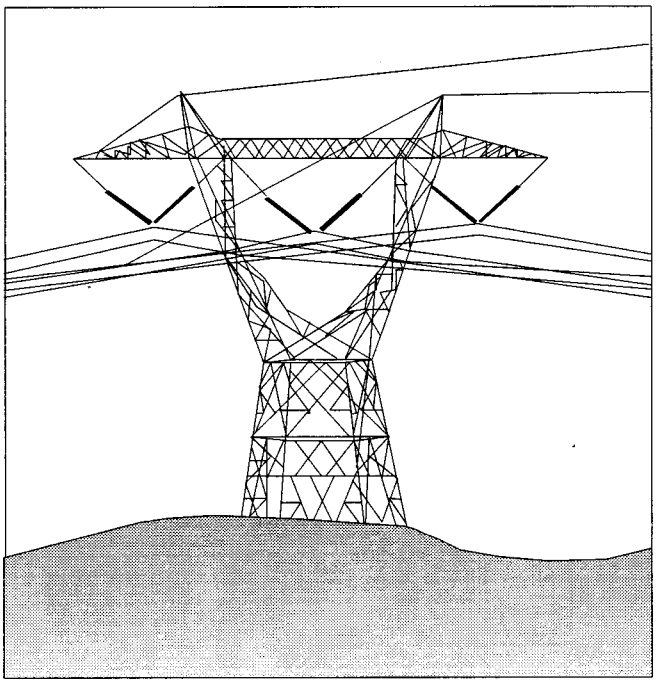
BONNEVILLE POWER ADMINISTRATION
TRANSMISSION BUSINESS LINE

2002 FINAL TRANSMISSION PROPOSAL

REVENUE REQUIREMENT DOCUMENTATION

TR-02-FS-BPA-01A



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DOCUMENTATION
FOR
REVENUE REQUIREMENTS STUDY

TR-02-FS-BPA-01A

AUGUST 2000

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CHAPTER 1

TRANSMISSION REVENUE REQUIREMENTS

I. Introduction

This chapter documents how Bonneville Power Administration's (BPA) annual transmission revenue requirements are determined. Two tables are presented showing both years of the rate period (FYs 2002 and 2003). On the first table, revenue requirements for FYs 2002 and 2003 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.

II. Income Statement

A more detailed description of the following line items is presented in Chapter 4 of the Revenue Requirement Study (Study) (TR-02-FS-BPA-01). Operating expenses (lines 1-5) include: BPA's transmission system operation, maintenance and development expenses, environmental remediation, facility leases, non-Federal transmission arrangements, transmission marketing and scheduling, transmission business line support services and overheads, and corporate overheads (line 2); inter-business lines expenses (primarily the generation inputs for ancillary services) (line 3), and annual straight-line depreciation (remaining life technique) for transmission and general plant-in-service (line 4).

Federal interest expense is calculated in transmission repayment studies on appropriations granted by Congress for BPA capital investments prior to the Transmission Systems Act (line 8) and on bonds that BPA issues to the U.S. Treasury (line 9). Amortization of capitalized bond premiums (line 11) is the annual amortization of call premiums resulting from early retirement of bonds that have been refinanced. The call premiums are capitalized and included in the principal of the replacement bonds. They are then amortized over the term of the respective replacement

bonds and constitute a non-cash component of interest expense. Bond interest is reduced by interest income from BPA's projected cash reserves (line 10). The capitalization adjustment and the Allowance for Funds Used During Construction (AFUDC) (lines 22-23) further reduce gross interest expense. The capitalization adjustment, a non-cash expense, is the annual recognition of the write-down in principal that resulted from the BPA Refinancing Act.

Planned net revenues (lines 16-18) are included to ensure coverage of planned amortization payments (minimum required net revenues) and to meet the Administrator's risk mitigation policy (planned net revenues for risk). *See* Chapter 9 of this volume and Section 2.2 of the Revenue Requirement Study TR-02-FS-BPA-01.

III. Statement of Cash Flows

- ***Cash from Current Operations***: Minimum required net revenues (line 2) is the amount necessary to ensure that cash from operations is sufficient for planned amortization payments. It is the amount by which these planned payments to the U.S. Treasury exceed the expenses that do not require cash outlays (depreciation [line 4], amortization of capitalized bond premiums [line 5] and the capitalization adjustment [line 6]) and the revenues that do not provide cash in that year (accrual revenues from AC Intertie capacity ownership and fiber optic cable leases [line 7]).

- ***Cash Used for Capital Investments***: Investment in utility plant (line 11) is the increase in capital outlays associated with BPA investments for transmission, environment and general plant assets.

- ***Cash from Treasury Borrowing and Appropriations***: Increase in long-term debt (line 14) is the annual increment in bonds that BPA issues to Treasury to fund capital outlays for transmission, environment and general plant assets. Repayment of long-term debt (line 15)

is planned amortization of bonds issued to Treasury, as determined in transmission repayment studies. Repayment of capital appropriations (line 16) is planned amortization associated with pre-Transmission System Act appropriations, as determined in transmission repayment studies.

TRANSMISSION REVENUE REQUIREMENT
INCOME STATEMENT
($thousands)

		A FY 2002	B FY 2003	C AVERAGE
1	OPERATING EXPENSES			
2	OPERATION AND MAINTENANCE	235,686	229,810	232,748
3	INTER-BUSINESS LINE EXPENSES	77,320	77,303	77,312
4	FEDERAL PROJECTS DEPRECIATION	181,734	194,009	187,872
5	TOTAL OPERATING EXPENSES	494,740	501,122	497,932
6	INTEREST EXPENSE			
7	INTEREST ON FEDERAL INVESTMENT -			
8	ON APPROPRIATED FUNDS	66,904	65,280	66,092
9	ON LONG-TERM DEBT	138,609	144,768	141,689
10	INTEREST CREDIT ON CASH RESERVES	(7,767)	(9,754)	(8,761)
11	AMORTIZATION OF CAPITALIZED BOND PREMIUMS	3,220	3,220	3,220
12	CAPITALIZATION ADJUSTMENT	(19,618)	(20,174)	(19,896)
13	AFUDC	(5,040)	(5,225)	(5,133)
14	NET INTEREST EXPENSE	176,308	178,115	177,211
15	TOTAL EXPENSES	671,048	679,237	675,143
16	MINIMUM REQUIRED NET REVENUES 1/	0	0	0
17	PLANNED NET REVENUES FOR RISK	0	0	0
18	TOTAL PLANNED NET REVENUES	0	0	0
17	**TOTAL REVENUE REQUIREMENT**	**671,048**	**679,237**	**675,143**

1/ SEE NOTE ON CASH FLOW TABLE.

TRANSMISSION REVENUE REQUIREMENT
STATEMENT OF CASH FLOWS
($thousands)

		A FY 2002	B FY 2003
1	CASH FROM CURRENT OPERATIONS:		
2	MINIMUM REQUIRED NET REVENUES 1/	0	0
3	EXPENSES NOT REQUIRING CASH:		
4	FEDERAL PROJECTS DEPRECIATION	181,734	194,009
5	AMORTIZATION OF CAPITALIZED BOND PREMIUMS	3,220	3,220
6	CAPITALIZATION ADJUSTMENT	(19,618)	(20,174)
7	ACCRUAL REVENUES (AC INTERTIE/FIBER)	(4,031)	(4,031)
8	CASH PROVIDED BY CURRENT OPERATIONS	161,305	173,024
9	CASH USED FOR CAPITAL INVESTMENTS:		
10	INVESTMENT IN:		
11	UTILITY PLANT	(252,300)	(248,416)
12	CASH USED FOR CAPITAL INVESTMENTS	(252,300)	(248,416)
13	CASH FROM TREASURY BORROWING AND APPROPRIATIONS:		
14	INCREASE IN LONG-TERM DEBT	252,300	248,416
15	REPAYMENT OF LONG-TERM DEBT	(107,604)	(116,544)
16	REPAYMENT OF CAPITAL APPROPRIATIONS	(23,913)	(26,247)
17	CASH FROM TREASURY BORROWING AND APPROPRIATIONS	120,783	105,625
18	ANNUAL INCREASE (DECREASE) IN CASH	29,788	30,233
19	PLANNED NET REVENUES FOR RISK	0	0
20	TOTAL ANNUAL INCREASE (DECREASE) IN CASH	29,788	30,233

1/ Line 18 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.

CHAPTER 2

SEGMENTATION OF TRANSMISSION REVENUE REQUIREMENT

I. Introduction

This chapter documents how the components of the transmission revenue requirements are segmented in order to identify the cost of each transmission and ancillary service provided by the FCRTS.

II. Segmentation

Operations & Maintenance (O&M)

BPA transmission O&M (*see* Chapter 3 - Transmission Expenses) is segmented in three steps.

Step 1, direct assignment: the costs for generation inputs to ancillary services, COE and BOR transmission, ancillary services O&M, leases, GTAs (non-Federal transmission arrangements) and remedial action schemes (RAS) are assigned to segments and ancillary services as appropriate. The bases for these assignments are made by staff supporting the respective areas, except for COE and BOR costs. COE and BOR costs are segmented based on the same method used in the 2002 power rate case to quantify the total amount of these charges. COE & BOR O&M is based on average gross investment. Depreciation is calculated from the specific Network and Utility Delivery investment, and interest is based on average net plant.

Step 2, three-year averages of historical data: the transmission system operations (less the directly-assigned amount for ancillary services) and maintenance and environmental remediation programs are divided between lines and substations according to a 3-year historical average of that split. The costs are then separately segmented for lines and substations based on the

respective 3-year averages of historical O&M. *See* Segmentation Study, TR-02-FS-BPA-02, Table C.

Step 3, sum of previously-segmented non-payment related O&M: the classification of ancillary services O&M in step 1 and transmission O&M in step 2 are summed in order to provide the pro rata basis for the segmentation of all remaining O&M costs. Station service is segmented by the 3-year historical averages of O&M for substations by segment.

Depreciation

BPA depreciation is segmented in three steps. In the first step, BPA transmission depreciation is calculated for each segment and ancillary service from the gross investment (*see* Chapter 4 - FCRTS Investment Base). In the second step, transmission depreciation for control equipment and communications equipment is pro rated to the segments based on their depreciation expense. In the third step, the remaining general plant depreciation is prorated to the segments and ancillary services based on the total of the above steps.

Net Interest Expense and Planned Net Revenues

The transmission net interest expense (line 14, Transmission Revenue Requirement) and the planned net revenues (line 18) are prorated to the segments and ancillary services based on the average net plant investment in those areas (*see* Chapter 4). The Southern Intertie net plant is adjusted to remove the balance of the unearned revenues associated with non-Federal capacity ownership. Similarly, the unearned revenue balance associated with prepaid fiber optic leases is segmented pro rata based on the disposition of communications plant in each segment to reduce net plant. Interest credits for the Utility and DSI Delivery segments were applied directly to those segments prior to the segmentation of the remainder of net interest expense.

SEGMENTED TRANSMISSION REVENUE REQUIREMENTS
($thousands)

	A	B	C	D	E	F	G	H
FY 2002	**TOTAL**	**GI**	**NETWORK**	**SOUTH INTER**	**EAST INTER**	**UTIL DELIV**	**DSI**	**ANCILL SERV**
1 Operations & Maintenance	235,686	2,335	154,775	25,476	2,048	4,588	2,559	43,905
2 Inter-Business Line Expenses	77,320	30	4,611	630	8	321	56	71,664
3 Depreciation	181,734	2,402	119,986	26,371	4,062	2,675	2,427	23,811
4 Net Interest Expense	176,308	2,816	127,914	23,633	4,517	2,811	2,430	12,187
5 Planned Net Revenues	0	0	0	0	0	0	0	0
6 Total Transmission Rev Req	671,048	7,583	407,286	76,110	10,635	10,395	7,472	151,567
FY 2003								
1 Operations & Maintenance	229,810	2,276	151,036	24,832	1,996	4,473	2,494	42,703
2 Inter-Business Line Expenses	77,303	30	4,591	630	8	324	56	71,664
3 Depreciation	194,009	2,473	128,861	27,065	4,161	2,803	2,548	26,098
4 Net Interest Expense	178,115	2,690	131,595	22,365	4,273	2,749	2,386	12,057
5 Planned Net Revenues	0	0	0	0	0	0	0	0
6 Total Transmission Rev Req	679,237	7,469	416,083	74,892	10,438	10,349	7,484	152,522

REVENUE REQUIREMENTS FOR ANCILLARY SERVICES
($in thousands)

		A Total Ancillary Services	B Scheduling, Syst Control, & Dispatch	C Reactive Supply & Volt Control	D Regulation & Freqncy Response	E Energy Imbalance	F Op Resrv Spinning	G Op Resrv Supplmtl
	FY 2002							
1	Direct O&M	20,643	19,279	424	876	0	32	32
2	Overheads	23,262	21,725	478	987	0	36	36
3	Total O&M	43,905	41,004	902	1,863	0	68	68
4	Generation Inputs	71,664	0	25,000	11,544	0	17,560	17,560
5	Depreciation	23,811	20,753	595	2,080	0	196	187
6	Net Interest	12,185	10,574	302	1,138	0	88	83
7	Planned NR	0	0	0	0	0	0	0
8	Total Rev Req	151,565	72,331	26,799	16,625	0	17,912	17,898
	FY 2003							
1	Direct O&M	21,262	19,857	437	902	0	33	33
2	Overheads	21,441	20,024	441	910	0	33	33
3	Total O&M	42,703	39,881	878	1,812	0	66	66
4	Generation Inputs	71,664	0	25,000	11,544	0	17,560	17,560
5	Depreciation	26,098	22,700	652	2,318	0	219	209
6	Net Interest	12,058	10,463	299	1,126	0	87	83
7	Planned NR	0	0	0	0	0	0	0
8	Total Rev Req	152,523	73,044	26,829	16,800	0	17,932	17,918

REVENUE REQUIREMENTS FOR ANCILLARY SERVICES
($in thousands)

		A Total Ancillary Services	B Scheduling, Syst Control, & Dispatch	C Reactive Supply & Volt Control	D Regulation & Freqncy Response	E Energy Imbalance	F Op Resrv Spinning	G Op Resrv Supplmtl
	FY 2002							
1	INVESTMENT BASE	204,918	177,819	5,076	19,137	0	1,483	1,403
2	PERCENT	100%	86.8%	2.5%	9.3%	0.0%	0.7%	0.7%
3	NET INTEREST	12,187	10,574	302	1,138	0	88	83
4	PLANNED NET REVENUES	0	0	0	0	0	0	0
5	DEPRECIATION	21,304	18,569	532	1,861	0	175	167
6	PERCENT	100%	87.2%	2.5%	8.7%	0.0%	0.8%	0.8%
7	GP DEPRECIATION	2,507	2,184	63	219	0	21	20
8	TOTAL DEPRECIATION	23,811	20,753	595	2,080	0	196	187
	FY 2003							
9	INVESTMENT BASE	205,769	177,841	5,114	19,852	0	1,517	1,445
10	PERCENT	100%	86.4%	2.5%	9.6%	0.0%	0.7%	0.7%
11	NET INTEREST	12,057	10,463	299	1,126	0	87	83
12	PLANNED NET REVENUES	0	0	0	0	0	0	0
13	DEPRECIATION	22,931	19,945	573	2,037	0	192	184
14	PERCENT	100%	87.0%	2.5%	8.9%	0.0%	0.8%	0.8%
15	GP DEPRECIATION	3,167	2,755	79	281	0	27	25
16	TOTAL DEPRECIATION	26,098	22,700	652	2,318	0	219	209

SEGMENTATION OF TRANSMISSION REVENUE REQUIREMENT ($000)

	FY 2002	TOTAL	GI	NETWORK	SOUTH INTER	EAST INTER	UTIL DELIV	DSI	ANCILL SERV
1	INVESTMENT BASE	3,136,059	49,881	2,265,598	418,586	80,001	56,451	49,691	215,851
2	percent	100%	1.59%	72.24%	13.35%	2.55%	1.80%	1.58%	6.88%
3	Interest Credit from Facilities Sa	(752)					(376)	(376)	
4	NET INTEREST	177,060	2,816	127,914	23,633	4,517	3,187	2,806	12,187
5	NET REVENUES	0	0	0	0	0	0	0	0
6	DEPRECIATION	117,032	1,780	88,919	19,543	3,010	1,982	1,798	21,304
7	percent	100%	1.52%	75.98%	16.70%	2.57%	1.69%	1.54%	
8	TX GP DEPRECIATION	24,262	369	18,434	4,051	624	411	373	
9	subtotal	162,598	2,149	107,353	23,594	3,634	2,393	2,171	21,304
10	percent	100%	1.32%	66.02%	14.51%	2.23%	1.47%	1.34%	13.10%
11	REMAINING GP DEPR	19,136	253	12,633	2,777	428	282	256	2,507
12	TOTAL DEPR	181,734	2,402	119,986	26,371	4,062	2,675	2,427	23,811
1	DIRECT ASSIGNMENT:								
2	GENERATION INPUTS	71,664							71,664
3	COE/BOR TRANSMISSION	3,701		3,478			223		
4	STABILITY RESERVES	0							
5	ANCILLARY SERVICES O&M	20,643							20,643
6	LEASES	5,267		5,188			79		
7	GTAs	2,000		2,000					
8	TOTAL O&M DIRECT ASSIGN	27,910	0	7,188	0	0	79	0	20,643
9	3-YR AVG O&M: LINES	58,744	548	53,245	4,023	924	4	0	
10	3-YR AVG O&M: SUBS	43,866	751	28,828	10,145	215	2,504	1,423	
11	TOTAL 3-YR AVG	102,610							
12	SYS OP, SYS MNT, ENV	86,753							
13	DIRECT LINES O&M	49,666	463	45,018	3,401	781	3		
14	DIRECT SUBS O&M	37,087	635	24,373	8,577	182	2,117	1,203	
15	TOTAL DIRECT TRANS O&M	86,753	1,098	69,391	11,978	963	2,120	1,203	
16	TOTAL DIRECT O&M	107,396	1,098	69,391	11,978	963	2,120	1,203	20,643
17	OVERHEAD CATEGORIES	121,023	1,237	78,196	13,498	1,085	2,389	1,356	23,262
18	TOTAL O&M	235,686	2,335	154,775	25,476	2,048	4,588	2,559	43,905
19	STATION SERVICE	1,724	30	1,133	399	8	98	56	
20	RAS	231	0	0	231	0	0	0	
21	TOTAL INTERBUSINESS LINE	77,320	30	4,611	630	8	321	56	71,664

SEGMENTATION OF TRANSMISSION REVENUE REQUIREMENT ($000)

	FY 2003	TOTAL	GI	NETWORK	SOUTH INTER	EAST INTER	UTIL DELIV	DSI	ANCILL SERV
1	INVESTMENT BASE	3,206,660	48,224	2,359,217	400,961	76,598	56,001	49,506	216,153
2	percent	100%	1.50%	73.57%	12.50%	2.39%	1.75%	1.54%	6.74%
3		(750)					(375)	(375)	
4	NET INTEREST	178,865	2,690	131,595	22,365	4,273	3,124	2,761	12,057
5	NET REVENUES	0	0	0	0	0	0	0	0
	DEPRECIATION	122,121	1,799	93,720	19,684	3,026	2,039	1,853	22,931
6	percent	100%	1.47%	76.74%	16.12%	2.48%	1.67%	1.52%	
7	TX GP DEPRECIATION	25,416	374	19,505	4,097	630	424	386	
8	subtotal	147,537	2,173	113,225	23,781	3,656	2,463	2,239	22,931
9	percent	100%	1.47%	76.74%	16.12%	2.48%	1.67%	1.52%	15.54%
10	REMAINING GP DEPR	20,374	300	15,636	3,284	505	340	309	3,167
11	TOTAL DEPR	194,009	2,473	128,861	27,065	4,161	2,803	2,548	26,098
1	DIRECT ASSIGNMENT:								
2	GENERATION INPUTS	71,664							71,664
3	COE/BOR TRANSMISSION	3,684		3,458			226		
4	STABILITY RESERVES	0							
5	ANCILLARY SERVICES O&M	21,262							21,262
6	LEASES	5,267		5,188			79		
7	GTAs	2,000		2,000					
8	TOTAL O&M DIRECT ASSIGN	28,529	0	7,188	0	0	79	0	21,262
9	3-YR AVG O&M: LINES	58,744	548	53,245	4,023	924	4	0	
10	3-YR AVG O&M: SUBS	43,866	751	28,828	10,145	215	2,504	1,423	
11	TOTAL 3-YR AVG	102,610							
12	SYS OP, SYS MNT, ENV	89,544							
13	DIRECT LINES O&M	51,264	478	46,466	3,511	806	3	0	
14	DIRECT SUBS O&M	38,280	655	25,157	8,853	188	2,185	1,242	
15	TOTAL DIRECT TRANS O&M	89,544	1,133	71,623	12,364	994	2,188	1,242	
16	TOTAL DIRECT O&M	110,806	1,133	71,623	12,364	994	2,188	1,242	21,262
17	OVERHEAD CATEGORIES	111,737	1,143	72,225	12,468	1,002	2,206	1,252	21,441
18	TOTAL O&M	229,810	2,276	151,036	24,832	1,996	4,473	2,494	42,703
19	STATION SERVICE	1,724	30	1,133	399	8	98	56	
20	RAS	231	0	0	231	0	0	0	
21	TOTAL INTERBUSINESS LINE	77,303	30	4,591	630	8	324	56	71,664

BPA Transmission Plan
Allocation of General Plant Investment
($000)

