FY 2012 start-of-year reserves instead of defining FY 2012 start-of-year reserves as an uncertain input variable. The model forecasts the start-of-year FY 2012 financial reserves based on transmission function historical cash flows, current forecasts of expenses and revenues, and uncertainty in expenses and revenues explicitly modeled for FY 2011. The "most likely" forecasts are equal to the mode or peak of the underlying probability distribution for all uncertain variables. The most likely (mode or peak) forecast will also equal the mean or expected value when the underlying distribution is symmetric or the value is a single point estimate. However, in a few cases the most likely forecast is greater or less than the expected (or mean) value if 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 (©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 the user to develop models incorporating uncertainty in a spreadsheet computer program environment. Uncertainty is incorporated by specifying model variables as probability distributions over possible values that the variables of interest 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 uncertain variables in the model. This is done in analyses external to the @RISK computer program.

10.3 Revenue Risk

Revenue risk is one of the uncertainties for which BPA determines probability distributions for modeling in TRAM. The amount of revenue earned during the rate period can vary from the revenue forecast due to uncertainty in the quantity of service sold. To capture the total transmission revenue variability, BPA models certain revenue drivers and the resulting revenue risk for those transmission products that generate significant revenues or that have significant revenue variability. The significant revenue-generating products include Network Integration, long-term Point-to-Point, and long-term Southern Intertie transmission services, as well as the ancillary service Scheduling, System Control, and Dispatch. The products that generate moderate revenues and have significant revenue variability are short-term Point-to-Point and short-term Southern Intertie transmission service. BPA assumes that other transmission products do not carry revenue risk due to their lower levels of revenue and lower revenue variability. BPA models revenue risk based on the risk variables discussed below, and determines the revenue risk distribution and the expected value (mean) of revenue by running 3,500 revenue forecasting games using Excel and Palisade @RISK's Monte Carlo-based simulation.

10.3.1 Network Integration Service (NT) Revenue Risk

Risks in the NT revenue forecast arise with respect to the load forecast used to forecast NT revenue. The load forecast is based on predicted year-to-year NT load growth, which in turn is based on forecast economic conditions normalized for load center temperatures (that is, adjusted to reflect normal temperatures). To quantify the revenue risks, BPA models variance in the year-to-year load growth rate based on risk in economic outlook and temperature. For economic outlook risk in the growth rate, we apply a triangular risk distribution to the growth rate. A triangular distribution describes a population when the only known values are a high value, a low value, and a most likely value, or mode. For economic outlook risk, 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. Likewise, 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 forecast year-to-year load growth rate is also modeled. The forecast growth rate is based on normalized temperature, so the risk arises from the variability of load center temperatures. Variability in these temperatures induces variability around the load growth rate. The distribution of temperatures in a 30-year period follows a normal distribution (bell curve symmetrical around the mean). The distribution from temperature variation serves as the second component of NT revenue risk.

The addition of the economic stability impacts and temperature variance impacts to the load growth rates provides the basis for the NT revenue risk distribution. This risk distribution results in average NT revenue risk standard deviation or impact to gross revenue, of $7.0 million per year for the rate period.

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

Risks regarding revenue from long-term PTP service are related to assumptions regarding new service requests, deferrals, and renewals under provisions of BPA's Open Access Transmission Tariff (OATT).

BPA models risk for future revenue from transmission service that has been requested but has not yet been sold (that is, transmission service requests (TSRs) that have not yet been confirmed). This risk is modeled by assuming a probability of service commencement, based on historical data concerning requests and service commencement dates, with a normal distribution. No long-term PTP revenue risk is modeled for TSRs that are already in service (that is, TSRs that have been confirmed) and that do not expire during the rate period.

Also identified are TSRs (and associated contract demands) that are eligible to defer service during the rate period. Using historical deferral data, a probability of service commencement for TSRs that are eligible to defer is developed using a triangular risk distribution with an expected average deferral rate that ranges from zero to 100 percent. The TSRs eligible to defer during the rate period are assumed to be distributed in the same manner as this distribution, with all eligible TSRs commencing service being the maximum outcome, and no eligible TSRs commencing service being the minimum outcome. Applying the distribution to the identified TSRs results in a most likely outcome, or the number of TSRs (with their associated demands) expected to commence.

Finally, historical data is gathered on the probability of commencement of long-term PTP service for TSRs that are eligible for renewal or for conversion from a grandfathered product (Integration of Resources and Formula Power Transmission). A triangular distribution is identified for the probability of service commencement for TSRs that are eligible for conversion and applied to the associated contract demands to produce a most likely value. A normal distribution is identified for the probability of service commencement for TSRs that are eligible for renewal and applied to the TSRs and their associated contract demands.

These risk distributions result in an average long-term PTP revenue risk standard deviation of $11.0 million per year for the rate period.

10.3.3 Long-Term Southern Intertie Service Revenue Risk

Southern Intertie long-term capacity is fully subscribed, meaning that the capacity is completely sold out. In addition, there is a queue of TSRs that have requested long-term Southern Intertie service but that have not been granted because no long-term Southern Intertie service is available for sale. Uncertainties in the revenue are based primarily on transmission service contracts that expire and do not have service renewal rights. TSRs in the queue are expected to replace any contracts that expire. Thus, a high service commencement probability is identified, with a normal distribution, for these TSRs. This risk distribution results in an average revenue risk standard deviation of $1.6 million per year for long-term Southern Intertie service.

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

The revenue forecast for short-term PTP service carries significant variability risk due to the nature of the product. This service is not reserved far in advance with an existing contract, but instead service is requested on an hourly, daily, weekly, or monthly basis. PTP short-term service is sensitive to market conditions and streamflow, so BPA models the risks around the North-of-Path 15 (NP-15) minus Mid-Columbia (Mid-C) price spread (the price difference between electric energy sold at the Mid-Columbia hub and electric energy sold at the North of Path 15 hub), available transfer capability (ATC) limitations, and streamflow. The forecast for short-term PTP service 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 PTP short-term forecast and risk assessment process, see Chapter 14.7. This risk distribution results in an average revenue risk standard deviation of $11.1 million per year for short-term PTP service.

10.3.5 Short-Term Southern Intertie Service Revenue Risk

The revenue forecast for short-term Southern Intertie service carries significant variability risk due to the nature of the product. This service is not reserved far in advance with an existing contract, but instead service 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, available transfer capability (ATC) limitations, 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 IS short-term forecast and risk assessment process, see Chapter 14.10. This risk distribution results in an average revenue risk standard deviation of $2.1 million per year for short-term Southern Intertie service.

10.3.6 Ancillary and Control Area Services Revenue Risk

BPA does not model the revenue risk associated with all of the ancillary and control area services. BPA does model the revenue risk associated with the ancillary service Scheduling, System Control, and Dispatch (SCD), because that product generates significant revenues. SCD applies to customers taking firm and non-firm transmission service. SCD revenue is based on sales of NT, long-term PTP, short-term PTP, long-term Southern Intertie, and short-term Southern Intertie products. As such, the revenue variability for SCD follows the risk associated

with those services, and SCD revenue risk is not modeled individually. Instead, the risk associated with SCD revenues is assumed to vary in a manner directly proportional to the uncertainty in the revenue from those services.

A separate risk module in TRAM incorporates the uncertainty in Variable Energy Resource Balancing Services (VERBS) revenue. In FY 2011-2013, Transmission Services will provide VERBS, formerly known as Wind Balancing Service, to wind and other variable resource generators in the BPA Balancing Authority Area. Generation Inputs Study, section 10.5. Transmission Services will charge generators for the VERBS services they receive. Transmission Services will obtain from Power Services the generation inputs needed to support these services and will pay Power Services for these generation inputs.

VERBS comprise three components: regulation, following, and imbalance, with separate rates applying to each. *Id.* at section 10.5.4. The costs of supplying these services have two components: embedded costs and variable costs. In May 2011 generators are expected to elect balancing service from BPA or to supply one or more of the three components themselves (termed "self-supply" whether obtained from their own resources or from non-BPA sources).

Neither the quantity of wind generation in BPA's Balancing Authority Area nor the amount of customer-supplied imbalance capacity is knowable now with certainty. There is financial risk due to the likelihood that the quantities will differ from the forecast, and therefore Transmission Services will receive either more or less revenue for VERBS than forecast. Transmission Services and Power Services will each bear half of the risk related to the recovery of embedded costs. Power Services will bear the risk related to the recovery of variable costs, which is offset by an equal and opposite risk to net secondary revenue, as explained below.

The variable cost component reflects the deoptimization of the power system that results from setting aside some system capability to support the integration into the system of variable energy resources. If less VERBS than forecast is actually supplied to customers, Transmission Services will receive less revenue for such services, but Power Services will be able to generate greater net secondary revenue than forecast. The incremental net secondary revenue is expected to equal and therefore offset the decrease in Transmission Services' revenue. Transmission Services will pass to Power Services all actual revenue from sales of VERBS to wind generators that is intended to recover the variable costs of generation inputs provided by Power Services. In this way, Transmission Services faces no risk due to variation in the total quantity of wind associated with the recovery of the variable costs of VERBS. Power Services bears the entire risk of deviations in the recovery of the variable cost component, but because this risk is offset by the corresponding impact on Power Services' net secondary revenue, Power Services faces no significant financial risk. Therefore, Power Services does not face significant risk for the recovery of the variable costs of generation inputs.

The recovery of embedded costs, however, is subject to risk, and this risk will be shared equally by the two business lines. If the amount of installed wind capacity is lower than the rate case forecast, or if there is more imbalance self-supply by generators than forecast, BPA will calculate the portion of the Transmission Services revenue shortfall that was intended to recover the embedded costs of VERBS. Transmission Services' payments to Power Services for the

embedded costs of generation inputs will then equal the forecast amount minus half of the embedded-cost portion of the Transmission Services revenue shortfall. Similarly, if the amount of installed wind capacity exceeds the rate case forecast or if there is less imbalance self-supply than forecast, Transmission Services' payments to Power Services for the embedded costs of generation inputs for that year will equal the rate case forecast for that year plus half of the embedded-cost portion of the Transmission Services revenue increase.

Installed wind capacity is modeled using estimates of low, most-likely, and high quantities for FY 2011-2013, with the low and high representing the 10th and 90th percentile of capacity probability distributions. The years are modeled sequentially, such that the installed capacity drawn for one fiscal year impacts the most-likely capacity for the next fiscal year, and capacity does not decrease from one year to the next. The quantity of imbalance self-supply by generators is modeled by taking the rate case forecast and applying a 50 percent probability of the forecasted self-supply occurring and a 50 percent probability that no self-supply occurs. This self-supply occurrence is drawn once per game *(i.e.*, self-supply occurs for both 2012 and 2013 or neither). Installed capacity and imbalance self-supply for each fiscal year are drawn 3,500 times. The difference between the forecast and gamed values are multiplied by the embedded-cost portion of the appropriate VERBS rates, resulting in a negative or positive financial result.

Fifty percent of the financial result of these two risks is then applied to the net revenue for both Transmission Services and Power Services in their risk analyses.

10.3.7 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 model then adds in revenues from products that are not modeled for risk (revenues from products such as Integration of Resources transmission service and Formula Power Transmission service). As a result of the inclusion of revenues from all transmission services, risk is pooled, which reduces the variability of the total transmission revenues as compared to evaluating and mitigating the risks of each service individually. The standard deviation of the distribution of total transmission revenue is $21.0 million per year. Uncertainty over VERBS revenue is incorporated separately into TRAM.

10.4 Expense Risk

The following expense items were modeled probabilistically in TRAM:

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

To obtain the data used to develop the probability distributions used by TRAM for these items, BPA risk staff interviewed subject matter experts for each expense item modeled. The experts were asked for their assessment of the risks concerning their cost estimates, including the

possible range of outcomes and the associated probabilities of occurrence. In some instances, the experts were able to provide a complete probability distribution. For items in which the experts were unable to provide a complete probability distribution, BPA risk staff used the information they did provide to develop the probability distributions.

10.4.1 Transmission Operations

For this study, TRAM models variability in transmission operations expense. A PERT distribution of this risk is created and used for FY 2011 and for each of the two fiscal years in the rate period. A PERT distribution is a distribution in which maximum, most likely, and minimum values are defined for the distribution. For all of the years modeled, the most likely value in the distribution is the discrete (*i.e.*, deterministic) forecast from the revenue requirement; the minimum value is 1.5 percent lower than the discrete forecast; and the maximum value is 1.5 percent higher than the discrete forecast. This risk distribution results in an expected value net revenue impact of transmission operations expense risk of $0 for all of the years.

10.4.2 Transmission Maintenance

For this study, TRAM models variability in transmission maintenance expense. A PERT distribution for this risk is created and used for FY 2011 and for each of the two fiscal years in the rate period. For all of the years modeled, the most likely value in the distribution is the discrete forecast from the revenue requirement; the minimum value is $1 million lower; and the maximum value is $3 million higher. This risk distribution results in an expected value net revenue impact of transmission maintenance expense risk of $2 million each year.

10.4.3 Additional Post-Retirement Contributions to Retirement Plans

For this study, TRAM models variability in the expense for additional post-retirement contributions to retirement plans. A PERT distribution for this risk is created and used for FY 2011 and for each of the two fiscal years in the rate period. For all of the years modeled, the most likely value in the distribution is the discrete forecast from the revenue requirement; the minimum value is 7.5 percent lower; and the maximum value is 10 percent higher. This risk distribution results in an expected value net revenue impact of this expense of $65,000 for FY 2011, $78,000 for FY 2012, and $80,000 for FY 2013.

10.4.4 Agency Services General & Administrative

For this study, TRAM models variability in agency services general and administrative costs. A PERT distribution for this risk is created and used for FY 2011 and for each of the two fiscal years in the rate period. For all of the years modeled, the most likely value in the distribution is the discrete forecast from the revenue requirement; the minimum value is 5 percent lower; and the maximum value is 5 percent higher. This risk distribution results in an expected value net revenue impact of this expense risk of $0 for all years.

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

TRAM models the impact of interest rate risk on Federal debt issuance. TRAM models the risk of interest rate fluctuation using potential interest rates for Federal debt that is forecast to be

issued, which are based on planned debt issuance schedules. TRAM uses a lognormal distribution of interest rates with autocorrelation for year-to-year results. A lognormal distribution is not symmetrical. The asymmetry in the distribution reflects the fact that there is no upper bound on interest rates and that it is possible (although unlikely) for rates to increase to a large extent. The lower bound on interest rates is 0 percent, meaning that simulated interest rates cannot go below 0 percent.. Thus, the lognormal distribution for interest rates has a long tail to the right, reflecting the lower bound of 0 percent and unlimited upper bound.

Autocorrelation for year-to-year results means that the interest rate modeled in a given year impacts the interest rate modeled in following years. TRAM models interest rates with autocorrelation for year-to-year results so that rates for FY 2011 influence rates for FY 2012, which then influence rates for FY 2013. This prevents interest rates from varying unrealistically from one year to the next.

The difference in game-specific interest payments from the point forecast is calculated for every game run by TRAM. This results in expected value net revenue impacts of the risk fluctuations in interest on long-term debt issued to the U.S. Treasury of $0 in FY 2011, –$3.4 million in FY 2012, and –$11.2 million in FY 2013.

10.5 Calibration of TRAM Results to Historical Variability

The results from TRAM were calibrated to the historical variability in actual net revenues. We adjusted the net revenues for FY 2011, 2012, and 2013 based on the historical differences between rate case forecasts of net revenues and actual results for fiscal years 2003 through 2010. The standard deviation of the difference between the rate case forecasts and actual results was $66.026 million. In the current rate proceeding, the standard deviation of FY 2012 net revenue is $19.269 million and the standard deviation of FY 2013 net revenue is $25.4 million. The average standard deviation for the two years is $22.330 million. A calibration multiplier of 2.957 was calculated by dividing the standard deviation of the difference between forecasts and results by the average FY 2012-2013 standard deviation: 66.026 / 22.330 = 2.957. This calibration multiplier is used to create adjusted net revenue for each game with the result that the average of the standard deviations of the adjusted net revenue for FY 2012 and 2013 equals the standard deviation of the historical difference between rate case forecasts of net revenues and actual net revenues.

TRAM is run once after any updating of data. Next the calibration multiplier is recomputed; the resulting value is 2.957. The calibration multiplier is used to increase the variability in net revenue that is modeled by TRAM. To increase the variability by a factor equal to the calibration multiplier, the difference between the mean net revenue (NR) and the net revenue for each game needs to be increased by a factor equal to the calibration multiplier. This increases the standard deviation but leaves the mean the same. The unadjusted difference, the game-specific NR minus the Mean NR, can be called the OldGap. We want the adjusted difference, the NewGap, to be 2.957 * OldGap. The calibration adjustment for the game should equal the NewGap minus the OldGap:

CalibrationAdjustment = NewGap – OldGap.

Since NewGap = Calibration Multiplier × OldGap, that can be substituted into the formula for NewGap:

CalibrationAdjustment = Calibration Multiplier × OldGap – OldGap, or
CalibrationAdjustment = (Calibration Multiplier – 1) × OldGap.

That calibration adjustment is added to the net revenue calculated on the "TS IS" (income statement) worksheet to create a value for adjusted net revenue. The standard deviation of the adjusted net revenue line then matches the variability from the historical data. The adjusted net revenue is then used on the "TS CF" (cashflow) sheet, which passes results to the "TPP Calculation" sheet for the final calculation.

10.6 Risk Analysis Results

The transmission risk analysis simulation resulted in 3,500 games out of 3,500 in which end-of-year financial reserves were sufficient to pay Treasury on time and in full in the FY 2012–2013 rate period. This represents a TPP higher than 99.9 percent for the rate period. These results were obtained with the @RISK sampling option set for Latin Hypercube sampling (a method of generating random values).

10.7 Financial Reserves and PNRR

In the 3,500-game distribution of results, the expected values of year-end financial reserves available for risk for FYs 2011, 2012, and 2013 are $580.4 million, $492.4 million, and $424.9 million, respectively. Since the TPP is above 95 percent for the rate period, no PNRR was needed.

Table 10-1: TRAM Transmission Income Statement
($ in millions)

		FY 2010	FY 2011	FY11 E.V.*	FY11 @ Risk*	FY 2012	FY12 E.V.*	FY12 @ Risk*	FY 2013	FY13 E.V.*	FY13 @ Risk*
1	**Operating Revenues**										
2	Transmission Revenues	738.330									
3	Miscellaneous Revenues	32.175									
4	Reimbursable Revenues	0.000									
5	Plug for planned net revenue for risk	0.000									
6	Inter Business Line Revenues	113.576									
7	**Total Operating Revenues**	884.080	903.475	891.121	893.416	936.384	932.139	946.332	958.405	955.207	969.597
8											
9	**VERBS Net Revenue Deviations**			(0.499)	(0.499)		1.774	4.960		3.128	7.057
10											
11	**Operating Expenses**										
12	Transmission Operations	103.625	123.112	123.112	123.112	130.050	130.050	130.050	133.590	133.590	133.590
13	Transmission Maintenance	125.431	142.331	144.331	144.331	146.712	148.712	148.712	150.831	152.831	152.831
14	Transmission Engineering	24.221	30.967		30.967	31.800		31.800	32.803		32.803
15	Trans Services Transmission Acquisition and Ancillary	109.782	115.144		115.144	138.373		138.373	142.079		142.079
16	Transmission Reimbursables							0.000			0.000
17	Additional Post-Retirement Contribution	15.447	15.579	15.643	15.643	18.819	18.897	18.897	19.143	19.223	19.223
18	Agency Services G&A	50.362	58.088	58.088	58.088	58.281	58.281	58.281	59.638	59.638	59.638
19	Other Income, Expenses & Adjustments	7.721	3.462		3.462	(0.200)		(0.200)	0.401		0.401
20	Non-Federal Debt Service (see Note 2 of EPM report)	0.000	0.000		0.000	0.000		0.000	0.000		0.000
21	Other	0.000	0.000		0.000	0.000		0.000	0.000		0.000
22	**Total Transmission Operating Expense**	**436.589**	**488.683**	**490.748**	**490.748**	**523.835**	**525.913**	**525.913**	**538.485**	**540.565**	**540.565**
23											
24	**Net Operating Margin**	**447.491**	**414.792**	**400.373**	**402.668**	**412.549**	**406.226**	**420.418**	**419.920**	**414.642**	**429.032**
25											
26	Federal Projects Depreciation	183.382	193.900		193.900	198.604		198.604	218.124		218.124
27											
28	**Total Operating Expense & Depreciation**	**619.971**	**682.583**	**684.648**	**684.648**	**722.439**	724.517	**724.517**	**756.609**	758.689	**758.689**
29											
30	**Net Operating Revenue**	**264.109**	**220.892**		**208.768**	**213.945**		**221.814**	**201.796**		**210.908**
31	Interest on Appropriated Funds	34.658	29.217	29.217	29.217	23.086	23.086	23.086	10.396	10.396	10.396
32	Capitalization Adjustment	(18.968)	(18.968)		(18.968)	(18.968)		(18.968)	(18.968)		(18.968)
33	Interest on Long-Term Debt Issued to Treasury	74.962	84.469	84.469	84.469	101.642	98.239	98.241	137.021	125.834	125.835
34	Amortization of Capitalized Bond Premiums	0.758	0.692		0.692	0.561		0.561	0.561		0.561
35	Debt Reassignment Interest Expense	56.781	54.358	54.358	54.358	54.352	54.352	54.352	52.556	52.556	52.556
36	Interest on Customer Advances	8.135	9.300		9.300			0.000			0.000
37	AFUDC	(23.204)	(28.300)		(28.300)	(30.069)		(30.069)	(32.255)		(32.255)
38	Non Federal Interest	20.718	22.522		22.522	44.842		44.842	47.321		47.321
39	Interest Credit on Cash Reserves	(30.644)	(28.080)		(28.080)	(17.362)		(17.362)	(21.467)		(21.467)
40	**Net Interest Expense**	**123.195**	**125.210**	125.210	**125.210**	**158.085**	154.682	**154.684**	**175.165**	163.977	**163.979**
41											
41	**Total Operating & Net Interest Expenses**	**743.165**	**807.793**	809.858	**809.858**	**880.524**	879.199	**879.201**	**931.774**	922.666	**922.668**
42											
43	**Net Revenues**	**140.915**	**95.682**	80.765	**83.059**	**55.860**	54.713	**72.090**	**26.631**	35.668	**53.986**
44	**Calibration Adjustment**			(0.057)	**4.433**		0.060	**34.064**		0.045	**35.890**
45	**Adjusted Net Revenues**			80.708	**87.492**		54.774	**106.155**		35.713	**89.876**

* The "@Risk" columns are needed for the actual calculations, but the values shown in those cells are not necessarily the actual expected values of the distributions created when @Risk runs. The adjacent columns, "True E.V.", do not affect the calculations, but display the correct expected values of the variables in the "@Risk" columns. The "@Risk" columns are for the software; the "True E.V." columns are for the convenience of people reading the results.

Table 10-2: TRAM Transmission Services Statement of Cash Flows

($ in millions)

		A	B	C	D	E	F	G	H	I	J
		FY 2010	FY 2011	FY11 E.V.*	FY11 @ Risk*	FY 2012	FY12 E.V.*	FY12 @ Risk*	FY 2013	FY13 E.V.*	FY13 @ Risk*
1	**Cash Provided by Current Operations**										
2	Adjusted Net Revenues	140.915	95.682	80.708	87.492	55.860	54.774	106.155	26.631	35.713	89.876
3	Expenses not Requiring Cash										
4	Depreciation/Amortization	183.382	193.900		193.900	198.604		198.604	218.124		218.124
5	Transmission Credit Projects Net Interest							0.000			0.000
6	Amort of Capitalized Bond Premiums	0.758	0.692		0.692	0.561		0.561	0.561		0.561
7	Capitalization Adjustment	(18.968)	(18.968)		(18.968)	(18.968)		(18.968)	(18.968)		(18.968)
8	Drawdown of Cash Reserves for Capital Funding										
9	Accrual Revenues (LGIA/AC Intertie/Fiber)							0.000			0.000
10	Revenue Recognition (Third AC)	(3.065)	(3.065)		(3.065)			0.000			0.000
11	Revenue Recognition (Fiberoptics)	(0.777)	(0.737)		(0.737)			0.000			0.000
12	MBS interest accrual net of cash received	0.000	3.600		3.600	0.000		0.000	0.000		0.000
13	Fiber Lease Pre Pay	(4.152)	(3.535)		(3.535)			0.000			0.000
14	Interest on LGIA Customer Advances	8.135	9.300		9.300	17.970		17.970	20.026		20.026
15	LGIA Revenue Credits	(30.182)	(26.421)		(26.421)	(48.616)		(48.616)	(54.851)		(54.851)
16	Cash Provided by Current Operations	276.044	250.448		242.258	205.411		255.706	191.523		254.768
17	**Cash Used for Capital Investments**										
18	Investment in										
19	Gross Utility Plant and CWIP	(347.500)	(454.575)		(454.575)	(579.415)		(579.415)	(627.722)		(627.722)
20	Cash Used for Capital Investments	(347.500)	(454.575)		(454.575)	(579.415)		(579.415)	(627.722)		(627.722)
21	**Cash From Borrowing and Appropriations**										
22	Cash from Borrowing & Appropriations 1/	347.500	424.575		424.575	564.415		564.415	612.722		612.722
23	Adjust DSR Accruals to Actual Cash Flows	(4.575)	(7.407)		(7.407)	(41.141)		(41.141)	(165.717)		(165.717)
24	Repayment of Long-term Debt (Plus Advanced Refunding)	(140.251)	(100.000)		(100.000)	(25.000)		(25.000)	0.000		0.000
25	Repayment of Capital Appropriations	(74.905)	(124.707)		(124.707)	(175.110)		(175.110)	(56.374)		(56.374)
26	**Subtotal Cash from Borrowing & Approp**	127.769	192.461		192.461	323.164		323.164	390.631		390.631
27	**Annual Change in Cash Balance**	56.313	(11.666)	(26.640)	(19.856)	(50.840)	(51.926)	(0.545)	(45.568)	(36.486)	17.677
28	Plus Beginning Cash Balance	516.149	579.000	579.000	579.000	567.334	552.360	559.144	516.494	500.434	558.599
29	Reserves For Risk	579.000	567.334	552.360	559.144	516.494	500.434	558.599	470.926	463.948	576.276
30											
31	**Reserve Financing for Capital**	0.000	30.000		30.000	15.000		15.000	15.000		15.000

* The "@Risk" columns are needed for the actual calculations, but the values shown in those cells are not necessarily the actual expected values of the distributions created when @Risk runs. The adjacent columns, "True E.V.", do not affect the calculations, but display the correct expected values of the variables in the "@Risk" columns. The "@Risk" columns are for the software; the "True E.V." columns are for the convenience of people reading the results.

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

		2011		2012		2013	
		@Risk*	True E.V.*	@Risk*	True E.V.*	@Risk*	True E.V.*
1	Starting Reserves for Risk	607,000		587,144	580,360	550,599	492,434
2							
3	Decrease Starting Reserves for Add'l Liquidity for PS TPP						
4							
5	Revenues	893,416	891,121	946,332	932,139	969,597	955,207
6	VERBS Net Revenue Deviations	(499)	(499)	4,960	1,774	7,057	3,128
7	Expenses	(809,858)	(809,858)	(879,201)	(879,199)	(922,668)	(922,666)
8	Calibration Adjustment	4,433	(57)	34,064	60	35,890	45
9	Adjusted Net Revenue	87,492	80,708	106,155	54,774	89,876	35,713
10							
11	Total Expenses Not Requiring Cash	154,766	154,766	149,551	149,551	164,892	164,892
12	Cash Used for Capital Investment	(454,575)	(454,575)	(579,415)	(579,415)	(627,722)	(627,722)
13	Cash From Borrowing and Appropriations	192,461	192,461	323,164	323,164	390,631	390,631
14	Accrual-to-Cash Adjustment	(107,348)	(107,348)	(106,700)	(106,700)	(72,199)	(72,199)
15							
16	Net Adjusted Cash Flow	(19,856)	(26,640)	(545)	(51,926)	17,677	(36,486)
17							
18	Additional Use of Reserves			(36,000)	(36,000)	(31,000)	(31,000)
19							
20	Ending Reserves for Risk	587,144	580,360	550,599	492,434	537,276	424,948
21							
22	Required EOY Reserve Balance ("Liquidity Reserves")	20,000		20,000		20,000	
23							
24	Are Ending Reserves Higher than Liquidity Reserve level?	1		1		1	
25							
26	Test to See if TPP is Met in Rate Period					TRUE	
27							
28	TPP Calculation					1.00	
29	**TPP Percentage**			**2-year TPP =**		**> 99.9%**	

* The "@Risk" columns are needed for the actual calculations, but the values shown in those cells are not necessarily the actual expected values of the distributions created when @Risk runs. The adjacent columns, "True E.V.", do not affect the calculations, but display the correct expected values of the variables in the "@Risk" columns. The "@Risk" columns are for the software; the "True E.V." columns are for the convenience of people reading the results.

11. REPAYMENT STUDY INPUT DATA CURRENT STUDY

Table 11-1: Historical Investments ($000s) (FY 2010)

	A	B	C	D	E	F	G	H	I	J
	Project	Original Principal	Current Principal	Interest Rate	Due Date	Replacement?	In Service Date	Month	Rollover Date	Rollover Rate
1	Bonneville Power Administration	6,812	-	2.500%	1985	N	1940	9	-	-
2	Bonneville Power Administration	18,906	-	2.500%	1986	N	1941	9	-	-
3	Bonneville Power Administration	461	-	2.500%	1986	N	1941	9	-	-
4	Bonneville Power Administration	8,446	-	2.500%	1987	N	1942	9	-	-
5	Bonneville Power Administration	1,052	-	2.500%	1987	N	1942	9	-	-
6	Bonneville Power Administration	16,083	-	2.500%	1988	N	1943	9	-	-
7	Bonneville Power Administration	4,538	-	2.500%	1988	N	1943	9	-	-
8	Bonneville Power Administration	583	-	2.500%	1989	N	1944	9	-	-
9	Bonneville Power Administration	249	-	2.500%	1989	N	1944	9	-	-
10	Bonneville Power Administration	1,306	-	2.500%	1990	N	1945	9	-	-
11	Bonneville Power Administration	3,366	-	2.500%	1990	N	1945	9	-	-
12	Bonneville Power Administration	2,488	-	2.500%	1991	N	1946	9	-	-
13	Bonneville Power Administration	732	-	2.500%	1991	N	1946	9	-	-
14	Bonneville Power Administration	1,330	-	2.500%	1992	N	1947	9	-	-
15	Bonneville Power Administration	1,773	-	2.500%	1992	N	1947	9	-	-
16	Bonneville Power Administration	7,468	-	2.500%	1993	N	1948	9	-	-
17	Bonneville Power Administration	2,290	-	2.500%	1993	N	1948	9	-	-
18	Bonneville Power Administration	6,809	-	2.500%	1994	N	1949	9	-	-
19	Bonneville Power Administration	2,719	-	2.500%	1994	N	1949	9	-	-
20	Bonneville Power Administration	24,111	-	2.500%	1995	N	1950	9	-	-
21	Bonneville Power Administration	6,124	-	2.500%	1995	N	1950	9	-	-
22	Bonneville Power Administration	7,040	-	2.500%	1996	N	1951	9	-	-
23	Bonneville Power Administration	13,266	-	2.500%	1996	N	1951	9	-	-
24	Bonneville Power Administration	18,610	-	2.500%	1997	N	1952	9	-	-
25	Bonneville Power Administration	8,979	-	2.500%	1997	N	1952	9	-	-
26	Bonneville Power Administration	11,605	-	6.330%	1998	N	1953	9	-	-
27	Bonneville Power Administration	23,550	-	6.330%	1998	N	1953	9	-	-
28	Bonneville Power Administration	23,614	-	6.510%	1999	N	1954	9	-	-
29	Bonneville Power Administration	17,370	-	6.510%	1999	N	1954	9	-	-
30	Bonneville Power Administration	11,827	-	6.620%	2000	N	1955	9	-	-
31	Bonneville Power Administration	10,283	-	6.620%	2000	N	1955	9	-	-
32	Bonneville Power Administration	14,573	-	6.710%	2001	N	1956	9	-	-
33	Bonneville Power Administration	32,221	-	6.710%	2001	N	1956	9	-	-
34	Bonneville Power Administration	7,933	-	6.790%	2002	N	1957	9	-	-
35	Bonneville Power Administration	15,980	-	6.790%	2002	N	1957	9	-	-
36	Bonneville Power Administration	15,593	-	6.840%	2003	N	1958	9	-	-
37	Bonneville Power Administration	10,654	-	6.840%	2003	N	1958	9	-	-
38	Bonneville Power Administration	8,157	-	6.880%	2004	N	1959	9	-	-
39	Bonneville Power Administration	8,863	-	6.880%	2004	N	1959	9	-	-
40	Bonneville Power Administration	3,598	-	6.910%	2005	N	1960	9	-	-
41	Bonneville Power Administration	4,218	-	6.910%	2005	N	1960	9	-	-
42	Bonneville Power Administration	4,468	-	6.950%	2006	N	1961	9	-	-
43	Bonneville Power Administration	11,271	-	6.950%	2006	N	1961	9	-	-
44	Bonneville Power Administration	19,597	-	6.980%	2007	N	1962	9	-	-
45	Bonneville Power Administration	4,877	-	6.980%	2007	N	1962	9	-	-
46	Bonneville Power Administration	4,876	-	7.020%	2008	N	1963	9	-	-
47	Bonneville Power Administration	4,330	-	7.020%	2008	N	1963	9	-	-
48	Bonneville Power Administration	904	-	7.020%	2008	N	1963	9	-	-
49	Bonneville Power Administration	803	-	7.020%	2008	N	1963	9	-	-
50	Bonneville Power Administration	4,151	-	7.060%	2009	N	1964	9	-	-
51	Bonneville Power Administration	5,738	-	7.060%	2009	N	1964	9	-	-
52	Bonneville Power Administration	3,706	-	7.090%	2010	N	1965	9	-	-
53	Bonneville Power Administration	7,248	-	7.090%	2010	N	1965	9	-	-
54	Bonneville Power Administration	5,202	-	7.090%	2010	N	1965	9	-	-
55	Bonneville Power Administration	10,171	-	7.090%	2010	N	1965	9	-	-
56	Bonneville Power Administration	11,830	11,830	7.130%	2011	N	1966	9	-	-
57	Bonneville Power Administration	3,049	3,049	7.130%	2011	N	1966	9	-	-
58	Bonneville Power Administration	6,647	6,353	7.130%	2011	N	1966	9	-	-
59	Bonneville Power Administration	1,714	-	7.130%	2011	N	1966	9	-	-
60	Bonneville Power Administration	19,003	19,003	7.160%	2012	N	1967	9	-	-
61	Bonneville Power Administration	4,566	355	7.160%	2012	N	1967	9	-	-
62	Bonneville Power Administration	14,300	-	7.160%	2012	N	1967	9	-	-

Table 11-1: Historical Investments ($000s) (FY 2010)

	A	B	C	D	E	F	G	H	I	J
	Project	Original Principal	Current Principal	Interest Rate	Due Date	Replacement?	In Service Date	Month	Rollover Date	Rollover Rate
63	Bonneville Power Administration	3,436	-	7.160%	2012	N	1967	9	-	-
64	Bonneville Power Administration	41,070	18,250	7.200%	2013	N	1968	9	-	-
65	Bonneville Power Administration	8,076	-	7.200%	2013	N	1968	9	-	-
66	Bonneville Power Administration	23,202	-	7.200%	2013	N	1968	9	-	-
67	Bonneville Power Administration	4,562	-	7.200%	2013	N	1968	9	-	-
68	Bonneville Power Administration	42,237	19,198	7.230%	2014	N	1969	9	-	-
69	Bonneville Power Administration	22,537	-	7.230%	2014	N	1969	9	-	-
70	Bonneville Power Administration	384	-	7.230%	2014	N	1969	9	-	-
71	Bonneville Power Administration	205	-	7.230%	2014	N	1969	9	-	-
72	Bonneville Power Administration	64,977	41,171	7.270%	2015	N	1970	9	-	-
73	Bonneville Power Administration	7,995	3,699	7.270%	2015	N	1970	9	-	-
74	Bonneville Power Administration	24,412	23,551	7.270%	2015	N	1970	9	-	-
75	Bonneville Power Administration	3,003	-	7.270%	2015	N	1970	9	-	-
76	Bonneville Power Administration	12,025	-	7.290%	2016	N	1971	9	-	-
77	Bonneville Power Administration	17,766	-	7.290%	2016	N	1971	9	-	-
78	Bonneville Power Administration	12,051	-	7.290%	2016	N	1971	9	-	-
79	Bonneville Power Administration	17,805	-	7.290%	2016	N	1971	9	-	-
80	Bonneville Power Administration	29,326	-	7.290%	2017	N	1972	9	-	-
81	Bonneville Power Administration	21,170	-	7.290%	2017	N	1972	9	-	-
82	Bonneville Power Administration	3,980	-	7.290%	2017	N	1972	9	-	-
83	Bonneville Power Administration	2,873	-	7.290%	2017	N	1972	9	-	-
84	Bonneville Power Administration	33,788	15,769	7.280%	2018	N	1973	9	-	-
85	Bonneville Power Administration	21,656	5,041	7.280%	2018	N	1973	9	-	-
86	Bonneville Power Administration	16,368	-	7.280%	2018	N	1973	9	-	-
87	Bonneville Power Administration	10,491	-	7.280%	2018	N	1973	9	-	-
88	Bonneville Power Administration	12,079	12,079	7.270%	2019	N	1974	9	-	-
89	Bonneville Power Administration	20,984	17,810	7.270%	2019	N	1974	9	-	-
90	Bonneville Power Administration	12,563	12,563	7.270%	2019	N	1974	9	-	-
91	Bonneville Power Administration	21,826	-	7.270%	2019	N	1974	9	-	-
92	Bonneville Power Administration	32,026	32,026	7.250%	2020	N	1975	9	-	-
93	Bonneville Power Administration	21,916	21,916	7.250%	2020	N	1975	9	-	-
94	Bonneville Power Administration	17,158	17,158	7.250%	2020	N	1975	9	-	-
95	Bonneville Power Administration	11,742	11,742	7.250%	2020	N	1975	9	-	-
96	Bonneville Power Administration	61,025	61,025	7.230%	2021	N	1976	9	-	-
97	Bonneville Power Administration	2,212	2,212	7.230%	2021	N	1976	9	-	-
98	Bonneville Power Administration	3,948	3,948	7.210%	2022	N	1977	9	-	-
99	Bonneville Power Administration	5,380	5,380	7.210%	2022	N	1977	9	-	-
100	Bonneville Power Administration	33,702	33,702	7.210%	2022	N	1977	9	-	-
101	Bonneville Power Administration	4,981	4,981	7.210%	2022	N	1977	9	-	-
102	Construction	17,770	-	8.950%	2013	N	1978	9	-	-
103	Construction	24,222	-	8.950%	2013	N	1978	9	-	-
104	Construction	3,389	-	8.950%	2013	N	1978	9	-	-
105	Construction	4,619	-	8.950%	2013	N	1978	9	-	-
106	Construction	7,010	-	9.450%	2014	N	1979	6	-	-
107	Construction	9,804	-	9.450%	2014	N	1979	6	-	-
108	Construction	26,690	-	9.450%	2014	N	1979	6	-	-
109	Construction	21,977	-	9.450%	2014	N	1979	6	-	-
110	Construction	6,026	-	9.450%	2014	N	1979	6	-	-
111	Construction	21,228	-	9.900%	2014	N	1979	9	-	-
112	Construction	14,340	-	9.900%	2014	N	1979	9	-	-
113	Construction	10,610	-	9.900%	2014	N	1979	9	-	-
114	Construction	2,888	-	9.900%	2014	N	1979	9	-	-
115	Construction	1,371	-	9.450%	2014	N	1979	6	-	-
116	Construction	1,870	-	9.450%	2014	N	1979	6	-	-
117	Construction	150	-	9.450%	2014	N	1979	6	-	-
118	Construction	102	-	9.450%	2014	N	1979	6	-	-
119	Construction	98	-	9.900%	2014	N	1979	9	-	-
120	Construction	66	-	9.900%	2014	N	1979	9	-	-
121	Construction	605	-	9.900%	2014	N	1979	9	-	-
122	Construction	165	-	9.900%	2014	N	1979	9	-	-
123	Construction	39,696	-	13.000%	2015	N	1980	9	-	-
124	Construction	10,806	-	13.000%	2015	N	1980	9	-	-

Table 11-1: Historical Investments ($000s) (FY 2010)

	A	B	C	D	E	F	G	H	I	J
	Project	Original Principal	Current Principal	Interest Rate	Due Date	Replacement?	In Service Date	Month	Rollover Date	Rollover Rate
125	Construction	44,811	-	13.000%	2015	N	1980	9	-	-
126	Construction	1,469	-	13.000%	2015	N	1980	9	-	-
127	Construction	9,292	-	13.000%	2015	N	1980	9	-	-
128	Construction	4,253	-	13.000%	2015	N	1980	9	-	-
129	Construction	2,263	-	13.000%	2015	N	1980	9	-	-
130	Construction	616	-	13.000%	2015	N	1980	9	-	-
131	Construction	1,707	-	13.000%	2015	N	1980	9	-	-
132	Construction	56	-	13.000%	2015	N	1980	9	-	-
133	Construction	21	-	13.000%	2015	N	1980	9	-	-
134	Construction	10	-	13.000%	2015	N	1980	9	-	-
135	Construction	119,775	-	16.600%	2016	N	1981	9	-	-
136	Construction	54,821	-	16.600%	2016	N	1981	9	-	-
137	Construction	277	-	16.600%	2016	N	1981	9	-	-
138	Construction	127	-	16.600%	2016	N	1981	9	-	-
139	Construction	34,221	-	14.400%	2017	N	1982	12	-	-
140	Construction	15,663	-	14.400%	2017	N	1982	12	-	-
141	Construction	9,975	-	14.400%	2017	N	1982	4	-	-
142	Construction	4,566	-	14.400%	2017	N	1982	4	-	-
143	Construction	46,980	-	14.400%	2017	N	1982	4	-	-
144	Construction	37,455	-	14.400%	2017	N	1982	4	-	-
145	Construction	3,677	-	14.150%	2017	N	1982	7	-	-
146	Construction	2,932	-	14.150%	2017	N	1982	7	-	-
147	Construction	77,807	-	14.150%	2017	N	1982	7	-	-
148	Construction	80	-	14.400%	2017	N	1982	12	-	-
149	Construction	36	-	14.400%	2017	N	1982	12	-	-
150	Construction	23	-	14.400%	2017	N	1982	4	-	-
151	Construction	11	-	14.400%	2017	N	1982	4	-	-
152	Construction	551	-	14.400%	2017	N	1982	4	-	-
153	Construction	439	-	14.400%	2017	N	1982	4	-	-
154	Construction	43	-	14.150%	2017	N	1982	7	-	-
155	Construction	34	-	14.150%	2017	N	1982	7	-	-
156	Construction	402	-	14.150%	2017	N	1982	7	-	-
157	Construction	105	-	14.150%	2017	N	1982	7	-	-
158	Construction	154	-	11.700%	2018	N	1983	6	-	-
159	Construction	29,806	-	11.700%	2018	N	1983	6	-	-
160	Construction	814	-	12.250%	2018	N	1983	9	-	-
161	Construction	37,235	-	12.250%	2018	N	1983	9	-	-
162	Construction	6,708	-	12.250%	2018	N	1983	9	-	-
163	Construction	205	-	10.850%	2018	N	1983	11	-	-
164	Construction	54	-	10.850%	2018	N	1983	11	-	-
165	Construction	4	-	12.250%	2018	N	1983	9	-	-
166	Construction	1	-	12.250%	2018	N	1983	9	-	-
167	Construction	203	-	12.250%	2018	N	1983	9	-	-
168	Construction	35	-	12.250%	2018	N	1983	9	-	-
169	Construction	39,741	-	10.850%	2018	N	1983	11	-	-
170	Construction	40	-	11.700%	2018	N	1983	6	-	-
171	Construction	25,283	-	12.300%	2019	N	1984	11	-	-
172	Construction	4,555	-	12.300%	2019	N	1984	11	-	-
173	Construction	50,567	-	13.050%	2019	N	1984	9	-	-
174	Construction	9,109	-	13.050%	2019	N	1984	9	-	-
175	Construction	138	-	12.300%	2019	N	1984	11	-	-
176	Construction	24	-	12.300%	2019	N	1984	11	-	-
177	Construction	276	-	13.050%	2019	N	1984	9	-	-
178	Construction	48	-	13.050%	2019	N	1984	9	-	-
179	Construction	15,182	-	11.250%	2029	N	1985	6	-	-
180	Construction	460	-	11.250%	2029	N	1985	6	-	-
181	Construction	80	-	11.250%	2029	N	1985	6	-	-
182	Construction	84,278	-	11.250%	2030	N	1985	6	-	-
183	Construction	870	-	8.150%	1996	N	1986	3	-	-
184	Construction	157	-	8.150%	1996	N	1986	3	-	-
185	Construction	30,161	-	8.150%	1996	N	1986	3	-	-
186	Construction	68,194	-	8.150%	1996	N	1986	3	-	-

Table 11-1: Historical Investments ($000s) (FY 2010)