			A	B	C	E	F	G	H
	FY 2002		**GENER INTEG**	**NETWORK**	**SOUTH INTER**	**EAST INTER**	**UTIL DELIV**	**DSI**	**ANCILL SERV**
1	NET TRANSMISSION PLANT	2,496,199	40,836	1,854,797	448,175	65,495	46,215	40,681	
2	PERCENT	100%	1.64%	74.30%	17.95%	2.62%	1.85%	1.63%	
3	TRANS GP: 353 and 397	332,756	5,444	247,254	59,744	8,731	6,161	5,423	
4	SUBTOTAL PLANT	3,033,874	46,280	2,102,051	507,919	74,226	52,376	46,104	204,918
5	PERCENT	100%	1.53%	69.29%	16.74%	2.45%	1.73%	1.52%	6.75%
6	REMAINING GEN PLANT	243,635	3,717	168,805	40,788	5,961	4,206	3,702	16,456
7	ACC REV BAL ADJ - Fiber	(12,599)	(116)	(5,258)	(1,270)	(186)	(131)	(115)	(5,523)
8	ACC REV BAL ADJ - 3AC	(128,851)			(128,851)				
9	INVESTMENT BASE	2,610,983	49,881	2,265,598	418,586	80,001	56,451	49,691	215,851
	FY 2003								
10	NET TRANSMISSION PLANT	2,565,815	39,709	1,942,641	433,515	63,073	46,113	40,764	
11	PERCENT	100%	1.55%	75.71%	16.90%	2.46%	1.80%	1.59%	
12	TRANS GP: 353 and 397	336,808	5,212	255,006	56,906	8,279	6,053	5,351	
13	SUBTOTAL PLANT	3,108,391	44,921	2,197,647	490,421	71,352	52,166	46,115	205,769
14	PERCENT	100%	1.45%	70.70%	15.78%	2.30%	1.68%	1.48%	6.62%
15	GENERAL PLANT	235,686	3,406	166,631	37,185	5,410	3,955	3,497	15,602
16	ACC REV BAL ADJ - Fiber	(11,901)	(103)	(5,061)	(1,129)	(164)	(120)	(106)	(5,218)
17	ACC REV BAL ADJ - 3AC	(125,516)			(125,516)				
18	INVESTMENT BASE	2,675,985	48,224	2,359,217	400,961	76,598	56,001	49,506	216,153

Transmission Accrual Revenues
Unearned Revenue Balances
($000)

Intertie Capacity Ownership

	Annual Write-Down	Unearned Balance	Average Unearned Balance
1999	3,335	137,188	
2000	3,335	133,853	
2001	3,335	130,518	
2002	3,335	127,183	128,851
2003	3,335	123,848	125,516

Fiber Optic Leases

	Beginning Balance	Annual Write-Down	Cumulative Write-Down	Unearned Balance	Average Unearned Balance
1999	3,104	235	235	2,869	
2000	14,354	685	920	13,434	
2001	14,563	696	1,616	12,947	
2002	14,563	696	2,312	12,251	12,599
2003	14,563	696	3,008	11,555	11,903

COE/BOR ANNUAL COSTS
($000)

		AVG 2002 INVEST	PERCENT	2002 O&M	AVG 2003 INVEST	PERCENT	2002 O&M
1	**BONNEVILLE**						
2	NETWORK	885	100%	13	885	100%	13
3	TOTAL	885	100%	13	885	100%	13
4	**COLUMBIA BASIN**						
5	NETWORK	42,963	97%	1,296	42,963	97%	1,300
6	DELIVERY	1,147	3%	35	1,147	3%	35
7	TOTAL	44,110	100%	1,331	44,110	100%	1,335
8	**HUNGRY HORSE**						
9	NETWORK	2,488	100%	46	2,488	100%	46
10	TOTAL	2,488	100%	46	2,488	100%	46
11	**MINIDOKA-PALISADES**						
12	NETWORK	1,281	76%	420	1,281	76%	434
13	DELIVERY	398	24%	131	398	24%	135
14	TOTAL	1,679	100%	551	1,679	100%	569
15	**NETWORK**			1,775			1,793
16	**DELIVERY**			166			170
17	**TOTAL TRANSMISSION**			1,941			1,963

	FY 2002				FY 2003			
	O&M	DEPR	INTEREST	TOTAL	O&M	DEPR	INTEREST	TOTAL
NETWORK	1,775	660	1,043	**3,478**	1,793	660	1,005	**3,458**
DELIVERY	166	21	36	**223**	170	21	35	**226**
TOTAL TRANSMISSION	1,941	681	1,079	**3,701**	1,963	681	1,040	**3,684**

COE/BOR ANNUAL COSTS
($000)

		2002 ADDTNS	ADDTNS: 1/2 YR DEPR	2002 DEPR INCR	TOTAL DEPR EXP	2002 ACCUM DEPR	INVESTMENT 9/30/02	2003 ADDTNS	ADDTNS: 1/2 YR DEPR	2003 DEPR INCR	TOTAL DEPR EXP	2003 ACCUM DEPR	INVESTMENT 9/30/03
1	**BONNEVILLE**												
2	NETWORK		0		0	885	885		0		0	885	885
3	TOTAL	0	0	0	0	885	885	0	0	0	0	885	885
4	**COLUMBIA BASIN**												
5	NETWORK		0	604	604	13,586	42,963		0	604	604	14,190	42,963
6	DELIVERY		0	16	16	362	1,147		0	16	16	378	1,147
7	TOTAL	0	0	620	620	13,948	44,110	0	0	620	620	14,568	44,110
8	**HUNGRY HORSE**												
9	NETWORK		0	30	30	997	2,488		0	30	30	1,027	2,488
10	TOTAL	0	0	30	30	997	2,488	0	0	30	30	1,027	2,488
11	**MINIDOKA-PALISADES**												
12	NETWORK		0	15	15	249	1,281		0	15	15	264	1,281
13	DELIVERY		0	5	5	79	398		0	5	5	84	398
14	TOTAL	0	0	20	20	328	1,679	0	0	20	20	348	1,679
15	TOTAL COE/USBR	0	0	670	670	16,158	49,162	0	0	670	670	16,828	49,162
16	**NETWORK**			660	649	15,717	47,617			660	649	16,366	47,617
17	**DELIVERY**			21	21	441	1,545			21	21	462	1,545
18	**TOTAL TRANSMISSION**			681	670	16,158	49,162			681	670	16,828	49,162
					avg acc d	**net plnt**	**interest**				**avg acc d**	**net plnt**	**interest**
					15,393	32,224	1,043				16,042	31,575	1,005
					431	1,114	36				452	1,093	35
					15,824	33,338	1,079				16,494	32,668	1,040

CHAPTER 3

TRANSMISSION EXPENSES

I. Introduction

This chapter compiles the expenses that are the basis for cost recovery in determination of transmission revenue requirements for the rate approval period.

II. Expenses

BPA used preliminary O&M expenses for the initial proposal. The final study will reflect the spending level process and decisions explained in Chapter 2 of the Study.

Inter-business line expenses, included in the initial rate proposal of BPA's wholesale power rate case, are the generation inputs for ancillary services and the COE and BOR costs of transmission and delivery facilities of those agencies.

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

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 - Projected Cash Balances / Interest Credit** for calculation of the interest credit on cash reserves.

Transmission O&M Programs
($000)

	1 **Operating Expenses**	**2002**	**2003**
2	Transmission G&A	22,200	23,800
3	Transmission Marketing and Scheduling	15,246	15,703
4	Transmission System Operations	30,996	32,106
5	Transmission System Maintenance	71,300	73,400
6	Transmission System Development	21,354	21,554
7	Support Services	11,890	12,246
8	TBL Services		
9	Environment	5,100	5,300
10	Administrative & Support Services	30,000	28,100
11	Between Business Line Expenses	77,320	77,303
12	CSRS Pension Expense	27,600	17,600
13	Total System Operation & Maintenance	313,006	307,113

PBL Revenue & Expense Forecast-- Ancillary & Reserve Services 2002-2006

	FY 2002 Gross Revenue	FY 2003 Gross Revenue
Federal Remedial Action Scheme	$231,470	$231,470
Generation Supplied Reactive	$25,000,008	$25,000,008
Station Service	$1,723,572	$1,723,572
Step-up Transformers	$0	$0
Regulating Reserve	$11,544,072	$11,544,072
Spinning Reserve	$17,559,876	$17,559,876
Non Spinning Reseve	$17,559,876	$17,559,876
COE/BOR Network/delivery Facilities	$3,701,004	$3,684,000
Total	**$77,319,878**	**$77,302,874**

Capitalization Adjustment
1997-2025

FY	Forecast per Repayment Model	Actual amounts	Capitalization Adjustment Balance		Rate Case Generation	Adjusted Generation	Transmission
1997	50,642	63,841	2,525,786	1.2606	36,744	**46,321**	**17,520**
1998	51,471	64,886	2,460,900		36,237	**45,682**	**19,204**
1999	52,240	65,855	2,395,044		36,680	**46,240**	**19,615**
2000	53,524	67,474	2,327,570		37,882	**47,755**	**19,719**
2001	54,571	68,794	2,258,776		38,070	**47,992**	**20,802**
2002	53,430	67,356	2,191,421		37,868	**47,738**	**19,618**
2003	53,705	67,702	2,123,718		37,702	**47,528**	**20,174**
2004	53,614	67,588	2,056,131		37,977	**47,875**	**19,713**
2005	51,486	64,905	1,991,226		35,530	**44,790**	**20,115**
2006		64,905	1,926,321			**44,790**	**20,115**
2007		64,905	1,861,416			**44,790**	**20,115**
2008		64,905	1,796,511			**44,790**	**20,115**
2009		64,905	1,731,606			**44,790**	**20,115**
2010		64,905	1,666,701			**44,790**	**20,115**
2011		64,905	1,601,796			**44,790**	**20,115**
2012		64,905	1,536,891			**44,790**	**20,115**
2013		64,905	1,471,986			**44,790**	**20,115**
2014		64,905	1,407,081			**44,790**	**20,115**
2015		64,905	1,342,176			**44,790**	**20,115**
2016		64,905	1,277,271			**44,790**	**20,115**
2017		64,905	1,212,366			**44,790**	**20,115**
2018		64,905	1,147,461			**44,790**	**20,115**
2019		64,905	1,082,556			**44,790**	**20,115**
2020		64,905	1,017,651			**44,790**	**20,115**
2021		64,905	952,746			**44,790**	**20,115**
2022		64,905	887,841			**44,790**	**20,115**
2023		64,905	822,936			**44,790**	**20,115**
2024		64,905	758,031			**44,790**	**20,115**
2025		64,905	693,126			**44,790**	**20,115**
2026		64,905	628,221			**44,790**	**20,115**
2027		64,905	563,316			**44,790**	**20,115**
2028		64,905	498,411			**44,790**	**20,115**
2029		64,905	433,506			**44,790**	**20,115**
2030		64,905	368,601			**44,790**	**20,115**
2031		64,905	303,696			**44,790**	**20,115**
2032		64,905	238,791			**44,790**	**20,115**
2033		64,905	173,886			**44,790**	**20,115**
2034		64,905	108,981			**44,790**	**20,115**
2035		64,905	44,076			**44,790**	**20,115**
2036		44,076	(0)				

CHAPTER 4

FCRTS INVESTMENT BASE

I. Introduction

This chapter documents the development of the FCRTS investment base by transmission segment and ancillary service for the rate approval period. The investment data are the source of depreciation calculations and provide the basis for the segmentation of net interest expense and planned net revenues.

II. Methodology

The FCRTS plant investment is compiled by segment and ancillary service. The historical investment information is prepared in the Segmentation Study (TR-02-FS-BPA-02). BPA general plant contains equipment associated previously with the generation function, which is now reflected in ancillary services. The general plant investment is identified according to different types of facilities (communications, supervisory control, buildings, etc.) by FERC Account. A direction of effort study was conducted to identify the portions of control facilities and communications equipment devoted to transmission and the individual ancillary services.

The historical plant investment data are from FY 1999. The Segmentation Study used FY 1998 data for lines and substations. The change in actual plant investment between 1998 and 1999 was prorated among the segments based on the forecast of 1999 line and substation additions, respectively. This method was also applied to General Plant for control and communication equipment for the distribution between transmission and the various ancillary services.

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 rate has been weighted by the groups that compose these facilities, e.g., Substations is

made up of land and land rights, structures and improvements, and station equipment. Both historical investment and forecasted additions are depreciated according to their group rate.

Projected investments and projected depreciation expenses are accumulated with historical amounts to provide projected cumulative investments and accumulated depreciation for each forecasted year. The investment base is calculated for each year of the rate period as an annual average.

III. Depreciation Study

In 1999, BPA contracted for a study recommending annual depreciation accrual rates and estimates of service life and net salvage characteristics for transmission and general plant. This study updated and replaced the prior 1987 study. BPA commissioned the new study for several reasons, including:

1. FERC recommends a depreciation study be conducted every 3 to 5 years and the most recent depreciation study was over 10 years old;
2. BPA's independent, external auditors, PriceWaterhouseCoopers requested a new study be performed;
3. Changes in the industry, such as restructuring, maintenance policies, and technology advances made it advisable to bring the depreciation study up to date.

The consultant, Gannett Fleming Valuation and Rate Consultants, Inc., a member of the Society for Depreciation Professionals, was selected to perform the depreciation study. PriceWaterhouseCoopers reviewed their qualifications and found them acceptable. A preliminary copy of the report was presented to BPA's transmission business line (BPA-TBL) operations and financial personnel for review of the findings. Additional information provided by BPA-TBL staff was incorporated into the final report, which was reviewed by PriceWaterhouseCooper. BPA management accepted the study and implemented recommendations, including incorporation into BPA's audited 1999 Financial Statements.

Where applicable, these results were used in the repayment model and initial proposal revenue requirements study for transmission and ancillary services rates.

FCRTS INVESTMENT BASE

FY 2002

($ IN THOUSANDS)

		A	B	C
		BALANCE-AS-OF		AVERAGE
		2002	2001	2002
1	COMPLETED PLANT			
2	GENER-INTEGRATION	62,361	61,695	62,028
3	NETWORK	3,437,595	3,272,153	3,354,874
4	SOUTHERN INTERTIE	689,410	684,448	686,929
5	EASTERN INERTIE	123,670	123,066	123,368
6	UTILITY DELIVERY	65,602	63,684	64,643
7	DSI DELIVERY	59,577	57,659	58,618
8	PLANT HELD FOR FUTURE USE	3,245	3,245	3,245
9	PLANT LEASED	189	189	189
10	GENERAL PLANT	1,021,392	954,050	987,721
11	TOTAL COMPLETED PLANT	5,463,041	5,220,189	5,341,615
12	ACCUMULATED DEPRECIATION			
13	GENER-INTEGRATION	22,082	20,302	21,192
14	NETWORK	1,544,536	1,455,617	1,500,077
15	SOUTHERN INTERTIE	248,525	228,982	238,754
16	EASTERN INERTIE	59,378	56,368	57,873
17	UTILITY DELIVERY	19,419	17,437	18,428
18	DSI DELIVERY	18,836	17,038	17,937
19	PLANT HELD FOR FUTURE USE	0	0	0
20	PLANT LEASED	189	189	189
21	GENERAL PLANT	443,681	378,979	411,330
22	TOTAL ACCUMULATED DEPRECIATION	2,356,646	2,174,912	2,265,780
23	NET PLANT INVESTMENT			
24	GENER-INTEGRATION	40,279	41,393	40,836
25	NETWORK	1,893,059	1,816,536	1,854,797
26	SOUTHERN INTERTIE	440,885	455,466	448,175
27	EASTERN INERTIE	64,292	66,698	65,495
28	UTILITY DELIVERY	46,183	46,247	46,215
29	DSI DELIVERY	40,741	40,621	40,681
30	PLANT HELD FOR FUTURE USE	3,245	3,245	3,245
31	PLANT LEASED	0	0	0
32	GENERAL PLANT	577,711	575,071	576,391
33	TOTAL NET PLANT INVESTMENT	3,106,395	3,045,277	3,075,835

FCRTS INVESTMENT BASE

($ IN THOUSANDS)

		A	B	C
		BALANCE-AS-OF		AVERAGE
		2003	2002	2003
1	COMPLETED PLANT			
2	GENER-INTEGRATION	63,020	62,361	62,691
3	NETWORK	3,630,478	3,437,595	3,534,037
4	SOUTHERN INTERTIE	694,354	689,410	691,882
5	EASTERN INERTIE	124,258	123,670	123,964
6	UTILITY DELIVERY	67,501	65,602	66,552
7	DSI DELIVERY	61,476	59,577	60,527
8	PLANT HELD FOR FUTURE USE	3,245	3,245	3,245
9	PLANT LEASED	189	189	189
10	GENERAL PLANT	1,079,680	1,021,392	1,050,536
11	TOTAL COMPLETED PLANT	5,724,201	5,463,041	5,593,623
12	ACCUMULATED DEPRECIATION			
13	GENER-INTEGRATION	23,881	22,082	22,982
14	NETWORK	1,638,256	1,544,536	1,591,396
15	SOUTHERN INTERTIE	268,209	248,525	258,367
16	EASTERN INERTIE	62,404	59,378	60,891
17	UTILITY DELIVERY	21,458	19,419	20,439
18	DSI DELIVERY	20,689	18,836	19,763
19	PLANT HELD FOR FUTURE USE	0	0	0
20	PLANT LEASED	189	189	189
21	GENERAL PLANT	512,402	443,681	478,042
22	TOTAL ACCUMULATED DEPRECIATION	2,547,488	2,356,646	2,452,069
23	NET PLANT INVESTMENT			
24	GENER-INTEGRATION	39,139	40,279	39,709
25	NETWORK	1,992,222	1,893,059	1,942,641
26	SOUTHERN INTERTIE	426,145	440,885	433,515
27	EASTERN INERTIE	61,854	64,292	63,073
28	UTILITY DELIVERY	46,043	46,183	46,113
29	DSI DELIVERY	40,787	40,741	40,764
30	PLANT HELD FOR FUTURE USE	3,245	3,245	3,245
31	PLANT LEASED	0	0	0
32	GENERAL PLANT	567,278	577,711	572,494
33	TOTAL NET PLANT INVESTMENT	3,176,713	3,106,395	3,141,554

INVESTMENT BASE FOR ANCILLARY SERVICES
FERC ACCOUNTS 353 and 397
($000)

	A	B	C	A	B	C
			AVERAGE			AVERAGE
	2002	2001	2002	2003	2002	2003
1 COMPLETED PLANT						
2 Sched, Syst Control, and Disp Serv	283,141	263,013	273,077	301,570	283,141	292,356
3 Reactive Supply and Volt Control	8,049	7,437	7,743	8,619	8,049	8,334
4 Regulation and Freq Response	29,962	27,165	28,564	32,494	29,962	31,228
5 Energy Imbalance	0	0	-	0	0	-
6 Op Reserve - Spinning Reserve	2,308	2,082	2,195	2,515	2,308	2,412
7 Op Reserve - Supplem Reserve	2,171	1,945	2,058	2,378	2,171	2,275
8 Transmission	501,685	469,193	485,439	526,974	501,685	514,330
9 Total Completed Plant	827,316	770,835	799,076	874,550	827,316	850,935
10 ACCUMULATED DEPRECIATION						
11 Sched, Syst Control, and Disp Serv	104,542	85,973	95,258	124,487	104,542	114,515
12 Reactive Supply and Volt Control	2,933	2,401	2,667	3,506	2,933	3,220
13 Regulation and Freq Response	10,357	8,496	9,427	12,394	10,357	11,376
14 Energy Imbalance	0	0	-	0	0	-
15 Op Reserve - Spinning Reserve	799	624	712	991	799	895
16 Op Reserve - Supplem Reserve	738	571	655	922	738	830
17 Transmission	164,814	140,552	152,683	190,230	164,814	177,522
18 Total Accumulated Depreciation	284,183	238,617	261,402	332,530	284,183	308,358
19 NET PLANT INVESTMENT						
20 Sched, Syst Control, and Disp Serv	178,599	177,040	177,819	177,083	178,599	177,841
21 Reactive Supply and Volt Control	5,116	5,036	5,076	5,113	5,116	5,114
22 Regulation and Freq Response	19,605	18,669	19,137	20,100	19,605	19,852
23 Energy Imbalance	0	0	0	0	0	0
24 Op Reserve - Spinning Reserve	1,509	1,458	1,483	1,524	1,509	1,517
25 Op Reserve - Supplem Reserve	1,433	1,374	1,403	1,456	1,433	1,445
26 Transmission	336,871	328,641	332,756	336,744	336,871	336,808
27 Total Net Plant Investment	543,133	532,218	537,674	542,020	543,133	542,577

ANCILLARY SERVICES
DEPRECIATION EXPENSE
($THOUSANDS)

	FERC ACCOUNT		1999	FERC ACCOUNT		2000	FERC ACCOUNT		2001	FERC ACCOUNT		2002	FERC ACCOUNT		2003
	353	397	TOTAL	353	397	TOTAL	353	397	TOTAL	353	397	TOTAL	353	397	TOTAL
Sched, Syst Control, and Disp Serv	4,319	9,490	13,809	5,615	9,832	15,447	6,822	10,256	17,078	7,976	10,593	18,569	9,071	10,874	19,945
Reactive Supply and Volt Control	154	245	399	183	259	442	212	276	488	242	290	532	271	302	573
Regulation and Freq Response	161	1,100	1,261	269	1,185	1,454	378	1,291	1,669	485	1,376	1,861	591	1,446	2,037
Energy Imbalance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Op Reserve - Spinning Reserve	84	30	114	107	30	137	127	30	157	145	30	175	162	30	192
Op Reserve - Supplem Reserve	84	22	106	107	22	129	127	22	149	145	22	167	162	22	184
Total Depreciation Expense	4,802	10,887	15,689	6,281	11,328	17,609	7,666	11,875	19,541	8,993	12,311	21,304	10,257	12,674	22,931

ANCILLARY SERVICES
ACCUMULATED DEPRECIATION
($THOUSANDS)

	FERC ACCOUNT		1998	FERC ACCOUNT		1999	FERC ACCOUNT		2000	FERC ACCOUNT		2001	FERC ACCOUNT		2002	FERC ACCOUNT		2003
	353	397	TOTAL	353	397	TOTAL	353	397	TOTAL	353	397	TOTAL	353	397	TOTAL	353	397	TOTAL
Sched, Syst Control, and Disp Serv	5,565	34,074	39,639	9,884	43,564	53,448	15,499	53,396	68,895	22,321	63,652	85,973	30,297	74,245	104,542	39,368	85,119	124,487
Reactive Supply and Volt Control	199	873	1,072	353	1,118	1,471	536	1,377	1,913	748	1,653	2,401	990	1,943	2,933	1,261	2,245	3,506
Regulation and Freq Response	208	3,904	4,112	369	5,004	5,373	638	6,189	6,827	1,016	7,480	8,496	1,501	8,856	10,357	2,092	10,302	12,394
Energy Imbalance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Op Reserve - Spinning Reserve	109	107	216	193	137	330	300	167	467	427	197	624	572	227	799	734	257	991
Op Reserve - Supplem Reserve	109	78	187	193	100	293	300	122	422	427	144	571	572	166	738	734	188	922
Total Accumulated Depreciation	6,190	39,036	45,226	10,992	49,923	60,915	17,273	61,251	78,524	24,939	73,126	98,065	33,932	85,437	119,369	44,189	98,111	142,300