	A	B	C	D	E	F	G	H	I	J
	Project	Original Principal	Current Principal	Interest Rate	Due Date	Replacement?	In Service Date	Month	Rollover Date	Rollover Rate
187	Construction	5	-	8.150%	1996	N	1986	3	-	-
188	Construction	1	-	8.150%	1996	N	1986	3	-	-
189	Construction	443	-	8.150%	1996	N	1986	3	-	-
190	Construction	169	-	8.150%	1996	N	1986	3	-	-
191	Construction	5,161	-	8.950%	2031	N	1986	6	-	-
192	Construction	11,668	-	8.950%	2031	N	1986	6	-	-
193	Construction	180,054	-	8.950%	2031	N	1986	6	-	-
194	Construction	3,117	-	8.950%	2031	N	1986	6	-	-
195	Construction	40,000	-	8.950%	2031	N	1986	6	-	-
196	Construction	57,354	-	8.950%	2031	N	1986	6	-	-
197	Construction	76	-	8.950%	2031	N	1986	6	-	-
198	Construction	29	-	8.950%	2031	N	1986	6	-	-
199	Construction	1,819	-	8.950%	2031	N	1986	6	-	-
200	Construction	722	-	8.950%	2031	N	1986	6	-	-
201	Construction	96,519	-	8.350%	1992	N	1987	6	-	-
202	Construction	2,498	-	8.350%	1992	N	1987	6	-	-
203	Construction	983	-	8.350%	1992	N	1987	6	-	-
204	Construction	4,113	-	9.550%	2017	N	1987	7	-	-
205	Construction	86,958	-	9.550%	2017	N	1987	7	-	-
206	Construction	569	-	9.550%	2017	N	1987	7	-	-
207	Construction	38	-	9.550%	2017	N	1987	7	-	-
208	Construction	3,274	-	9.550%	2017	N	1987	7	-	-
209	Construction	48	-	9.550%	2017	N	1987	7	-	-
210	Construction	618	-	9.550%	2032	N	1987	7	-	-
211	Construction	112	-	9.550%	2032	N	1987	7	-	-
212	Construction	43,236	-	9.300%	2032	N	1987	4	-	-
213	Construction	54,409	-	9.300%	2032	N	1987	4	-	-
214	Construction	7,903	-	9.550%	2032	N	1987	7	-	-
215	Construction	3,109	-	9.550%	2032	N	1987	7	-	-
216	Construction	37,342	-	9.550%	2032	N	1987	7	-	-
217	Construction	111	-	9.300%	2032	N	1987	4	-	-
218	Construction	281	-	9.300%	2032	N	1987	4	-	-
219	Construction	554	-	9.300%	2032	N	1987	4	-	-
220	Construction	1,409	-	9.300%	2032	N	1987	4	-	-
221	Construction	285	-	9.550%	2032	N	1987	7	-	-
222	Construction	631	-	9.550%	2032	N	1987	7	-	-
223	Construction	283	-	9.500%	2018	N	1988	2	-	-
224	Construction	43,417	-	9.500%	2018	N	1988	2	-	-
225	Construction	28,513	-	9.500%	2033	N	1988	2	-	-
226	Construction	27,887	-	9.500%	2033	N	1988	2	-	-
227	Construction	20,677	-	9.500%	2033	N	1988	2	-	-
228	Construction	22,923	-	9.500%	2033	N	1988	2	-	-
229	Construction	45,870	-	9.500%	2033	N	1988	2	-	-
230	Construction	9,018	-	9.900%	2033	N	1988	6	-	-
231	Construction	30,004	-	9.900%	2033	N	1988	6	-	-
232	Construction	954	-	9.500%	2033	N	1988	2	-	-
233	Construction	933	-	9.500%	2033	N	1988	2	-	-
234	Construction	518	-	9.500%	2033	N	1988	2	-	-
235	Construction	1,725	-	9.500%	2033	N	1988	2	-	-
236	Construction	226	-	9.900%	2033	N	1988	6	-	-
237	Construction	752	-	9.900%	2033	N	1988	6	-	-
238	Construction	16,909	-	8.950%	1999	N	1989	5	-	-
239	Construction	56,257	-	8.950%	1999	N	1989	5	-	-
240	Construction	424	-	8.950%	1999	N	1989	5	-	-
241	Construction	1,410	-	8.950%	1999	N	1989	5	-	-
242	Construction	41,894	-	9.250%	2030	N	1990	1	-	-
243	Construction	1,149	-	9.250%	2030	N	1990	1	-	-
244	Construction	3,824	-	9.250%	2030	N	1990	1	-	-
245	Construction	29	-	9.250%	2030	N	1990	1	-	-
246	Construction	96	-	9.250%	2030	N	1990	1	-	-
247	Construction	3,008	-	9.250%	2030	N	1990	1	-	-
248	Construction	54,145	-	7.550%	1995	N	1991	2	-	-

Table 11-1: Historical Investments ($000s) (FY 2010)

	A	B	C	D	E	F	G	H	I	J
	Project	Original Principal	Current Principal	Interest Rate	Due Date	Replacement?	In Service Date	Month	Rollover Date	Rollover Rate
249	Construction	5,855	-	7.550%	1995	N	1991	2	-	-
250	Construction	80,000	-	6.200%	1995	N	1992	4	-	-
251	Construction	50,000	-	7.000%	1997	N	1992	4	-	-
252	Construction	28,300	-	7.000%	1997	N	1992	4	-	-
253	Construction	107,800	-	6.600%	2000	N	1992	8	-	-
254	Construction	107,700	-	7.250%	2007	N	1992	8	-	-
255	Construction	147,521	-	8.800%	2032	N	1992	4	-	-
256	Construction	150,000	-	8.130%	2032	N	1992	7	-	-
257	Construction	2,479	-	8.800%	2032	N	1992	4	-	-
258	Construction	50,000	-	6.050%	1998	N	1993	10	-	-
259	Construction	99,962	-	8.350%	2033	N	1993	10	-	-
260	Construction	130,000	-	7.800%	2033	N	1993	2	-	-
261	Construction	110,000	-	6.950%	2033	N	1993	8	-	-
262	Construction	100,000	-	7.500%	2033	N	1993	4	-	-
263	Construction	43,155	-	7.100%	1998	N	1994	5	-	-
264	Construction	49,489	-	7.100%	1998	N	1994	5	-	-
265	Construction	4,456	-	7.100%	1998	N	1994	5	-	-
266	Construction	55,000	-	7.650%	1999	N	1994	9	-	-
267	Construction	50,000	-	7.050%	2034	N	1994	1	-	-
268	Construction	50,000	-	6.850%	2034	N	1994	10	-	-
269	Construction	108,400	-	6.850%	2034	N	1994	10	-	-
270	Construction	50,000	-	8.200%	2034	N	1994	5	-	-
271	Construction	55,000	-	8.350%	2001	N	1995	1	-	-
272	Construction	49,933	-	7.700%	2025	N	1995	7	-	-
273	Construction	65,000	-	7.700%	2025	N	1995	8	-	-
274	Construction	54,378	-	5.900%	2003	N	1996	1	-	-
275	Construction	70,000	-	7.050%	2006	N	1996	8	-	-
276	Construction	22,600	-	6.800%	2004	N	1997	1	-	-
277	Construction	80,000	-	6.900%	2005	N	1997	5	-	-
278	Construction	111,254	-	6.650%	2007	N	1997	8	-	-
279	Construction	36,819	-	5.750%	2008	N	1998	8	-	-
280	Construction	75,300	-	6.000%	2008	N	1998	4	-	-
281	Construction	72,700	-	6.000%	2009	N	1998	5	-	-
282	Construction	40,000	40,000	6.200%	2011	N	1998	5	-	-
283	Construction	50,000	50,000	6.650%	2028	N	1998	4	-	-
284	Construction	106,500	106,500	5.850%	2028	N	1998	8	2031	5.570%
285	Construction	112,300	112,300	5.850%	2028	N	1998	8	-	-
286	Construction	98,900	98,900	6.700%	2032	N	1998	5	-	-
287	Construction	40,000	-	6.200%	2002	N	1999	9	-	-
288	Construction	26,200	-	5.950%	2004	N	1999	5	-	-
289	Construction	59,050	59,050	5.900%	2014	N	1999	2	2025	5.590%
290	Construction	40,000	-	6.400%	2003	N	2000	11	-	-
291	Construction	15,300	-	6.850%	2003	N	2000	8	-	-
292	Construction	39,052	-	7.000%	2004	N	2000	7	-	-
293	Construction	53,500	-	7.150%	2005	N	2000	1	-	-
294	Construction	40,000	-	6.750%	2006	N	2000	9	-	-
295	Construction	20,000	-	5.650%	2005	N	2001	1	-	-
296	Construction	59,932	-	6.050%	2010	N	2001	1	-	-
297	Construction	25,000	25,000	5.950%	2011	N	2001	6	-	-
298	Construction	50,000	50,000	5.750%	2011	N	2001	8	2026	3.910%
299	Construction	108,010	-	4.600%	2005	N	2002	3	-	-
300	Construction	60,000	-	3.750%	2005	N	2002	6	-	-
301	Construction	100,000	-	3.050%	2006	N	2002	9	-	-
302	Construction	4,938	-	3.000%	2006	N	2003	10	-	-
303	Construction	40,000	-	2.800%	2006	N	2003	11	-	-
304	Construction	75,000	-	2.300%	2006	N	2003	7	-	-
305	Construction	20,000	-	2.500%	2006	N	2003	9	-	-
306	Construction	40,000	-	2.900%	2007	N	2003	4	-	-
307	Construction	25,000	-	2.950%	2007	N	2003	7	-	-
308	Construction	40,000	40,000	5.550%	2033	N	2003	4	-	-
309	Construction	46,643	-	2.500%	2007	N	2004	1	-	-
310	Construction	65,000	-	2.950%	2007	N	2004	4	-	-

Table 11-1: Historical Investments ($000s) (FY 2010)

	A	B	C	D	E	F	G	H	I	J
	Project	Original Principal	Current Principal	Interest Rate	Due Date	Replacement?	In Service Date	Month	Rollover Date	Rollover Rate
311	Construction	30,000	-	3.100%	2007	N	2004	9	-	-
312	Construction	50,000	-	-	2007	N	2004	7	-	-
313	Construction	65,000	-	2.950%	2008	N	2004	1	-	-
314	Construction	25,000	-	3.800%	2008	N	2004	7	-	-
315	Construction	40,000	40,000	5.600%	2034	N	2004	9	-	-
316	Construction	27,010	-	3.750%	2009	N	2005	11	-	-
317	Construction	40,000	-	4.000%	2009	N	2005	6	-	-
318	Construction	40,000	40,000	5.400%	2035	N	2005	1	-	-
319	Construction	40,000	40,000	5.500%	2035	N	2005	4	-	-
320	Construction	45,000	45,000	5.250%	2035	N	2005	9	-	-
321	Construction	20,000	-	5.050%	2009	N	2006	3	-	-
322	Construction	70,000	-	5.350%	2009	N	2006	7	-	-
323	Construction	5,319	-	4.950%	2010	N	2006	9	-	-
324	Construction	20,000	-	4.950%	2010	N	2006	9	-	-
325	Construction	25,000	-	5.100%	2010	N	2007	1	-	-
326	Construction	50,000	-	5.200%	2010	N	2007	7	-	-
327	Construction	40,000	40,000	4.850%	2012	N	2007	3	2026	4.440%
328	Construction	35,000	35,000	6.400%	2037	N	2007	6	2040	5.570%
329	Construction	40,000	40,000	3.358%	2011	N	2008	5	-	-
330	Construction	25,000	25,000	3.151%	2011	N	2008	9	-	-
331	Construction	30,000	30,000	3.913%	2012	N	2008	7	2032	4.810%
332	Construction	30,000	30,000	3.200%	2012	N	2008	1	2030	4.690%
333	Construction	25,000	25,000	3.444%	2012	N	2008	9	-	-
334	Construction	14,000	14,000	2.746%	2014	N	2009	9	-	-
335	Construction	46,940	46,940	-	2019	N	2009	7	-	-
336	Construction	35,000	35,000	3.699%	2019	N	2009	9	-	-
337	Construction	50,000	50,000	3.830%	2020	N	2009	1	-	-
338	Construction	20,000	20,000	4.200%	2022	N	2009	1	-	-
339	Construction	35,000	35,000	4.253%	2022	N	2009	4	-	-
340	Construction	35,000	35,000	5.192%	2039	N	2009	6	-	-
341	Construction	7,500	7,500	0.165%	2015	N	2010	2	-	-
342	Construction	15,000	15,000	1.619%	2015	N	2010	8	-	-
343	Construction	23,000	23,000	3.719%	2019	N	2010	10	-	-
344	Construction	15,000	15,000	3.533%	2019	N	2010	11	-	-
345	Construction	13,000	13,000	4.069%	2019	N	2010	12	-	-
346	Construction	30,000	30,000	3.714%	2019	N	2010	1	-	-
347	Construction	10,000	10,000	0.165%	2019	N	2010	2	-	-
348	Construction	43,000	43,000	3.842%	2020	N	2010	10	-	-
349	Construction	50,000	50,000	3.118%	2020	N	2010	7	-	-
350	Construction	15,000	15,000	4.188%	2021	N	2010	3	-	-
351	Construction	22,000	22,000	4.094%	2021	N	2010	4	-	-
352	Construction	22,000	22,000	3.694%	2021	N	2010	5	-	-
353	Construction	22,000	22,000	3.374%	2021	N	2010	6	-	-
354	Construction	30,000	30,000	3.372%	2022	N	2010	7	-	-
355	Construction	20,000	20,000	3.029%	2022	N	2010	8	-	-
356	Construction	5,000	5,000	0.165%	2022	N	2010	8	-	-
357	Construction	46,000	46,000	3.161%	2023	N	2010	9	-	-
358	Environment	40,000	-	6.950%	2012	N	1997	11	-	-
359	Environment	30,000	-	6.050%	2010	N	2001	1	-	-
360	Environment	30,000	-	3.050%	2006	N	2002	9	-	-
361	Environment	20,000	-	5.050%	2009	N	2006	3	-	-
362	Environment	10,000	10,000	3.151%	2011	N	2008	9	-	-
363	Environment	10,000	10,000	4.279%	2025	N	2010	2	-	-

Table 11-2: Projected Federal Investments ($000s)(FY 2012)

	A	B	C	D	E	F	G
	Project	Original Principal	Current Principal	Interest Rate	Due Date	In Service Date	Month
1	Environment	-	-	4.340%	2026	2011	9
2	Environment	4,989	4,989	4.880%	2027	2012	3
3	Projections Construction	26,000	26,000	2.600%	2016	2011	9
4	Projections Construction	45,000	45,000	3.490%	2026	2011	10
5	Projections Construction	20,000	20,000	4.340%	2026	2011	9
6	Projections Construction	50,000	50,000	5.430%	2036	2011	6
7	Projections Construction	50,000	50,000	4.950%	2036	2011	1
8	Projections Construction	55,000	55,000	4.940%	2038	2011	2
9	Projections Construction	40,000	40,000	4.790%	2039	2011	4
10	Projections Construction	20,000	20,000	5.750%	2039	2011	8
11	Projections Construction	40,000	40,000	5.860%	2040	2011	9
12	Projections Construction	20,000	20,000	5.860%	2040	2011	8
13	Projections Construction	26,775	26,775	3.890%	2018	2012	3
14	Projections Construction	532,651	532,651	6.010%	2047	2012	3
15	**Totals:**	930,415	930,415				

Table 11-3: Projected Federal Investments ($000s)(FY 2013)

	A	B	C	D	E	F	G
	Project	Original Principal	Current Principal	Interest Rate	Due Date	In Service Date	Month
1	Environment	-	-	4.340%	2026	2011	9
2	Environment	4,989	4,989	4.880%	2027	2012	3
3	Environment	5,086	5,086	5.450%	2028	2013	3
4	Projections Construction	26,000	26,000	2.600%	2016	2011	9
5	Projections Construction	45,000	45,000	3.490%	2026	2011	10
6	Projections Construction	20,000	20,000	4.340%	2026	2011	9
7	Projections Construction	50,000	50,000	5.430%	2036	2011	6
8	Projections Construction	50,000	50,000	4.950%	2036	2011	1
9	Projections Construction	55,000	55,000	4.940%	2038	2011	2
10	Projections Construction	40,000	40,000	4.790%	2039	2011	4
11	Projections Construction	20,000	20,000	5.750%	2039	2011	8
12	Projections Construction	40,000	40,000	5.860%	2040	2011	9
13	Projections Construction	20,000	20,000	5.860%	2040	2011	8
14	Projections Construction	26,775	26,775	3.890%	2018	2012	3
15	Projections Construction	532,651	532,651	6.010%	2047	2012	3
16	Projections Construction	24,416	24,416	4.810%	2019	2013	3
17	Projections Construction	583,220	583,220	6.280%	2048	2013	3
18	**Total**	1,543,137	1,543,137				

12. REPAYMENT STUDY RESULTS CURRENT STUDY

Table 12-1: Summary of Interest ($000s) (FY 2012)

	A	B	C	D	E	F	G	H	I	J	K	L
1			**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
2	**Appropriation**	BPA	29,217	23,086	10,396	6,325	3,815	2,869	2,363	1,082	1,082	-
3		**Appropriation Subtotal:**	**29,217**	**23,086**	**10,396**	**6,325**	**3,815**	**2,869**	**2,363**	**1,082**	**1,082**	**-**
4												
5	**Treasury**	Construction	80,326	101,093	121,460	129,854	137,855	146,352	154,637	163,795	172,080	175,323
6		Environment	743	550	671	671	671	671	671	671	671	671
7		(Less Interest Income)	(3,273)	(4,955)	(2,203)	(2,146)	(1,941)	(1,954)	(1,749)	(1,967)	(5,411)	(5,130)
8		Coupon Scale Down Premiums	-	-	-	-	-	-	-	-	736	1,338
9		**BPA Borrowing Subtotal:**	**77,796**	**96,687**	**119,928**	**128,379**	**136,586**	**145,070**	**153,560**	**162,500**	**168,076**	**172,203**
10		**GRAND TOTAL:**	**107,013**	**119,774**	**130,324**	**134,704**	**140,400**	**147,938**	**155,923**	**163,581**	**169,158**	**172,203**
11												

Table 12-1: Summary of Interest ($000s) (FY 2012)

	A	B	M	N	O	P	Q	R	S	T	U	V	W	X	Y
1			**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
2	**Appropriation**	BPA	-	-	-	-	-	-	-	-	-	-	-	-	-
3		**Appropriation Subtotal:**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
4															
5	**Treasury**	Construction	176,151	175,519	176,529	176,620	175,343	173,815	174,501	172,933	170,806	169,156	168,001	166,909	166,053
6		Environment	671	671	671	671	671	243	243	-	-	-	-	-	-
7		(Less Interest Income)	(5,125)	(5,132)	(5,124)	(5,236)	(5,583)	(5,604)	(5,599)	(5,620)	(5,641)	(5,659)	(5,672)	(5,683)	(4,080)
8		Coupon Scale Down Premiums	3,048	3,741	6,092	7,834	5,842	2,680	8,240	4,356	8,652	7,722	4,892	7,841	4,033
9		**BPA Borrowing Subtotal:**	**174,745**	**174,800**	**178,168**	**179,888**	**176,274**	**171,134**	**177,385**	**171,670**	**173,817**	**171,219**	**167,221**	**169,067**	**166,006**
10		**GRAND TOTAL:**	**174,745**	**174,800**	**178,168**	**179,888**	**176,274**	**171,134**	**177,385**	**171,670**	**173,817**	**171,219**	**167,221**	**169,067**	**166,006**
11															

Table 12-1: Summary of Interest ($000s) (FY 2012)

	A	B	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ
1			**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**	**2042**	**2043**	**2044**
2	**Appropriation**	BPA	-	-	-	-	-	-	-	-	-	-	-
3		**Appropriation Subtotal:**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
4													
5	**Treasury**	Construction	170,456	171,517	171,437	172,542	180,317	191,026	194,164	194,386	194,869	195,607	196,646
6		Environment	-	-	-	-	-	-	-	-	-	-	-
7		(Less Interest Income)	(5,207)	(5,768)	(5,496)	(3,352)	(2,733)	(5,248)	(6,028)	(6,028)	(6,027)	(6,023)	(6,016)
8		Coupon Scale Down Premiums	6,299	4,243	4,506	3,698	268	3,534	6,104	8,175	8,241	8,290	8,347
9		**BPA Borrowing Subtotal:**	**171,547**	**169,992**	**170,447**	**172,889**	**177,852**	**189,312**	**194,240**	**196,533**	**197,083**	**197,874**	**198,976**
10		**GRAND TOTAL:**	**171,547**	**169,992**	**170,447**	**172,889**	**177,852**	**189,312**	**194,240**	**196,533**	**197,083**	**197,874**	**198,976**
11													

Table 12-1: Summary of Interest ($000s) (FY 2012)

	A	B	AK	AL	AM	AN
1			**2045**	**2046**	**2047**	**Total**
2	**Appropriation**	BPA	-	-	-	80,234
3		**Appropriation Subtotal:**	**-**	**-**	**-**	**80,234**
4						
5	**Treasury**	Construction	197,956	199,533	201,419	6,256,986
6		Environment	-	-	-	10,507
7		(Less Interest Income)	(6,006)	(5,994)	(5,979)	(176,393)
8		Coupon Scale Down Premiums	8,381	8,367	8,331	163,830
9		**BPA Borrowing Subtotal:**	**200,331**	**201,905**	**203,771**	**6,254,930**
10		**GRAND TOTAL:**	**200,331**	**201,905**	**203,771**	**6,335,164**
11						

Table 12-2: Interest Calculation Summary ($000s) (FY 2012)

	A	B	C	D	E	F	G	H
1	Fiscal Year	Project	Type	Principal	Rate	Interest	Premium	Total
2	2011	Bonneville Power Administration	Historical	403,811	7.235%	29,217	-	29,217
3	2011	Construction	Historical	1,549,250	4.775%	73,981	-	73,981
4	2011	Construction	New	280,000	2.266%	6,345	-	6,345
5	2011	Environment	Historical	20,000	3.715%	743	-	743
6	2011	Float	Historical	-	-	(3,273)	-	(3,273)
7	**FY 2011**	**Subtotal:**		**2,253,061**		**107,013**	**-**	**107,013**
8	2012	Bonneville Power Administration	Historical	319,104	7.235%	23,086	-	23,086
9	2012	Construction	Historical	1,785,250	4.737%	84,566	-	84,566
10	2012	Construction	New	559,426	2.954%	16,527	-	16,527
11	2012	Environment	Historical	10,000	4.279%	428	-	428
12	2012	Environment	New	4,989	2.440%	122	-	122
13	2012	Float	Historical	-	-	(4,955)	-	(4,955)
14	**FY 2012**	**Subtotal:**		**2,678,769**		**119,774**	**-**	**119,774**
15	2013	Bonneville Power Administration	Historical	143,994	7.220%	10,396	-	10,396
16	2013	Construction	Historical	2,319,676	5.057%	117,311	-	117,311
17	2013	Construction	New	138,091	3.005%	4,150	-	4,150
18	2013	Environment	Historical	14,989	4.479%	671	-	671
19	2013	Float	Historical	-	-	(2,203)	-	(2,203)
20	**FY 2013**	**Subtotal:**		**2,616,750**		**130,324**	**-**	**130,324**
21	2014	Bonneville Power Administration	Historical	87,620	7.219%	6,325	-	6,325
22	2014	Construction	Historical	2,457,767	5.111%	125,610	-	125,610
23	2014	Construction	New	141,230	3.005%	4,244	-	4,244
24	2014	Environment	Historical	14,989	4.479%	671	-	671
25	2014	Float	Historical	-	-	(2,146)	-	(2,146)
26	**FY 2014**	**Subtotal:**		**2,701,606**		**134,704**	**-**	**134,704**
27	2015	Bonneville Power Administration	Historical	52,896	7.212%	3,815	-	3,815
28	2015	Construction	Historical	2,584,997	5.166%	133,530	-	133,530
29	2015	Construction	New	143,918	3.005%	4,325	-	4,325
30	2015	Environment	Historical	14,989	4.479%	671	-	671
31	2015	Float	Historical	-	-	(1,941)	-	(1,941)
32	**FY 2015**	**Subtotal:**		**2,796,800**		**140,400**	**-**	**140,400**
33	2016	Bonneville Power Administration	Historical	39,788	7.210%	2,869	-	2,869
34	2016	Construction	Historical	2,706,415	5.244%	141,925	-	141,925
35	2016	Construction	New	147,341	3.005%	4,428	-	4,428
36	2016	Environment	Historical	14,989	4.479%	671	-	671
37	2016	Float	Historical	-	-	(1,954)	-	(1,954)
38	**FY 2016**	**Subtotal:**		**2,908,533**		**147,938**	**-**	**147,938**
39	2017	Bonneville Power Administration	Historical	32,773	7.210%	2,363	-	2,363
40	2017	Construction	Historical	2,827,756	5.308%	150,104	-	150,104
41	2017	Construction	New	150,869	3.005%	4,534	-	4,534
42	2017	Environment	Historical	14,989	4.479%	671	-	671
43	2017	Float	Historical	-	-	(1,749)	-	(1,749)
44	**FY 2017**	**Subtotal:**		**3,026,387**		**155,923**	**-**	**155,923**

Table 12-2: Interest Calculation Summary ($000s) (FY 2012)

	A	B	C	D	E	F	G	H
1	**Fiscal Year**	**Project**	**Type**	**Principal**	**Rate**	**Interest**	**Premium**	**Total**
45	2018	Bonneville Power Administration	Historical	15,002	7.210%	1,082	-	1,082
46	2018	Construction	Historical	2,978,625	5.344%	159,171	-	159,171
47	2018	Construction	New	153,885	3.005%	4,624	-	4,624
48	2018	Environment	Historical	14,989	4.479%	671	-	671
49	2018	Float	Historical	-	-	(1,967)	-	(1,967)
50	**FY 2018**	**Subtotal:**		**3,162,501**		**163,581**	**-**	**163,581**
51	2019	Bonneville Power Administration	Historical	15,001	7.210%	1,082	-	1,082
52	2019	Construction	Historical	3,105,735	5.389%	167,378	736	168,113
53	2019	Construction	New	156,476	3.005%	4,702	-	4,702
54	2019	Environment	Historical	14,989	4.479%	671	-	671
55	2019	Float	Historical	-	-	(5,411)	-	(5,411)
56	**FY 2019**	**Subtotal:**		**3,292,201**		**168,422**	**736**	**169,158**
57	2020	Construction	Historical	3,107,497	5.487%	170,519	1,338	171,856
58	2020	Construction	New	159,889	3.005%	4,805	-	4,805
59	2020	Environment	Historical	14,989	4.479%	671	-	671
60	2020	Float	Historical	-	-	(5,130)	-	(5,130)
61	**FY 2020**	**Subtotal:**		**3,282,375**		**170,865**	**1,338**	**172,203**
62	2021	Construction	Historical	3,067,818	5.581%	171,212	3,048	174,260
63	2021	Construction	New	164,358	3.005%	4,939	-	4,939
64	2021	Environment	Historical	14,989	4.479%	671	-	671
65	2021	Float	Historical	-	-	(5,125)	-	(5,125)
66	**FY 2021**	**Subtotal:**		**3,247,165**		**171,697**	**3,048**	**174,745**
67	2022	Construction	Historical	3,035,037	5.617%	170,476	3,741	174,217
68	2022	Construction	New	167,849	3.005%	5,044	-	5,044
69	2022	Environment	Historical	14,989	4.479%	671	-	671
70	2022	Float	Historical	-	-	(5,132)	-	(5,132)
71	**FY 2022**	**Subtotal:**		**3,217,875**		**171,059**	**3,741**	**174,800**
72	2023	Construction	Historical	3,005,742	5.701%	171,372	6,092	177,463
73	2023	Construction	New	171,638	3.005%	5,158	-	5,158
74	2023	Environment	Historical	14,989	4.479%	671	-	671
75	2023	Float	Historical	-	-	(5,124)	-	(5,124)
76	**FY 2023**	**Subtotal:**		**3,192,369**		**172,077**	**6,092**	**178,168**
77	2024	Construction	Historical	2,983,562	5.743%	171,349	7,834	179,183
78	2024	Construction	New	175,385	3.005%	5,270	-	5,270
79	2024	Environment	Historical	14,989	4.479%	671	-	671
80	2024	Float	Historical	-	-	(5,236)	-	(5,236)
81	**FY 2024**	**Subtotal:**		**3,173,936**		**172,054**	**7,834**	**179,888**
82	2025	Construction	Historical	2,960,596	5.741%	169,969	5,842	175,811
83	2025	Construction	New	178,838	3.005%	5,374	-	5,374
84	2025	Environment	Historical	14,989	4.479%	671	-	671
85	2025	Float	Historical	-	-	(5,583)	-	(5,583)
86	**FY 2025**	**Subtotal:**		**3,154,423**		**170,432**	**5,842**	**176,274**

Table 12-2: Interest Calculation Summary ($000s) (FY 2012)

	A	B	C	D	E	F	G	H
1	**Fiscal Year**	**Project**	**Type**	**Principal**	**Rate**	**Interest**	**Premium**	**Total**
87	2026	Construction	Historical	2,928,900	5.747%	168,312	2,680	170,992
88	2026	Construction	New	183,118	3.005%	5,503	-	5,503
89	2026	Environment	Historical	4,989	4.880%	243	-	243
90	2026	Float	Historical	-	-	(5,604)	-	(5,604)
91	**FY 2026**	**Subtotal:**		**3,117,007**		**168,455**	**2,680**	**171,134**
92	2027	Construction	Historical	2,886,193	5.852%	168,891	8,240	177,131
93	2027	Construction	New	186,688	3.005%	5,610	-	5,610
94	2027	Environment	Historical	4,989	4.880%	243	-	243
95	2027	Float	Historical	-	-	(5,599)	-	(5,599)
96	**FY 2027**	**Subtotal:**		**3,077,870**		**169,145**	**8,240**	**177,385**
97	2028	Construction	Historical	2,858,209	5.850%	167,210	4,356	171,566
98	2028	Construction	New	190,462	3.005%	5,723	-	5,723
99	2028	Float	Historical	-	-	(5,620)	-	(5,620)
100	**FY 2028**	**Subtotal:**		**3,048,671**		**167,313**	**4,356**	**171,670**
101	2029	Construction	Historical	2,823,108	5.844%	164,981	8,652	173,633
102	2029	Construction	New	193,831	3.005%	5,825	-	5,825
103	2029	Float	Historical	-	-	(5,641)	-	(5,641)
104	**FY 2029**	**Subtotal:**		**3,016,939**		**165,165**	**8,652**	**173,817**
105	2030	Construction	Historical	2,793,436	5.842%	163,198	7,722	170,920
106	2030	Construction	New	198,274	3.005%	5,958	-	5,958
107	2030	Float	Historical	-	-	(5,659)	-	(5,659)
108	**FY 2030**	**Subtotal:**		**2,991,710**		**163,497**	**7,722**	**171,219**
109	2031	Construction	Historical	2,765,461	5.855%	161,913	4,892	166,804
110	2031	Construction	New	202,592	3.005%	6,088	-	6,088
111	2031	Float	Historical	-	-	(5,672)	-	(5,672)
112	**FY 2031**	**Subtotal:**		**2,968,053**		**162,329**	**4,892**	**167,221**
113	2032	Construction	Historical	2,737,698	5.870%	160,713	7,841	168,554
114	2032	Construction	New	206,196	3.005%	6,196	-	6,196
115	2032	Float	Historical	-	-	(5,683)	-	(5,683)
116	**FY 2032**	**Subtotal:**		**2,943,894**		**161,226**	**7,841**	**169,067**
117	2033	Construction	Historical	2,715,312	5.882%	159,727	4,033	163,761
118	2033	Construction	New	210,495	3.005%	6,325	-	6,325
119	2033	Float	Historical	-	-	(4,080)	-	(4,080)
120	**FY 2033**	**Subtotal:**		**2,925,807**		**161,973**	**4,033**	**166,006**
121	2034	Construction	Historical	2,783,684	5.892%	164,021	6,299	170,319
122	2034	Construction	New	214,143	3.005%	6,435	-	6,435
123	2034	Float	Historical	-	-	(5,207)	-	(5,207)
124	**FY 2034**	**Subtotal:**		**2,997,827**		**165,248**	**6,299**	**171,547**
125	2035	Construction	Historical	2,796,459	5.899%	164,952	4,243	169,195
126	2035	Construction	New	218,472	3.005%	6,565	-	6,565
127	2035	Float	Historical	-	-	(5,768)	-	(5,768)
128	**FY 2035**	**Subtotal:**		**3,014,931**		**165,749**	**4,243**	**169,992**

Table 12-2: Interest Calculation Summary ($000s) (FY 2012)

	A	B	C	D	E	F	G	H
1	**Fiscal Year**	**Project**	**Type**	**Principal**	**Rate**	**Interest**	**Premium**	**Total**
129	2036	Construction	Historical	2,780,338	5.926%	164,773	4,506	169,279
130	2036	Construction	New	221,762	3.005%	6,664	-	6,664
131	2036	Float	Historical	-	-	(5,496)	-	(5,496)
132	**FY 2036**	**Subtotal:**		**3,002,100**		**165,941**	**4,506**	**170,447**
133	2037	Construction	Historical	2,783,148	5.956%	165,762	3,698	169,461
134	2037	Construction	New	225,613	3.005%	6,780	-	6,780
135	2037	Float	Historical	-	-	(3,352)	-	(3,352)
136	**FY 2037**	**Subtotal:**		**3,008,761**		**169,190**	**3,698**	**172,889**
137	2038	Construction	Historical	2,910,860	5.958%	173,438	268	173,706
138	2038	Construction	New	228,932	3.005%	6,879	-	6,879
139	2038	Float	Historical	-	-	(2,733)	-	(2,733)
140	**FY 2038**	**Subtotal:**		**3,139,792**		**177,584**	**268**	**177,852**
141	2039	Construction	Historical	3,077,357	5.980%	184,033	3,534	187,567
142	2039	Construction	New	232,724	3.005%	6,993	-	6,993
143	2039	Float	Historical	-	-	(5,248)	-	(5,248)
144	**FY 2039**	**Subtotal:**		**3,310,081**		**185,778**	**3,534**	**189,312**
145	2040	Construction	Historical	3,114,073	6.007%	187,066	6,104	193,170
146	2040	Construction	New	236,218	3.005%	7,098	-	7,098
147	2040	Float	Historical	-	-	(6,028)	-	(6,028)
148	**FY 2040**	**Subtotal:**		**3,350,291**		**188,136**	**6,104**	**194,240**
149	2041	Construction	Historical	3,114,322	6.010%	187,171	8,175	195,346
150	2041	Construction	New	240,101	3.005%	7,215	-	7,215
151	2041	Float	Historical	-	-	(6,028)	-	(6,028)
152	**FY 2041**	**Subtotal:**		**3,354,423**		**188,358**	**8,175**	**196,533**
153	2042	Construction	Historical	3,120,665	6.010%	187,552	8,241	195,793
154	2042	Construction	New	243,498	3.005%	7,317	-	7,317
155	2042	Float	Historical	-	-	(6,027)	-	(6,027)
156	**FY 2042**	**Subtotal:**		**3,364,163**		**188,842**	**8,241**	**197,083**
157	2043	Construction	Historical	3,130,827	6.010%	188,163	8,290	196,453
158	2043	Construction	New	247,716	3.005%	7,444	-	7,444
159	2043	Float	Historical	-	-	(6,023)	-	(6,023)
160	**FY 2043**	**Subtotal:**		**3,378,543**		**189,584**	**8,290**	**197,874**
161	2044	Construction	Historical	3,145,880	6.010%	189,067	8,347	197,414
162	2044	Construction	New	252,186	3.005%	7,578	-	7,578
163	2044	Float	Historical	-	-	(6,016)	-	(6,016)
164	**FY 2044**	**Subtotal:**		**3,398,066**		**190,629**	**8,347**	**198,976**
165	2045	Construction	Historical	3,166,369	6.010%	190,299	8,381	198,680
166	2045	Construction	New	254,827	3.005%	7,658	-	7,658
167	2045	Float	Historical	-	-	(6,006)	-	(6,006)
168	**FY 2045**	**Subtotal:**		**3,421,196**		**191,950**	**8,381**	**200,331**
169	2046	Construction	Historical	3,190,790	6.010%	191,766	8,367	200,134
170	2046	Construction	New	258,437	3.005%	7,766	-	7,766
171	2046	Float	Historical	-	-	(5,994)	-	(5,994)
172	**FY 2046**	**Subtotal:**		**3,449,227**		**193,538**	**8,367**	**201,905**
173	2047	Construction	Historical	3,220,284	6.010%	193,539	8,331	201,870
174	2047	Construction	New	262,238	3.005%	7,880	-	7,880
175	2047	Float	Historical	-	-	(5,979)	-	(5,979)
176	**FY 2047**	**Subtotal:**		**3,482,522**		**195,440**	**8,331**	**203,771**
177								
178	**Grand Total:**			**114,466,628**		**6,171,335**	**163,830**	**6,335,164**

Table 12-3: Summary of Amortization ($000s) (FY 2012)

	A	B	C	D	E	F	G	H	I	J	K
1			**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
2	**Bonneville Power Administration**	BPA	84,707	175,110	56,374	34,725	13,108	7,014	17,771	1	15,001
3		**Appropriation Subtotal:**	**84,707**	**175,110**	**56,374**	**34,725**	**13,108**	**7,014**	**17,771**	**1**	**15,001**
4											
5											
6	**BPA Borrowing**	Construction	130,000	25,000	-	14,000	22,500	26,000	-	26,775	201,654
7		Environment	10,000	-	-	-	-	-	-	-	-
8		**BPA Borrowing Subtotal:**	**140,000**	**25,000**	**-**	**14,000**	**22,500**	**26,000**	**-**	**26,775**	**201,654**
9											
10	**Make Whole Call**	Discounts	-	-	-	-	-	-	-	-	-
11		Premiums	-	-	-	-	-	-	-	-	-
12		**Make Whole Call Subtotal:**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
13											
14		**Treasury Subtotal:**	**140,000**	**25,000**	**-**	**14,000**	**22,500**	**26,000**	**-**	**26,775**	**201,654**
15		**GRAND TOTAL:**	**224,707**	**200,110**	**56,374**	**48,725**	**35,608**	**33,014**	**17,771**	**26,776**	**216,655**
16											

Table 12-3: Summary of Amortization ($000s) (FY 2012)

	A	B	L	M	N	O	P	Q	R	S	T	U
1			**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
2	**Bonneville Power Administration**	BPA	-	-	-	-	-	-	-	-	-	-
3		**Appropriation Subtotal:**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
4												
5												
6	**BPA Borrowing**	Construction	199,568	197,139	197,144	193,818	198,351	210,534	225,826	214,671	225,564	223,503
7		Environment	-	-	-	-	-	10,000	-	4,989	-	-
8		**BPA Borrowing Subtotal:**	**199,568**	**197,139**	**197,144**	**193,818**	**198,351**	**220,534**	**225,826**	**219,660**	**225,564**	**223,503**
9												
10	**Make Whole Call**	Discounts	-	-	-	-	-	-	-	-	-	-
11		Premiums	-	-	-	-	-	-	-	-	-	-
12		**Make Whole Call Subtotal:**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
13												
14		**Treasury Subtotal:**	**199,568**	**197,139**	**197,144**	**193,818**	**198,351**	**220,534**	**225,826**	**219,660**	**225,564**	**223,503**
15		**GRAND TOTAL:**	**199,568**	**197,139**	**197,144**	**193,818**	**198,351**	**220,534**	**225,826**	**219,660**	**225,564**	**223,503**
16												

Table 12-3: Summary of Amortization ($000s) (FY 2012)

	A	B	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF
1			**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
2	**Bonneville Power Administration**	BPA	-	-	-	-	-	-	-	-	-	-	-
3		**Appropriation Subtotal:**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
4													
5													
6	**BPA Borrowing**	Construction	226,248	230,356	228,582	142,122	201,369	234,593	218,952	97,901	62,435	196,008	235,969
7		Environment	-	-	-	-	-	-	-	-	-	-	-
8		**BPA Borrowing Subtotal:**	**226,248**	**230,356**	**228,582**	**142,122**	**201,369**	**234,593**	**218,952**	**97,901**	**62,435**	**196,008**	**235,969**
9													
10	**Make Whole Call**	Discounts	-	-	-	-	-	-	-	-	-	-	-
11		Premiums	-	-	-	-	-	-	-	-	-	-	-
12		**Make Whole Call Subtotal:**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
13													
14		**Treasury Subtotal:**	**226,248**	**230,356**	**228,582**	**142,122**	**201,369**	**234,593**	**218,952**	**97,901**	**62,435**	**196,008**	**235,969**
15		**GRAND TOTAL:**	**226,248**	**230,356**	**228,582**	**142,122**	**201,369**	**234,593**	**218,952**	**97,901**	**62,435**	**196,008**	**235,969**
16													

Table 12-3: Summary of Amortization ($000s) (FY 2012)

	A	B	AG	AH	AI	AJ	AK	AL	AM	AN
1			**2041**	**2042**	**2043**	**2044**	**2045**	**2046**	**2047**	**Total**
2	**Bonneville Power Administration**	BPA	-	-	-	-	-	-	-	403,811
3		**Appropriation Subtotal:**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**403,811**
4										
5										
6	**BPA Borrowing**	Construction	233,758	233,336	232,663	231,697	230,406	228,943	227,155	6,224,539
7		Environment	-	-	-	-	-	-	-	24,989
8		**BPA Borrowing Subtotal:**	**233,758**	**233,336**	**232,663**	**231,697**	**230,406**	**228,943**	**227,155**	**6,249,528**
9										
10	**Make Whole Call**	Discounts	-	-	-	-	-	-	-	-
11		Premiums	-	-	-	-	-	-	-	-
12		**Make Whole Call Subtotal:**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
13										
14		**Treasury Subtotal:**	**233,758**	**233,336**	**232,663**	**231,697**	**230,406**	**228,943**	**227,155**	**6,249,528**
15		**GRAND TOTAL:**	**233,758**	**233,336**	**232,663**	**231,697**	**230,406**	**228,943**	**227,155**	**6,653,339**
16										

Table 12-4: Application of Amortization ($000s) (FY 2012)

	A	B	C	D	E	F	G	H	I	J
	Fiscal Year	Project	Appropriation Type	In Service	Due Date	Principal	Balance	Rate	Rollover	Amortized
1	FY 2011	Bonneville Power Administration	BPA	1966	2011	3,049	3,049	7.130%	No	3,049
2	FY 2011	Bonneville Power Administration	BPA	1966	2011	6,647	6,353	7.130%	No	6,353
3	FY 2011	Bonneville Power Administration	BPA	1966	2011	11,830	11,830	7.130%	No	11,830
4	FY 2011	Construction	-	1998	2011	40,000	40,000	6.200%	No	40,000
5	FY 2011	Construction	-	2001	2011	25,000	25,000	5.950%	No	25,000
6	FY 2011	Construction	-	2008	2011	40,000	40,000	3.358%	No	40,000
7	FY 2011	Construction	-	2008	2011	25,000	25,000	3.151%	No	25,000
8	FY 2011	Environment	-	2008	2011	10,000	10,000	3.151%	No	10,000
9	FY 2011	Bonneville Power Administration	BPA	1970	2015	7,995	3,699	7.270%	No	3,699
10	FY 2011	Bonneville Power Administration	BPA	1970	2015	24,412	23,551	7.270%	No	23,551
11	FY 2011	Bonneville Power Administration	BPA	1970	2015	64,977	41,171	7.270%	No	15,415
12	FY 2011	Bonneville Power Administration	BPA	1973	2018	21,656	5,041	7.280%	No	5,041
13	FY 2011	Bonneville Power Administration	BPA	1973	2018	33,788	15,769	7.280%	No	15,769
14		**FY 2011 Subtotal:**	**-**	**-**	**-**	**314,354**	**250,463**	**-**	**-**	**224,707**
15	FY 2012	Bonneville Power Administration	BPA	1967	2012	4,566	355	7.160%	No	355
16	FY 2012	Bonneville Power Administration	BPA	1967	2012	19,003	19,003	7.160%	No	19,003
17	FY 2012	Construction	-	2008	2012	25,000	25,000	3.444%	No	25,000
18	FY 2012	Bonneville Power Administration	BPA	1969	2014	42,237	19,198	7.230%	No	4,702
19	FY 2012	Bonneville Power Administration	BPA	1970	2015	64,977	25,756	7.270%	No	25,756
20	FY 2012	Bonneville Power Administration	BPA	1974	2019	12,079	12,079	7.270%	No	12,079
21	FY 2012	Bonneville Power Administration	BPA	1974	2019	12,563	12,563	7.270%	No	12,563
22	FY 2012	Bonneville Power Administration	BPA	1974	2019	20,984	17,810	7.270%	No	17,810
23	FY 2012	Bonneville Power Administration	BPA	1975	2020	11,742	11,742	7.250%	No	11,742
24	FY 2012	Bonneville Power Administration	BPA	1975	2020	17,158	17,158	7.250%	No	17,158
25	FY 2012	Bonneville Power Administration	BPA	1975	2020	21,916	21,916	7.250%	No	21,916
26	FY 2012	Bonneville Power Administration	BPA	1975	2020	32,026	32,026	7.250%	No	32,026
27		**FY 2012 Subtotal:**	**-**	**-**	**-**	**284,251**	**214,606**	**-**	**-**	**200,110**
28	FY 2013	Bonneville Power Administration	BPA	1968	2013	41,070	18,250	7.200%	No	18,250
29	FY 2013	Bonneville Power Administration	BPA	1969	2014	42,237	14,496	7.230%	No	14,496
30	FY 2013	Bonneville Power Administration	BPA	1976	2021	2,212	2,212	7.230%	No	2,212
31	FY 2013	Bonneville Power Administration	BPA	1976	2021	61,025	61,025	7.230%	No	21,416
32		**FY 2013 Subtotal:**	**-**	**-**	**-**	**146,544**	**95,983**	**-**	**-**	**56,374**
33	FY 2014	Construction	-	2009	2014	14,000	14,000	2.746%	No	14,000
34	FY 2014	Bonneville Power Administration	BPA	1976	2021	61,025	39,609	7.230%	No	34,725
35		**FY 2014 Subtotal:**	**-**	**-**	**-**	**75,025**	**53,609**	**-**	**-**	**48,725**