ANCILLARY SERVICES
PLANT-IN-SERVICE
($THOUSANDS)

	FERC ACCOUNT		TOTAL	FERC ACCOUNT		1999	FERC ACCOUNT		2000	FERC ACCOUNT		2001	FERC ACCOUNT		2002	FERC ACCOUNT		2003
	353	397	1998	353	397	TOTAL	353	397	TOTAL	353	397	TOTAL	353	397	TOTAL	353	397	TOTAL
Sched, Syst Control, and Disp Serv	51,948	146,003	197,951	53,387	165,335	218,722	69,402	171,294	240,696	84,331	178,682	263,013	98,592	184,549	283,141	112,121	189,449	301,570
Reactive Supply and Volt Control	1,855	3,739	5,594	1,906	4,260	6,166	2,257	4,508	6,765	2,621	4,816	7,437	2,989	5,060	8,049	3,355	5,264	8,619
Regulation and Freq Response	1,942	16,729	18,671	1,996	19,161	21,157	3,329	20,651	23,980	4,667	22,498	27,165	5,997	23,965	29,962	7,304	25,190	32,494
Energy Imbalance			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Op Reserve - Spinning Reserve	1,013	458	1,471	1,041	514	1,555	1,322	514	1,836	1,568	514	2,082	1,794	514	2,308	2,001	514	2,515
Op Reserve - Supplem Reserve	1,015	334	1,349	1,043	375	1,418	1,324	375	1,699	1,570	375	1,945	1,796	375	2,171	2,003	375	2,378
Total Plant-in-Service	57,773	167,263	225,036	59,373	189,645	249,018	77,634	197,342	274,976	94,757	206,885	301,642	111,168	214,463	325,631	126,784	220,792	347,576

ANCILLARY SERVICES
PLANT ADDITIONS
($THOUSANDS)

	FERC ACCOUNT		1999	FERC ACCOUNT		2000	FERC ACCOUNT		2001	FERC ACCOUNT		2002	FERC ACCOUNT		2003
	353	397	TOTAL	353	397	TOTAL	353	397	TOTAL	353	397	TOTAL	353	397	TOTAL
Sched, Syst Control, and Disp Serv	1,439	19,332	20,771	16,015	5,959	21,974	14,929	7,388	22,317	14,261	5,867	20,128	13,529	4,900	18,429
Reactive Supply and Volt Control	51	521	572	351	248	599	364	308	672	368	244	612	366	204	570
Regulation and Freq Response	54	2,432	2,486	1,333	1,490	2,823	1,338	1,847	3,185	1,330	1,467	2,797	1,307	1,225	2,532
Energy Imbalance			0			0			0			0			0
Op Reserve - Spinning Reserve	28	56	84	281		281	246		246	226		226	207		207
Op Reserve - Supplem Reserve	28	41	69	281		281	246		246	226		226	207		207
Total Additions	1,600	22,382	23,982	18,261	7,697	25,958	17,123	9,543	26,666	16,411	7,578	23,989	15,616	6,329	21,945

BPA GENERAL PLANT
DEPRECIATION EXPENSE
($THOUSANDS)

		FERC ACCT	ANCILL SERV	TRANS	FY 1999 TOTAL	ANCILL SERV	TRANS	FY 2000 TOTAL	ANCILL SERV	TRANS	FY 2001 TOTAL	ANCILL SERV
1	LAND & LAND RIGHTS	389	0	98	98	0	98	98	0	98	98	0
2	STRUCTURES & IMPROVEMENTS	390	0	2,222	2,222	0	2,285	2,285	0	2,362	2,362	0
3	OFFICE FURNITURE & FIXTURES	391.1	0	67	67	0	67	67	0	91	91	0
4	DATA PROCESSING -EQUIPMENT	391.2	0	3,829	3,829	0	4,292	4,292	0	4,644	4,644	0
5	DATA PROCESSING -SOFTWARE	391.3	0	4,236	4,236	0	5,645	5,645	0	6,186	6,186	0
6	TRANSPORT EQUIPMENT	392.1	0	1,895	1,895	0	1,947	1,947	0	2,030	2,030	0
7	HELICOPTERS	392.2	0	157	157	0	167	167	0	183	183	0
8	AIRPLANES	392.3	0	123	123	0	133	133	0	149	149	0
9	STORES EQUIPMENT	393	0	73	73	0	89	89	0	114	114	0
10	TOOLS, SHOP & GARAGE EQUIPMENT	394	0	232	232	0	244	244	0	263	263	0
11	LAB EQUIPMENT	395	0	2,591	2,591	0	2,626	2,626	0	2,684	2,684	0
12	TEST FACILITIES	395.1	0	60	60	0	60	60	0	60	60	0
13	POWER OPERATED EQUIPMENT	396	0	1,308	1,308	0	1,349	1,349	0	1,416	1,416	0
14	COMMUNICATIONS EQUIPMENT	397	10,887	14,045	24,932	11,328	15,028	26,356	11,875	16,247	28,122	12,311
15	MISC EQUIPMENT	398	0	0	0	0	0	0	0	0	0	0
16	SUBTOTAL GENERAL PLANT		10,887	30,936	41,823	11,328	34,030	45,358	11,875	36,527	48,402	12,311
17	STATION EQUIPMENT	353	4,802	3,920	8,722	6,281	4,085	10,366	7,666	4,262	11,928	8,993
18	TOTAL GENERAL PLANT		15,689	34,856	50,545	17,609	38,115	55,724	19,541	40,789	60,330	21,304

BPA GENERAL PLANT
DEPRECIATION EXPENSE
($THOUSANDS)

		FERC ACCT	TRANS	FY 2002 TOTAL	ANCILL SERV	TRANS	FY 2003 TOTAL
1	LAND & LAND RIGHTS	389	98	98	0	98	98
2	STRUCTURES & IMPROVEMENTS	390	2,598	2,598	0	2,755	2,755
3	OFFICE FURNITURE & FIXTURES	391.1	114	114	0	137	137
4	DATA PROCESSING -EQUIPMENT	391.2	4,950	4,950	0	5,261	5,261
5	DATA PROCESSING -SOFTWARE	391.3	6,788	6,788	0	7,399	7,399
6	TRANSPORT EQUIPMENT	392.1	2,114	2,114	0	2,200	2,200
7	HELICOPTERS	392.2	199	199	0	216	216
8	AIRPLANES	392.3	166	166	0	182	182
9	STORES EQUIPMENT	393	140	140	0	166	166
10	TOOLS, SHOP & GARAGE EQUIPMENT	394	283	283	0	303	303
11	LAB EQUIPMENT	395	2,741	2,741	0	2,800	2,800
12	TEST FACILITIES	395.1	60	60	0	60	60
13	POWER OPERATED EQUIPMENT	396	1,483	1,483	0	1,552	1,552
14	COMMUNICATIONS EQUIPMENT	397	17,216	29,527	12,674	18,024	30,698
15	MISC EQUIPMENT	398	0	0	0	0	0
16	SUBTOTAL GENERAL PLANT		38,950	51,261	12,674	41,153	53,827
17	STATION EQUIPMENT	353	4,448	13,441	10,257	4,637	14,894
18	TOTAL GENERAL PLANT		43,398	64,702	22,931	45,790	68,721

BPA TRANSMISSION GENERAL PLANT
PROJECTED PLANT ADDITIONS

		FERC ACCT	FY 2000 ADDTNS	FY 2001 ADDTNS	FY 2002 ADDTNS	FY 2003 ADDTNS
1	LAND & LAND RIGHTS	389	0	0	0	0
2	STRUCTURES & IMPROVEMENTS	390	3,582	4,358	13,327	8,864
3	OFFICE FURNITURE & FIXTURES	391.1	8	450	449	454
4	DATA PROCESSING -EQUIPMENT	391.2	3,290	2,507	2,182	2,211
5	DATA PROCESSING -SOFTWARE	391.3	7,921	3,041	3,380	3,437
6	TRANSPORT EQUIPMENT	392.1	448	718	725	741
7	HELICOPTERS	392.2	300	481	486	496
8	AIRPLANES	392.3	300	481	486	496
9	STORES EQUIPMENT	393	448	718	725	741
10	TOOLS, SHOP & GARAGE EQUIPMENT	394	300	481	486	496
11	LAB EQUIPMENT	395	601	963	971	991
12	TEST FACILITIES	395.1	0	0	0	0
13	POWER OPERATED EQUIPMENT	396	601	963	971	991
14	COMMUNICATIONS EQUIPMENT	397	24,829	30,784	24,444	20,417
15	MISC EQUIPMENT	398	0	0	0	0
16	SUBTOTAL GENERAL PLANT		42,628	45,945	48,632	40,335
17	STATION EQUIPMENT	353	20,296	19,318	18,710	17,953
18	TOTAL GENERAL PLANT		62,924	65,263	67,342	58,288

BPA GENERAL PLANT
CUMULATIVE PLANT INVESTMENT
($THOUSANDS)

		FERC ACCT	ANCILL SERV	TRANS	FY 1999 TOTAL	ANCILL SERV	TRANS	FY 2000 TOTAL	ANCILL SERV	TRANS	FY 2001 TOTAL	ANCILL SERV
1	LAND & LAND RIGHTS	389		7,294	7,294		7,294	7,294		7,294	7,294	
2	STRUCTURES & IMPROVEMENTS	390	0	125,509	125,509	0	129,091	129,091	0	133,449	133,449	0
3	OFFICE FURNITURE & FIXTURES	391.1		1,291	1,291		1,299	1,299		1,749	1,749	
4	DATA PROCESSING -EQUIPMENT	391.2		27,255	27,255		30,545	30,545		33,052	33,052	
5	DATA PROCESSING -SOFTWARE	391.3		23,812	23,812		31,733	31,733		34,774	34,774	
6	TRANSPORT EQUIPMENT	392.1		16,379	16,379		16,827	16,827		17,545	17,545	
7	HELICOPTERS	392.2		4,659	4,659		4,959	4,959		5,440	5,440	
8	AIRPLANES	392.3		3,665	3,665		3,965	3,965		4,446	4,446	
9	STORES EQUIPMENT	393		2,043	2,043		2,491	2,491		3,209	3,209	
10	TOOLS, SHOP & GARAGE EQUIPMENT	394		5,740	5,740		6,040	6,040		6,521	6,521	
11	LAB EQUIPMENT	395		43,613	43,613		44,214	44,214		45,177	45,177	
12	TEST FACILITIES	395.1		3,512	3,512		3,512	3,512		3,512	3,512	
13	POWER OPERATED EQUIPMENT	396		18,928	18,928		19,529	19,529		20,492	20,492	
14	COMMUNICATIONS EQUIPMENT	397	189,645	244,684	434,329	197,342	261,816	459,158	206,885	283,057	489,942	214,463
15	MISC EQUIPMENT	398		4	4		4	4		4	4	
16	SUBTOTAL GENERAL PLANT		189,645	528,388	718,033	197,342	563,319	760,661	206,885	599,721	806,606	214,463
17	STATION EQUIPMENT	353	59,373	48,457	107,830	77,634	50,492	128,126	94,757	52,687	147,444	111,168
18	TOTAL GENERAL PLANT		249,018	576,845	825,863	274,976	613,811	888,787	301,642	652,408	954,050	325,631

BPA GENERAL PLANT
CUMULATIVE PLANT INVESTMENT
($THOUSANDS)

		FERC ACCT	TRANS	FY 2002 TOTAL	ANCILL SERV	TRANS	FY 2003 TOTAL
1	LAND & LAND RIGHTS	389	7,294	7,294		7,294	7,294
2	STRUCTURES & IMPROVEMENTS	390	146,776	146,776	0	155,640	155,640
3	OFFICE FURNITURE & FIXTURES	391.1	2,198	2,198		2,652	2,652
4	DATA PROCESSING -EQUIPMENT	391.2	35,234	35,234		37,445	37,445
5	DATA PROCESSING -SOFTWARE	391.3	38,154	38,154		41,591	41,591
6	TRANSPORT EQUIPMENT	392.1	18,270	18,270		19,011	19,011
7	HELICOPTERS	392.2	5,926	5,926		6,422	6,422
8	AIRPLANES	392.3	4,932	4,932		5,428	5,428
9	STORES EQUIPMENT	393	3,934	3,934		4,675	4,675
10	TOOLS, SHOP & GARAGE EQUIPMENT	394	7,007	7,007		7,503	7,503
11	LAB EQUIPMENT	395	46,148	46,148		47,139	47,139
12	TEST FACILITIES	395.1	3,512	3,512		3,512	3,512
13	POWER OPERATED EQUIPMENT	396	21,463	21,463		22,454	22,454
14	COMMUNICATIONS EQUIPMENT	397	299,923	514,386	220,792	314,011	534,803
15	MISC EQUIPMENT	398	4	4		4	4
16	SUBTOTAL GENERAL PLANT		640,775	855,238	220,792	674,781	895,573
17	STATION EQUIPMENT	353	54,986	166,154	126,784	57,323	184,107
18	TOTAL GENERAL PLANT		695,761	1,021,392	347,576	732,104	1,079,680

ACCUMULATED DEPRECIATION SUMMARY FOR BPA TRANSMISSION PLANT
($000)

	1998	1999	2000	2001	2002	2003
1 GENER-INTEGRATION	15,078	16,801	18,542	20,302	22,082	23,881
2 NETWORK	1,210,266	1,289,343	1,370,868	1,455,617	1,544,536	1,638,256
3 SOUTHERN INTERTIE	171,243	190,345	209,587	228,982	248,525	268,209
4 EASTERN INERTIE	47,432	50,399	53,375	56,368	59,378	62,404
5 UTILITY DELIVERY	9,579	12,318	15,071	17,437	19,419	21,458
6 DSI DELIVERY	9,545	12,214	14,832	17,038	18,836	20,689
7 PLANT LEASED	179	183	187	189	189	189
8 GENERAL PLANT	212,380	262,925	318,649	378,979	443,681	512,402
9 TOTAL	1,675,702	1,834,528	2,001,111	2,174,912	2,356,646	2,547,488

Transmission Plant Depreciation
($000)

	A 1998 ACCUM DEPREC	B 1998 PLANT INVEST	C 1999 PLANT INVEST	D 1999 DEPREC EXPEN	E 1999 ACCUM DEPREC	F 2000 PLANT INVEST	G 2000 DEPREC EXPEN	H 2000 ACCUM DEPREC	I 2001 PLANT INVEST	J 2001 DEPREC EXPEN	K 2001 ACCUM DEPREC
1 LINES:											
2 GENER-INTEGRATION	10,383	16,025	16,025	365	10,748	16,158	367	11,115	16,282	370	11,485
3 NETWORK	1,070,296	1,651,942	1,661,089	37,769	1,108,065	1,696,832	38,280	1,146,345	1,760,648	39,415	1,185,760
4 SOUTHERN INTERTIE	74,271	197,378	197,899	4,506	78,777	199,516	4,531	83,308	201,053	4,566	87,874
5 EASTERN INERTIE	41,637	97,890	97,890	2,232	43,869	98,223	2,236	46,105	98,533	2,243	48,348
6 UTILITY DELIVERY	20	31	61	1	21	457	6	27	827	15	42
7 DSI DELIVERY	0	0	30	0	0	426	5	5	796	14	19
8 PLANT LEASED	175	185	185	4	179	185	4	183	185	2	185
9 TOTAL LINES	1,196,782	1,963,451	1,973,179	44,877	1,241,659	2,011,797	45,429	1,287,088	2,078,324	46,625	1,333,713
10 SUBSTATIONS:											
11 GENER-INTEGRATION	4,695	43,821	44,384	1,358	6,053	44,860	1,374	7,427	45,413	1,390	8,817
12 NETWORK	139,970	1,306,496	1,375,824	41,308	181,278	1,432,291	43,245	224,523	1,511,505	45,334	269,857
13 SOUTHERN INTERTIE	96,972	472,127	475,686	14,596	111,568	479,544	14,711	126,279	483,395	14,829	141,108
14 EASTERN INERTIE	5,795	23,866	23,866	735	6,530	24,200	740	7,270	24,533	750	8,020
15 UTILITY DELIVERY	9,559	89,220	88,545	2,738	12,297	89,805	2,747	15,044	62,857	2,351	17,395
16 DSI DELIVERY	9,545	89,089	84,223	2,669	12,214	85,483	2,613	14,827	56,863	2,192	17,019
17 PLANT LEASED	4	4	4	0	4	4	0	4	4	0	4
18 TOTAL SUBSTATIONS	266,540	2,024,623	2,092,532	63,404	329,944	2,156,187	65,430	395,374	2,184,570	66,846	462,220

Transmission Plant Depreciation
($000)

	L 2002 PLANT INVEST	M 2002 DEPREC EXPEN	N 2002 ACCUM DEPREC	O 2003 PLANT INVEST	P 2003 DEPREC EXPEN	Q 2003 ACCUM DEPREC
1 LINES:						
2 GENER-INTEGRATION	16,398	373	11,858	16,511	375	12,233
3 NETWORK	1,842,076	41,071	1,226,831	1,939,962	43,115	1,269,946
4 SOUTHERN INTERTIE	202,494	4,600	92,474	203,938	4,633	97,107
5 EASTERN INERTIE	98,822	2,250	50,598	99,104	2,256	52,854
6 UTILITY DELIVERY	1,231	23	65	1,627	33	98
7 DSI DELIVERY	1,200	23	42	1,596	32	74
8 PLANT LEASED	185	0	185	185	0	185
9 TOTAL LINES	2,162,406	48,340	1,382,053	2,262,923	50,444	1,432,497
10 SUBSTATIONS:						
11 GENER-INTEGRATION	45,963	1,407	10,224	46,509	1,424	11,648
12 NETWORK	1,595,519	47,848	317,705	1,690,516	50,605	368,310
13 SOUTHERN INTERTIE	486,916	14,943	156,051	490,416	15,051	171,102
14 EASTERN INERTIE	24,848	760	8,780	25,154	770	9,550
15 UTILITY DELIVERY	64,371	1,959	19,354	65,874	2,006	21,360
16 DSI DELIVERY	58,377	1,775	18,794	59,880	1,821	20,615
17 PLANT LEASED	4	0	4	4	0	4
18 TOTAL SUBSTATIONS	2,275,998	68,692	530,912	2,378,353	71,677	602,589

ANNUAL ACCRUAL RATE WEIGHTINGS

DESCRIPTION	FERC ACCT	A INVESTMENT	B ANNUAL ACCRUAL	C WTD RATE (B/A)
SUBSTATIONS:				
MISC INTANGIBLE PLANT	303	8,237	197	
LAND & LAND RIGHTS	350	12,230	164	
STRUCTURES & IMPROVEMENTS	352	215,330	3,815	
STATION EQUIPMENT	353	1,818,227	59,132	
TOTAL SUBSTATIONS		2,054,024	63,308	**3.08%**
LINES:				
LAND & LAND RIGHTS	350	109,044	1,462	
TOWERS & FIXTURES	354	768,159	15,074	
POLES & FIXTURES	355	94,945	3,322	
OVERHEAD CONDUCTORS	356	890,135	23,160	
UNDERGROUND CONDUCTORS	358	9,109	361	
ROADS & TRAILS	359	81,653	1,102	
TOTAL LINES		1,953,045	44,481	**2.28%**
TOTAL TRANSMISSION PLANT		4,007,069		
Acct 353 subset for Ancillary Services				
METERING	353	8,343	290	
CONTROL	353	60,337	5,266	
TOTAL FOR 353 "GENERAL PLANT"		68,680	5,556	**8.09%**

BONNEVILLE POWER ADMINISTRATION

TABLE 2. ESTIMATED SURVIVOR CURVE, NET SALVAGE, ORIGINAL COST, BOOK RESERVE AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO ELECTRIC PLANT AT SEPTEMBER 30, 1998
(AVERAGE SERVICE LIFE PROCEDURE, REMAINING LIFE METHOD AND GENERAL PLANT AMORTIZATION)

	ACCOUNT (1)	SURVIVOR CURVE (2)	NET SALVAGE (3)	ORIGINAL COST (4)	BOOK RESERVE (5)	FUTURE ACCRUALS (6)	ANNUAL ACCRUAL AMOUNT (7)	COMPOSITE REMAINING LIFE (8)	ANNUAL ACCRUAL RATE PERCENT (9)=(7)/(4)
303.00	MISCELLANEOUS INTANGIBLE PLANT	40-SQ	0	8,236,630.00	929,369	7,307,261	196,769	37.1	2.39
	TRANSMISSION PLANT								
350.10	LAND RIGHTS	75-R4	0	119,809,209.00	32,010,405	87,798,804	1,625,802	54.0	1.36
352.00	STRUCTURES & IMPROVEMENTS	60-R2.5	(5)	215,330,468.00	42,399,313	183,697,681	3,814,515	48.2	1.77
	STATION EQUIPMENT								
353.90	1970 & PRIOR	39-S0	(10)	209,802,762.40	122,345,517	108,437,524	6,215,459	17.4	2.96
353.90	1971 & SUBSEQUENT	34-R2.5	(10)	1,591,912,569.60	422,472,980	1,328,630,848	52,333,654	25.4	3.29
	TOTAL ACCOUNT 353.90			1,801,715,332.00	544,818,497	1,437,068,372	58,549,113	24.5	3.25
353.91	SUBSTATIONS ON CUSTOMER'S PREMISES	28-R1.5	(10)	9,911,168.00	4,211,481	6,690,802	401,223	16.7	4.05
353.92	PORTABLE PROPERTY (AT SUBSTATIONS)	40-SQ	(10)	6,599,936.00	2,254,730	5,005,202	182,261	27.5	2.76
353.93	METERING STATION	32-R0.5	(10)	8,343,167.00	1,833,263	7,344,221	290,385	25.3	3.48
353.94	CONTROL EQUIPMENT	13-R2.5	(10)	60,337,059.00	24,438,796	41,931,970	5,265,864	8.0	8.73
	TOTAL ACCOUNT 353			1,886,906,660.00	577,556,767	1,498,040,567	64,688,846		
354.00	TOWERS & FIXTURES	65-R3	(25)	768,159,095.00	285,403,681	674,795,195	15,074,229	44.8	1.96
355.00	POLES & FIXTURES	50-R2.5	(70)	94,944,795.00	51,072,021	110,334,132	3,321,844	33.2	3.50
356.00	CONDUCTOR AND CLEARING ROW	50-R4	(25)	890,135,148.00	424,893,851	687,775,093	23,159,769	29.7	2.60
358.00	UNDERGROUND CONDUCTOR AND DEVICES	30-S3	(10)	9,109,080.00	5,687,629	4,332,358	361,291	12.0	3.97
359.00	ROADS AND TRAILS	75-R4	0	81,653,425.00	16,327,204	65,326,221	1,102,276	59.3	1.35
	TOTAL TRANSMISSION PLANT			4,066,047,880.00	1,435,350,871	3,312,100,051	113,148,572		
	GENERAL PLANT								
389.00	LAND AND LAND RIGHTS	75-R4	0	11,524,158.00	1,090,376	10,433,782	154,506	67.5	1.34
390.00	STRUCTURES AND IMPROVEMENTS	60-R2	(5)	123,247,365.00	20,270,359	109,139,380	2,176,541	50.1	1.77
	OFFICE FURNITURE & EQUIPMENT								
391.10	OFFICE FURNITURE	20-SQ	0	3,381,638.00	1,224,192	2,157,446	175,104	12.3	5.18
391.20	DATA PROCESSING	5-SQ	0	50,279,496.00	32,321,895	17,957,602	7,063,264	2.5	14.05
391.30	SOFTWARE	5-SQ	0	32,852,321.00	12,815,144	20,037,177	5,845,074	3.4	17.79
	TOTAL ACCOUNT 391			86,513,455.00	46,361,231	40,152,225	13,083,442		