Table 12-4: Application of Amortization ($000s) (FY 2012)

	A	B	C	D	E	F	G	H	I	J
	Fiscal Year	Project	Appropriation Type	In Service	Due Date	Principal	Balance	Rate	Rollover	Amortized
36	FY 2015	Construction	-	2010	2015	15,000	15,000	1.619%	No	15,000
37	FY 2015	Construction	-	2010	2015	7,500	7,500	0.165%	No	7,500
38	FY 2015	Bonneville Power Administration	BPA	1976	2021	61,025	4,885	7.230%	No	4,885
39	FY 2015	Bonneville Power Administration	BPA	1977	2022	4,981	4,981	7.210%	No	4,981
40	FY 2015	Bonneville Power Administration	BPA	1977	2022	33,702	33,702	7.210%	No	3,242
41		**FY 2015 Subtotal:**	**-**	**-**	**-**	**122,208**	**66,068**	**-**	**-**	**35,608**
42	FY 2016	Construction	-	2011	2016	26,000	26,000	2.600%	No	26,000
43	FY 2016	Bonneville Power Administration	BPA	1977	2022	33,702	30,460	7.210%	No	7,014
44		**FY 2016 Subtotal:**	**-**	**-**	**-**	**59,702**	**56,460**	**-**	**-**	**33,014**
45	FY 2017	Bonneville Power Administration	BPA	1977	2022	33,702	23,445	7.210%	No	17,771
46		**FY 2017 Subtotal:**	**-**	**-**	**-**	**33,702**	**23,445**	**-**	**-**	**17,771**
47	FY 2018	Construction	-	2012	2018	26,775	26,775	3.890%	No	26,775
48	FY 2018	Bonneville Power Administration	BPA	1977	2022	33,702	5,674	7.210%	No	1
49		**FY 2018 Subtotal:**	**-**	**-**	**-**	**60,477**	**32,449**	**-**	**-**	**26,776**
50	FY 2019	Construction	-	2009	2019	35,000	35,000	3.699%	No	35,000
51	FY 2019	Construction	-	2009	2019	46,940	46,940	-	No	46,940
52	FY 2019	Construction	-	2010	2019	13,000	13,000	4.069%	No	13,000
53	FY 2019	Construction	-	2010	2019	23,000	23,000	3.719%	No	23,000
54	FY 2019	Construction	-	2010	2019	30,000	30,000	3.714%	No	30,000
55	FY 2019	Construction	-	2010	2019	15,000	15,000	3.533%	No	15,000
56	FY 2019	Construction	-	2010	2019	10,000	10,000	0.165%	No	10,000
57	FY 2019	Bonneville Power Administration	BPA	1977	2022	3,948	3,948	7.210%	No	3,948
58	FY 2019	Bonneville Power Administration	BPA	1977	2022	5,380	5,380	7.210%	No	5,380
59	FY 2019	Bonneville Power Administration	BPA	1977	2022	33,702	5,673	7.210%	No	5,673
60	FY 2019	Construction	-	1998	2032	98,900	98,900	6.700%	No	28,714
61		**FY 2019 Subtotal:**	**-**	**-**	**-**	**314,870**	**286,841**	**-**	**-**	**216,655**
62	FY 2020	Construction	-	2009	2020	50,000	50,000	3.830%	No	50,000
63	FY 2020	Construction	-	2010	2020	43,000	43,000	3.842%	No	43,000
64	FY 2020	Construction	-	2010	2020	50,000	50,000	3.118%	No	50,000
65	FY 2020	Construction	-	1998	2032	98,900	70,186	6.700%	No	56,568
66		**FY 2020 Subtotal:**	**-**	**-**	**-**	**241,900**	**213,186**	**-**	**-**	**199,568**
67	FY 2021	Construction	-	2010	2021	15,000	15,000	4.188%	No	15,000
68	FY 2021	Construction	-	2010	2021	22,000	22,000	4.094%	No	22,000
69	FY 2021	Construction	-	2010	2021	22,000	22,000	3.694%	No	22,000
70	FY 2021	Construction	-	2010	2021	22,000	22,000	3.374%	No	22,000
71	FY 2021	Construction	-	1998	2028	50,000	50,000	6.650%	No	50,000
72	FY 2021	Construction	-	1998	2032	98,900	13,618	6.700%	No	13,618
73	FY 2021	Construction	-	2007	2040	35,000	35,000	5.570%	Yes	35,000
74	FY 2021	Construction	-	2012	2047	532,651	532,651	6.010%	No	17,521
75		**FY 2021 Subtotal:**	**-**	**-**	**-**	**797,551**	**712,269**	**-**	**-**	**197,139**

Table 12-4: Application of Amortization ($000s) (FY 2012)

	A	B	C	D	E	F	G	H	I	J
	Fiscal Year	Project	Appropriation Type	In Service	Due Date	Principal	Balance	Rate	Rollover	Amortized
76	FY 2022	Construction	-	2009	2022	35,000	35,000	4.253%	No	35,000
77	FY 2022	Construction	-	2009	2022	20,000	20,000	4.200%	No	20,000
78	FY 2022	Construction	-	2010	2022	30,000	30,000	3.372%	No	30,000
79	FY 2022	Construction	-	2010	2022	20,000	20,000	3.029%	No	20,000
80	FY 2022	Construction	-	2010	2022	5,000	5,000	0.165%	No	5,000
81	FY 2022	Construction	-	2012	2047	532,651	515,130	6.010%	No	87,144
82		**FY 2022 Subtotal:**	**-**	**-**	**-**	**642,651**	**625,130**	**-**	**-**	**197,144**
83	FY 2023	Construction	-	2010	2023	46,000	46,000	3.161%	No	46,000
84	FY 2023	Construction	-	2012	2047	532,651	427,986	6.010%	No	147,818
85		**FY 2023 Subtotal:**	**-**	**-**	**-**	**578,651**	**473,986**	**-**	**-**	**193,818**
86	FY 2024	Construction	-	2012	2047	532,651	280,168	6.010%	No	198,351
87		**FY 2024 Subtotal:**	**-**	**-**	**-**	**532,651**	**280,168**	**-**	**-**	**198,351**
88	FY 2025	Construction	-	1999	2025	59,050	59,050	5.590%	Yes	59,050
89	FY 2025	Environment	-	2010	2025	10,000	10,000	4.279%	No	10,000
90	FY 2025	Construction	-	2012	2047	532,651	81,817	6.010%	No	81,817
91	FY 2025	Construction	-	2013	2048	138,091	138,091	6.010%	No	69,667
92		**FY 2025 Subtotal:**	**-**	**-**	**-**	**739,792**	**288,958**	**-**	**-**	**220,534**
93	FY 2026	Construction	-	2001	2026	50,000	50,000	3.910%	Yes	50,000
94	FY 2026	Construction	-	2007	2026	40,000	40,000	4.440%	Yes	40,000
95	FY 2026	Construction	-	2011	2026	20,000	20,000	4.340%	No	20,000
96	FY 2026	Construction	-	2011	2026	45,000	45,000	3.490%	No	45,000
97	FY 2026	Construction	-	2013	2048	138,091	68,424	6.010%	No	68,424
98	FY 2026	Construction	-	2014	2049	141,230	141,230	6.010%	No	2,402
99		**FY 2026 Subtotal:**	**-**	**-**	**-**	**434,321**	**364,654**	**-**	**-**	**225,826**
100	FY 2027	Environment	-	2012	2027	4,989	4,989	4.880%	No	4,989
101	FY 2027	Construction	-	2014	2049	141,230	138,829	6.010%	No	138,829
102	FY 2027	Construction	-	2015	2050	143,918	143,918	6.010%	No	75,843
103		**FY 2027 Subtotal:**	**-**	**-**	**-**	**290,137**	**287,736**	**-**	**-**	**219,660**
104	FY 2028	Construction	-	1998	2028	112,300	112,300	5.850%	No	112,300
105	FY 2028	Construction	-	2015	2050	143,918	68,075	6.010%	No	68,075
106	FY 2028	Construction	-	2016	2051	147,341	147,341	6.010%	No	45,188
107		**FY 2028 Subtotal:**	**-**	**-**	**-**	**403,559**	**327,716**	**-**	**-**	**225,564**
108	FY 2029	Construction	-	2016	2051	147,341	102,153	6.010%	No	102,153
109	FY 2029	Construction	-	2017	2052	150,869	150,869	6.010%	No	121,350
110		**FY 2029 Subtotal:**	**-**	**-**	**-**	**298,210**	**253,022**	**-**	**-**	**223,503**
111	FY 2030	Construction	-	2008	2030	30,000	30,000	4.690%	Yes	30,000
112	FY 2030	Construction	-	2017	2052	150,869	29,519	6.010%	No	29,519
113	FY 2030	Construction	-	2018	2053	153,885	153,885	6.010%	No	153,885
114	FY 2030	Construction	-	2019	2054	156,476	156,476	6.010%	No	12,845
115		**FY 2030 Subtotal:**	**-**	**-**	**-**	**491,230**	**369,880**	**-**	**-**	**226,248**

Table 12-4: Application of Amortization ($000s) (FY 2012)

	A	B	C	D	E	F	G	H	I	J
	Fiscal Year	Project	Appropriation Type	In Service	Due Date	Principal	Balance	Rate	Rollover	Amortized
116	FY 2031	Construction	-	1998	2031	106,500	106,500	5.570%	Yes	106,500
117	FY 2031	Construction	-	2019	2054	156,476	143,631	6.010%	No	123,856
118		**FY 2031 Subtotal:**	**-**	**-**	**-**	**262,976**	**250,131**	**-**	**-**	**230,356**
119	FY 2032	Construction	-	2008	2032	30,000	30,000	4.810%	Yes	30,000
120	FY 2032	Construction	-	2019	2054	156,476	19,776	6.010%	No	19,776
121	FY 2032	Construction	-	2020	2055	159,889	159,889	6.010%	No	159,889
122	FY 2032	Construction	-	2021	2056	164,358	164,358	6.010%	No	18,917
123		**FY 2032 Subtotal:**	**-**	**-**	**-**	**510,723**	**374,023**	**-**	**-**	**228,582**
124	FY 2033	Construction	-	2003	2033	40,000	40,000	5.550%	No	40,000
125	FY 2033	Construction	-	2021	2056	164,358	145,441	6.010%	No	102,122
126		**FY 2033 Subtotal:**	**-**	**-**	**-**	**204,358**	**185,441**	**-**	**-**	**142,122**
127	FY 2034	Construction	-	2004	2034	40,000	40,000	5.600%	No	40,000
128	FY 2034	Construction	-	2021	2056	164,358	43,318	6.010%	No	43,318
129	FY 2034	Construction	-	2022	2057	167,849	167,849	6.010%	No	118,050
130		**FY 2034 Subtotal:**	**-**	**-**	**-**	**372,207**	**251,167**	**-**	**-**	**201,369**
131	FY 2035	Construction	-	2005	2035	40,000	40,000	5.500%	No	40,000
132	FY 2035	Construction	-	2005	2035	40,000	40,000	5.400%	No	40,000
133	FY 2035	Construction	-	2005	2035	45,000	45,000	5.250%	No	45,000
134	FY 2035	Construction	-	2022	2057	167,849	49,799	6.010%	No	49,799
135	FY 2035	Construction	-	2023	2058	171,638	171,638	6.010%	No	59,794
136		**FY 2035 Subtotal:**	**-**	**-**	**-**	**464,487**	**346,437**	**-**	**-**	**234,593**
137	FY 2036	Construction	-	2011	2036	50,000	50,000	5.430%	No	50,000
138	FY 2036	Construction	-	2011	2036	50,000	50,000	4.950%	No	50,000
139	FY 2036	Construction	-	2023	2058	171,638	111,844	6.010%	No	111,844
140	FY 2036	Construction	-	2024	2059	175,385	175,385	6.010%	No	7,108
141		**FY 2036 Subtotal:**	**-**	**-**	**-**	**447,023**	**387,229**	**-**	**-**	**218,952**
142	FY 2037	Construction	-	2024	2059	175,385	168,277	6.010%	No	97,901
143		**FY 2037 Subtotal:**	**-**	**-**	**-**	**175,385**	**168,277**	**-**	**-**	**97,901**
144	FY 2038	Construction	-	2011	2038	55,000	55,000	4.940%	No	55,000
145	FY 2038	Construction	-	2024	2059	175,385	70,376	6.010%	No	7,435
146		**FY 2038 Subtotal:**	**-**	**-**	**-**	**230,385**	**125,376**	**-**	**-**	**62,435**
147	FY 2039	Construction	-	2009	2039	35,000	35,000	5.192%	No	35,000
148	FY 2039	Construction	-	2011	2039	20,000	20,000	5.750%	No	20,000
149	FY 2039	Construction	-	2011	2039	40,000	40,000	4.790%	No	40,000
150	FY 2039	Construction	-	2024	2059	175,385	62,941	6.010%	No	62,941
151	FY 2039	Construction	-	2025	2060	178,838	178,838	6.010%	No	38,067
152		**FY 2039 Subtotal:**	**-**	**-**	**-**	**449,223**	**336,779**	**-**	**-**	**196,008**
153	FY 2040	Construction	-	2011	2040	20,000	20,000	5.860%	No	20,000
154	FY 2040	Construction	-	2011	2040	40,000	40,000	5.860%	No	40,000
155	FY 2040	Construction	-	2025	2060	178,838	140,771	6.010%	No	140,771
156	FY 2040	Construction	-	2026	2061	183,118	183,118	6.010%	No	35,198

Table 12-4: Application of Amortization ($000s) (FY 2012)

	A	B	C	D	E	F	G	H	I	J
	Fiscal Year	Project	Appropriation Type	In Service	Due Date	Principal	Balance	Rate	Rollover	Amortized
157		**FY 2040 Subtotal:**	**-**	**-**	**-**	**421,956**	**383,889**	**-**	**-**	**235,969**
158	FY 2041	Construction	-	2026	2061	183,118	147,920	6.010%	No	147,920
159	FY 2041	Construction	-	2027	2062	186,688	186,688	6.010%	No	85,838
160		**FY 2041 Subtotal:**	**-**	**-**	**-**	**369,806**	**334,608**	**-**	**-**	**233,758**
161	FY 2042	Construction	-	2027	2062	186,688	100,850	6.010%	No	100,850
162	FY 2042	Construction	-	2028	2063	190,462	190,462	6.010%	No	132,486
163		**FY 2042 Subtotal:**	**-**	**-**	**-**	**377,150**	**291,312**	**-**	**-**	**233,336**
164	FY 2043	Construction	-	2028	2063	190,462	57,976	6.010%	No	57,976
165	FY 2043	Construction	-	2029	2064	193,831	193,831	6.010%	No	174,687
166		**FY 2043 Subtotal:**	**-**	**-**	**-**	**384,293**	**251,807**	**-**	**-**	**232,663**
167	FY 2044	Construction	-	2029	2064	193,831	19,144	6.010%	No	19,144
168	FY 2044	Construction	-	2030	2065	198,274	198,274	6.010%	No	198,274
169	FY 2044	Construction	-	2031	2066	202,592	202,592	6.010%	No	14,279
170		**FY 2044 Subtotal:**	**-**	**-**	**-**	**594,697**	**420,010**	**-**	**-**	**231,697**
171	FY 2045	Construction	-	2031	2066	202,592	188,313	6.010%	No	188,313
172	FY 2045	Construction	-	2032	2067	206,196	206,196	6.010%	No	42,093
173		**FY 2045 Subtotal:**	**-**	**-**	**-**	**408,788**	**394,509**	**-**	**-**	**230,406**
174	FY 2046	Construction	-	2032	2067	206,196	164,103	6.010%	No	164,103
175	FY 2046	Construction	-	2033	2068	210,495	210,495	6.010%	No	64,840
176		**FY 2046 Subtotal:**	**-**	**-**	**-**	**416,691**	**374,598**	**-**	**-**	**228,943**
177	FY 2047	Construction	-	2033	2068	210,495	145,655	6.010%	No	145,655
178	FY 2047	Construction	-	2034	2069	214,143	214,143	6.010%	No	81,500
179		**FY 2047 Subtotal:**	**-**	**-**	**-**	**424,638**	**359,798**	**-**	**-**	**227,155**
180		**Grand Total:**	**-**	**-**	**-**	**13,376,572**	**10,512,023**	**-**	**-**	**6,653,339**

Table 12-5: Summary of Interest ($000s) (FY 2013)

	A	B	C	D	E	F	G	H	I	J	K
1			**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
2	**Appropriation**	BPA	29,217	23,086	10,396	6,325	3,502	2,269	1,497	-	-
3		**Appropriation Subtotal:**	**29,217**	**23,086**	**10,396**	**6,325**	**3,502**	**2,269**	**1,497**	**-**	**-**
4											
5	**Treasury**	Construction	80,326	101,093	136,211	159,642	168,221	177,308	186,196	195,953	204,678
6		Environment	743	550	810	949	949	949	949	949	949
7		(Less Interest Income)	(3,273)	(4,955)	(3,239)	(3,280)	(3,001)	(3,012)	(2,733)	(3,015)	(7,573)
8		Coupon Scale Down Premiums	-	-	-	-	-	-	8	80	591
9		**BPA Borrowing Subtotal:**	**77,796**	**96,687**	**133,782**	**157,310**	**166,169**	**175,245**	**184,420**	**193,967**	**198,645**
10		**GRAND TOTAL:**	**107,013**	**119,774**	**144,177**	**163,636**	**169,670**	**177,514**	**185,917**	**193,967**	**198,645**
11											

Table 12-5: Summary of Interest ($000s) (FY 2013)

	A	B	L	M	N	O	P	Q	R	S	T	U
1			**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
2	**Appropriation**	BPA	-	-	-	-	-	-	-	-	-	-
3		**Appropriation Subtotal:**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
4												
5	**Treasury**	Construction	207,768	209,082	208,958	210,350	210,710	209,605	208,377	209,605	208,261	206,949
6		Environment	949	949	949	949	949	949	521	521	277	-
7		(Less Interest Income)	(7,202)	(7,190)	(7,194)	(7,179)	(7,324)	(7,781)	(7,805)	(7,794)	(7,818)	(7,839)
8		Coupon Scale Down Premiums	1,398	3,212	4,123	6,661	8,554	6,314	2,939	8,785	4,456	9,208
9		**BPA Borrowing Subtotal:**	**202,913**	**206,053**	**206,836**	**210,781**	**212,888**	**209,086**	**204,031**	**211,117**	**205,176**	**208,318**
10		**GRAND TOTAL:**	**202,913**	**206,053**	**206,836**	**210,781**	**212,888**	**209,086**	**204,031**	**211,117**	**205,176**	**208,318**
11												

Table 12-5: Summary of Interest ($000s) (FY 2013)

	A	B	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG
1			**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**
2	**Appropriation**	BPA	-	-	-	-	-	-	-	-	-	-	-	-
3		**Appropriation Subtotal:**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
4														
5	**Treasury**	Construction	205,575	204,801	204,315	203,929	209,121	210,863	211,648	213,670	222,525	234,640	238,999	240,326
6		Environment	-	-	-	-	-	-	-	-	-	-	-	-
7		(Less Interest Income)	(7,860)	(7,873)	(7,881)	(5,752)	(7,236)	(7,971)	(7,600)	(4,748)	(3,916)	(7,231)	(8,251)	(8,238)
8		Coupon Scale Down Premiums	8,188	5,127	8,238	4,106	6,513	4,350	4,573	3,615		3,409	6,034	8,131
9		**BPA Borrowing Subtotal:**	**205,902**	**202,054**	**204,672**	**202,283**	**208,399**	**207,242**	**208,620**	**212,536**	**218,609**	**230,818**	**236,782**	**240,219**
10		**GRAND TOTAL:**	**205,902**	**202,054**	**204,672**	**202,283**	**208,399**	**207,242**	**208,620**	**212,536**	**218,609**	**230,818**	**236,782**	**240,219**
11														

Table 12-5: Summary of Interest ($000s) (FY 2013)

	A	B	AH	AI	AJ	AK	AL	AM	AN	AO
1			**2042**	**2043**	**2044**	**2045**	**2046**	**2047**	**2048**	**Total**
2	**Appropriation**	BPA	-	-	-	-	-	-	-	**76,292**
3		**Appropriation Subtotal:**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**76,292**
4										
5	**Treasury**	Construction	241,843	243,696	245,940	248,549	251,583	255,095	259,052	**7,845,461**
6		Environment	-	-	-	-	-	-	-	14,804
7		(Less Interest Income)	(8,223)	(8,205)	(8,182)	(8,153)	(8,121)	(8,081)	(8,041)	(250,771)
8		Coupon Scale Down Premiums	8,137	8,120	8,081	4,879	378	-	6,786	154,994
9		**BPA Borrowing Subtotal:**	**241,756**	**243,611**	**245,839**	**245,274**	**243,841**	**247,014**	**257,797**	**7,764,488**
10		**GRAND TOTAL:**	**241,756**	**243,611**	**245,839**	**245,274**	**243,841**	**247,014**	**257,797**	**7,840,780**
11										

Table 12-6: Interest Calculation Summary ($000s) (FY 2013)