BONNEVILLE POWER ADMINISTRATION
TABLE 2. ESTIMATED SURVIVOR CURVE, NET SALVAGE, ORIGINAL COST, BOOK RESERVE AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO ELECTRIC PLANT AT SEPTEMBER 30, 1998
(AVERAGE SERVICE LIFE PROCEDURE, REMAINING LIFE METHOD AND GENERAL PLANT AMORTIZATION)

	ACCOUNT (1)	SURVIVOR CURVE (2)	NET SALVAGE (3)	ORIGINAL COST (4)	BOOK RESERVE (5)	FUTURE ACCRUALS (6)	ANNUAL ACCRUAL AMOUNT (7)	COMPOSITE REMAINING LIFE (8)	ANNUAL ACCRUAL RATE PERCENT (9)=(7)/(4)
	TRANSPORTATION EQUIPMENT								
392.10	ROLLING STOCK	10-L3	0	17,580,694.00	9,920,138	7,660,556	2,034,591	3.8	11.57
392.20	HELICOPTERS	15-SQ	50	5,715,565.00	459,142	2,398,642	192,122	12.5	3.36
392.30	AIRPLANES	15-SQ	50	3,664,706.00	308,578	1,523,777	123,297	12.4	3.36
	TOTAL ACCOUNT 392			26,960,965.00	10,687,858	11,582,975	2,350,010		
393.00	STORES EQUIPMENT	30-SQ	0	2,072,757.00	541,943	1,530,814	73,860	20.7	3.56
394.00	TOOLS, SHOP, & GARAGE EQUIPMENT	25-SQ	0	5,788,645.00	988,536	4,800,109	233,864	20.5	4.04
	LABORATORY EQUIPMENT								
395.00	PORTABLE & FIXED	15-SQ	0	43,575,218.00	14,201,913	29,373,035	2,586,893	11.4	5.94
395.10	TEST FACILITIES	15-SQ	0	3,506,642.00	3,334,318	172,324	59,761	2.9	1.70
	TOTAL ACCOUNT 395			47,081,860.00	17,536,231	29,545,359	2,646,654		
396.00	POWER OPERATED EQUIPMENT	15-L2	0	18,323,191.00	7,906,615	10,416,576	1,265,979	8.2	6.91
	COMMUNICATION EQUIPMENT								
397.90	PORTABLE	15-SQ	0	17,188,894.00	6,520,759	10,668,134	1,124,502	9.5	6.54
397.91	SUBSTATIONS	15-SQ	0	147,526,465.00	57,262,283	90,264,182	6,811,065	10.2	5.97
397.92	TRANS LINE	40-S4	0	64,461,274.00	1,483,181	62,978,093	1,612,360	39.1	2.50
397.93	JOINT FACILITY	15-SQ	0	733,528.00	71,805	661,723	48,361	13.7	6.59
397.94	MICROWAVE RADIO	15-SQ	0	155,064,530.00	68,519,297	86,545,233	9,335,570	9.3	6.02
	TOTAL ACCOUNT 397			384,974,691.00	133,857,325	251,117,365	20,931,858		5.74
398.00	MISCELLANEOUS EQUIPMENT	15-SQ	0	3,988.00	2,110	1,878	278	6.8	6.97
	TOTAL GENERAL PLANT			706,491,075.00	239,242,584	468,720,463	42,916,992		
	NONDEPRECIABLE PLANT								
350.00	LAND			16,882,157.00					
	ACCOUNTS NOT STUDIED			1,772,487.00					
	TOTAL ELECTRIC PLANT			4,799,430,229.00	1,675,522,824	3,788,127,775	156,262,333		

BONNEVILLE POWER ADMINISTRATION
PROJECTED TRANSMISSION PLANT INVESTMENT
($ IN THOUSANDS)

	A TOTAL 1998 INVEST	B 1999 ADDITIONS	C TOTAL 1999 INVEST	D 2000 ADDITIONS	E TOTAL 2000 INVEST	F 2001 ADDITIONS	G TOTAL 2001 INVEST	H 2002 ADDITIONS	I TOTAL 2002 INVEST	J 2003 ADDITIONS	K TOTAL 2003 INVEST
1 GENER-INTEGRATION	59,846	563	60,409	609	61,018	677	61,695	666	62,361	659	63,020
2 NETWORK	2,958,438	78,475	3,036,913	92,210	3,129,123	143,030	3,272,153	165,442	3,437,595	192,883	3,630,478
3 SOUTHERN INTERTIE	669,505	4,080	673,585	5,475	679,060	5,388	684,448	4,962	689,410	4,944	694,354
4 EASTERN INERTIE	121,756	0	121,756	667	122,423	643	123,066	604	123,670	588	124,258
5 UTILITY DELIVERY	89,251	(645)	88,606	1,656	90,262	(26,578)	63,684	1,918	65,602	1,899	67,501
6 DSI DELIVERY	89,089	(4,836)	84,253	1,656	85,909	(28,250)	57,659	1,918	59,577	1,899	61,476
7 PLANT HELD	3,245	0	3,245	0	3,245	0	3,245	0	3,245	0	3,245
8 PLANT LEASED	189	0	189	0	189	0	189	0	189	0	189
9 GENERAL PLANT	789,237	36,626	825,863	62,924	888,787	65,263	954,050	67,342	1,021,392	58,288	1,079,680
# TOTAL BPA	4,780,556	114,263	4,894,819	165,197	5,060,016	160,173	5,220,189	242,852	5,463,041	261,160	5,724,201
			4,891,385								

BONNEVILLE POWER ADMINISTRATION
PLANT INVESTMENT ADDITIONS
($ IN THOUSANDS)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
				TOTAL				TOTAL				TOTAL				TOTAL				TOTAL
			GEN	1999			GEN	2000			GEN	2001			GEN	2002			GEN	2003
	LINES	SUBS	PLANT	ADDITIONS	LINES	SUBS	PLANT	ADDITIONS	LINES	SUBS	PLANT	ADDITIONS	LINES	SUBS	PLANT	ADDITIONS	LINES	SUBS	PLANT	ADDITIONS
1 GENER-INTEGRATION	0	563		563	133	476		609	124	553		677	116	550		666	113	546		659
2 NETWORK	9,147	69,328		78,475	35,743	56,467		92,210	63,816	79,214		143,030	81,428	84,014		165,442	97,886	94,997		192,883
3 SOUTHERN INTERTIE	521	3,559		4,080	1,617	3,858		5,475	1,537	3,851		5,388	1,441	3,521		4,962	1,444	3,500		4,944
4 EASTERN INERTIE	0	0		0	333	334		667	310	333		643	289	315		604	282	306		588
5 UTILITY DELIVERY	30	(675)		(645)	396	1,260		1,656	370	(26,948)		(26,578)	404	1,514		1,918	396	1,503		1,899
6 DSI DELIVERY	30	(4,866)		(4,836)	396	1,260		1,656	370	(28,620)		(28,250)	404	1,514		1,918	396	1,503		1,899
7 PLANT HELD				0				0				0				0				0
8 PLANT LEASED				0				0				0				0				0
9 GENERAL PLANT			36,626	36,626			62,924	62,924			65,263	65,263			67,342	67,342			58,288	58,288
10 TOTAL BPA	9,728	67,909	36,626	114,263	38,618	63,655	62,924	165,197	66,527	28,383	65,263	160,173	84,082	91,428	67,342	242,852	100,517	102,355	58,288	261,160
P-I-S for Sold Facilities:																				
UTILITY DELIVERY		(2,148)								(28,402)										
DSI DELIVERY		(6,339)								(30,074)										

SEGMENTED BPA PLANT INVESTMENT 9/30/98
AND ACCUMULATED DEPRECIATION ALLOCATION
($ IN THOUSANDS)

	A	B	C	E	F	G	H	I	J	K	L	M
	GENER INTEG	NETWORK	SOUTH INTER	EAST INTER	UTIL DELIV	DSI	MTRNG AND GN PLNT	CONTROL EQUIP	PLANT LEASED	EMRGCY SPRS & PT SBS	OTHR PLNT	TOTAL 9.30.95
1. SUBSTATIONS	43,361	1,292,779	470,554	23,866	88,283	88,154	37,009	60,337	4	18,103		2,122,450
2. METERING STATIONS							8,332					8,332
3. SUB TOTAL	43,361	1,292,779	470,554	23,866	88,283	88,154	45,341	60,337	4	18,103		2,130,782
4. EMRGNCY SPARES & PORT SUBS 1/	460	13,717	1,573	0	937	935	481			(18,103)		0
5. TOTAL SUBSTATIONS	43,821	1,306,496	472,127	23,866	89,220	89,089	45,822	60,337	4			2,130,782
6. ACCUMULATED DEPRECIATION	(4,695)	(139,970)	(96,972)	(5,795)	(9,559)	(9,545)	(4,909)	(6,464)	(4)			(277,913)
7. NET SUBSTATIONS	39,126	1,166,526	375,155	18,071	79,661	79,544	40,913	53,873	0			1,852,869
8. LINES (INCL LEASD/OTHERS)	16,025	1,651,942	197,378	97,890	31	0			185			1,963,451
9. ACCUMULATED DEPRECIATION	(10,383)	(1,070,296)	(74,271)	(41,637)	(20)	0			(175)			(1,196,782)
10. NET LINES	5,642	581,646	123,107	56,253	11	0			10			766,669
11. GENERAL PLANT							683,078					683,078
12. ACCUMULATED DEPRECIATION							(201,007)					(201,007)
13. NET GENERAL PLANT							239,268					239,268
14. OTHER PHYSICAL PLANT (LAND) 2/											39	39
15. PLANT FOR FUTURE USE (LAND)											3,245	3,245
16. TOTAL COMPLETED PLANT	59,846	2,958,438	669,505	121,756	89,251	89,089	728,900	60,337	189	0	3,284	4,780,595
17. TOTAL BPA COMPLETED PLANT 3/	59,846	2,958,438	669,505	121,756	89,251	89,089	728,900	60,337	189		3,245	4,780,556
18. ACCUMULATED DEPRECIATION	(15,078)	(1,210,266)	(171,243)	(47,432)	(9,579)	(9,545)	(205,916)	(6,464)	(179)		0	(1,675,702)
19. NET COMPLETED PLANT	44,768	1,748,172	498,262	74,324	79,672	79,544	522,984	53,873	10		3,245	3,104,854

1/ ALLOCATED TO SEGMENTS BY SUBSTATION INVESTMENT.
2/ NON-DEPRECIABLE LAND.
3/ DOES NOT INCLUDE NON-DEPRECIABLE LAND.

ADJUSTMENT FOR FY 1999 ACTUAL PLANT DATA
($000)

SEGMENTED LINES AND SUBSTATIONS PLANT

		1999 PROJ'D PLANT INVEST	1999 PROJ'D PLANT ADDTNS	ADJ TO ADDTNS	1999 ADJ ACTUAL PLANT INVEST
1	LINES:				
2	GENER-INTEGRATION	16,025	0	0	16,025
3	NETWORK	1,670,773	18,831	(9,684)	1,661,089
4	SOUTHERN INTERTIE	198,451	1,073	(552)	197,899
5	EASTERN INERTIE	97,890	0	0	97,890
6	UTILITY DELIVERY	92	61	(31)	61
7	DSI DELIVERY	61	61	(31)	30
8	PLANT LEASED	185			185
9	TOTAL LINES	1,983,477	20,026	(10,298)	1,973,179
10	ACTUAL INVESTMENT	1,973,179			
11	SUBSTATIONS:				
12	GENER-INTEGRATION	44,204	383	180	44,384
13	NETWORK	1,353,690	47,194	22,134	1,375,824
14	SOUTHERN INTERTIE	474,550	2,423	1,136	475,686
15	EASTERN INERTIE	23,866	0	0	23,866
16	UTILITY DELIVERY 1/	90,223	1,003	470	88,545
17	DSI DELIVERY 2/	90,092	1,003	470	84,223
18	PLANT LEASED/GP	37,494	0	0	37,494
19	TOTAL SUBSTATIONS	2,114,119	52,006	24,390	2,130,022
20	ACTUAL INVESTMENT	2,138,509			

Sold Delivery Facilities P-I-S:

1/ (2,148)

2/ (6,339)

GENERAL PLANT: CONTROL AND COMMUNICATIONS EQUIPMENT INVESTMENT

		Proj'd 1999 FERC ACCOUNT		ADJ'D 1999 FERC ACCOUNT		ACTUAL 1998 FERC ACCOUNT		ADJ 1999 ADDTNS FERC ACCOUNT	
		353	397	353	397	353	397	353	397
21	Sched, Syst Control, and Disp Serv	51,948	147,432	53,387	165,335	51,948	146,003	1,439	19,332
22	Reactive Supply and Volt Control	1,855	3,799	1,906	4,260	1,855	3,739	51	521
23	Regulation and Freq Response	1,942	17,086	1,996	19,161	1,942	16,729	54	2,432
24	Energy Imbalance	0	0	0	0			0	0
25	Op Reserve - Spinning Reserve	1,013	458	1,041	514	1,013	458	28	56
26	Op Reserve - Supplem Reserve	1,015	334	1,043	375	1,015	334	28	41
27	Transmission	2,485	218,189	2,554	244,684	2,485	214,290	69	30,394
28	Total Plant-in-Service	60,258	387,298	61,927	434,329	60,258	381,553	1,669	52,776

353=CONTROL ONLY

MONTANA INTERTIE
GARRISON SUBSTATION

	YEAR	NVESTMEN	LIFE	ANNUAL EXPENSE	AGE	\CCUM DEI
	1984	23674	59	401	14.5	5815
	1985	-10424	59	-177	13.5	-2390
	1987	7855	59	133	11.5	1530
	1988	-1588	59	-27	10.5	-284
	1990	173	59	3	8.5	26
	1991	807	59	14	7.5	105
	1993	545	59	9	5.5	50
	1994	140	59	2	4.5	9
	1997	1331	59	23	1.5	35
TOTAL	1998	22513				4896

MONTANA INTERTIE
COMMUNICATION EQUIPMENT FOR MONTANA INTERTIE

	YEAR	NVESTMEN	LIFE	ANNUAL EXPENSE	AGE	\CCUM DEI
	1984	1353	22	62	14.5	899
TOTAL	1998	1353		62		899
		23866				5795

SUBSTATIONS: BIG EDDY, BUCKLEY, BAKEOVEN, FORT ROCK, SAND SPRING, SYCAN, CELILO, CHIEF JOSEPH, JOHN DAY, GRIZZLEY, MALIN, SUMMER LAKE, (INC. SPARES)

	YEAR	NVESTMEN	LIFE	ANNUAL EXPENSE	AGE	\CCUM DEI
	1968	9500	41	232	4.5	1044
			37	257	5	1285
			55	173	6	1038
			59	161	15	2415
	1969	7970	41	194	3.5	679
			37	215	5	1075
			55	145	6	870
			59	135	15	2025
	1970	56591	41	1380	2.5	3450
			37	1529	5	7645
			55	1029	6	6174
			59	959	15	14385
	1975	613	37	17	2.5	43
			55	11	6	66
			59	10	15	150
	1978	482	55	9	5.5	50
			59	8	15	120
	1979	1260	55	23	4.5	104
			59	21	15	315
	1980	214	55	4	3.5	14
			59	4	15	60
	1981	-247	55	-4	2.5	-10
			59	-4	15	-60
	1982	264	55	5	1.5	8
			59	4	15	60
	1983	11616	55	211	0.5	106
			59	197	15	2955
	1985	54826	59	929	13.5	12542
	1986	5764	59	98	12.5	1225
	1987	4523	59	77	11.5	886
	1988	14905	57	261	10.5	2741
	1989	12170	57	214	9.5	2033
	1990	90060	57	1580	8.5	13430
	1991	21540	57	378	7.5	2835
	1992	66873	57	1173	6.5	7625
	1993	57157	57	1003	5.5	5517
	1994	5543	57	97	4.5	437
	1995	10375	57	182	3.5	637
	1997	37895	57	665	1.5	998
TOTAL	1998	469894				96972

MONTANA INTERTIE
TOWNSEND-GARRISON LINE

	YEAR	NVESTMEN	LIFE	ANNUAL EXPENSE	AGE	\CCUM DEI
	1984	93987	34	2764	14.5	40078
	1985	1148	34	34	13.5	459
	1986	3112	34	92	12.5	1150
	1987	-252	34	-4	11.5	-46
	1988	-153	34	-2	10.5	-21
	1989	-28	34	0	9.5	0
	1990	102	34	2	8.5	17
	1993	-25	34	0	5.5	0
TOTAL	1998	97891				41637

SW INTERTIE
LINES: BUCKLEY-SUMMER LAKE, CELILO-SYLMAR, BIG EDDY-CELILO, JOHN DAY-GRIZZLEY, JOHN DAY-BIG EDDY, GRIZZLEY-MALIN

	YEAR	NVESTMEN	LIFE	ANNUAL EXPENSE	AGE	\CCUM DEI
	1968	39105	58	674	4.5	3033
			51	767	5	3835
			38	1029	6	6174
			34	1150	15	17250
	1970	21315	58	368	2.5	920
			51	418	5	2090
			38	561	6	3366
			34	627	15	9405
	1979	47	38	1	4.5	5
			34	1	15	15
	1980	118	38	3	3.5	11
			33	4	15	60
	1981	-70	38	-2	2.5	-5
			33	-2	15	-30
	1983	27934	38	735	0.5	368
			33	846	15	12690
	1985	772	33	23	13.5	311
	1987	300	33	9	11.5	104
	1988	171	33	5	10.5	53
	1989	3813	33	116	9.5	1102
	1990	365	33	11	8.5	94
	1991	520	33	16	7.5	120
	1993	39283	33	1190	5.5	6545
	1994	158	33	5	4.5	23
	1995	63432	33	1922	3.5	6727
	1997	115	33	3	1.5	5
TOTAL	1998	197378				74271

CHAPTER 5

PROJECTED CASH BALANCES/INTEREST CREDITS

I. Introduction

This chapter projects BPA-TBL cash balances for the rate period and estimates the interest income (credits) to be earned on of BPA's projected cash balances and on annual funds to be returned to Treasury. Included in BPA-TBL's projected cash balances are proceeds from the sale of Delivery segment facilities projected to be sold prior to the 2002-2003 rate period.

Interest credits on BPA's projected cash balances

The risk model provides the risk-adjusted beginning rate period cash balance. The annual incremental cash provided from forecasted net revenues are added to this, for both revenue requirements and the revised revenue test. Using projected interest earnings rates, annual interest income is calculated from projected average annual cash balances. The resulting interest income is applied as a credit against interest expense in the transmission revenue requirements and in the income statement of the revised revenue test.

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 that 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. For a further explanation of the calculation of the interest credit computed

within repayment studies, *see* Revenue Requirement Study (TR-02-FS-BPA-01), Appendix A - The Repayment Program.

Proceeds from projected sales of Delivery facilities

As reflected in the Segmentation Study (TR-02-FS-BPA-02), BPA-TBL has compiled a list of Delivery facilities expected to be sold prior to the 2002-2003 rate period. Book value was calculated for the Delivery facilities. BPA-TBL staff determined proceeds to be an average price of 25% over book value. The total book value was included in the beginning cash balance for the rate period to provide an interest credit comparable to the reduction in interest expense that would occur from retirement of an equivalent amount of transmission debt. This portion of the projected sales proceeds was not available for the risk analysis to use in determining Treasury payment probability. However, the amounts over book value were used by the risk analysis in determining the beginning rate period cash balance. Further, they were used to calculate interest credits directly applied to the respective delivery segments in the segmented revenue requirements.

Interest Income from Projected Cash Balances
Revenues from Proposed Rates
BPA Transmission Business Line
($ thousands)

		2002	2003
1	Annual Cash Surplus/(Deficit)	25,795	26,931
2	Adjustments to Cash		
3	SOY Cash Balance 1/	101,547	134,975
4	EOY Cash Balance	127,342	161,907
5	Average Cash Balance	114,445	148,441
6	Interest Income Rate	6.67%	6.66%
7	Annual Interest Income	7,633	9,886

1/ Includes:
Projected Proceeds
from sale of Delivery facilities 56,347

Interest Income from Projected Cash Balances
BPA Transmission Business Line
($ thousands)

		2002	2003
1	Annual Cash Surplus/(Deficit)	29,788	30,233
2	Adjustments to Cash		
3	SOY Cash Balance 1/	101,547	131,335
4	EOY Cash Balance	131,335	161,568
5	Average Cash Balance	116,441	146,452
6	Interest Income Rate	6.67%	6.66%
7	Annual Interest Income	7,767	9,754

1/ Includes:

Projected Proceeds = bv from sale of Delivery facilities (not available for risk)	45,077	
plus amounts over book value:		
Utility Delivery	5,634	
DSI Delivery	5,636	
Credits for Delivery Segments:		
Utility Delivery	376	375
DSI Delivery	376	375

Projected Delivery Facility Sales, 2000-2001

($000)

Utility Delvery	Book Value
Alderwood	480,000
Athol	438,000
Bayshore	162,000
Benton City	214,000
Bigelow	204,000
Blue River	146,000
Cheshire	1,056,000
Connell	162,000
Curlew	382,000
Dayton	246,000
Dexter	166,000
East Hills	390,000
Fern Ridge	53,000
Fircrest	780,000
Franklin	5,914,000
Freewater	421,000
Geisel Monument	39,000
Green Bluff	40,000
Harrisburg	114,000
Haymill	884,000
Kamilche	305,000
Lopez Island	2,693,000
McMinnville	201,000
Mica	31,000
Milton	230,000
Minico	586,000
Newcomb	173,000
Oakridge	364,000
Prosser	398,000
Raft	309,000
Rainbow Valley	100,000
Riverton	349,000
Riverview	562,000
Roes Corner	1,678,000
Sagehill	280,000
Scarcello	821,000
Snipes	239,000
Taylor Flats	252,000
Unity	294,000
Winthrop	378,000
Total	**$22,534,000**
25% of BV	**5,633,500**

DSI Delivery	Total Facility Book Value	DSI Delivery Book Value
Bell	32,900,000	11,420,000
Conkelly	9,215,000	4,828,000
Hanna	1,468,000	1,468,000
Tacoma	9,694,000	2,637,000
Trentwood	3,929,000	2,190,000
	57,206,000	**22,543,000**
25% of BV		**5,635,750**

TOTAL INVESTMENT IN DSI SUBS PROPOSED TO BE SOLD BY FY2002					
ID	**NAME SUBS**	**SUB INVEST 98**		**AVG O&M COSTS**	**SEGC**
10605	Alcoa	6,338,949		377,748	D
10605	Alcoa	2,781,718		559,877	N
	TOTAL	**9,120,667**			
13271	Bell	14,545,296	34.71%	420,350	D
13271	Bell	27,363,003		1,138,521	N
	TOTAL	**41,908,299**			
41517	Conkelley	5,539,872	52.39%	384,612	D
41517	Conkelley	5,035,305		737,054	N
	TOTAL	**10,575,177**			
21031	Hanna	2,360,198		79,946	D
	TOTAL	**2,360,198**			
12775	Tacoma	3,890,334	27.20%	79,124	D
12775	Tacoma	10,412,285		211,770	N
	TOTAL	**14,302,619**			
13275	Trentwood	3,738,726	55.74%	105,742	D
13275	Trentwood	2,969,231		83,978	N
	TOTAL	**6,707,957**			
Data from preliminary segmentation study 11/16/99					

CHAPTER 6

INTEREST RATES FOR TREASURY SOURCES OF CAPITAL AND PRICE DEFLATORS

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. Price deflators are used for developing spending levels in revenue requirements.

WEFA

The WEFA Group (WEFA) provides Treasury yield curve forecasts that BPA uses to project interest rates on bonds issued to Treasury. WEFA is also the source of price deflators that BPA treats as escalators for purposes of developing spending levels. The price deflators are derived from projections of Gross Domestic Product (GDP). The GDP consists of the sum of consumption, investment, government purchases and net exports, excluding transfers to foreigners.

Interest Rate Projections

Projected interest rates for BPA bonds issued to Treasury are based on WEFA's yield curve projections of Treasury market rates, plus a markup of 32 to 90 basis points depending on the length of time to maturity. The markup estimate reflects an interagency agreement that Treasury price BPA bonds at a level comparable to 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. As noted in the attached transmittal memo documenting the interest rates in this revenue requirement study, for the FY 2002-2003 period the 30-year rate reflects a markup of 90 basis points.

Deflators

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

$$[(FY_1/100) \times 0\ 5] + 1 = \text{Cumulative Price Deflator}_1$$

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

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

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.

To the extent deflators are used in developing the FY 2002-2003 spending levels they are based on the price deflators from the Fourth Quarter 1997 WEFA forecast.

InterOffice Memo

Date: April 16, 1998

To: Addressees

From: Robert Mealey, Financial Economist - CMD-2
THRU: David J. Armstrong, Manager, Corporate Risk Management - C-2

Subject: FY 1998.Q2 Updated WNP Long Term Debt Service Forecasts

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The Second Quarter FY 1998 forecast of Supply System debt service is attached. It is used in BPA's Quarterly Financial Review, budget formulation, financial planning, and strategic analyses.

This forecast was prepared on April 2, 1998. It reflects recent Supply System refundings and revised investment income assumptions. The forecast does not include debt service associated with additional capital investments for WNP-2 that would be debt financed under BPA's capital funding policy (as determined in the 10-year Financial Plan). It is unlikely that new debt will be issued to finance WNP-2 capital additions.

The Second Quarter 1998 Forecast reduces net debt service by approximately $69 million from BPA's Second Quarter 1997 forecast. (See Table 1.) Annual debt service declined on average by more than $3 million to approximately $489 million per year. Estimates of net debt service over the current rate case period, FY 1998-2001, fell by $10 million, or almost $2.5 million per year. Over this period debt service averaged $583 million per year.

WNP debt service is projected to decline from BPA's 1996 Final Rate Case Proposal Forecast by approximately $203 million, or almost $10 million per year. (See Table 2.) Over the rate case period, FY 1998-2001, debt service is projected to decline approximately $72 million, or approximately $18 million per year from the 1996 Final Rate Case Proposal Forecast.

Several factors account for the decline in WNP net debt service since the Rate Case Forecast.

- Refunding efforts account for most of the drop in net debt service. Refunding efforts have reduced debt service estimates by approximately $180 million, or $8 million per year since the 1996 rate case forecast and $113 million since BPA's 1997.Q2 forecast. This forecast reflects debt service savings generated by the 1997A, 1997B, 1998A refunding issues and the 1972A variable rate refunding that occurred on April 1,1998.

- Estimates of investment income increased $58 million from the 1996 Rate Case forecast, and $11 million since BPA's FY 1997.Q2 forecast. Part of the increase reflects higher reserve fund estimates and revised estimates of investment earnings on short-term financial assets. Interest rates remain relatively unchanged in the FY 1998.Q2 debt service forecast. (See Chart 1) Revised interest rate assumptions are based on WEFA's forecast of U.S. Treasury yields (WEFA, Fourth Quarter, CY 1997 Long Term Economic Outlook, Trend Forecast)

- Other factors contributing to the decline in net debt service include slight gains in bond reserve free-ups balances, and reduction in R&C funding requirements.

Reductions to WNP debt service were partially offset by revised estimates of transfers from the Construction Fund and "other costs" not shown explicitly in the attached tables. Other costs such as Treasury Services and incidental financing costs are reflected implicitly in estimates of total debt service.

Annual net debt service peaks in FY 1999 at approximately $612 million, and remains generally in excess of $600 million through FY 2001. (See Table 3.) In FY 2002 net debt service drops to $529 million and ranges around $550 million until 2012. After the retirement of WNP-2 debt in FY 2012, net debt service drops to about $350 million annually. Net debt service requirements for WNP-1, WNP-2, and WNP-3 are shown on Charts 2-5 and Tables 4-6. The estimates do not reflect BPA's debt service reduction target of $20 million per year over the Rate Case period, FY 2002-2006. These expected savings will be shown separately in BPA's current Rate Case.

Addresses:
M. DeWolf-CM-2
D. Armstrong-C-2
A. Mertsching-CMD-2
C. Andrews-CMF-2
M. Chang-CMR-2
V. Lefler-CMR-2
R. Homenick-CMR-2
D. Carbonari-CMD-2
S. Dunne-CMD-2
K. Wood-CRO-2
M. Hawkin-CRB-2
J. Matkevich-CRB-2
E. Brost-PGCM/Richland
D. Grover Sandlin-PBCM/Richland
D. Steele-PB-6
K. Suckow-PB-6
G. Moorman-PM-6
K. Kintz-PM-6

RSMealey:rsm:x5389 04/15/97(6589-FPD-w:\CM\FPD\MEALEY\DS040898.DOC)

TABLE 1

30 YEAR TREASURY YIELDS
FY 1998.Q2 FORECAST OF BPA TREASURY BORROWING RATES

Calendar/Fiscal Years 1997 - 2019

	(A)	(B)	(C)
YEAR	**BOND RATE 1/ Calendar Year**	**BOND RATE Fiscal Year**	**BPA RATE 2/ Fiscal Year**
1997	6.62%	6.64%	7.54%
1998	6.62%	6.62%	7.52%
1999	6.75%	6.72%	7.62%
2000	6.60%	6.64%	7.54%
2001	6.32%	6.39%	7.29%
2002	6.14%	6.18%	7.08%
2003	5.94%	5.99%	6.89%
2004	6.01%	6.00%	6.90%
2005	5.97%	5.98%	6.88%
2006	5.94%	5.95%	6.85%
2007	5.90%	5.91%	6.81%
2008	5.86%	5.87%	6.77%
2009	5.81%	5.82%	6.72%
2010	5.76%	5.77%	6.67%
2011	5.75%	5.75%	6.65%
2012	5.74%	5.74%	6.64%
2013	5.74%	5.74%	6.64%
2014	5.74%	5.74%	6.64%
2015	5.75%	5.75%	6.65%
2016	5.76%	5.76%	6.66%
2017	5.76%	5.76%	6.66%
2018	5.77%	5.77%	6.67%
2019	5.77%	5.77%	6.67%

1/ Source: The WEFA Group, U.S. Long-Term Economic Outlook, Fourth Quarter 1997, Volume 1 Trend\Moderate Growth Scenario. Average market yield on 30-year Treasury bonds. Calendar year adjusted to reflect BPA fiscal year.

2/ Column C = Column B + markup of 90 bp. The Treasury markup is based on the average rate of BPA long term bonds issued to the U.S. Treasury in FY 1993, 1994 and 1995, and adjustments by BPA Treasury analyst.

TABLE 2

30 YEAR TREASURY YIELDS
FY 1998.Q2 COMPARISON OF BPA BORROWING RATES

Fiscal Years 1997 - 2019

	(A)	(B)	(C)
YEAR	**FY 1998 Q.2 FORECAST BPA RATE 1/**	**FY 1998 Q.2 FORECAST BPA RATE 2/**	**DIFFERENCE (A-B)**
1997	7.54%	7.35%	0.19%
1998	7.52%	7.16%	0.36%
1999	7.62%	7.05%	0.57%
2000	7.54%	6.94%	0.60%
2001	7.29%	6.83%	0.46%
2002	7.08%	6.77%	0.31%
2003	6.89%	6.74%	0.15%
2004	6.90%	6.71%	0.19%
2005	6.88%	6.69%	0.19%
2006	6.85%	6.67%	0.18%
2007	6.81%	6.67%	0.14%
2008	6.77%	6.66%	0.11%
2009	6.72%	6.64%	0.08%
2010	6.67%	6.67%	0.00%
2011	6.65%	6.72%	-0.07%
2012	6.64%	6.75%	-0.11%
2013	6.64%	6.72%	-0.08%
2014	6.64%	6.71%	-0.07%
2015	6.65%	6.73%	-0.08%
2016	6.66%	6.72%	-0.06%
2017	6.66%	6.71%	-0.05%
2018	6.67%	6.72%	-0.05%
2019	6.67%	6.73%	-0.06%

1/ Forecast prepared February 20, 1998. Source: The WEFA Group, U.S. Long-Term Economic Outlook, Fourth Quarter 1997, Volume 1 Trend\Moderate Growth Scenario. Average market yield on 30-year Treasury bonds. Calendar year adjusted to reflect BPA fiscal year.

2/ Source: The WEFA Group, U.S. Long-Term Economic Outlook, Fourth Quarter 1996, Volume 1 Trend\Moderate Growth Scenario. Average market yield on 30-year Treasury bonds. Calendar year adjusted to reflect BPA fiscal year.

TABLE 3

15 YEAR TREASURY YIELDS
FY 1998.Q2 FORECAST OF BPA TREASURY BORROWING RATES

Calendar/Fiscal Years 1997 - 2019

	(A)	(B)	(C)
YEAR	**BOND RATE 1/ Calendar Year**	**BOND RATE Fiscal Year**	**BPA RATE 2/ Fiscal Year**
1997	6.43%	6.45%	7.14%
1998	6.49%	6.48%	7.17%
1999	6.66%	6.62%	7.31%
2000	6.52%	6.55%	7.24%
2001	6.17%	6.24%	6.93%
2002	5.95%	6.00%	6.69%
2003	5.76%	5.81%	6.50%
2004	5.81%	5.79%	6.48%
2005	5.73%	5.75%	6.44%
2006	5.68%	5.69%	6.38%
2007	5.64%	5.65%	6.34%
2008	5.58%	5.60%	6.29%
2009	5.53%	5.54%	6.23%
2010	5.48%	5.49%	6.18%
2011	5.47%	5.47%	6.16%
2012	5.46%	5.46%	6.15%
2013	5.46%	5.46%	6.15%
2014	5.46%	5.46%	6.15%
2015	5.47%	5.47%	6.16%
2016	5.48%	5.48%	6.17%
2017	5.48%	5.48%	6.17%
2018	5.49%	5.49%	6.18%
2019	5.49%	5.49%	6.18%

1/ Source: The WEFA Group, U.S. Long-Term Economic Outlook, Fourth Quarter 1997, Volume 1 Trend\Moderate Growth Scenario. Average market yield on 15-year Treasury bonds. Calendar year adjusted to reflect BPA fiscal year.

2/ Column C = Column B + markup of 69 bp. The Treasury markup is based on the average rate of BPA long term bonds issued to the U.S. Treasury in FY 1993, 1994 and 1995, and adjustments by BPA Treasury analyst.

TABLE 4

20 YEAR TREASURY YIELDS
FY 1998.Q2 FORECAST OF BPA TREASURY BORROWING RATES

Calendar/Fiscal Years 1997 - 2019

	(A)	(B)	(C)
YEAR	**BOND RATE 1/ Calendar Year**	**BOND RATE Fiscal Year**	**BPA RATE 2/ Fiscal Year**
1997	6.50%	6.52%	7.34%
1998	6.54%	6.53%	7.35%
1999	6.69%	6.65%	7.47%
2000	6.54%	6.58%	7.40%
2001	6.20%	6.29%	7.11%
2002	6.02%	6.06%	6.88%
2003	5.82%	5.87%	6.69%
2004	5.87%	5.86%	6.68%
2005	5.81%	5.83%	6.65%
2006	5.77%	5.78%	6.60%
2007	5.73%	5.74%	6.56%
2008	5.68%	5.69%	6.51%
2009	5.62%	5.63%	6.45%
2010	5.58%	5.59%	6.41%
2011	5.56%	5.57%	6.39%
2012	5.55%	5.56%	6.38%
2013	5.55%	5.55%	6.37%
2014	5.56%	5.56%	6.38%
2015	5.56%	5.56%	6.38%
2016	5.57%	5.57%	6.39%
2017	5.58%	5.58%	6.40%
2018	5.58%	5.58%	6.40%
2019	5.58%	5.58%	6.40%

1/ Source: The WEFA Group, U.S. Long-Term Economic Outlook, Fourth Quarter 1997, Volume 1 Trend\Moderate Growth Scenario. Average market yield on 20-year Treasury bonds. Calendar year adjusted to reflect BPA fiscal year.

2/ Column C = Column B + markup of 82 bp. The Treasury markup is based on the average rate of BPA long term bonds issued to the U.S. Treasury in FY 1993, 1994 and 1995, and adjustments by BPA Treasury analyst.

TABLE 5
FY 1998.Q2 FORECAST OF BPA TREASURY BORROWING RATES
FORECAST PREPARED FEBRUARY 20, 1998

Fiscal Years 1997 - 2019

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
1997	5.92	6.19	6.45	6.55	6.65	6.73	6.82	6.89	6.90	6.95	6.98	7.02	7.06	7.10	7.14
1998	6.18	6.40	6.62	6.68	6.75	6.82	6.89	6.92	6.95	6.98	7.02	7.06	7.09	7.13	7.17
1999	6.41	6.59	6.77	6.84	6.91	6.97	7.03	7.07	7.10	7.14	7.18	7.21	7.24	7.27	7.31
2000	6.26	6.43	6.60	6.68	6.77	6.83	6.89	6.95	7.02	7.08	7.11	7.14	7.18	7.21	7.24
2001	5.88	6.05	6.23	6.30	6.38	6.44	6.50	6.58	6.66	6.74	6.78	6.82	6.85	6.89	6.92
2002	5.74	5.91	6.08	6.15	6.22	6.28	6.34	6.39	6.45	6.50	6.54	6.58	6.61	6.65	6.69
2003	5.56	5.75	5.93	6.00	6.07	6.12	6.18	6.22	6.26	6.30	6.34	6.38	6.42	6.46	6.50
2004	5.69	5.81	5.92	5.98	6.04	6.10	6.16	6.20	6.24	6.28	6.32	6.36	6.40	6.44	6.48
2005	5.73	5.81	5.89	5.94	5.99	6.04	6.10	6.15	6.19	6.23	6.27	6.32	6.36	6.40	6.44
2006	5.70	5.77	5.83	5.87	5.91	5.97	6.03	6.08	6.12	6.16	6.21	6.25	6.27	6.34	6.38
2007	5.65	5.71	5.78	5.82	5.86	5.92	5.98	6.02	6.07	6.12	6.16	6.20	6.25	6.29	6.34
2008	5.56	5.63	5.71	5.75	5.80	5.86	5.92	5.97	6.02	6.06	6.11	6.15	6.20	6.24	6.29
2009	5.46	5.55	5.63	5.68	5.73	5.80	5.86	5.91	5.96	6.01	6.05	6.10	6.14	6.19	6.23
2010	5.38	5.47	5.57	5.62	5.68	5.75	5.81	5.86	5.91	5.96	6.00	6.05	6.09	6.14	6.18
2011	5.35	5.45	5.55	5.61	5.66	5.73	5.80	5.84	5.89	5.94	5.98	6.03	6.07	6.12	6.16
2012	5.33	5.43	5.54	5.59	5.65	5.72	5.78	5.83	5.88	5.93	5.97	6.02	6.06	6.11	6.15
2013	5.32	5.42	5.53	5.58	5.64	5.71	5.78	5.83	5.87	5.92	5.97	6.01	6.06	6.10	6.15
2014	5.32	5.42	5.53	5.58	5.64	5.71	5.78	5.83	5.88	5.93	5.97	6.02	6.06	6.11	6.15
2015	5.33	5.43	5.53	5.58	5.64	5.71	5.78	5.83	5.88	5.93	5.97	6.02	6.06	6.11	6.16
2016	5.34	5.44	5.54	5.60	5.65	5.72	5.79	5.84	5.89	5.94	5.98	6.03	6.07	6.12	6.17
2017	5.35	5.45	5.55	5.61	5.66	5.73	5.80	5.85	5.90	5.95	5.99	6.04	6.08	6.13	6.17
2018	5.36	5.46	5.56	5.61	5.67	5.74	5.81	5.85	5.90	5.95	6.00	6.04	6.09	6.13	6.18
2019	5.36	5.46	5.56	5.62	5.67	5.74	5.81	5.86	5.91	5.95	6.00	6.04	6.09	6.13	6.18

16 Year	17 Year	18 Year	19 Year	20 Year	21 Year	22 Year	23 Year	24 Year	25 Year	26 Year	27 Year	28 Year	29 Year	30 Year	50 Year	Year
7.18	7.22	7.27	7.30	7.34	7.36	7.38	7.40	7.42	7.44	7.46	7.48	7.50	7.52	7.54	7.54	1997
7.20	7.24	7.27	7.31	7.35	7.36	7.38	7.40	7.42	7.43	7.45	7.47	7.49	7.51	7.52	7.52	1998
7.34	7.37	7.41	7.44	7.47	7.49	7.50	7.52	7.53	7.54	7.56	7.57	7.59	7.60	7.62	7.62	1999
7.27	7.30	7.34	7.37	7.40	7.42	7.43	7.44	7.46	7.47	7.48	7.50	7.51	7.53	7.54	7.54	2000
6.96	7.00	7.03	7.07	7.11	7.12	7.14	7.16	7.18	7.20	7.22	7.23	7.25	7.27	7.29	7.29	2001
6.73	6.77	6.81	6.84	6.88	6.90	6.92	6.94	6.96	6.98	7.00	7.02	7.04	7.06	7.08	7.08	2002
6.54	6.54	6.61	6.65	6.69	6.71	6.73	6.75	6.77	6.79	6.81	6.83	6.85	6.87	6.89	6.89	2003
6.52	6.56	6.60	6.64	6.68	6.70	6.72	6.75	6.77	6.79	6.81	6.83	6.85	6.87	6.90	6.90	2004
6.48	6.52	6.57	6.61	6.65	6.67	6.70	6.72	6.74	6.77	6.79	6.81	6.84	6.86	6.88	6.88	2005
6.42	6.47	6.51	6.55	6.60	6.62	6.65	6.67	6.7	6.72	6.75	6.77	6.80	6.82	6.85	6.85	2006
6.38	6.42	6.47	6.51	6.56	6.58	6.61	6.63	6.66	6.68	6.71	6.74	6.76	6.79	6.81	6.81	2007
6.33	6.38	6.42	6.46	6.51	6.53	6.56	6.59	6.61	6.64	6.67	6.69	6.72	6.74	6.77	6.77	2008
6.28	6.32	6.36	6.41	6.45	6.48	6.51	6.53	6.56	6.59	6.61	6.64	6.67	6.69	6.72	6.72	2009
6.23	6.27	6.32	6.36	6.41	6.43	6.46	6.49	6.51	6.54	6.57	6.59	6.62	6.65	6.67	6.67	2010
6.21	6.25	6.30	6.34	6.39	6.41	6.44	6.47	6.49	6.52	6.55	6.57	6.60	6.63	6.65	6.65	2011
6.20	6.24	6.29	6.33	6.38	6.40	6.43	6.46	6.48	6.51	6.54	6.56	6.59	6.62	6.64	6.64	2012
6.19	6.24	6.28	6.33	6.37	6.40	6.43	6.45	6.48	6.51	6.53	6.56	6.59	6.61	6.64	6.64	2013
6.20	6.24	6.29	6.33	6.38	6.40	6.43	6.46	6.48	6.51	6.54	6.56	6.59	6.62	6.64	6.64	2014
6.20	6.24	6.29	6.34	6.38	6.41	6.43	6.46	6349	6.52	6.54	6.57	6.60	6.62	6.65	6.65	2015
6.21	6.25	6.30	6.34	6.39	6.42	6.44	6.47	6.50	6.52	6.55	6.58	6.60	6.63	6.66	6.66	2016
6.22	6.26	6.31	6.35	6.40	6.42	6.45	6.48	6.50	6.53	6.56	6.58	6.61	6.64	6.66	6.66	2017
6.22	6.27	6.31	6.36	6.40	6.43	6.45	6.48	6.51	6.53	6.56	6.59	6.61	6.64	6.67	6.67	2018
6.22	6.27	6.31	6.36	6.40	6.43	6.46	6.48	6.51	6.54	6.56	6.59	6.62	6.64	6.67	6.67	2019