	A	B	C	D	E	F	G	H
	Fiscal Year	Project	Type	Principal	Rate	Interest	Premium	Total
1	2011	Bonneville Power Administration	Historical	403,811	7.235%	29,217	-	29,217
2	2011	Construction	Historical	1,549,250	4.775%	73,981	-	73,981
3	2011	Construction	New	280,000	2.266%	6,345	-	6,345
4	2011	Environment	Historical	20,000	3.715%	743	-	743
5	2011	Float	Historical	-	-	(3,273)	-	(3,273)
6	**FY 2011**	**Subtotal:**		**2,253,061**		**107,013**	**-**	**107,013**
7	2012	Bonneville Power Administration	Historical	319,104	7.235%	23,086	-	23,086
8	2012	Construction	Historical	1,785,250	4.737%	84,566	-	84,566
9	2012	Construction	New	559,426	2.954%	16,527	-	16,527
10	2012	Environment	Historical	10,000	4.279%	428	-	428
11	2012	Environment	New	4,989	2.440%	122	-	122
12	2012	Float	Historical	-	-	(4,955)	-	(4,955)
13	**FY 2012**	**Subtotal:**		**2,678,769**		**119,774**	**-**	**119,774**
14	2013	Bonneville Power Administration	Historical	143,994	7.220%	10,396	-	10,396
15	2013	Construction	Historical	2,319,676	5.057%	117,311	-	117,311
16	2013	Construction	New	607,636	3.110%	18,900	-	18,900
17	2013	Environment	Historical	14,989	4.479%	671	-	671
18	2013	Environment	New	5,086	2.725%	139	-	139
19	2013	Float	Historical	-	-	(3,239)	-	(3,239)
20	**FY 2013**	**Subtotal:**		**3,091,381**		**144,177**	**-**	**144,177**
21	2014	Bonneville Power Administration	Historical	87,620	7.219%	6,325	-	6,325
22	2014	Construction	Historical	2,927,312	5.299%	155,111	-	155,111
23	2014	Construction	New	144,288	3.140%	4,531	-	4,531
24	2014	Environment	Historical	20,075	4.725%	949	-	949
25	2014	Float	Historical	-	-	(3,280)	-	(3,280)
26	**FY 2014**	**Subtotal:**		**3,179,295**		**163,636**	**-**	**163,636**
27	2015	Bonneville Power Administration	Historical	48,567	7.210%	3,502	-	3,502
28	2015	Construction	Historical	3,057,600	5.351%	163,605	-	163,605
29	2015	Construction	New	147,019	3.140%	4,616	-	4,616
30	2015	Environment	Historical	20,075	4.725%	949	-	949
31	2015	Float	Historical	-	-	(3,001)	-	(3,001)
32	**FY 2015**	**Subtotal:**		**3,273,261**		**169,670**	**-**	**169,670**
33	2016	Bonneville Power Administration	Historical	31,466	7.210%	2,269	-	2,269
34	2016	Construction	Historical	3,182,119	5.424%	172,583	-	172,583
35	2016	Construction	New	150,497	3.140%	4,726	-	4,726
36	2016	Environment	Historical	20,075	4.725%	949	-	949
37	2016	Float	Historical	-	-	(3,012)	-	(3,012)
38	**FY 2016**	**Subtotal:**		**3,384,157**		**177,514**	**-**	**177,514**
39	2017	Bonneville Power Administration	Historical	20,764	7.210%	1,497	-	1,497
40	2017	Construction	Historical	3,306,616	5.485%	181,358	8	181,366
41	2017	Construction	New	154,079	3.140%	4,838	-	4,838
42	2017	Environment	Historical	20,075	4.725%	949	-	949
43	2017	Float	Historical	-	-	(2,733)	-	(2,733)
44	**FY 2017**	**Subtotal:**		**3,501,534**		**185,908**	**8**	**185,917**

Table 12-6: Interest Calculation Summary ($000s) (FY 2013)

	A		B	C	D	E	F	G	H
	Fiscal Year		Project	Type	Principal	Rate	Interest	Premium	Total
45	2018	Construction		Historical	3,460,416	5.520%	191,015	80	191,095
46	2018	Construction		New	157,269	3.140%	4,938	-	4,938
47	2018	Environment		Historical	20,075	4.725%	949	-	949
48	2018	Float		Historical	-	-	(3,015)	-	(3,015)
49	**FY 2018**	**Subtotal:**			**3,637,760**		**193,887**	**80**	**193,967**
50	2019	Construction		Historical	3,588,024	5.565%	199,657	591	200,248
51	2019	Construction		New	159,903	3.140%	5,021	-	5,021
52	2019	Environment		Historical	20,075	4.725%	949	-	949
53	2019	Float		Historical	-	-	(7,573)	-	(7,573)
54	**FY 2019**	**Subtotal:**			**3,768,002**		**198,053**	**591**	**198,645**
55	2020	Construction		Historical	3,574,427	5.669%	202,638	1,398	204,036
56	2020	Construction		New	163,370	3.140%	5,130	-	5,130
57	2020	Environment		Historical	20,075	4.725%	949	-	949
58	2020	Float		Historical	-	-	(7,202)	-	(7,202)
59	**FY 2020**	**Subtotal:**			**3,757,872**		**201,514**	**1,398**	**202,913**
60	2021	Construction		Historical	3,535,665	5.764%	203,810	3,212	207,022
61	2021	Construction		New	167,909	3.140%	5,272	-	5,272
62	2021	Environment		Historical	20,075	4.725%	949	-	949
63	2021	Float		Historical	-	-	(7,190)	-	(7,190)
64	**FY 2021**	**Subtotal:**			**3,723,649**		**202,841**	**3,212**	**206,053**
65	2022	Construction		Historical	3,504,467	5.809%	203,570	4,123	207,693
66	2022	Construction		New	171,584	3.140%	5,388	-	5,388
67	2022	Environment		Historical	20,075	4.725%	949	-	949
68	2022	Float		Historical	-	-	(7,194)	-	(7,194)
69	**FY 2022**	**Subtotal:**			**3,696,126**		**202,712**	**4,123**	**206,836**
70	2023	Construction		Historical	3,477,663	5.890%	204,840	6,661	211,501
71	2023	Construction		New	175,474	3.140%	5,510	-	5,510
72	2023	Environment		Historical	20,075	4.725%	949	-	949
73	2023	Float		Historical	-	-	(7,179)	-	(7,179)
74	**FY 2023**	**Subtotal:**			**3,673,212**		**204,120**	**6,661**	**210,781**
75	2024	Construction		Historical	3,458,649	5.930%	205,081	8,554	213,635
76	2024	Construction		New	179,281	3.140%	5,629	-	5,629
77	2024	Environment		Historical	20,075	4.725%	949	-	949
78	2024	Float		Historical	-	-	(7,324)	-	(7,324)
79	**FY 2024**	**Subtotal:**			**3,658,005**		**204,335**	**8,554**	**212,888**
80	2025	Construction		Historical	3,439,295	5.928%	203,865	6,314	210,179
81	2025	Construction		New	182,790	3.140%	5,740	-	5,740
82	2025	Environment		Historical	20,075	4.725%	949	-	949
83	2025	Float		Historical	-	-	(7,781)	-	(7,781)
84	**FY 2025**	**Subtotal:**			**3,642,160**		**202,773**	**6,314**	**209,086**
85	2026	Construction		Historical	3,411,077	5.937%	202,501	2,939	205,440
86	2026	Construction		New	187,135	3.140%	5,876	-	5,876
87	2026	Environment		Historical	10,075	5.168%	521	-	521
88	2026	Float		Historical	-	-	(7,805)	-	(7,805)
89	**FY 2026**	**Subtotal:**			**3,608,287**		**201,092**	**2,939**	**204,031**

Table 12-6: Interest Calculation Summary ($000s) (FY 2013)

	A		B	C	D	E	F	G	H
	Fiscal Year		Project	Type	Principal	Rate	Interest	Premium	Total
90	2027	Construction		Historical	3,371,995	6.038%	203,611	8,785	212,396
91	2027	Construction		New	190,900	3.140%	5,994	-	5,994
92	2027	Environment		Historical	10,075	5.168%	521	-	521
93	2027	Float		Historical	-	-	(7,794)	-	(7,794)
94	**FY 2027**	**Subtotal:**			**3,572,970**		**202,332**	**8,785**	**211,117**
95	2028	Construction		Historical	3,348,664	6.037%	202,146	4,456	206,601
96	2028	Construction		New	194,735	3.140%	6,115	-	6,115
97	2028	Environment		Historical	5,086	5.450%	277	-	277
98	2028	Float		Historical	-	-	(7,818)	-	(7,818)
99	**FY 2028**	**Subtotal:**			**3,548,485**		**200,720**	**4,456**	**205,176**
100	2029	Construction		Historical	3,323,132	6.040%	200,727	9,208	209,935
101	2029	Construction		New	198,158	3.140%	6,222	-	6,222
102	2029	Float		Historical	-	-	(7,839)	-	(7,839)
103	**FY 2029**	**Subtotal:**			**3,521,290**		**199,110**	**9,208**	**208,318**
104	2030	Construction		Historical	3,298,991	6.039%	199,211	8,188	207,399
105	2030	Construction		New	202,669	3.140%	6,364	-	6,364
106	2030	Float		Historical	-	-	(7,860)	-	(7,860)
107	**FY 2030**	**Subtotal:**			**3,501,660**		**197,715**	**8,188**	**205,902**
108	2031	Construction		Historical	3,276,796	6.051%	198,294	5,127	203,421
109	2031	Construction		New	207,219	3.140%	6,507	-	6,507
110	2031	Float		Historical	-	-	(7,873)	-	(7,873)
111	**FY 2031**	**Subtotal:**			**3,484,015**		**196,928**	**5,127**	**202,054**
112	2032	Construction		Historical	3,255,189	6.073%	197,693	8,238	205,931
113	2032	Construction		New	210,880	3.140%	6,622	-	6,622
114	2032	Float		Historical	-	-	(7,881)	-	(7,881)
115	**FY 2032**	**Subtotal:**			**3,466,069**		**196,434**	**8,238**	**204,672**
116	2033	Construction		Historical	3,239,787	6.086%	197,167	4,106	201,273
117	2033	Construction		New	215,333	3.140%	6,761	-	6,761
118	2033	Float		Historical	-	-	(5,752)	-	(5,752)
119	**FY 2033**	**Subtotal:**			**3,455,120**		**198,177**	**4,106**	**202,283**
120	2034	Construction		Historical	3,315,964	6.099%	202,243	6,513	208,756
121	2034	Construction		New	219,039	3.140%	6,878	-	6,878
122	2034	Float		Historical	-	-	(7,236)	-	(7,236)
123	**FY 2034**	**Subtotal:**			**3,535,003**		**201,885**	**6,513**	**208,399**
124	2035	Construction		Historical	3,337,175	6.108%	203,847	4,350	208,197
125	2035	Construction		New	223,434	3.140%	7,016	-	7,016
126	2035	Float		Historical	-	-	(7,971)	-	(7,971)
127	**FY 2035**	**Subtotal:**			**3,560,609**		**202,892**	**4,350**	**207,242**
128	2036	Construction		Historical	3,329,952	6.142%	204,521	4,573	209,094
129	2036	Construction		New	226,976	3.140%	7,127	-	7,127
130	2036	Float		Historical	-	-	(7,600)	-	(7,600)
131	**FY 2036**	**Subtotal:**			**3,556,928**		**204,048**	**4,573**	**208,620**

Table 12-6: Interest Calculation Summary ($000s) (FY 2013)

	A		B	C	D	E	F	G	H
	Fiscal Year		Project	Type	Principal	Rate	Interest	Premium	Total
132	2037	Construction		Historical	3,342,830	6.175%	206,420	3,615	210,035
133	2037	Construction		New	230,889	3.140%	7,250	-	7,250
134	2037	Float		Historical	-	-	(4,748)	-	(4,748)
135	**FY 2037**	**Subtotal:**			**3,573,719**		**208,921**	**3,615**	**212,536**
136	2038	Construction		Historical	3,482,145	6.179%	215,169		215,169
137	2038	Construction		New	234,261	3.140%	7,356	-	7,356
138	2038	Float		Historical	-	-	(3,916)	-	(3,916)
139	**FY 2038**	**Subtotal:**			**3,716,406**		**218,609**		**218,609**
140	2039	Construction		Historical	3,661,405	6.204%	227,163	3,409	230,573
141	2039	Construction		New	238,110	3.140%	7,477	-	7,477
142	2039	Float		Historical	-	-	(7,231)	-	(7,231)
143	**FY 2039**	**Subtotal:**			**3,899,515**		**227,409**	**3,409**	**230,818**
144	2040	Construction		Historical	3,711,687	6.234%	231,404	6,034	237,437
145	2040	Construction		New	241,894	3.140%	7,595	-	7,595
146	2040	Float		Historical	-	-	(8,251)	-	(8,251)
147	**FY 2040**	**Subtotal:**			**3,953,581**		**230,749**	**6,034**	**236,782**
148	2041	Construction		Historical	3,726,822	6.241%	232,606	8,131	240,738
149	2041	Construction		New	245,840	3.140%	7,719	-	7,719
150	2041	Float		Historical	-	-	(8,238)	-	(8,238)
151	**FY 2041**	**Subtotal:**			**3,972,662**		**232,088**	**8,131**	**240,219**
152	2042	Construction		Historical	3,749,257	6.242%	234,015	8,137	242,152
153	2042	Construction		New	249,290	3.140%	7,828	-	7,828
154	2042	Float		Historical	-	-	(8,223)	-	(8,223)
155	**FY 2042**	**Subtotal:**			**3,998,547**		**233,620**	**8,137**	**241,756**
156	2043	Construction		Historical	3,776,550	6.242%	235,729	8,120	243,849
157	2043	Construction		New	253,722	3.140%	7,967	-	7,967
158	2043	Float		Historical	-	-	(8,205)	-	(8,205)
159	**FY 2043**	**Subtotal:**			**4,030,272**		**235,491**	**8,120**	**243,611**
160	2044	Construction		Historical	3,810,006	6.242%	237,830	8,081	245,912
161	2044	Construction		New	258,259	3.140%	8,109	-	8,109
162	2044	Float		Historical	-	-	(8,182)	-	(8,182)
163	**FY 2044**	**Subtotal:**			**4,068,265**		**237,757**	**8,081**	**245,839**
164	2045	Construction		Historical	3,850,089	6.243%	240,347	4,879	245,226
165	2045	Construction		New	261,205	3.140%	8,202	-	8,202
166	2045	Float		Historical	-	-	(8,153)	-	(8,153)
167	**FY 2045**	**Subtotal:**			**4,111,294**		**240,396**	**4,879**	**245,274**
168	2046	Construction		Historical	3,892,483	6.250%	243,266	378	243,645
169	2046	Construction		New	264,873	3.140%	8,317	-	8,317
170	2046	Float		Historical	-	-	(8,121)	-	(8,121)

Table 12-6: Interest Calculation Summary ($000s) (FY 2013)

	A		B	C	D	E	F	G	H
	Fiscal Year		Project	Type	Principal	Rate	Interest	Premium	Total
171	**FY 2046**	**Subtotal:**			**4,157,356**		**243,463**	**378**	**243,841**
172	2047	Construction		Historical	3,936,999	6.265%	246,657	-	246,657
173	2047	Construction		New	268,735	3.140%	8,438	-	8,438
174	2047	Float		Historical	-	-	(8,081)	-	(8,081)
175	**FY 2047**	**Subtotal:**			**4,205,734**		**247,014**	**-**	**247,014**
176	2048	Construction		Historical	3,988,474	6.280%	250,476	6,786	257,262
177	2048	Construction		New	273,109	3.140%	8,576	-	8,576
178	2048	Float		Historical	-	-	(8,041)	-	(8,041)
179	**FY 2048**	**Subtotal:**			**4,261,583**		**251,011**	**6,786**	**257,797**
180	**Grand Total:**				**137,677,614**	**0**	**7,685,787**	**154,994**	**7,840,780**

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 considerably 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.

Figure 13-1

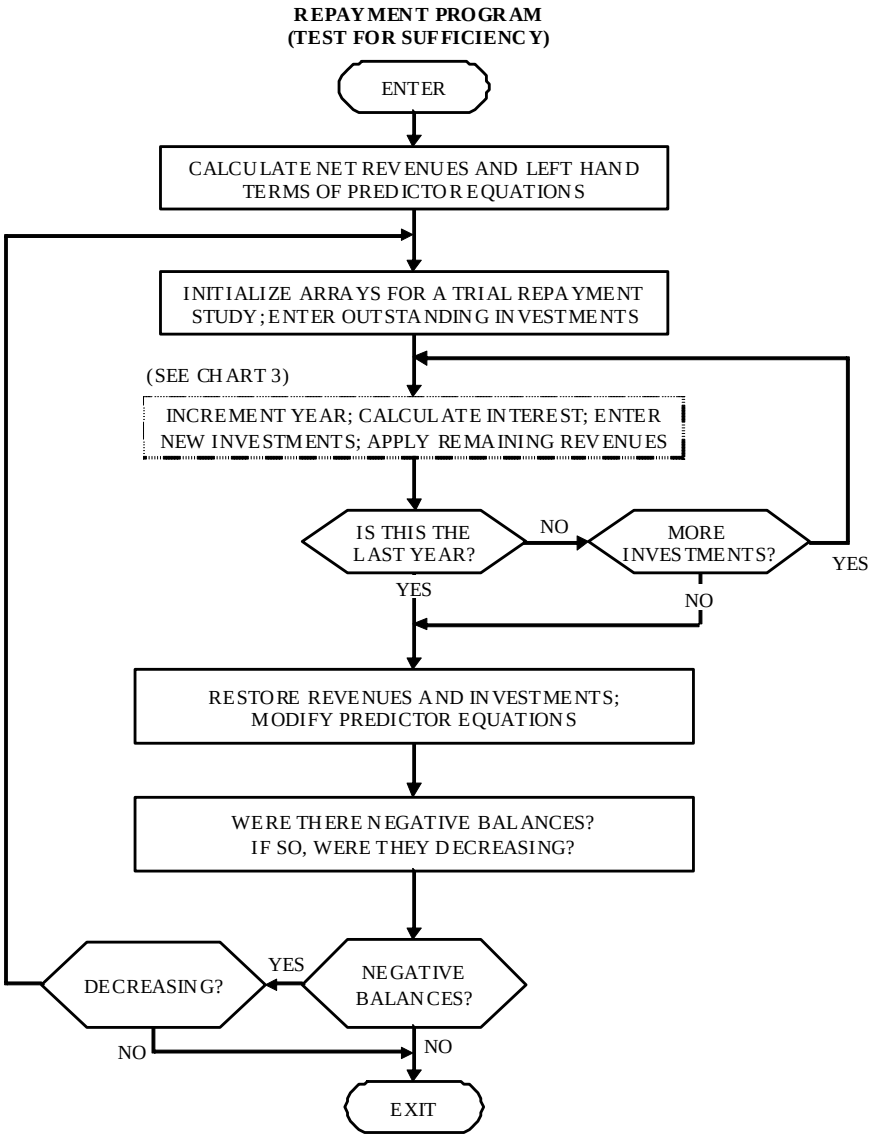
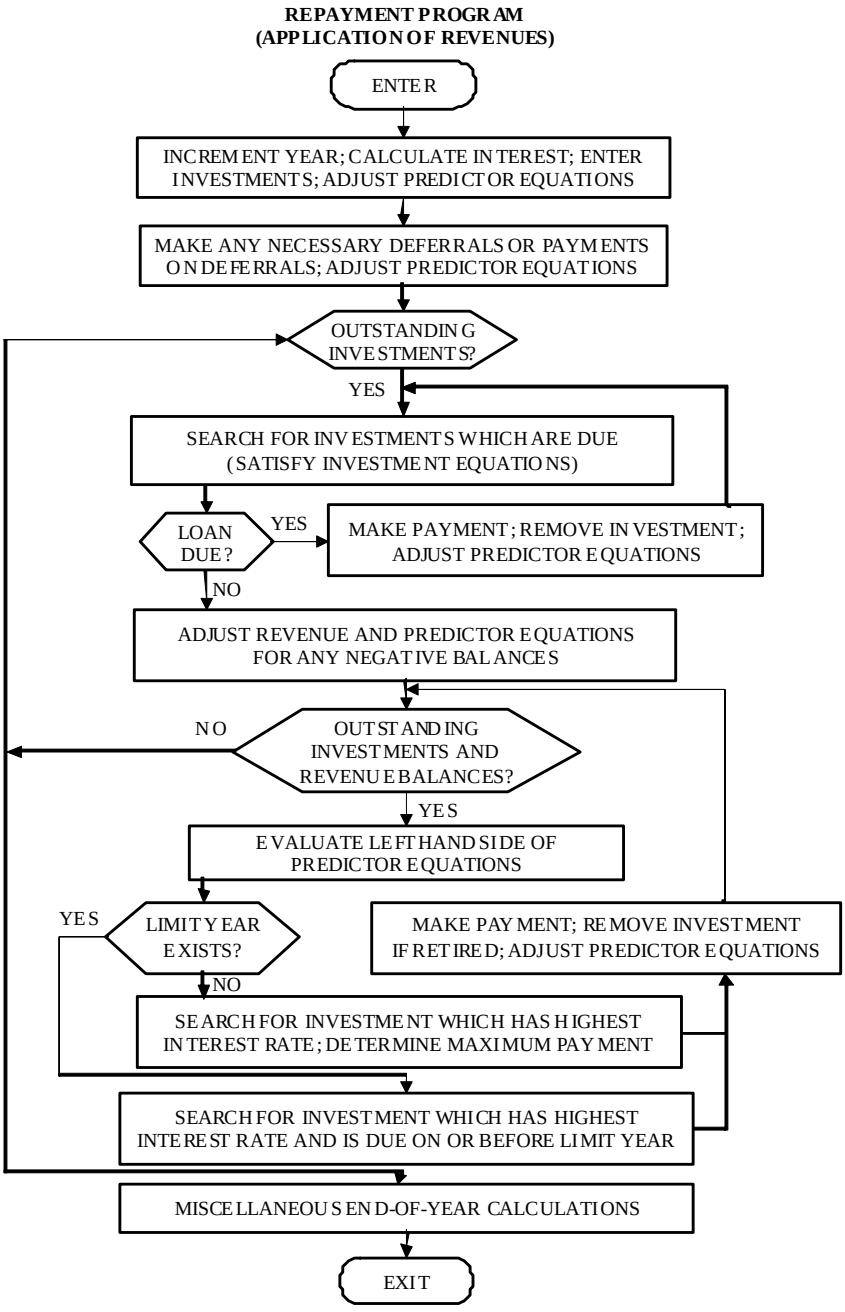


Figure 13-2


REPAYMENT PROGRAM
(APPLICATION OF REVENUES)
ENTER
INCREMENT YEAR; CALCULATE INTEREST; ENTER INVESTMENTS; ADJUST PREDICTOR EQUATIONS
MAKE ANY NECESSARY DEFERRALS OR PAYMENTS ON DEFERRALS; ADJUST PREDICTOR EQUATIONS
OUTSTANDING INVESTMENTS?
YES
SEARCH FOR INVESTMENTS WHICH ARE DUE (SATISFY INVESTMENT EQUATIONS)
LOAN DUE?
YES
MAKE PAYMENT; REMOVE INVESTMENT; ADJUST PREDICTOR EQUATIONS
NO
ADJUST REVENUE AND PREDICTOR EQUATIONS FOR ANY NEGATIVE BALANCES
NO
OUTSTANDING INVESTMENTS AND REVENUE BALANCES?
YES
EVALUATE LEFT HAND SIDE OF PREDICTOR EQUATIONS
YES
LIMIT YEAR EXISTS?
MAKE PAYMENT; REMOVE INVESTMENT IF RETIRED; ADJUST PREDICTOR EQUATIONS
NO
SEARCH FOR INVESTMENT WHICH HAS HIGHEST INTEREST RATE; DETERMINE MAXIMUM PAYMENT
SEARCH FOR INVESTMENT WHICH HAS HIGHEST INTEREST RATE AND IS DUE ON OR BEFORE LIMIT YEAR
MISCELLANEOUS END-OF-YEAR CALCULATIONS
EXIT

14. SALES AND REVENUE FORECAST

14.1 Overview

BPA forecasts sales for each of the various transmission services and ancillary services it offers. Transmission sales forecasts are based either on forecast load or forecast contract transmission demand, depending on the type of transmission service.

Sales forecasts of Network Integration transmission (NT) service and Utility Delivery (UD) service are based on load forecasts, because the charges for these types of transmission service are based on the customers' load.

Sales forecasts of long-term Point-to-Point (PTP) transmission service, Formula Power Transmission (FPT) service, Integration of Resources (IR) transmission service, long-term service on the Southern Intertie (IS), and service on the Montana Intertie (IM) are based on transmission contract demand; that is, the amounts of transmission capacity reserved in existing sales and expected future transmission service reservations, because the charges for these types of service are based on the customers' transmission demand.