TABLE 6

Corrected

FY 1998.Q2 FORECAST OF INFLATIONARY TRENDS
CHANGE IN GROSS DOMESTIC PRODUCT PRICE DEFLATOR

Calendar/Fiscal Year

Year	(A) CALENDAR YEAR % CHANGE 1/	(B) FY 98 Q.2 FISCAL YEAR % CHANGE	(C) FISCAL YEAR CUMULATIVE PRICE DEFLATOR INDEX 2/ (1994 Base Year)	(D) FISCAL YEAR CUMULATIVE PRICE DEFLATOR INDEX (1995 Base Year)	(E) FISCAL YEAR CUMULATIVE PRICE DEFLATOR INDEX (1996 Base Year)	(F) FISCAL YEAR CUMULATIVE PRICE DEFLATOR INDEX (1997 Base Year)	(G) FISCAL YEAR CUMULATIVE PRICE DEFLATOR INDEX (1998 Base Year)
1994	2.38%	2.45%	1.012				
1995	2.54%	2.50%	1.038	1.013			
1996	2.29%	2.35%	1.062	1.036	1.012		
1997	2.04%	2.10%	1.084	1.058	1.033	1.010	
1998	1.98%	2.00%	1.106	1.079	1.054	1.031	1.010
1999	2.62%	2.46%	1.133	1.106	1.080	1.056	1.035
2000	2.52%	2.54%	1.162	1.134	1.107	1.083	1.061
2001	2.46%	2.48%	1.191	1.162	1.134	1.110	1.087
2002	2.50%	2.49%	1.220	1.191	1.163	1.137	1.115
2003	2.80%	2.73%	1.254	1.223	1.194	1.168	1.145
2004	2.67%	2.70%	1.287	1.256	1.227	1.200	1.176
2005	2.67%	2.67%	1.322	1.290	1.259	1.232	1.207
2006	2.51%	2.55%	1.356	1.323	1.291	1.263	1.238
2007	2.48%	2.49%	1.389	1.356	1.324	1.295	1.269
2008	2.53%	2.51%	1.424	1.390	1.357	1.327	1.301
2009	2.56%	2.55%	1.461	1.425	1.391	1.361	1.334
2010	2.60%	2.59%	1.498	1.462	1.428	1.397	1.368
2011	2.57%	2.58%	1.537	1.500	1.464	1.433	1.404
2012	2.63%	2.62%	1.577	1.539	1.503	1.470	1.441
2013	2.67%	2.66%	1.619	1.580	1.543	1.509	1.479
2014	2.66%	2.66%	1.662	1.622	1.584	1.549	1.518
2015	2.70%	2.69%	1.707	1.666	1.626	1.591	1.559
2016	2.70%	2.70%	1.753	1.711	1.670	1.634	1.601
2017	2.68%	2.69%	1.800	1.757	1.715	1.678	1.644
2018	2.70%	2.70%	1.849	1.804	1.762	1.723	1.890
2019	2.71%	2.71%	1.899	1.853	1.809	1.770	1.734

1/ Source: WEFA Fourth Quarter 1997 U.S. Long-Term Economic Outlook, Gross Domestic Product Implicit Price Deflator Indes, Calendar Year. Base year Index = 1992

2/ Fiscal Year Cumulative Price Deflator assocates to midyear dollars. The first year, 1994, is determined as follows: 1.0118 = [(2.363%/100)*0.5] + 1. Subsequent years use the prior Fiscal Year Cumulative Price Deflator . For example, the rate in 1995 is given by: 1.036 = [1 + (2.363%/100)]*1.0118.

TABLE 7

FY 1998.Q2 INFLATION FORECAST COMPARISONS
GROSS DOMESTIC PRODUCT PRICE DEFLATOR INDEXES

BPA Fiscal Year

Year	(A) FY 98.Q2 1/ FISCAL YEAR CUMULATIVE PRICE DEFLATOR INDEX (1994 Base Year)	(B) FY 97.Q1 2/ FISCAL YEAR CUMULATIVE PRICE DEFLATOR INDEX (1994 Base Year)	(C) (A-B) DIFFERENCE
1994	1.012	1.012	0.000
1995	1.038	1.037	0.001
1996	1.062	1.060	0.002
1997	1.084	1.084	0.000
1998	1.106	1.111	-0.005
1999	1.133	1.139	-0.006
2000	1.162	1.169	-0.007
2001	1.191	1.199	-0.008
2002	1.220	1.231	-0.011
2003	1.254	1.263	-0.009
2004	1.287	1.297	-0.010
2005	1.322	1.331	-0.009
2006	1.356	1.367	-0.011
2007	1.389	1.404	-0.015
2008	1.424	1.441	-0.017
2009	1.461	1.479	-0.018
2010	1.498	1.518	-0.020
2011	1.537	1.558	-0.021
2012	1.577	1.600	-0.023
2013	1.619	1.643	-0.024
2014	1.662	1.688	-0.026
2015	1.707	1.734	-0.027
2016	1.753	1.781	-0.028
2017	1.800	1.828	-0.028
2018	1.849	1.875	-0.026
2019	1.899	1.923	-0.024

1/ Source: WEFA Fourth Quarter 1997 U.S. Long-Term Economic Outlook, Gross Domestic Product Price Deflator Index, Calendar Year. Base year index = 1992.

2/ Source: WEFA Fourth Quarter 1996 U.S. Long-Term Economic Outlook, Gross Domestic Product Price Deflator Index.

CHAPTER 7

PROJECTED NEW BONDS ISSUED TO TREASURY

Purpose: To provide the projected bonds that BPA plans to issue to the U.S. Treasury to finance BPA capital investments.

Method: New long-term debt consist of bonds issued by BPA to Treasury reflecting actual and projected outlays for BPA Transmission and Environmental programs during the cost evaluation period. New debt for FY 2000 reflects projected bonds issued. All bonds projected for issuance are entered into the projected portions of the repayment study.

Application of Methodology: Projections for new bonds issued to Treasury in FY 2000 are consistent with BPA's Second Quarter Review and are based on a FY 2000 Borrowing Analysis. New bonds for the remainder of the cost evaluation period (FYs 2002-03) are based on projected BPA capital program outlays.

TBL CAPITAL BUDGET PROJECTION

INFLATED DOLLARS - $(000)

FY 2000 - FY 2003 TARGET SETTING PROJECTIONS

	OMB01 FY2000	OMB01 FY2001	OMB01 FY2002	OMB01 FY2003
TOTAL TBL CAPITAL (DIRECT)	**122,327.6**	**173,536.2**	**205,344.2**	**201,606.4**
INDIRECTS				
Total TBL Indirects	**20,480.0**	**20,860.0**	**21,540.0**	**22,080.0**
AFUDC [1]				
Total AFUDC	**4,390.0**	**4,691.0**	**5,040.0**	**5,225.0**
CORPORATE OVERHEAD [2]				
Total Corporate Overhead	**11,575.3**	**10,880.8**	**7,754.4**	**7,728.0**
TOTAL TBL CAPITAL	**158,772.9**	**209,968.0**	**239,678.6**	**236,639.4**
Adjustments				
Fiber [3]		**(11,900.0)**	**(10,000.0)**	**(1,100.0)**
Deferred Borrowing	**21,151.0**			
Corporate Capital Allocated to TBL	**9,669.0**	**3,536.0**	**3,506.0**	**3,592.0**
Public Process close out			**(1,200.0)**	**(1,200.0)**
ZABF	**189,592.9**	**201,604.0**	**231,984.6**	**237,931.4**
ENVIRONMENT				
Total Environment	**9,086.1**	**9,086.1**	**9,046.8**	**9,273.6**
Adjustments- deferred borrowing	**10,517.4**			
ZAFW	**19,603.5**	**9,086.1**	**9,046.8**	**9,273.6**

1/ used Ron's calculations

2/ Corporate overhead amounts are consistent with those being used in the the Power rate case, per conversations with D. Barringer and C. Andrews 6/29/99.

3/ Changes to Fiber Budget for Presidential Budget

Notes: ZABF bonds - 35 years
ZAFW bonds - 15 years
Repayment study reflects actual 1999 borrowing for transmission programs, while other areas of the case start with 1998 actuals.

BPA Projected Transmission Federal Borrowing
FY 2000- 2003 1/
($ Thousands)

FY Year	Description	Interest Rate	Term	Total Borrowing
2000	Construction 2/	6.40	3	40,000
	Construction	7.54	35	149,593
	Construction	7.54	31	15,323
	Environmental	7.24	15	19,603
				224,519
2001	Construction	7.29	35	201,604
	Environmental	6.92	15	9,086
				210,690
2002	Construction	7.08	35	231,985
	Environmental	6.69	15	9,047
				241,032
2003	Construction	6.89	45	237,931
	Environmental	6.50	15	9,274
				247,205

1/ Projected borrowing over the cost evaluation period includes FYs 2000-03.
2/ On 11/30/99, $40 million construction bond was issued.

TABLE C-2
Association of Transmission Construction
Funded by Bonds 1/
FY 1977 - FY 1990
($ Thousands)

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)
Fiscal Year	Plant in Service 2/	Amount Funded by Bonds	Amount of Bond Sales	Amount Outstanding	Interest Rate	Term	Year Due	Refinancing Date	Refinancing Amount
1977	171,038	100,800 3/							
		50,000							
		20,238							
		171,038							
1978	90,494	54,762	50,000	0	8.95	35	2013		
		35,732							
		90,494							
1979	67,649	14,268	75,000	0	9.45	35	2014		
		53,381	50,000	0	9.90	35	2014		
		67,649							
1980	48,043	48,043	115,000	0	13.00	35	2015		
1981	253,151	13,576	175,000	0	16.60	35	2016		
		175,000							
		50,000							
		14,575							
		253,151							
1982	92,111	85,425	50,000	0	14.40	35	2017		
		6,686	100,000	0	14.40	35	2017		
		92,111	85,000	0	14.15	35	2017	7/31/87	85,000 4/
1983	149,133	78,314	40,000	0	10.85	35	2018	2/29/88	40,000 5/
		40,000	30,000	0	11.70	35	2018		
		30,000	45,000	0	12.25	35	2018		
		819							
		149,133							
1984	235,214	44,181	30,000	0	12.30	35	2019		
		30,000	60,000	0	13.05	35	2019		
		60,000							
		100,000							
		1,033							
		235,214							
1985	115,901	98,967	100,000	0	11.25	45	2030		
		16,934							
		115,901							
1986	326,694	283,066	100,000	100,000	8.15	10	1996		
		43,628	300,000	0	8.95	45	2031	8/31/92	100,000 6/
								8/31/92	100,000 7/
								5/31/94	40,000 8/
		326,694							
1987	167,781	56,372	100,000	0	9.30	45	2032	4/30/92	100,000 9/

(Con't)

TABLE C-2
Association of Transmission Construction
Funded by Bonds 1/
FY 1977 - FY 1990
($ Thousands)

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)
Fiscal Year	Plant in Service 2/	Amount Funded by Bonds	Amount of Bond Sales	Amount Outstanding	Interest Rate	Term	Year Due	Refinancing Date	Refinancing Amount
(Con't)		100,000	100,000	0	8.35	5	1992		
		11,409	50,000	0	9.55	45	2032		
		167,781							
1988	96,878	38,591	150,000	0	9.50	45	2033	10/31/93	100,000 10/
								5/31/94	50,000 11/
		58,287	40,000	0	9.90	45	2033		
		96,878							
1989	211,811	91,713	75,000	75,000	8.95	10	1999		
		40,000							
		75,000							
		5,098							
		211,811							
1990	88,894	44,902	50,000	50,000	9.25	40	2030		
		43,992 12/							
		88,894							

1/ These investments have an estimated average service life of 40 years and a maximum repayment period of 40 years.
2/ BPA's Summary Financial data, Analysis of Funds Returned to the U.S Treasury and Cash Amortization Table, change in Total column from previous year.
3/ Funded by appropriations (Reference WP-89-E-BPA-01A1, Documentation for the Revenue Requirement Study - Volume 1, 1989 Rate Proposal, page 195).
4/ Refinanced on 7/31/87 with $ 95,000 issued at 9.55%, 30 year term, due in 2017.
5/ Refinanced on 2/29/88 with $43,700 issued at 9.50%, 30 year term, due in 2018.
6/ Refinanced on 8/31/92 with $107,800 issued at 6.60%, 8 year term, due in 2000.
7/ Refinanced on 8/31/92 with $107,700 issued at 7.25%, 15 year term, due in 2007.
8/ (See 11/)
9/ Refinanced on 4/30/92 with $80,000 issued at 6.20%, 3 year term, due in 1995; and $28,300 issued at 7.00%, 5 year term, due in 1997.
10/ Refinanced on 10/31/93 with $108,400 issued at 6.85%, 40 year term, due in 2033.
11/ (And 8/) Refinanced on 5/31/94 with $97,100 issued at 7.1%, 4 year term, due in 1998.
12/ See Association of Transmission Construction Functionalized to Transmission (Table C-2a)

Table C-2a
Association of Transmission Construction
Functionalized to Transmission
Funded by Bonds 1/
FY 1991 - FY 1999
($ Thousands)

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)
Fiscal Year	Plant in Service 2/	Amount Funded by Bonds	Amount of Bond Sales	Amount Outstanding	Interest Rate	Term	Year Due	Refinancing Date	Refinancing Amount
1990		43,992 3/							
1991	139,891	16,008	60,000	0	7.55	4	1995		
		123,883							
		139,891							
1992	214,883	26,117	150,000	0	8.80	40	2032	7/31/97	103,300 4/
		50,000	50,000	0	7.00	5	1997		
		138,766	150,000	0	8.13	40	2032	5/31/98	138,200 5/
		214,883							
1993	209,541	11,234	50,000	0	6.05	5	1998		
		50,000	99,962	0	8.35	40	2033		
		99,962	130,000	0	7.80	40	2033	2/28/98	130,000 6/
	0	48,345	100,000	0	7.50	40	2033	8/31/98	100,000 7/
			110,000	110,000	6.95	40	2033		
		209,541							
1994	239,060	81,655	50,000	50,000	6.85	40	2034		
		100,000	50,000	50,000	7.05	40	2034		
		57,405	50,000	0	8.20	40	2034		
			55,000	0	7.65	5	1999		
		239,060							
1995	290,221	52,595	55,000	0	8.35	6	2001		
		50,000	49,933	49,933	7.70	30	2025		
		50,000	65,000	65,000	7.70	30	2025		
		50,000							
		55,000							
		32,626							
		290,221							
1996	152,508	22,374	54,378	54,378	5.90	7	2003		
		49,933	70,000	70,000	7.05	10	2006		
		65,000							
		15,201							
		152,508							
1997	185,951	39,177	22,800	22,800	6.80	7	2004		
		70,000	80,000	80,000	6.90	8	2005		
		22,800							
		53,974							
		185,951							
1998	153,121	26,026	50,000	50,000	6.65	30	2028		
		50,000	40,000	40,000	5.75	10	2008		
		40,000							
		37,095							
		153,121							
1999	147,835	11,817	48,912	48,912	5.90	15	2014		
		40,000	40,000	40,000	6.20	3	2002		
		96,018 8/							
		147,835							

1/ These investments have an estimated average service life of 40 years and a maximum repayment period of 40 years.
2/ BPA's Summary Financial data, Analysis of Funds Returned to the U.S Treasury and Cash Amortization Table, change in Total column from previous year.
3/ See Association of Transmission Construction (Table C-2).
4/ Refinanced on 8/31/97 with $111,300 at 6.65% for 10 year term, due 2007.
5/ Refinanced on 5/31/98 with $72,700 at 6.00% for 11 year term, due 2009 and $40,000 at 6.20% for 13 year term, due 2011.
6/ Refinanced on 5/31/98 with $138,900 at for 40 year term
7/ Refinanced on 8/31/98 with $104,300 at 5.75% for 10 year term, due 2008.
8/ These amounts not yet financed thru long-term bonds

Association of Environment Investment
Funded by Bonds
FY 1995 - 1999
($ Thousands)

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)
								Refinancing	
Fiscal Year	Plant in Service 1/	Amount Funded by Bonds	Amount of Bond Sales	Amount Outstanding	Interest Rate	Term	Year Due	Date	Amount
1995	16,014	16,014	16,014	16,014	7.20	15	2010		
1996									
1997	40,000	40,000	40,000	40,000	6.95	15	2011		
1998									
1999	10,517 2/								

1/ BPA's Summary Financial data, Analysis of Funds Returned to the U. S. Treasury and Cash Amortization Table, change in Total column from previous year.

2/ These amounts not yet financed thru long-term bonds

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CHAPTER 8

REPLACEMENTS PROJECTED AFTER THE COST EVALUATION PERIOD

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

Method: BPA uses the Iowa Curve Methodology to forecast replacements for the transmission system.

Application of Methodology: The repayment study incorporates a schedule of Federal investment with the replacements that are expected to occur over the repayment period for the existing transmission system. This schedule is expressed in mid-year dollars for FYs 2002 through 2003 and is based on the amount of the plant-in-service in the transmission system for BPA through the end of the cost evaluation period.

Transmission Replacements:

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

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

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

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

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

Gross plant investment data for the cost evaluation period is obtained from BPA's Budget Support (see table entitled COST-EVALUATION PERIOD DATA). This latter plant is first de-escalated to the dollars of the last year of the Handy-Whitman index and then distributed among the various FERC accounts in the same proportions as the total plant of BPA's summary of BPA investment from plant balances as of September 30, 1995 (see years 2002 through 2003 of table entitled PLANT INVESTMENT BY YEAR AND FERC ACCOUNT). Some of the historical plant obtained from the Plant Investment Section will be retired during the cost evaluation period and be replaced with plant funded by amounts obtained from Budget Support. If future replacements were calculated for both, a double counting would occur. Therefore the amount budgeted for a cost evaluation period year is reduced by the amount calculated for replacements for the same year. Future replacements are then calculated for only the remaining net initial investment of that year (see table entitled ADJUSTED PLANT INVESTMENT BY YEAR AND FERC ACCOUNT).

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

Third AC Replacements:

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

The cost-evaluation period data for the AC Intertie was obtained (see the table entitled Segmentation Summary). The resulting plant data was then processed by the replacement methodology as described above. Those listings that apply only to the AC Intertie follow those for the transmission system. The results are the future replacements for the total AC Intertie and have to be multiplied by the appropriate fraction, 21 percent, to obtain the future contributions required by new capacity owners. These fractional parts, together with the amounts budgeted for the cost evaluation period, are entered into the Transmission Repayment Studies as negative expenses in the Capital Contract Obligation field (*see* Chapter 10, transmission input data).

BPA REPLACEMENTS

TABLE22 FROM 'STATISTICAL ANALYSES OF INDUSTRIAL PROPERTY RETIREMENTS' BY ROBLEY WINFREY, BULLETIN 125, IOWA STATE UNIVERSITY

	L0	L1	L2	L3	L4	L5	S0	S1	S2	S3	S4	S5	S6	R1	R2	R3	R4	R5
1	2.93	.95	.11	.00	.00	.00	1.17	.16	.00	.00	.00	.00	.00	2.78	1.14	.15	.02	.00
2	4.82	2.09	.68	.08	.00	.00	2.68	.89	.12	.00	.00	.00	.00	3.23	1.57	.40	.06	.00
3	5.92	3.64	1.60	.47	.00	.00	3.84	2.03	.58	.06	.00	.00	.00	3.69	2.12	.88	.19	.00
4	6.72	5.35	2.78	1.22	.16	.00	4.83	3.36	1.59	.38	.00	.00	.00	4.18	2.81	1.60	.51	.00
5	7.32	6.90	4.83	2.40	.95	.01	5.71	4.78	3.16	1.34	.10	.00	.00	4.76	3.67	2.59	1.18	.05
6	7.77	7.95	7.42	4.63	2.64	.46	6.52	6.17	5.18	3.32	.79	.02	.00	5.47	4.73	3.83	2.45	.46
7	8.18	8.45	9.50	8.28	5.00	2.64	7.25	7.48	7.39	6.36	3.28	.46	.00	6.31	6.01	5.37	4.53	1.96
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	.36	7.25	7.50	7.50	7.49	5.59
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	8.25	9.17	10.38	11.23	13.40
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	9.24	10.85	13.57	17.14	24.92
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	10.16	12.32	15.94	21.62	29.98
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	10.94	13.23	16.20	18.76	18.70
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	.36	11.52	13.26	13.79	11.69	4.71
14	9.92	10.18	9.94	8.70	6.40	3.26	10.86	11.24	10.64	8.49	3.79	.47	.00	11.84	12.34	9.97	5.69	.49
15	10.01	10.24	10.06	9.14	6.00	2.09	11.08	10.96	9.61	6.79	2.20	.14	.00	11.86	10.85	7.63	3.08	.65
16	10.08	10.25	10.16	9.76	6.57	2.78	11.20	10.54	8.84	6.50	3.31	.74	.01	11.56	9.54	6.34	3.94	1.78
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	.30	10.97	8.66	6.31	5.87	4.13
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	10.18	8.04	7.68	8.19	8.17
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	9.39	8.17	9.13	10.67	13.68
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	8.87	8.94	10.46	12.94	18.94
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	8.74	9.66	11.48	14.43	20.78
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	9.15	10.24	12.00	14.40	17.13
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	9.52	10.62	11.92	12.67	10.08
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	.30	9.84	10.79	11.29	10.00	4.35
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	.02	10.08	10.77	10.35	7.64	2.27
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	.15	10.25	10.58	9.44	6.54	3.02
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	10.34	10.30	8.84	6.85	5.40
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	10.36	10.00	8.70	8.11	8.85
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	10.31	9.76	8.97	9.70	12.74
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	10.23	9.61	9.49	11.13	15.91
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	10.13	9.59	10.06	12.06	16.93
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	10.02	9.67	10.50	12.29	15.07
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	9.93	9.82	10.73	11.77	11.12
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	9.86	9.98	10.71	10.70	7.04
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	.22	9.84	10.11	10.50	9.49	4.65
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	.51	9.84	10.19	10.18	8.57	4.54
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	9.88	10.20	9.86	8.26	6.24
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	9.93	10.17	9.63	8.58	8.94
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	9.99	10.10	9.54	9.33	11.83
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	10.03	10.03	9.61	10.18	14.02