BPA develops the forecasts of short-term sales of PTP and IS transmission service using an analysis of the correlation between historical short-term sales data and historical price spread and streamflow data. To forecast short-term sales, it is assumed that the historical correlation represents the future relationship between short-term sales and streamflow and forecast price spread.

Sales forecasts for SCD and GSR Services are the sum of the sales forecasts of all the transmission services, because those services apply to all transmission service. The sales forecasts for each type of transmission service are discussed further below.

BPA uses the sales forecast as the basis for the transmission revenue forecasts, which present the expected levels of revenue from transmission and ancillary services rates and other sources for the rate period. The revenue forecasts also include revenue credits; that is, revenue from sources other than the adjustable transmission rates determined in this rate proceeding (see Chapter 14.2).

BPA prepares two revenue forecasts, one forecasting the revenue at current rates and the other at proposed rates. The forecast of revenue at current rates applies the transmission and ancillary services rates effective beginning October 1, 2009, to the sales forecasts. The forecast of revenue at proposed rates applies the rates proposed in this Final Proposal to the sales forecasts. These forecasts are used to test whether current rates are sufficient to recover the transmission revenue requirement and whether proposed rates are sufficient to recover the transmission revenue requirement. The revenue tests are described in the Study, section 3.

14.2 Revenue Credits

Revenue credits are transmission revenues from sources other than the general transmission rates developed in the rate case; that is, from fixed-price contracts and fixed-price fees. These contracts and fees include such items as fiber and wireless sales, land leases, reservation and application fees, direct funding of projects and facilities, and operations and maintenance (O&M) charges. Fiber and wireless sales are a significant portion of the revenue credits. These are sales that BPA makes over installed communications capacity that is in excess of its operational needs during the rate period. BPA applies the revenues from these sales to the transmission revenue requirement as a revenue credit.

Revenue credits also include revenue from specific use-of-facilities contracts such as the Montana Intertie Agreement, rates set in Direct Service Industry (DSI) contracts, and capacity ownership agreements on the Southern Intertie whereby parties pay for the rights to a capacity share of the available transmission. BPA forecasts revenue credits based on existing contract charges and expectations of additional receipt of fixed-price fees and additional sales under fixed-price contracts or at contract-based rates.

The expected revenue credits from various sources are identified in Tables 14-2 and 14-3.

14.3 Forecast of Transmission Credits and Interest Expense Associated with Customer-Financed Projects

BPA forecasts transmission credits and related interest expense associated with generator interconnection agreements (Large Generator Interconnection Agreements, or LGIA, and Small Generator Interconnection Agreements, or SGIA) and the California-Oregon Intertie (COI) upgrade project. Under the generator interconnection agreements, interconnection customers advance-fund Network Upgrades if BPA, as the transmission provider, does not provide the funding. BPA's Open Access Transmission Tariff (OATT), Attachment L, LGIA Art. 11.3, and Attachment N, SGIA Art. 5.2. The advance funds are then returned to the customers, with interest in the form of transmission credits. These credits either offset charges for eligible transmission service in the customers' bills or are provided as monthly cash payments based on the generating facility's capacity and its plant capacity factor. BPA's OATT, Attachment L, LGIA Art. 11.3.1, and Attachment N, SGIA Art. 5.2.1; BPA's *Transmission Credits – Generator Large Business Practice, Version 6,* section 4.

BPA also provides transmission credits for similar customer financing for the COI upgrade. The upgrade is intended to increase COI and Pacific DC Intertie (PDCI) availability so that BPA is able to support requests for long-term firm transmission service up to the full rating of the COI and PDCI. The forecasts of transmission credits and related interest expense include the transmission credits related to the COI upgrade and transmission credits related to generator interconnection agreements.

These customer-financed projects and transmission credits are also discussed in the Study, section 2.3.5.

The forecasts of transmission credits and related interest expense at current rates and at proposed rates are provided in Tables 14-4 and 14-5.

14.4 Formula Power Transmission Sales Forecast

The forecast of sales of FPT service for the FY 2012–2013 rate period is the sum of the contract demands identified in the FPT contracts. No FPT agreements expire during the rate period, and none is expected to convert early to OATT service on the Network. *See* Table 14-1, line 2.

14.5 Integration of Resources Sales Forecast

The forecast IR sales amount is the sum of the contract demands identified in IR contracts. For IR agreements that expire during the rate period, the forecast includes only the revenues associated with the agreements while the agreements are in effect. Of the 166 MW of IR agreements that are expiring, BPA expects 160 MW to convert to OATT service on the Network. BPA includes expected conversions in the sales forecasts for OATT service on the Network by increasing the PTP sales forecast by the same number of megawatts expected to convert to OATT service. These adjustments are made beginning with the month that the conversion is expected to take place. The IR sales forecast is provided in Table 14-1, line 3.

14.6 PTP Long-Term Network Sales Forecast

Forecasts of long-term PTP sales include both existing sales and expected additional long-term sales. The forecast of existing long-term PTP Network sales is based on:

(a) current long-term contract demands effective through the FY 2012–2013 rate period. This forecast includes confirmed reservations from BPA's Network Open Season that have been offered service without a need for any additional infrastructure and confirmed reservations for Conditional Firm service; and

(b) confirmed OATT section 17.7 customer deferrals (extensions of commencement of service), which reduce the sales forecast for the period of the deferral.

The forecast of expected additional long-term PTP Network sales is based on:

(a) long-term sales that have not yet been requested but are expected to occur during the rate period, such as OATT section 2.2 renewals;

(b) Network Open Season reservations that are expected to be authorized during the rate period (i.e., service BPA expects to offer as a result of new or additional infrastructure BPA plans to place into service during the rate period);

(c) expected sales of Conditional Firm Service;

(d) long-term PTP sales to customers whose existing IR agreements are expiring during the rate period and that are expected to convert their transmission to PTP service on the Network (no expected conversions from FPT agreements are

included because no FPT agreements are expected to convert during the FY 2012–2013 rate period); and

(e) expected OATT section 17.7 customer deferrals (extensions of commencement of service), which reduce the sales forecast for the period of the deferral.

In forecasting expected additional long-term PTP Network sales, BPA consults with its account executives and customers about expected long-term PTP reservations, including the service demand, the start date, and the length of the reservation.

The Short-Distance Discount (SDD) for PTP Network sales applies to the contract demand for any reservation using less than 75 circuit miles of BPA transmission. BPA forecasts the reduction in sales due to the SDD by multiplying the contract demand for each applicable reservation by the distance-based percentage: $40\% \times (75 - \text{distance}) / 75$.

The PTP sales forecast for each fiscal year of the rate period, including the reduction for SDD, is provided on Table 14-1, line 8. The PTP sales forecast for each fiscal year of the rate period, excluding the reduction for SDD, is provided on Table 14-1, line 19.

14.7 Point-to-Point Short-Term Network Sales Forecast

Short-term PTP sales are firm or non-firm sales of less than one year, including monthly, weekly, daily, and hourly sales. Because short-term PTP service is not reserved far in advance, there are not existing contract demands for short-term service on which to base the sales forecast. Rather, the forecast of short-term PTP sales expected to occur during the rate period is based on historical short-term sales data and key market indicators: streamflow and market price spread. The forecast of short-term PTP sales is developed in three steps: (1) a regression analysis of historical data identifies correlations between sales and market indicators, (2) the data to be used as inputs to the short-term sales forecasting model (which is based on the correlations) is identified, and (3) the forecast of short-term sales is developed. This method develops a forecast that reflects historical relationships between sales and market indicators and expected market conditions over the rate period.

Step 1: Regression Analysis of Historical Data to Identify Correlations

First, a regression analysis, using Excel Professional Edition 2003, determines the relationship (correlation) between historical short-term PTP sales and two historical market indicators: regulated streamflows at The Dalles, and the NP-15 minus Mid-C price spread (the difference between power prices at the NP-15 and Mid-C trading hubs). Actual data from October 2004 through September 2009 is used for sales, streamflow, and price spread. A five-year data sample for the regression analysis provides a sample of data adequate to perform meaningful statistical analysis. Historical regulated streamflow at The Dalles, obtained from the U.S. Geological Survey (USGS), is used because it is an indicator of the amount of power that will be generated and sold using short-term PTP service.

The NP-15 minus Mid-C price spread is calculated by obtaining NP-15 and Mid-C power prices from Intercontinental Exchange (ICE) (an operator of over-the-counter electricity

markets) and subtracting the Mid-C prices from the NP-15 prices. The price spread provides a representation of the difference in power prices between California (represented by the NP-15 prices) and the Pacific Northwest (represented by the Mid-C prices). In general, a price spread provides incentive for customers in the location with lower prices to sell power (and purchase short-term transmission with which to deliver it) to the location with higher prices. Thus, price spread is a driver of short-term transmission sales. As an example, a positive price spread indicates that prices in California are higher than those in the Pacific Northwest, and provides incentive for customers in the Pacific Northwest to sell power, and purchase short-term transmission with which to deliver it to California.

For sales of short-term PTP service to BPA's Power Services, BPA performs the regression analysis on historical short-term PTP sales against streamflow only. The correlation between streamflow and sales to Power Services has been found to be statistically significant, but the correlation between price spread and sales to Power Services is not statistically significant. This is because Power Services is obligated to dispose of the power generated by the FCRPS, regardless of the price.

For short-term PTP sales to all other transmission customers, BPA performs the regression analysis on historical short-term PTP sales against both streamflow and price spread. For these customers, there is a statistically significant correlation between sales and both streamflow and price spread. These customers are more likely to sell power (and purchase short-term transmission to do so) when streamflow conditions are high, but also when pricing conditions provide incentives to market power. These customers are less likely to sell power and purchase short-term transmission if the price spread is too low to allow them to produce a profit and recover the cost of the additional transmission purchases, or if streamflow at The Dalles is low.

BPA developed a forecasting model using Excel that incorporates these correlations identified by the regression analyses and applies other inputs to those correlations, as discussed below, to develop the short-term sales forecast. The model assumes that the historical correlations between sales on the one hand and streamflow and price spread on the other hand represent the future correlations (with certain adjustments for risk). Certain streamflow and price spread data are input to the model as predictions of future conditions and used with certain adjustments for variability, discussed in step 3, to project the historical correlation into the future to produce a sales forecast.

Step 2: Data to be used as Inputs to the Short-Term Sales Forecasting Model

As the second step in developing the forecast, streamflow and price spread data are identified to be used as inputs to forecast short-term sales. These inputs represent future market conditions in the model. The way the model uses these inputs is described further in step 3 below. The 55-year average streamflow at The Dalles is used as the input for streamflow conditions. This data set has streamflow data for each month of each of the 55 years. This data set is a large enough sample size to account for short-term variations in the data and therefore provides a more reasonable expectation of the potential range of streamflow scenarios in the rate period than a smaller sample size would.

As the input for price spread conditions, ICE's Settlement Prices for Mid-C and NP-15 are used to represent expected power prices during the rate period. ICE Settlement Prices are forward prices at which power can be purchased today to be delivered in a future month, and reflect the current market value of future power. The Mid-C Settlement Price is subtracted from the NP-15 Settlement Price to obtain the price spread to input into the forecasting model to predict future sales. This method is consistent with the use of the historical NP-15 minus Mid-C price spread to identify the correlation between short-term sales and price spread.

This streamflow and price spread data are used as inputs to the historical correlations to produce a short-term sales forecast, as described below. Streamflow is the input for forecasting short-term sales to Power Services, and streamflow and price spread are the inputs for forecasting short-term sales to all other customers. This method is consistent with the historical correlations discussed in step 1. Also incorporated in the model is variability in these inputs.

Step 3: Develop the Forecast of Short-Term PTP Sales

The historical correlations between sales and streamflow and price spread are used to represent the future correlations. To forecast short-term sales to Power Services, historical streamflow are input to the model as a prediction of future conditions. To forecast short-term sales to all other customers, historical streamflow and forecasted price spread are input to the model as predictions of future conditions. In both cases, the sales forecasts are modeled to include variability, as discussed below. Short-term sales are variable because they do not require long-term commitments and instead are purchased on an hourly, daily, weekly, or monthly (less than 12 months) basis. Short-term sales forecasts are also subject to uncertainty due to variability in streamflow and price spread.

To account for the impact of variability in short-term sales, uncertainty is incorporated around the streamflow, price spread, and other parameters using an Excel add-in, @RISK, Professional version 5.05 (©Palisade Corporation). @RISK uses a Monte Carlo-based simulation to run 5,000 short-term sales forecasting games and generate the distribution of the outcomes of those games around a mean. Running these games models the following three sources of uncertainty, all of which impact the short-term sales forecast: (1) variability in the correlations (that is, the risk of imperfections in the correlations); (2) variability of input data (streamflow and price spread); and (3) the possibility of limitations on available transfer capability (ATC). The final short-term sales forecast is based on this analysis and is the mean, or expected value, of the distribution of the outcomes of the games run by the short-term sales forecasting model using @RISK.

The variability in the correlations is the risk that the correlations between short-term sales and the market indicators are imperfect. This variability is also known as regression prediction error, because it represents possible error in the regression analysis. This variability is modeled to reflect the fact that these correlations may not accurately predict sales 100 percent of the time. The impact of this variability on the forecast of short-term sales to BPA Power

Services is modeled separately from the modeling for other customers, consistent with the analysis outlined above.

To estimate the variability around the correlation between short-term sales to Power Services and streamflow, the model was first applied to predict what the short-term sales forecast for Power Services would have been for October 2004–September 2009, based on streamflow data at The Dalles for that time period. The model's prediction was compared to actual short-term sales to Power Services for that time period. The difference between predicted sales and actual sales indicates the possible magnitude and direction of variability between the sales forecast produced by the model and actual short-term sales. As short-term sales are greater in some months than in others, the differences are greater in some months than in others. As a result, for each year of the five-year data set each calendar month was categorized as high variation, medium variation, or low variation, based on the size of the differences between predictions and actuals in that month. For each category of months (high variation, medium variation, and low variation), the standard deviation of the differences was calculated, which indicates the amount of variability around the mean. The standard deviation was input to the model as an indicator of the range of possible error in the correlation between short-term sales to BPA Power Services and streamflow. This allows the model to generate a range of possible outcomes to account for possible error in the correlation.

For all customers other than Power Services, the impact of regression prediction error was analyzed in the same manner as described above, with one difference: both streamflow and historical price spread are inputs to the model to produce predicted sales for calculating differences between predicted and actual sales, and both streamflow and price spread are used in generating a range of possible outcomes to account for possible error in the correlation.

Also modeled was the impact of variation in the forecast market indicators that are used to develop the sales forecast, in order to account for uncertainty using the 55-year streamflow data set for the Columbia River at The Dalles. For each Monte Carlo game and for each year of the rate period, @RISK randomly chooses one of the annual streamflow data sets from the overall 55-year set of data, and uses the data from each month of that year to simulate the streamflows in each month of the simulated rate period year.

Variability in the price spread used in @RISK was modeled by using ICE Settlement Prices for Mid-C and NP-15 to represent expected power prices during the rate period. To model variability in prices, the model creates variability around the Settlement Prices by inputting factors that affect power prices, such as natural gas prices, Columbia River streamflows, and ambient temperatures in the BPA load area. By running games that randomly sample natural gas, streamflow, and temperature data, and applying that data to the historical relationships between these factors and power prices, the model produces power prices at the Mid-C and NP-15 for each month that are adjusted for natural gas price, streamflow, and seasonal variation. These power prices are then used to create the NP-15 minus Mid-C price spread that is used as the price spread input to the model.

Also modeled was the possibility of ATC being limited or not available during each month of the rate period. BPA currently sells unlimited hourly ATC on the Network, but BPA expects

that implementation of FERC Order 729 and the North American Electric Reliability Corporation's (NERC) ATC standards, expected to occur during the rate period, will limit the amount of ATC that can be sold short-term. The availability of ATC could directly impact short-term sales: if ATC is limited or not available, BPA may impose a sales limitation, meaning that BPA may not be able to fully meet the anticipated demand for short-term sales. To model the possibility of ATC being limited or not available, the percentage of time that the power flows on a transmission path are within 10 percent of the path's Operational Transfer Capacity (OTC) limit were considered. OTC is the amount of power that can be reliably transmitted through a transmission path given current or forecast system conditions. OTC limits vary depending on path and system conditions (such as outages and seasonal path ratings). Power flows within 10 percent of the OTC limit indicate high use of the path. It is in these periods of high use that there is a possibility of a sales limitation being imposed.

To model possible sales limitations, Supervisory Control and Data Acquisitions (SCADA) data for monitored Network flowgates from January 2004–October 2009 were used. SCADA is a computer system that monitors, controls, and collects data regarding the transmission system. Monitored Network flowgates are the transmission paths on which BPA monitors and measures power flows and OTC in order to calculate ATC. The SCADA data show power flows and limits at each flowgate measured in five-minute increments. For each flowgate the percentage of time in each month that flows were within 10 percent of the path's OTC limit were calculated. The data were grouped by calendar month (that is, the data for each January from 2004–2009 were grouped, for each February were grouped, and so on). For each calendar month group BPA then identified the month within the group with the largest percentage of time that any flowgate was within 10 percent of its OTC limit. For example, January 2009 was the January with the largest percentage of time that any flowgate was within 10 percent of its OTC limit (in this case, 7.6 percent of the time). This percentage was assumed to represent the percentage of the time that a limitation on sales would be imposed each year during that month. Thus, in this example a sales limitation was assumed to be imposed 7.6 percent of the time each January.

If a sales limitation is required, it indicates that ATC constraints may prevent BPA from selling short-term transmission service to meet full demand. Sales limitations can vary depending on system conditions. If a game being run by the model indicates a sales limitation would be imposed, then the model randomly chooses what portion of forecast short-term sales demand can be granted given the available ATC, identified as a percentage (zero to 100 percent) of the full amount of short-term sales forecast by the model. This percentage is applied to the full amount of short-term sales forecasted by the model for that game. The result is a short-term sales forecast for that game that is adjusted for possible ATC limitations.

As mentioned above, the market indicators and sources of variability were input to the @RISK model, which uses a Monte Carlo-based simulation to generate 5,000 games and generate a distribution of the outcomes of the games around a mean. The outcome of each game is a value for short-term sales given the assumed market conditions and variability. The resulting forecast of short-term sales for each month of the rate period is the mean, or average, of the 5,000 games.

Short-term PTP sales may be for monthly, weekly, daily, or hourly service. Hourly firm and hourly non-firm service are charged the same hourly rate. Daily, weekly, and monthly firm and non-firm service are all charged identical rates based on the number of days of the reservation: the Block 1 rate is charged for the first five days of a reservation, and the Block 2 rate is charged for day six and beyond. The short-term sales forecasting model discussed above produces forecasts of total monthly PTP short-term sales to Power Services and to all other customers, measured in kilowatt-days. To determine the individual forecast of short-term PTP sales associated with each rate, BPA determines the historical allocation of short-term sales across the three rates, using five years of historical data (the same data used to forecast total short-term sales). The historical allocation of sales under each rate for Power Services is measured separately from the historical allocation of sales under each rate for all other customers. In both cases the historical allocation of sales under each rate is applied to the total short-term sales forecast, resulting in a forecast for sales under each short-term PTP rate for each month of the rate period. The forecasts for sales, by rate, to Power Services and to all other customers are then summed to result in overall short-term PTP sales forecasts under each rate. The annual forecast of short-term PTP sales over the rate period is provided in Table 14-1, line 9.

14.8 Network Integration Sales Forecast

The monthly sales forecast for Network Integration service is based on peak monthly load forecasts for all of the Points of Delivery (POD) listed in the NT customers' contracts. The forecast uses the customers' monthly POD load forecasts, which are the customers' forecasted network loads coincident with the hour of the Monthly Transmission Peak Load for each month of the rate period. The description of the POD load forecast is in Chapter 14.8.1 below. The NT customers' POD load forecasts are summed for each month of the fiscal year to establish the monthly sales forecast and then summed to calculate a fiscal year average. Table 14-1, line 18.

Since the proposed SDD is a credit calculated at the Base Charge rate, the monthly sales forecast for the SDD is adjusted by calculating a megawatt impact for the SDD and subtracting that megawatt value from the monthly sales forecast. The forecast of monthly SDD is calculated as the average of the amount of generation during heavy load hours in megawatts times the distance-based percentage formula. See Transmission and Ancillary Service Rate Schedules, BP-12-E-BPA-10, NT-12 Network Integration Rate, section IV-F. Then a fiscal year average of the adjusted monthly sales forecast is calculated. Table 14-1, line 4.

The Base Charge is multiplied by the monthly sales forecast, adjusted for the SDD, to establish the revenue forecasted from the Base Charge. To forecast revenue from the Load Shaping Charge, the proposed Load Shaping Charge is multiplied by the monthly sales forecast, not adjusted for SDD, since the proposed SDD does not apply to the Load Shaping Charge. The forecast Base Charge and Load Shaping Charge revenues are summed to calculate the revenues at current and proposed rates from Network Integration transmission service. Table 14-2, line 6, and Table 14-3, line 6.

14.8.1 Load Forecast for Network Integration and Utility Delivery Customers

BPA's Customer Services Load Forecasting group prepares monthly Point of Delivery (POD) load forecasts for each NT Customer. The POD load forecast is adjusted to reflect the customer's average hourly load coincident with the hour of the Monthly Transmission Peak Load. BPA uses these POD load forecasts to establish forecast sales and revenue for NT and UD customers. The load forecasting method is the same method used for the last rate period.

The POD load forecast is prepared for each month and reflects the hourly load coincident with the historical Monthly Transmission Peak Load. The Monthly Transmission Peak Load is the hour during the month when the transmission system experienced maximum loading. Thus, the customer's monthly POD load forecast represents the customer's forecast load on the hour when the transmission system experienced maximum loading during the month. The POD load forecast includes all residential, commercial, and industrial retail loads in the customer's service territory.

The POD load forecast is the result of a two-step process. The first step is to forecast the customer peak load based on historical data using a least-squares regression model, which is a common statistical technique used by the electricity industry to estimate the rate of change in load with the change in temperature (the coefficient).

To apply the least-squares regression model in this case, monthly projections of the customer's maximum hourly peak load by POD are produced from historical peak meter readings between 1999 and 2010, a time period that represents the historical load levels at the POD and provides a trend for the forecast. For customers for which this time period would not accurately reflect future load growth, such as a customer that added a new sizeable load in 2002, a shorter time period may be used.

The historical meter readings are applied in the least-squares regression-based model. Several independent variables are included in the model, including heating degree days, cooling degree days, monthly indicator variables to capture changes in load (the load in January is higher than the load in March), and a time trend variable to capture how loads change over time. Heating and cooling degree days are used to account for load changes related to temperature changes. The daily average temperature is calculated by averaging the maximum and minimum temperatures for that day in that region from 1970 to 2004. Then, the daily average (36 degrees) is subtracted from the base temperature (65 degrees) to determine the heating degrees for that day (29 degrees). Typically, there is a positive relationship between the degree days and the load change; for example, more heating degree days means colder average temperatures and higher loads.