TABLE22 FROM 'STATISTICAL ANALYSES OF INDUSTRIAL PROPERTY RETIREMENTS' BY ROBLEY WINFREY, BULLETIN 125, IOWA STATE UNIVERSITY

	L0	L1	L2	L3	L4	L5	S0	S1	S2	S3	S4	S5	S6	R1	R2	R3	R4	R5
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	10.06	9.96	9.77	10.86	14.74
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	10.07	9.92	9.97	11.18	13.67
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	10.06	9.90	10.15	11.09	11.21
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	10.04	9.91	10.25	10.66	8.43
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	.70	10.02	9.94	10.26	10.06	6.47
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	10.00	9.98	10.20	9.51	6.01
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	9.99	10.01	10.09	9.18	7.01
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	9.98	10.04	9.97	9.16	8.95
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	9.97	10.05	9.88	9.42	11.09
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	9.97	10.04	9.84	9.84	12.73
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	9.98	10.01	9.85	10.26	13.32
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	9.98	9.99	9.90	10.54	12.69
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	9.98	9.98	10.61	11.10
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	9.97	10.04	10.47	9.18
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	9.97	10.08	10.20	7.70
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	9.98	10.10	9.90	7.18
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	10.00	10.08	9.66	7.72
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	10.04	9.53	9.03
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	10.01	10.00	9.62	10.58
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	10.02	9.96	9.79	11.82
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	10.01	9.94	10.02	12.34
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	9.99	10.01	9.94	10.20	11.98
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	9.99	10.00	9.96	10.30	10.94
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	9.99	10.00	9.98	10.29	9.61
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	9.99	9.99	10.01	10.18	8.51
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	9.99	10.03	10.03	8.03
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	9.99	10.03	9.88	8.30
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	10.03	9.79	9.16
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	10.02	9.78	10.26
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	9.84	11.19
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	9.99	9.94	11.63
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	9.98	10.05	11.46
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	9.98	10.13	10.77
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	9.98	10.16	9.85
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	9.99	10.13	9.04
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	10.06	8.63
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	10.01	9.98	8.74
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	10.01	9.91	9.30
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	10.01	9.88	10.08
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	10.01	9.89	10.76

TABLE22 FROM 'STATISTICAL ANALYSES OF INDUSTRIAL PROPERTY RETIREMENTS' BY ROBLEY WINFREY, BULLETIN 125, IOWA STATE UNIVERSITY

	L0	L1	L2	L3	L4	L5	S0	S1	S2	S3	S4	S5	S6	R1	R2	R3	R4	R5
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	9.91	11.13
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	9.97	11.07
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	10.03	10.62
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	10.08	9.98
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	10.09	9.39
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	10.07	9.06
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	10.02	9.09
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	9.98	9.44
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	9.95	9.98
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	9.94	10.48
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	9.95	10.78
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	9.98	10.78
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	10.02	10.49
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	10.04	10.05
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	10.05	9.62
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	10.04	9.36
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	10.01	9.34
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	9.98	9.56
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	9.99	9.93
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	10.01	10.30
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	10.01	10.53
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	10.02	10.56
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	10.02	10.38
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	10.02	10.08
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	10.01	9.77
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	9.56
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	9.99	9.53
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	9.98	9.66
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	9.99	9.91
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	10.18
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	10.36
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	10.01	10.40
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	10.01	10.29
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	10.01	10.09
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	9.87
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	9.99	9.71
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	9.99	9.66
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	9.99	9.74
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	9.91
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	10.10

C HANDY-WHITMAN INDICES:
C
C
C YEAR | TOTAL PLANT | STATN EQPMT #353 | TOWRS & FIX #354 | POLES & FIX #355 | OVRHD CNDCT #356
C
C

YEAR	TOTAL PLANT	STATN EQPMT #353	TOWRS & FIX #354	POLES & FIX #355	OVRHD CNDCT #356
1940	22	35	17	15	22
1941	23	36	19	17	23
1942	25	37	20	18	25
1943	25	36	20	19	26
1944	25	35	21	21	26
1945	26	35	21	22	26
1946	29	39	24	24	30
1947	34	47	28	29	35
1948	37	49	31	32	39
1949	38	52	32	32	39
1950	40	56	34	33	41
1951	45	63	37	36	47
1952	46	64	39	37	49
1953	49	68	41	39	51
1954	50	69	42	40	52
1955	52	70	43	42	55
1956	56	77	46	44	61
1957	57	81	48	47	63
1958	59	84	51	49	63
1959	60	83	53	50	62
1960	60	77	55	52	63
1961	59	70	57	53	63
1962	59	69	57	54	65
1963	59	65	59	55	61
1964	61	69	61	56	64
1965	64	73	63	58	67
1966	67	75	67	61	70
1967	70	79	71	63	73
1968	73	83	74	65	73
1969	78	85	78	69	80
1970	83	89	82	76	89
1971	89	91	87	81	98
1972	93	94	92	87	99
1973	100	100	100	100	100
1974	124	124	123	126	117
1975	145	148	147	145	146
1976	158	156	150	150	173
1977	172	172	154	160	191
1978	174	182	170	170	176
1979	190	196	186	190	194
1980	211	217	210	210	215
1981	230	235	227	233	237
1982	245	254	229	253	251
1983	254	257	233	257	277
1984	255	261	247	263	265
1985	252	260	254	255	250
1986	256	262	262	258	254
1987	257	270	267	260	234
1988	286	280	280	282	326
1989	296	295	288	301	320
1990	308	315	290	309	333
1991	314	315	281	334	356
1992	310	323	283	353	312
1993	321	335	297	359	325
1994	336	353	314	376	333
1995	353	365	321	391	368

COST-EVALUATION PERIOD DATA:

YEAR	PLANT INVESTMENT	ESCALATION FACTOR
1996	241800.	1.00900
1997	180300.	1.03100
1998	176600.	1.05300
1999	168900.	1.07700
2000	172900.	1.10200
2001	195200.	1.12900
2002	264200.	1.15700

PLANT INVESTMENT BY YEAR AND FERC ACCOUNT

YEAR	350.3	352	353.1	354	355	356	358	359
1940	691.	466.	257.	1166.	89.	1469.	0.	100.
1941	1675.	924.	2189.	3835.	785.	6978.	0.	144.
1942	458.	711.	1313.	68.	601.	1675.	0.	289.
1943	568.	616.	1834.	4202.	120.	3620.	0.	431.
1944	32.	23.	13.	1.	26.	328.	0.	132.
1945	7.	32.	471.	538.	203.	511.	0.	101.
1946	62.	164.	548.	613.	104.	446.	0.	20.
1947	220.	69.	523.	12.	371.	604.	0.	116.
1948	807.	346.	1719.	325.	1069.	2404.	0.	177.
1949	506.	111.	3962.	403.	1206.	1652.	0.	114.
1950	1654.	768.	1672.	9205.	955.	9326.	0.	1173.
1951	1107.	475.	3286.	2030.	909.	3474.	0.	12.
1952	998.	443.	3933.	7448.	627.	7376.	193.	9.
1953	1510.	1604.	10639.	8496.	3495.	11045.	0.	236.
1954	2246.	1048.	5303.	13099.	1438.	12402.	0.	1484.
1955	522.	982.	10439.	2127.	463.	2633.	0.	50.
1956	1150.	540.	6954.	15390.	244.	12931.	0.	358.
1957	816.	1182.	9119.	1549.	1506.	3497.	0.	299.
1958	1846.	694.	7808.	5518.	1865.	7007.	0.	740.
1959	858.	371.	8115.	36.	1229.	1983.	0.	236.
1960	372.	177.	3400.	710.	395.	1106.	0.	40.
1961	584.	428.	7169.	2144.	741.	4162.	0.	212.
1962	2191.	559.	4035.	11363.	1407.	9796.	0.	543.
1963	1076.	274.	4229.	1232.	470.	1844.	0.	391.
1964	534.	593.	2897.	2217.	262.	1517.	0.	50.
1965	2244.	205.	4969.	9048.	324.	11700.	0.	538.
1966	2288.	634.	11059.	4123.	1144.	6264.	0.	274.
1967	2973.	1368.	12779.	11313.	828.	12338.	1401.	235.
1968	3570.	2925.	22670.	34803.	329.	36903.	0.	1036.
1969	5693.	2342.	15466.	26291.	1203.	26748.	0.	513.
1970	4710.	13541.	76507.	26627.	1173.	28554.	0.	943.
1971	4561.	1400.	14203.	16012.	649.	14211.	0.	329.
1972	4005.	2522.	20037.	14982.	1262.	18877.	0.	879.
1973	5352.	2184.	21089.	28675.	576.	26372.	1494.	1615.
1974	2265.	1152.	18740.	6504.	1598.	7255.	0.	1121.
1975	3484.	3720.	28935.	20981.	1957.	15024.	0.	1320.
1976	6744.	2263.	29886.	33087.	2074.	29099.	1318.	860.
1977	2548.	2718.	36766.	62818.	1558.	69438.	65.	1036.
1978	1324.	1798.	41730.	7713.	1558.	7802.	43.	51.
1979	1830.	1242.	24069.	9162.	2155.	12050.	0.	1337.
1980	388.	1709.	25538.	14702.	856.	16048.	0.	201.
1981	9241.	2654.	50949.	61377.	1320.	64696.	0.	527.
1982	627.	1982.	41018.	3573.	712.	5095.	0.	356.
1983	1944.	5987.	43349.	28742.	3252.	29255.	4818.	823.
1984	10353.	7522.	70637.	76150.	3318.	80683.	0.	8436.
1985	992.	8854.	78163.	303.	1728.	3230.	0.	-299.
1986	2897.	5915.	26492.	7490.	12869.	20574.	0.	1326.
1987	11797.	7774.	36947.	100751.	10586.	139642.	0.	40185.
1988	6237.	9055.	26772.	4838.	2727.	6911.	0.	309.
1989	3830.	13836.	155594.	2056.	1493.	1450.	0.	166.
1990	15.	4291.	56938.	3372.	1398.	2608.	0.	0.
1991	910.	6365.	102139.	1305.	1573.	3231.	0.	0.
1992	267.	3238.	163887.	221.	2116.	6607.	0.	325.
1993	1344.	9285.	96112.	21577.	1295.	22527.	0.	664.
1994	3122.	22902.	199733.	19643.	199.	19695.	0.	118.
1995	869.	9682.	58936.	524.	1143.	4282.	0.	450.
1996	7351.	9841.	96188.	42218.	4812.	48191.	532.	4111.
1997	5481.	7338.	71723.	31480.	3588.	35934.	397.	3065.
1998	5369.	7188.	70251.	30834.	3514.	35196.	389.	3002.
1999	5135.	6874.	67188.	29490.	3361.	33662.	372.	2871.
2000	5256.	7037.	68780.	30188.	3441.	34459.	380.	2939.
2001	5934.	7945.	77651.	34082.	3884.	38903.	429.	3318.
2002	8032.	10753.	105099.	46129.	5258.	52655.	581.	4491.

PLANT INVESTMENT BY YEAR AND FERC ACCOUNT

YEAR	389	390	391.1	391.2	392.1	392.2	392.3	393
1940	107.	66.	0.	0.	0.	0.	0.	0.
1941	2.	304.	0.	0.	0.	0.	0.	0.
1942	6.	107.	0.	0.	0.	0.	0.	0.
1943	2.	270.	0.	0.	0.	0.	0.	0.
1944	0.	18.	0.	0.	0.	0.	0.	0.
1945	0.	3.	0.	0.	9.	0.	0.	0.
1946	0.	26.	0.	0.	0.	0.	0.	0.
1947	0.	75.	0.	0.	0.	0.	0.	0.
1948	37.	34.	0.	0.	3.	0.	0.	0.
1949	4.	6.	0.	0.	0.	0.	0.	0.
1950	1.	315.	0.	0.	0.	0.	0.	0.
1951	9.	122.	0.	0.	10.	0.	0.	0.
1952	0.	292.	0.	0.	0.	0.	0.	0.
1953	0.	458.	0.	0.	0.	0.	0.	0.
1954	43.	227.	0.	0.	0.	0.	0.	0.
1955	51.	330.	0.	0.	0.	0.	0.	0.
1956	12.	170.	0.	0.	0.	0.	0.	0.
1957	1.	222.	0.	0.	0.	0.	0.	0.
1958	3.	105.	0.	0.	0.	0.	0.	0.
1959	4.	179.	0.	0.	0.	0.	0.	0.
1960	0.	401.	0.	0.	0.	0.	0.	0.
1961	17.	472.	0.	0.	0.	0.	0.	0.
1962	0.	116.	0.	0.	0.	0.	0.	0.
1963	3.	1500.	0.	0.	20.	0.	0.	0.
1964	0.	265.	0.	0.	15.	0.	0.	0.
1965	3.	736.	0.	0.	5.	0.	0.	0.
1966	12.	74.	0.	0.	0.	0.	0.	16.
1967	7.	234.	14.	0.	16.	0.	0.	7.
1968	37.	202.	0.	0.	26.	0.	0.	35.
1969	5.	983.	0.	0.	121.	0.	0.	29.
1970	23.	115.	0.	0.	120.	0.	0.	0.
1971	244.	253.	0.	4.	163.	0.	0.	26.
1972	8.	2292.	5.	0.	29.	0.	0.	20.
1973	1.	1535.	0.	0.	763.	0.	0.	0.
1974	1.	1796.	0.	0.	420.	0.	0.	180.
1975	24.	1410.	0.	0.	400.	0.	0.	90.
1976	30.	688.	10.	11.	504.	0.	0.	113.
1977	76.	7649.	7.	376.	306.	0.	0.	211.
1978	29.	1473.	0.	10.	1111.	0.	0.	89.
1979	306.	5933.	16.	80.	460.	538.	0.	497.
1980	0.	877.	51.	123.	657.	0.	0.	258.
1981	93.	1026.	61.	123.	668.	0.	0.	41.
1982	16.	1346.	21.	115.	555.	0.	0.	60.
1983	64.	7346.	106.	791.	178.	0.	1562.	0.
1984	2.	2948.	92.	1060.	77.	0.	0.	0.
1985	6.	1974.	140.	765.	754.	0.	0.	0.
1986	5.	1465.	196.	1846.	425.	0.	2102.	0.
1987	31.	1926.	1255.	2449.	236.	0.	0.	0.
1988	18.	986.	249.	1829.	478.	0.	0.	-74.
1989	17.	2364.	211.	1400.	1164.	0.	0.	0.
1990	147.	3652.	93.	1375.	560.	0.	0.	6.
1991	0.	5959.	526.	4988.	1311.	0.	0.	293.
1992	333.	8033.	439.	6240.	2056.	1895.	0.	350.
1993	176.	8882.	45.	6048.	970.	1679.	0.	214.
1994	912.	26759.	0.	1287.	117.	0.	0.	0.
1995	87.	1811.	0.	0.	0.	0.	0.	0.
1996	169.	6093.	193.	1814.	822.	242.	218.	145.
1997	126.	4544.	144.	1352.	613.	180.	162.	108.
1998	124.	4450.	141.	1325.	600.	177.	159.	106.
1999	118.	4256.	135.	1267.	574.	169.	152.	101.
2000	121.	4357.	138.	1297.	588.	173.	156.	104.
2001	137.	4919.	156.	1464.	664.	195.	176.	117.
2002	185.	6658.	211.	1982.	898.	264.	238.	159.

PLANT INVESTMENT BY YEAR AND FERC ACCOUNT

YEAR	394	395	395.1	396	397.3	398	TOTAL
1940	0.	0.	0.	0.	13.	0.	4424.
1941	0.	0.	0.	0.	27.	0.	16863.
1942	0.	0.	0.	0.	14.	0.	5242.
1943	0.	0.	0.	0.	16.	0.	11679.
1944	0.	3.	0.	0.	2.	0.	578.
1945	0.	0.	0.	0.	-2.	0.	1873.
1946	0.	0.	0.	0.	30.	0.	2013.
1947	0.	0.	0.	0.	6.	0.	1996.
1948	0.	0.	0.	0.	-3.	0.	6918.
1949	0.	0.	0.	0.	17.	0.	7981.
1950	24.	1.	0.	0.	26.	0.	25120.
1951	0.	0.	0.	0.	214.	0.	11648.
1952	8.	7.	0.	0.	-902.	0.	20432.
1953	0.	52.	0.	0.	39.	0.	37574.
1954	24.	0.	0.	0.	355.	0.	37669.
1955	13.	72.	0.	0.	1419.	0.	19101.
1956	0.	-84.	0.	0.	420.	0.	38085.
1957	0.	0.	0.	0.	43.	0.	18234.
1958	0.	0.	0.	0.	-146.	0.	25440.
1959	0.	0.	0.	26.	252.	0.	13289.
1960	6.	0.	0.	0.	117.	0.	6724.
1961	0.	105.	0.	0.	255.	0.	16289.
1962	8.	0.	0.	0.	90.	0.	30108.
1963	0.	40.	0.	0.	231.	0.	11310.
1964	22.	1709.	0.	0.	225.	0.	10306.
1965	45.	367.	0.	0.	621.	0.	30805.
1966	10.	164.	0.	77.	373.	4.	26516.
1967	75.	16.	0.	0.	133.	0.	43737.
1968	34.	107.	0.	0.	831.	0.	103508.
1969	0.	248.	0.	95.	763.	0.	80500.
1970	4.	227.	0.	57.	1745.	0.	154346.
1971	15.	326.	0.	5.	1225.	0.	53626.
1972	9.	161.	0.	256.	928.	0.	66272.
1973	51.	1221.	0.	0.	1140.	0.	92068.
1974	51.	207.	0.	169.	1086.	0.	42545.
1975	15.	1082.	0.	686.	1327.	0.	80455.
1976	186.	881.	0.	852.	8997.	0.	117603.
1977	111.	1384.	1294.	799.	4106.	0.	193266.
1978	169.	872.	1363.	583.	3431.	0.	71149.
1979	171.	861.	678.	233.	3498.	0.	65116.
1980	182.	352.	281.	343.	3561.	0.	66127.
1981	106.	627.	171.	798.	9803.	0.	204281.
1982	284.	935.	0.	773.	3215.	0.	60683.
1983	105.	882.	0.	1352.	6320.	0.	136876.
1984	608.	1808.	0.	1091.	7547.	0.	272332.
1985	179.	1194.	0.	727.	5978.	0.	104688.
1986	93.	1826.	184.	1021.	7788.	0.	94514.
1987	161.	2754.	0.	368.	8860.	0.	365722.
1988	83.	1510.	0.	549.	9869.	0.	72346.
1989	269.	1480.	0.	367.	6854.	0.	192551.
1990	452.	1367.	0.	753.	22648.	0.	99675.
1991	210.	2845.	0.	1383.	18079.	0.	151117.
1992	752.	1808.	0.	3113.	20828.	0.	222508.
1993	638.	2671.	0.	3111.	31273.	0.	208511.
1994	96.	872.	11.	299.	32443.	0.	328208.
1995	0.	349.	0.	0.	13587.	0.	91720.
1996	290.	1862.	218.	1112.	13589.	0.	240011.
1997	216.	1388.	162.	829.	10133.	0.	178966.
1998	212.	1360.	159.	812.	9925.	0.	175293.
1999	203.	1301.	152.	777.	9492.	0.	167650.
2000	207.	1331.	156.	795.	9717.	0.	171621.
2001	234.	1503.	176.	898.	10970.	0.	193756.
2002	317.	2034.	238.	1215.	14848.	0.	262245.

ADJUSTED PLANT INVESTMENT BY YEAR AND FERC ACCOUNT

YEAR	350.3	352	353.1	354	355	356	358	359
1996	7351.	8717.	44707.	39239.	-3896.	44689.	-587.	4111.
1997	5481.	6165.	17976.	28342.	-5188.	32244.	-707.	3065.
1998	5369.	5965.	14317.	27531.	-5307.	31313.	-682.	3002.
1999	5135.	5604.	9165.	26014.	-5437.	29577.	-753.	2871.
2000	5256.	5721.	8741.	26534.	-5293.	30166.	-732.	2939.
2001	5934.	6581.	15667.	30245.	-4773.	34398.	-629.	3318.
2002	8032.	9341.	41217.	42103.	-3331.	47931.	-459.	4491.

YEAR	389	390	391.1	391.2	392.1	392.2	392.3	393
1996	169.	4784.	-74.	466.	-1024.	105.	-51.	-72.
1997	126.	3168.	-161.	-213.	-1288.	102.	-164.	-109.
1998	124.	3011.	-201.	-471.	-1329.	150.	-227.	-113.
1999	118.	2755.	-241.	-767.	-1355.	159.	-289.	-120.
2000	121.	2794.	-264.	-974.	-1313.	162.	-328.	-122.
2001	137.	3293.	-264.	-1036.	-1188.	167.	-323.	-114.
2002	185.	4969.	-214.	-730.	-890.	202.	-255.	-79.

YEAR	394	395	395.1	396	397.3	398	TOTAL
1996	-98.	-269.	-149.	-353.	4359.	-2.	152120.
1997	-182.	-834.	-207.	-696.	128.	-2.	87046.
1998	-193.	-956.	-209.	-766.	-875.	-2.	79451.
1999	-206.	-1105.	-212.	-851.	-2103.	-2.	67957.
2000	-203.	-1161.	-204.	-879.	-2658.	-2.	68301.
2001	-177.	-1070.	-178.	-818.	-2156.	-2.	87012.
2002	-94.	-614.	-110.	-537.	1009.	-1.	152168.