The second step is to apply a ratio to the monthly POD load forecasts, because the customer's maximum peak load by POD does not represent the customer's load at the time of the Monthly Transmission Peak Load. The ratio is calculated for each month by dividing the customer's historical monthly peak load at each POD by the customer's average load on the hour of the Monthly Transmission Peak Load for that month. The ratios derived for each month are averaged to determine a single historical ratio for that month. Finally, the monthly historical

ratio is multiplied by the customer's forecast peak load at each POD during that month. The final value is the POD load forecast at the time of the Monthly Transmission Peak Load.

14.9 Southern Intertie Long-Term Sales Forecast

Forecasts of long-term IS sales include both existing and expected long-term sales. The forecast of existing long-term sales is based on:

(a) current confirmed long-term contract demands effective through the FY 2012–2013 rate period; and

(b) confirmed OATT section 17.7 customer deferrals (extensions of commencement of service), which reduce the Intertie sales forecast for the duration of the deferral.

The forecast of additional expected long-term IS sales is based on:

(a) long-term sales that have not been requested but are expected to occur, such as OATT section 2.2 renewals and additional sales due to the California-Oregon Intertie (COI) upgrade. The COI is the AC portion of the Southern Intertie. The upgrade is intended to increase COI and Pacific DC Intertie (PDCI) availability so that BPA is able to support requests for long-term firm transmission service up to the full rating of the COI and PDCI. BPA expects that the upgrade will be complete at the end of FY 2011.

(b) expected OATT section 17.7 deferrals during FY 2012–2013 (extensions of commencement of service), which reduce the IS long-term sales forecast for the duration of the deferral.

Additional expected long-term IS sales are forecast based on input from BPA account executives and from customer communications. The input includes information about expected IS reservations, including the service demand, the start date, and the length of the reservation.

Existing and expected long-term IS sales are identified in Table 14-1, lines 13-14.

14.10 Southern Intertie Short-term Sales Forecast

Short-term IS sales are firm or non-firm sales less than one year in length, including monthly, weekly, daily, and hourly sales. Because short-term IS service is not reserved far in advance, there are not existing contract demands for this type of service on which to base the sales forecast. Rather, the forecast of short-term IS sales expected to occur during the rate period is based on historical short-term sales data and key market indicators: streamflow and price spread. The forecast of short-term IS sales is developed using the same three-step process that is used to develop the forecast of short-term PTP sales (see Chapter 14.7), with two primary differences. First, the regression analysis used for short-term IS sales compares historical short-term IS sales to the historical price spread and streamflow data, rather than using historical PTP sales data. Second, in using the @RISK software to model variability and to run short-term sales forecasting games, BPA evaluates the possibility of ATC limitations on the Southern Intertie, rather than evaluating the risk of ATC limitations on Network flowgates.

BPA monitored the percent of time that the California-Oregon Intertie (COI) flowgate and the Pacific DC Intertie (PDCI) flowgate were within 10 percent of their OTC limits. These flowgates were used to indicate whether a sales limitation may be required in the same manner that the Network flowgates were used in developing the short-term PTP forecast, except that the average percentage of time that flows were within 10 percent of OTC on these two flowgates was used as an indication of limited sales for each month. These two flowgates experience more frequent periods of high use than Network flowgates do. Using the greatest of the percentage of time flows were within 10 percent of OTC limit for all months to represent the frequency of limitations on short-term sales, as was done for PTP short-term sales, would overstate the probability of sales limitations. Instead, the average percentage of the time where flows were within 10 percent of OTC on these two flowgates was used as an indication of limited sales for each month.

In all other respects, the process for developing the short-term IS sales forecast is the same as the process for developing the short-term PTP sales forecast, as described in Chapter 14.7.

As is the case with short-term PTP sales, higher-than-average streamflows lead to higher-than-average short-term IS sales to BPA Power Services, and higher-than-average streamflows and price spreads lead to higher-than-average short-term IS sales to all other customers. For this group of customers, short-term IS sales are more strongly correlated with price spread than with streamflow. Consistent with these relationships, streamflow is used as the input for forecasting short-term sales to BPA Power Services, while both streamflow and price spread are used as the inputs for forecasting short-term sales to all other customers.

Short-term IS service is charged at rates similar to those for short-term PTP service: hourly, Block 1, and Block 2. The overall short-term IS sales forecast is allocated between the various IS short-term rates in the same manner as the short-term PTP forecast is allocated between short-term PTP rates, as described in Chapter 14.7. The short-term IS sales forecast is provided in Table 14-1, line 16.

14.11 IM Sales Forecast

BPA's share of capacity on the Montana Intertie with the exchange provision in place is 185 MW. The only sale forecasted over BPA's capacity during the FY 2012–2013 rate period is an existing 16-MW long-term reservation. *See* Table 14-1, line 20.

14.12 Ancillary and Control Area Services

As a transmission provider, BPA provides (1) Scheduling, System Control, and Dispatch (SCD) Service and (2) Generation Supplied Reactive (GSR) Service (also known as Reactive Supply and Voltage Control from Generation Sources Service). The sales forecast for these two required Ancillary Services is discussed below. In addition, BPA offers to provide (1) Regulation and Frequency Response Service; (2) Energy Imbalance Service; (3) Operating Reserve – Spinning Service; and (4) Operating Reserve – Supplemental Service. The Generation Inputs Study proposes rates and discusses the rate development for these four Ancillary Services. Generation Inputs Study, BP-12-FS-BPA-05, section 10. BPA also is

proposing rates for six Control Area Services: (1) Regulation and Frequency Response Service; (2) Generation Imbalance Service; (3) Operating Reserve – Spinning Reserve Service; (4) Operating Reserve – Supplemental Reserve Service; (5) Variable Energy Resource Balancing Service; and (6) Dispatchable Energy Resource Balancing Service. *Id.* The Generation Inputs Study discusses rate development for all of these Control Area Services. *Id.*

14.12.1 Scheduling, System Control, and Dispatch (SCD) Service

SCD Service is necessary to the provision of basic transmission service within BPA's Balancing Authority Area. System control and communications equipment and dispatch of generating resources and transmission facilities are necessary to maintain generation and load balance, maintain physical and electronic security requirements for NERC Critical Infrastructure facilities, and preserve system reliability for all transactions. SCD service can be provided only by the operator of the Balancing Authority Area in which the transmission facilities used are located, since the service is used to schedule the movement of power through, out of, within, or into the Balancing Authority Area.

SCD applies to all transmission service. The sales forecast for SCD is the sum of the sales forecasts of transmission service under the OATT (NT and long-term and short-term PTP, IM, and IS) plus the IR sales forecast. This is because customers are charged for SCD on the same basis on which they are charged for their transmission service, which is (a) the capacity reservation for point-to-point customers (taking long-term and short-term PTP, IM, or IS service) and contract demand for IR customers; and (b) the customer load coincident with the monthly transmission peak for NT customers. The short-distance discount associated with NT and PTP service does not apply to SCD sales. The FPT sales forecast is not included in the SCD sales forecast because the FPT rate includes the costs of SCD associated with FPT service. The total SCD sales forecast for each year of the rate period thus is the sum of lines 9, 17, 18, 19 and 21 on Table 14-1.

14.12.2 Generation Supplied Reactive (GSR) Service

GSR Service, also known as Reactive Supply and Voltage Control from Generation Sources, is necessary to the provision of basic transmission service within BPA's Balancing Authority Area. GSR is the provision of reactive power and voltage control by generating facilities under the control of Transmission Services. GSR sales are driven by the same factors as SCD sales, as the billing factors are the same. As a result, the sales forecast for GSR for each year of the rate period is the sum of lines 9, 17, 18, 19 and 21 on Table 14-1.

Table 14-1
Transmission Sales Forecast, FY 2011 - FY 2013 (Megawatts)

	A	B	C	D
	Rate Schedule	**FY 2011**	**FY 2012**	**FY 2013**
1	Network			
2	Formula Power Transmission (FPT.1,3)	1,554	1,570	1,570
3	Integration of Resources (IR)	1,603	1,446	1,429
4	Network (NT) Base (incl. SDD in 12/13)	6,243	6,478	6,580
5	Long-term Point to Point (PTP)			
6	Confirmed Sales	23,448	21,077	19,093
7	Expected Sales	-675	2,208	5,064
8	Subtotal Long-term PTP	22,773	23,285	24,156
9	PTP Short Term	1,524	1,183	1,184
10	Subtotal Network	33,697	33,962	34,919
11	Southern Intertie			
12	Long-term Intertie South (IS)			
13	Confirmed Sales	5,348	5,515	5,120
14	Expected Sales	42	434	823
15	Subtotal Long-term IS	5,390	5,949	5,942
16	IS Short Term	222	177	187
17	Subtotal Intertie	5,612	6,126	6,129
18	NT Load Shaping	6,486	6,603	6,705
19	Long-term PTP Sales without SDD	23,722	23,796	24,669
20	Utility Delivery Charge	197	216	221
21	Montana Intertie	16	16	16
22	Sales Receiving Transmission Credits			
23	Long-Term PTP	504	1,442	1,743
24	NT/NT_LS	0	50	113
25	Long-Term IS	0	301	451

Table 14-2
Transmission Revenues, Current Rates FY 2011 - FY 2013
($000s)

	A	B	C	D
		FY2011	FY2012	FY2013
1	Long-Term			
2	Network			
3	Formula Power Transmission	25,411	25,629	25,629
4	Integration of Resources	28,807	25,999	25,679
5	Point-to-Point Long Term	354,901	362,694	376,256
6	Network Integration	123,120	129,974	132,022
7	Interties			
8	Southern Intertie Long Term	83,629	92,297	92,200
9	Montana Intertie Long Term	252	252	252
10	Short-Term			
11	Point-to-Point Short Term	34,081	27,883	28,069
12	Southern Intertie Short Term	5,596	4,258	4,463
13	Delivery			
14	Utility Delivery Charges- Delivery	2,675	2,902	2,969
15	DSI Delivery	1,785	1,785	1,785
16	Ancillary			
17	Scheduling, System Control & Dispatch	90,401	93,458	95,881
18	Reactive Supply & Voltage from Gen	0	0	0
19	Operating Reserves - Spin & Supp	37,978	44,947	36,726
20	Regulation & Frequency Response	7,421	7,434	7,518
21	Within-Hour Balancing (VERBS only)	38,544	46,552	60,528
22	Energy & Generation Imbalance	4,788	0	0
23	Revenue Credits			
24	Use of Facilities (UFT)	5,483	5,146	5,146
25	Townsend-Garrison Transmission	9,796	9,796	9,796
26	Operations & Maintenance	1,154	1,145	1,145
27	Reservation Fee- Other Revenue Sources	1,709	1,089	1,937
28	AC-PNW PSW Intertie	1,845	1,432	1,432
29	Power Factor Penalty	4,164	4,402	4,174
30	Wireless/PCS- Other Revenue	4,971	4,861	4,861
31	Wireless/PCS- Reimbursable Revenue	1,225	1,206	1,206
32	Fiber- Other Revenue	7,587	6,899	6,786
33	Fiber-Other Reimbursable Revenue	977	886	850
34	Land Leases and Sales	199	301	301
35	Other Leases/Misc Revenue Sources	127	151	106
36	COE/BOR Project Revenue	954	954	954
37	Remedial Action Scheme	51	51	51
38	Transmissions Share of Irrigation PP	382	382	382
39	NFP-Depr PNW PSW Intertie	3,094	3,065	3,065
40	Srvcs/FPS Loss/Int Exch/Arcrft	138	0	0
41	Failure to Comply	934	0	0
42	Gen-Integration-Other Revenue Source	8,296	8,296	8,296
43	Subtotal Network	566,321	572,180	587,655
44	Subtotal Interties	89,476	96,807	96,915
45	Subtotal Delivery	4,460	4,687	4,753
46	Subtotal Ancillary	179,131	192,390	200,653
47	Subtotal Revenue Credits	53,088	50,063	50,489
48	Total TS	892,477	916,127	940,465
49	Interbusiness Line Reimbursement for WIT costs	0	4,170	4,259
50	Adjusted Total	892,477	920,297	944,724

Table 14-3
Transmission Revenues, Proposed Rates, FY 2012 - FY 2013
($000s)

	A	B	C
		FY2012	FY2013
1	Long-Term		
2	Network		
3	Formula Power Transmission	25,629	25,629
4	Integration of Resources	25,999	25,679
5	Point-to-Point Long Term	362,694	376,256
6	Network Integration	129,974	132,022
7	Interties		
8	Southern Intertie Long Term	92,297	92,200
9	Montana Intertie Long Term	115	115
10	Short-Term		
11	Point-to-Point Short Term	27,883	28,069
12	Southern Intertie Short Term	4,258	4,463
13	Delivery		
14	Utility Delivery Charges- Delivery	2,902	2,969
15	DSI Delivery	1,785	1,785
16	Ancillary		
17	Scheduling, System Control & Dispatch	93,458	95,881
18	Reactive Supply & Voltage from Gen	0	0
19	Operating Reserves - Spin & Supp	55,572	45,417
20	Regulation & Frequency Response	6,442	6,513
21	Within-Hour Balancing (both VERBS and DERBS)	52,574	66,229
22	Energy & Generation Imbalance	0	0
23	Revenue Credits		
24	Use of Facilities (UFT)	5,146	5,146
25	Townsend-Garrison Transmission	9,796	9,796
26	Operations & Maintenance	1,145	1,145
27	Reservation Fee- Other Revenue Sources	1,089	1,937
28	AC-PNW PSW Intertie	1,432	1,432
29	Power Factor Penalty	4,402	4,174
30	Wireless/PCS- Other Revenue	4,861	4,861
31	Wireless/PCS- Reimbursable Revenue	1,206	1,206
32	Fiber- Other Revenue	6,899	6,786
33	Fiber-Other Reimbursable Revenue	886	850
34	Land Leases and Sales	301	301
35	Other Leases/Misc Revenue Sources	151	106
36	COE/BOR Project Revenue	954	954
37	Remedial Action Scheme	51	51
38	Transmissions Share of Irrigation PP	382	382
39	NFP-Depr PNW PSW Intertie	3,065	3,065
40	Srvcs/FPS Loss/Int Exch/Arcrft	0	0
41	Failure to Comply	0	0
42	Gen-Integration-Other Revenue Source	8,865	8,726
43	Subtotal Network	572,180	587,655
44	Subtotal Interties	96,670	96,777
45	Subtotal Delivery	4,687	4,753
46	Subtotal Ancillary	208,046	214,040
47	Subtotal Revenue Credits	50,632	50,920
48	Total TS	932,214	954,146
49	Interbusiness Line Reimbursement for WIT costs	4,170	4,259
50	Adjusted Total	936,384	958,405

/1 FY 2011 based on Start-of-Year forecast

Table 14-4
Transmission Credit Projects, Credits and Interest at Current Rates, FY 2011 - FY 2013
($000s)

	A	B	C	D	E	F	G
		FY 2011		FY 2012		FY 2013	
	Generation Project	Interest Expense	Transmission Credits Repaid	Interest Expense	Transmission Credits Repaid	Interest Expense	Transmission Credits Repaid
1	Generation Project A	186	2,885	101	2,885	17	1,622
2	Generation Project B	223	6,946	34	3,534	-	-
3	Generation Project C	414	4,673	277	5,452	88	5,597
4	Generation Project D	274	1,051	251	1,051	225	1,051
5	Generation Project E	36	1,383	13	1,411	-	-
6	Generation Project F	317	1,067	292	1,168	263	1,168
7	Generation Project G	6	-	12	-	6	371
8	Generation Project H	60	389	50	389	39	389
9	Generation Project I	155	-	161	-	151	1,817
10	Generation Project J	39	389	28	389	16	389
11	Generation Project K	199	966	175	966	149	966
12	Generation Project L	1,713	123	1,763	5,036	1,500	14,590
13	Generation Project M	21	359	10	359	1	116
14	Generation Project N	2,856	-	8,451	2,077	7,135	3,894
15	Generation Project O	84	1,038	35	1,554	-	-
16	Generation Project P	72	-	450	104	788	623
17	Generation Project Q	475	454	468	837	449	1,178
18	Generation Project R	10	-	11	340	-	-
19	Generation Project S	36	779	32	774	-	-
20	Generation Project T	31	-	886	-	2,241	-
21	Generation Project U	36	78	140	954	52	1,207
22	Generation Project V	3	195	-	-	-	-
23	Generation Project W	108	-	129	389	98	1,168
24	Generation Project X	11	117	10	270	-	-
25	Generation Project Y	20	-	42	-	35	1,188
26	Generation Project Z	107	243	252	243	199	243
27	Generation Project AA	107	243	252	243	199	243
28	Generation Project AB	8	19	19	19	15	19
29	Generation Project AC	189	430	445	430	352	430
30	Generation Project AD	87	336	196	336	145	336
31	Generation Project AE	30	-	172	-	141	273
32	Generation Project AF	43	-	106	-	108	234
33	Generation Project AG	5	-	133	-	315	-
34	Generation Project AH	-	-	11	-	44	-
35	Generation Project AI	129	-	318	-	329	312
36	Generation Project AJ	7	-	142	-	387	-
37	Generation Project AK	47	-	192	-	204	218
38	Generation Project AL	17	-	71	-	71	495
39	Generation Project AM	7	-	119	-	329	-
40	Generation Project AN	-	-	312	-	989	-
41	Generation Project AO	-	-	-	-	34	-
42	Generation Project AP	-	-	15	-	61	-
43	Generation Project AQ	121	-	885	-	1,606	-
44	Generation Project AR	120	-	694	-	1,278	-
45	Generation Project AS	16	-	39	-	34	428
46	Generation Project AT	4	-	42	-	66	-
47	Generation Project AU	13	-	60	-	64	62
48	Generation Project AV	-	-	120	-	399	-
49	Generation Project AW	-	-	37	-	79	-
50	Generation Project AX	8	1,135	-	-	-	-

Table 14-4
Transmission Credit Projects, Credits and Interest at Current Rates, FY 2011 - FY 2013
($000s)

	A	B	C	D	E	F	G
		FY 2011		FY 2012		FY 2013	
	Generation Project	Interest Expense	Transmission Credits Repaid	Interest Expense	Transmission Credits Repaid	Interest Expense	Transmission Credits Repaid
51	Small Generation Requests	2	-	17	156	7	370
52	COI Request A	350	-	335	1,552	276	1,552
53	COI Request B	350	-	335	1,552	276	1,552
54	COI Request C	134	-	128	605	106	605
55	COI Request D	344	-	329	1,552	271	1,552
56	COI Request E	255	-	243	1,148	200	1,148
57	COI Request F	10	-	10	47	8	47
58	COI Request G	172	-	164	776	135	776
59	COI Request H	172	-	164	776	135	776
60	COI Request I	52	-	49	233	41	233
61	COI Request J	47	-	50	186	44	186
62	**Total Network**	**8,453**	**25,298**	**18,470**	**31,367**	**20,712**	**40,998**
63	**COI Upgrades**	**1,886**	**-**	**1,807**	**8,425**	**1,492**	**8,425**
64	**Annual Total**	**10,339**	**25,298**	**20,277**	**39,793**	**22,204**	**49,424**

Table 14-5
Transmission Credit Projects, Credits and Interest at Proposed Rates, FY 2011 - FY 2013
($000s)

	A	B	C	D	E
		FY 2012		FY 2013	
	Generation Project	Interest Expense	Transmission Credits Repaid	Interest Expense	Transmission Credits Repaid
1	Generation Project A	101	2,885	17	1,622
2	Generation Project B	34	3,534	-	-
3	Generation Project C	277	5,452	88	5,597
4	Generation Project D	251	1,051	225	1,051
5	Generation Project E	13	1,411	-	-
6	Generation Project F	292	1,168	263	1,168
7	Generation Project G	12	-	6	371
8	Generation Project H	50	389	39	389
9	Generation Project I	161	-	151	1,817
10	Generation Project J	28	389	16	389
11	Generation Project K	175	966	149	966
12	Generation Project L	1,763	5,036	1,500	14,590
13	Generation Project M	10	359	1	116
14	Generation Project N	8,451	2,077	7,135	3,894
15	Generation Project O	35	1,554	-	-
16	Generation Project P	450	104	788	623
17	Generation Project Q	468	837	449	1,178
18	Generation Project R	11	340	-	-
19	Generation Project S	32	774	-	-
20	Generation Project T	886	-	2,241	-
21	Generation Project U	140	954	52	1,207
22	Generation Project V	-	-	-	-
23	Generation Project W	129	389	98	1,168
24	Generation Project X	10	270	-	-
25	Generation Project Y	42	-	35	1,188
26	Generation Project Z	252	243	199	243
27	Generation Project AA	252	243	199	243
28	Generation Project AB	19	19	15	19
29	Generation Project AC	445	430	352	430
30	Generation Project AD	196	336	145	336
31	Generation Project AE	172	-	141	273
32	Generation Project AF	106	-	108	234
33	Generation Project AG	133	-	315	-
34	Generation Project AH	11	-	44	-
35	Generation Project AI	318	-	329	312
36	Generation Project AJ	142	-	387	-
37	Generation Project AK	192	-	204	218
38	Generation Project AL	71	-	71	495
39	Generation Project AM	119	-	329	-
40	Generation Project AN	312	-	989	-

Table 14-5
Transmission Credit Projects, Credits and Interest at Proposed Rates, FY 2011 - FY 2013
($000s)

	A	B	C	D	E
		FY 2012		FY 2013	
	Generation Project	Interest Expense	Transmission Credits Repaid	Interest Expense	Transmission Credits Repaid
41	Generation Project AO	-	-	34	-
42	Generation Project AP	15	-	61	-
43	Generation Project AQ	885	-	1,606	-
44	Generation Project AR	694	-	1,278	-
45	Generation Project AS	39	-	34	428
46	Generation Project AT	42	-	66	-
47	Generation Project AU	60	-	64	62
48	Generation Project AV	120	-	399	-
49	Generation Project AW	37	-	79	-
50	Generation Project AX	-	-	-	-
51	Small Generation Requests	17	156	7	370
52	COI Request A	335	1,552	276	1,552
53	COI Request B	335	1,552	276	1,552
54	COI Request C	128	605	106	605
55	COI Request D	329	1,552	271	1,552
56	COI Request E	243	1,148	200	1,148
57	COI Request F	10	47	8	47
58	COI Request G	164	776	135	776
59	COI Request H	164	776	135	776
60	COI Request I	49	233	41	233
61	COI Request J	50	186	44	186
62	**Total Network**	**18,470**	**31,367**	**20,712**	**40,998**
63	**COI Upgrades**	**1,807**	**8,425**	**1,492**	**8,425**
64	**Annual Total**	**20,277**	**39,793**	**22,204**	**49,424**

Table 14-6
Credit Project Interest Rate Assumptions

	A	B	C
	Fiscal Year	Assumed Annual FERC Rate	Assumed Annual 10-Year Bloomberg Rate
1	2011	3.25%	3.80%
2	2012	7.79%	4.51%
3	2013	6.19%	5.17%

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