2002 REPLACEMENTS BY INDIVIDUAL FERC ACCOUNTS:

CURVE		R2	S0	R3	R3	R3	R5	
LIFE	100	90	37	100	39	100	25	90
FERC ACCT	350.3	352	353.1	354	355	356	358	359
1996	0.	1124.	51481.	2979.	8708.	3502.	1119.	0.
1997	0.	1173.	53747.	3138.	8776.	3690.	1104.	0.
1998	0.	1222.	55935.	3303.	8821.	3883.	1070.	0.
1999	0.	1270.	58023.	3476.	8798.	4085.	1124.	0.
2000	0.	1316.	60039.	3655.	8734.	4293.	1112.	0.
2001	0.	1363.	61984.	3837.	8658.	4505.	1058.	0.
2002	0.	1412.	63881.	4026.	8589.	4724.	1040.	0.
2003	0.	1462.	65773.	4223.	8493.	4954.	980.	0.
2004	0.	1513.	67592.	4426.	8371.	5191.	896.	0.
2005	0.	1562.	69336.	4632.	8247.	5433.	898.	0.
2006	0.	1611.	71015.	4846.	8155.	5683.	921.	0.
2007	0.	1659.	72641.	5068.	8089.	5945.	940.	0.
2008	0.	1706.	74207.	5294.	8012.	6213.	968.	0.
2009	0.	1755.	75722.	5531.	7939.	6491.	1026.	0.
2010	0.	1805.	77175.	5774.	7892.	6775.	971.	0.
2011	0.	1856.	78575.	6020.	7869.	7064.	894.	0.
2012	0.	1909.	79920.	6274.	7853.	7360.	831.	0.
2013	0.	1963.	81210.	6537.	7853.	7667.	755.	0.
2014	0.	2018.	82447.	6805.	7880.	7984.	679.	0.
2015	0.	2073.	83634.	7078.	7935.	8306.	690.	0.
2016	0.	2129.	84777.	7362.	8004.	8639.	719.	0.
2017	0.	2186.	85861.	7656.	8080.	8988.	729.	0.
2018	0.	2244.	86904.	7958.	8170.	9347.	780.	0.
2019	0.	2304.	87901.	8274.	8282.	9719.	778.	0.
2020	0.	2364.	88857.	8599.	8405.	10101.	761.	0.
2021	0.	2427.	89737.	8929.	8522.	10488.	741.	0.
2022	0.	2490.	90566.	9269.	8632.	10884.	690.	0.
2023	0.	2554.	91336.	9618.	8750.	11293.	641.	0.
2024	0.	2619.	92046.	9975.	8867.	11714.	624.	0.
2025	0.	2684.	92694.	10337.	8962.	12142.	610.	0.
2026	0.	2751.	93315.	10711.	9038.	12582.	614.	0.
2027	0.	2818.	93891.	11094.	9109.	13034.	667.	0.
2028	0.	2886.	94410.	11487.	9155.	13497.	704.	0.
2029	0.	2955.	94888.	11893.	9169.	13974.	758.	0.
2030	0.	3026.	95350.	12310.	9157.	14462.	814.	0.
2031	0.	3097.	95783.	12733.	9132.	14957.	850.	0.
2032	0.	3169.	96159.	13169.	9074.	15463.	879.	0.
2033	0.	3242.	96499.	13616.	8986.	15985.	893.	0.
2034	0.	3315.	96805.	14076.	8874.	16524.	902.	0.
2035	0.	3389.	97058.	14544.	8750.	17072.	885.	0.
2036	0.	3463.	97222.	15021.	8610.	17631.	868.	0.
2037	0.	3537.	97321.	15501.	8462.	18190.	848.	0.
2038	0.	3612.	97366.	15992.	8305.	18759.	818.	0.
2039	0.	3688.	97308.	16487.	8153.	19334.	785.	0.
2040	0.	3764.	97156.	16990.	8026.	19918.	767.	0.
2041	0.	3840.	96956.	17500.	7917.	20508.	752.	0.
2042	0.	3916.	96712.	18019.	7815.	21109.	729.	0.
2043	0.	3994.	96470.	18554.	7725.	21731.	738.	0.
2044	0.	4071.	96218.	19103.	7662.	22367.	723.	0.
2045	0.	4148.	95977.	19662.	7621.	23014.	719.	0.
2046	0.	4224.	95753.	20219.	7592.	23660.	719.	0.
2047	0.	4299.	95656.	20771.	7577.	24292.	704.	0.

2002 REPLACEMENTS BY INDIVIDUAL FERC ACCOUNTS:

CURVE		L1	R2	R2	L1	R5	R3	L2
LIFE	90	65	12	13	12	15	15	18
FERC ACCT	389	390	391.1	391.2	392.1	392.2	392.3	393
1996	0.	1309.	268.	1347.	1846.	137.	269.	217.
1997	0.	1376.	306.	1566.	1901.	78.	327.	218.
1998	0.	1439.	342.	1796.	1930.	27.	386.	219.
1999	0.	1501.	376.	2034.	1929.	10.	441.	222.
2000	0.	1564.	403.	2271.	1901.	11.	484.	226.
2001	0.	1626.	420.	2500.	1852.	28.	498.	231.
2002	0.	1689.	425.	2711.	1788.	62.	493.	237.
2003	0.	1753.	415.	2894.	1719.	123.	456.	242.
2004	0.	1817.	397.	3047.	1656.	230.	403.	245.
2005	0.	1882.	372.	3154.	1600.	388.	341.	245.
2006	0.	1946.	344.	3210.	1553.	595.	272.	244.
2007	0.	2008.	314.	3207.	1517.	782.	226.	241.
2008	0.	2069.	282.	3137.	1489.	877.	192.	236.
2009	0.	2128.	258.	3001.	1468.	801.	177.	230.
2010	0.	2186.	243.	2821.	1450.	602.	172.	225.
2011	0.	2245.	234.	2634.	1434.	390.	173.	220.
2012	0.	2304.	229.	2469.	1419.	254.	185.	216.
2013	0.	2361.	230.	2343.	1406.	203.	195.	213.
2014	0.	2416.	238.	2263.	1396.	188.	205.	211.
2015	0.	2469.	249.	2233.	1387.	192.	215.	210.
2016	0.	2521.	261.	2263.	1381.	207.	224.	211.
2017	0.	2571.	273.	2346.	1377.	233.	236.	211.
2018	0.	2620.	283.	2457.	1374.	275.	247.	212.
2019	0.	2668.	288.	2564.	1374.	338.	255.	213.
2020	0.	2714.	289.	2651.	1375.	425.	261.	214.
2021	0.	2758.	287.	2712.	1377.	526.	261.	214.
2022	0.	2800.	281.	2744.	1379.	613.	256.	215.
2023	0.	2841.	275.	2749.	1382.	661.	246.	215.
2024	0.	2878.	268.	2731.	1385.	649.	235.	214.
2025	0.	2914.	262.	2694.	1388.	577.	225.	214.
2026	0.	2948.	259.	2647.	1391.	471.	215.	214.
2027	0.	2981.	258.	2598.	1393.	364.	210.	214.
2028	0.	3012.	259.	2556.	1394.	286.	208.	214.
2029	0.	3042.	261.	2525.	1395.	240.	209.	213.
2030	0.	3069.	264.	2507.	1395.	226.	213.	213.
2031	0.	3092.	267.	2503.	1395.	238.	218.	213.
2032	0.	3115.	270.	2511.	1394.	266.	224.	213.
2033	0.	3136.	272.	2527.	1393.	309.	230.	213.
2034	0.	3157.	273.	2549.	1393.	363.	234.	214.
2035	0.	3177.	273.	2574.	1392.	425.	238.	214.
2036	0.	3196.	272.	2595.	1391.	488.	240.	214.
2037	0.	3213.	271.	2611.	1391.	537.	240.	214.
2038	0.	3230.	269.	2621.	1390.	566.	239.	214.
2039	0.	3245.	268.	2624.	1390.	564.	237.	214.
2040	0.	3261.	267.	2620.	1390.	529.	234.	214.
2041	0.	3276.	266.	2611.	1390.	472.	230.	214.
2042	0.	3290.	266.	2600.	1391.	404.	227.	214.
2043	0.	3304.	266.	2589.	1391.	343.	224.	214.
2044	0.	3318.	266.	2578.	1391.	297.	222.	214.
2045	0.	3331.	267.	2570.	1391.	274.	222.	214.
2046	0.	3344.	268.	2565.	1391.	275.	222.	214.
2047	0.	3357.	268.	2563.	1391.	294.	223.	214.

2003 REPLACEMENTS BY INDIVIDUAL FERC ACCOUNTS:

CURVE		R2	S0	R3	R3	R3	R5	
LIFE	100	90	37	100	39	100	25	90
FERC ACCT	350.3	352	353.1	354	355	356	358	359
1996	0.	1124.	51481.	2979.	8708.	3502.	1119.	0.
1997	0.	1173.	53747.	3138.	8776.	3690.	1104.	0.
1998	0.	1222.	55935.	3303.	8821.	3883.	1070.	0.
1999	0.	1270.	58023.	3476.	8798.	4085.	1124.	0.
2000	0.	1316.	60039.	3655.	8734.	4293.	1112.	0.
2001	0.	1363.	61984.	3837.	8658.	4505.	1058.	0.
2002	0.	1412.	63881.	4026.	8589.	4724.	1040.	0.
2003	0.	1462.	65773.	4223.	8493.	4954.	980.	0.
2004	0.	1515.	67614.	4427.	8370.	5192.	896.	0.
2005	0.	1566.	69380.	4634.	8245.	5435.	898.	0.
2006	0.	1617.	71073.	4849.	8153.	5686.	921.	0.
2007	0.	1666.	72713.	5071.	8086.	5949.	940.	0.
2008	0.	1715.	74293.	5299.	8008.	6218.	968.	0.
2009	0.	1764.	75822.	5536.	7934.	6497.	1026.	0.
2010	0.	1814.	77285.	5780.	7885.	6782.	971.	0.
2011	0.	1866.	78697.	6027.	7861.	7072.	894.	0.
2012	0.	1919.	80053.	6282.	7844.	7368.	831.	0.
2013	0.	1973.	81353.	6545.	7842.	7677.	755.	0.
2014	0.	2028.	82599.	6815.	7867.	7994.	679.	0.
2015	0.	2084.	83796.	7088.	7919.	8317.	689.	0.
2016	0.	2140.	84948.	7372.	7987.	8651.	718.	0.
2017	0.	2198.	86040.	7667.	8060.	9001.	727.	0.
2018	0.	2256.	87092.	7971.	8147.	9361.	777.	0.
2019	0.	2316.	88097.	8288.	8256.	9735.	774.	0.
2020	0.	2377.	89061.	8614.	8377.	10118.	755.	0.
2021	0.	2440.	89949.	8945.	8490.	10506.	731.	0.
2022	0.	2504.	90786.	9287.	8596.	10904.	676.	0.
2023	0.	2568.	91564.	9637.	8711.	11315.	620.	0.
2024	0.	2633.	92280.	9996.	8824.	11738.	596.	0.
2025	0.	2699.	92936.	10360.	8915.	12167.	574.	0.
2026	0.	2767.	93564.	10735.	8987.	12609.	568.	0.
2027	0.	2835.	94147.	11119.	9053.	13062.	612.	0.
2028	0.	2903.	94673.	11514.	9094.	13528.	644.	0.
2029	0.	2973.	95157.	11922.	9102.	14007.	694.	0.
2030	0.	3044.	95626.	12341.	9084.	14497.	757.	0.
2031	0.	3116.	96065.	12766.	9053.	14994.	802.	0.
2032	0.	3188.	96447.	13204.	8989.	15503.	842.	0.
2033	0.	3261.	96793.	13654.	8892.	16028.	867.	0.
2034	0.	3335.	97105.	14116.	8771.	16569.	889.	0.
2035	0.	3410.	97363.	14586.	8638.	17120.	878.	0.
2036	0.	3485.	97533.	15065.	8490.	17681.	864.	0.
2037	0.	3560.	97638.	15547.	8333.	18243.	847.	0.
2038	0.	3635.	97689.	16040.	8166.	18814.	816.	0.
2039	0.	3711.	97636.	16538.	8005.	19393.	783.	0.
2040	0.	3788.	97488.	17045.	7868.	19980.	765.	0.

2041	0.	3865.	97294.	17557.	7752.	20574.	749.	0.
2042	0.	3942.	97054.	18079.	7643.	21178.	724.	0.
2043	0.	4020.	96817.	18618.	7546.	21803.	731.	0.
2044	0.	4098.	96569.	19170.	7476.	22443.	715.	0.
2045	0.	4176.	96332.	19732.	7434.	23093.	707.	0.
2046	0.	4253.	96113.	20291.	7404.	23743.	704.	0.
2047	0.	4328.	96019.	20847.	7389.	24378.	685.	0.
2048	0.	4404.	95913.	21404.	7400.	25013.	671.	0.

2003 REPLACEMENTS BY INDIVIDUAL FERC ACCOUNTS:

CURVE		L1	R2	R2	L1	R5	R3	L2
LIFE	90	65	12	13	12	15	15	18
FERC ACCT	389	390	391.1	391.2	392.1	392.2	392.3	393
1996	0.	1309.	268.	1347.	1846.	137.	269.	217.
1997	0.	1376.	306.	1566.	1901.	78.	327.	218.
1998	0.	1439.	342.	1796.	1930.	27.	386.	219.
1999	0.	1501.	376.	2034.	1929.	10.	441.	222.
2000	0.	1564.	403.	2271.	1901.	11.	484.	226.
2001	0.	1626.	420.	2500.	1852.	28.	498.	231.
2002	0.	1689.	425.	2711.	1788.	62.	493.	237.
2003	0.	1753.	415.	2894.	1719.	123.	456.	242.
2004	0.	1819.	394.	3033.	1644.	230.	402.	245.
2005	0.	1885.	368.	3137.	1579.	388.	341.	245.
2006	0.	1950.	339.	3188.	1521.	595.	271.	243.
2007	0.	2013.	308.	3180.	1473.	782.	224.	240.
2008	0.	2075.	275.	3104.	1433.	877.	189.	235.
2009	0.	2135.	249.	2960.	1403.	801.	173.	229.
2010	0.	2194.	232.	2771.	1379.	602.	166.	222.
2011	0.	2254.	221.	2573.	1360.	390.	166.	216.
2012	0.	2314.	213.	2397.	1342.	255.	177.	211.
2013	0.	2372.	211.	2259.	1327.	204.	185.	208.
2014	0.	2428.	216.	2164.	1314.	191.	192.	205.
2015	0.	2482.	224.	2120.	1304.	197.	199.	204.
2016	0.	2535.	234.	2137.	1296.	215.	204.	204.
2017	0.	2586.	244.	2210.	1290.	244.	212.	204.
2018	0.	2636.	254.	2314.	1287.	289.	219.	205.
2019	0.	2686.	261.	2420.	1285.	352.	225.	206.
2020	0.	2733.	265.	2513.	1286.	435.	231.	206.
2021	0.	2778.	265.	2584.	1287.	532.	233.	207.
2022	0.	2822.	262.	2628.	1290.	615.	232.	208.
2023	0.	2864.	256.	2644.	1293.	662.	227.	208.
2024	0.	2903.	250.	2634.	1297.	649.	218.	208.
2025	0.	2940.	244.	2604.	1300.	577.	211.	208.
2026	0.	2975.	240.	2559.	1303.	472.	203.	207.
2027	0.	3009.	238.	2510.	1305.	365.	198.	207.
2028	0.	3042.	238.	2461.	1307.	288.	196.	207.
2029	0.	3072.	239.	2424.	1308.	244.	195.	207.
2030	0.	3101.	241.	2401.	1308.	231.	198.	206.
2031	0.	3125.	244.	2392.	1308.	245.	201.	206.
2032	0.	3149.	247.	2396.	1308.	275.	205.	206.
2033	0.	3171.	249.	2411.	1307.	319.	209.	206.
2034	0.	3193.	250.	2433.	1306.	373.	213.	207.
2035	0.	3213.	251.	2457.	1305.	434.	216.	207.
2036	0.	3233.	251.	2480.	1304.	495.	218.	207.
2037	0.	3251.	250.	2499.	1304.	542.	218.	207.
2038	0.	3269.	249.	2511.	1303.	569.	218.	207.
2039	0.	3285.	247.	2516.	1303.	566.	217.	207.
2040	0.	3301.	246.	2514.	1303.	530.	215.	207.

2041	0.	3316.	245.	2507.	1303.	473.	212.	207.
2042	0.	3331.	245.	2497.	1303.	406.	210.	207.
2043	0.	3346.	244.	2485.	1304.	346.	208.	207.
2044	0.	3360.	245.	2473.	1304.	302.	206.	207.
2045	0.	3373.	245.	2464.	1304.	280.	205.	207.
2046	0.	3386.	246.	2458.	1304.	282.	205.	207.
2047	0.	3399.	246.	2455.	1304.	302.	206.	207.
2048	0.	3412.	247.	2455.	1304.	336.	207.	207.

2003 REPLACEMENTS BY INDIVIDUAL FERC ACCOUNTS:

CURVE	L0	L2	L2	R2	S1	L0	
LIFE	18	22	22	15	20	10	
FERC ACCT	394	395	395.1	396	397.3	398	TOTAL
1996	389.	2131.	367.	1465.	9230.	2.	87891.
1997	399.	2222.	369.	1526.	10004.	2.	91920.
1998	405.	2316.	368.	1578.	10800.	2.	95842.
1999	409.	2406.	364.	1628.	11595.	2.	99693.
2000	411.	2492.	359.	1674.	12375.	2.	103320.
2001	411.	2574.	354.	1716.	13127.	2.	106744.
2002	411.	2648.	348.	1752.	13839.	1.	110077.
2003	411.	2713.	343.	1786.	14509.	1.	113251.
2004	409.	2765.	338.	1815.	15124.	1.	116234.
2005	410.	2804.	334.	1847.	15682.	1.	119180.
2006	411.	2826.	330.	1874.	16184.	1.	122034.
2007	412.	2833.	326.	1892.	16624.	1.	124732.
2008	413.	2825.	322.	1899.	17007.	1.	127155.
2009	414.	2803.	318.	1890.	17331.	1.	129285.
2010	415.	2773.	313.	1862.	17599.	1.	131049.
2011	415.	2736.	308.	1816.	17814.	1.	132687.
2012	416.	2696.	304.	1752.	17971.	1.	134345.
2013	416.	2658.	299.	1675.	18081.	1.	136039.
2014	416.	2623.	295.	1595.	18144.	1.	137764.
2015	416.	2594.	291.	1523.	18165.	1.	139613.
2016	416.	2572.	288.	1466.	18153.	1.	141537.
2017	416.	2558.	286.	1428.	18114.	1.	143486.
2018	415.	2550.	284.	1408.	18035.	1.	145501.
2019	415.	2548.	283.	1411.	17939.	1.	147497.
2020	414.	2550.	282.	1437.	17806.	1.	149462.
2021	413.	2554.	282.	1480.	17667.	1.	151348.
2022	413.	2560.	282.	1531.	17506.	1.	153101.
2023	412.	2566.	282.	1580.	17341.	1.	154752.
2024	411.	2571.	282.	1621.	17174.	1.	156287.
2025	411.	2575.	282.	1652.	17011.	1.	157664.
2026	410.	2577.	282.	1669.	16862.	1.	158989.
2027	410.	2578.	282.	1675.	16730.	1.	160334.
2028	409.	2577.	282.	1671.	16629.	1.	161663.
2029	408.	2575.	282.	1659.	16556.	1.	163024.
2030	408.	2572.	282.	1640.	16531.	1.	164470.
2031	408.	2569.	282.	1619.	16549.	1.	165945.
2032	407.	2565.	282.	1597.	16612.	1.	167424.
2033	407.	2562.	282.	1577.	16714.	1.	168912.
2034	407.	2559.	282.	1562.	16844.	1.	170416.
2035	407.	2557.	283.	1552.	16978.	1.	171856.
2036	407.	2556.	283.	1546.	17098.	1.	173197.
2037	407.	2556.	283.	1546.	17197.	1.	174427.
2038	406.	2556.	283.	1550.	17269.	1.	175551.
2039	406.	2556.	284.	1557.	17316.	1.	176528.
2040	407.	2557.	284.	1567.	17342.	1.	177408.

1987	313709.	257.	442016.
1988	65782.	286.	82310.
1989	188538.	296.	231739.
1990	99513.	308.	114699.
1991	150207.	314.	172194.
1992	221583.	310.	251099.
1993	206327.	321.	226235.
1994	324056.	336.	337651.
1995	90314.	353.	90314.
1996	140489.	353.	140489.
1997	78374.	353.	78374.
1998	70956.	353.	70956.
1999	59833.	353.	59833.
2000	59984.	353.	59984.
2001	77623.	353.	77623.
2002	139460.	353.	139460.
2003	73949.	353.	73949.

FUTURE REPLACEMENTS FOR YEAR 2002:

YEAR	1995 DOLLARS	2002 DOLLARS
1996	87891.	
1997	91920.	
1998	95842.	
1999	99693.	
2000	103320.	
2001	106744.	
2002	110077.	
2003	113251.	131031.
2004	116249.	134500.
2005	119194.	137907.
2006	122057.	141220.
2007	124772.	144361.
2008	127212.	147185.
2009	129366.	149676.
2010	131154.	151745.
2011	132819.	153671.
2012	134506.	155624.
2013	136233.	157621.
2014	137994.	159659.
2015	139877.	161838.
2016	141833.	164101.
2017	143810.	166388.
2018	145846.	168744.
2019	147851.	171064.
2020	149819.	173341.
2021	151697.	175513.
2022	153437.	177527.
2023	155070.	179416.
2024	156590.	181175.
2025	157957.	182756.
2026	159276.	184282.
2027	160619.	185836.
2028	161949.	187376.
2029	163311.	188951.
2030	164749.	190615.
2031	166211.	192307.
2032	167677.	194003.
2033	169151.	195708.
2034	170640.	197431.
2035	172071.	199086.
2036	173403.	200628.
2037	174625.	202041.
2038	175742.	203333.
2039	176710.	204454.
2040	177582.	205462.
2041	178398.	206406.

2042	179160.	207289.
2043	180005.	208266.
2044	180878.	209276.
2045	181834.	210382.
2046	182841.	211547.
2047	183976.	212860.

FUTURE REPLACEMENTS FOR YEAR 2003:

YEAR	1995 DOLLARS	2003 DOLLARS
1996	87891.	
1997	91920.	
1998	95842.	
1999	99693.	
2000	103320.	
2001	106744.	
2002	110077.	
2003	113251.	
2004	116234.	137969.
2005	119180.	141467.
2006	122034.	144854.
2007	124732.	148057.
2008	127155.	150933.
2009	129285.	153462.
2010	131049.	155555.
2011	132687.	157500.
2012	134345.	159468.
2013	136039.	161479.
2014	137764.	163526.
2015	139613.	165720.
2016	141537.	168004.
2017	143486.	170318.
2018	145501.	172710.
2019	147497.	175079.
2020	149462.	177412.
2021	151348.	179650.
2022	153101.	181731.
2023	154752.	183690.
2024	156287.	185513.
2025	157664.	187148.
2026	158989.	188720.
2027	160334.	190316.
2028	161663.	191894.
2029	163024.	193510.
2030	164470.	195226.
2031	165945.	196977.
2032	167424.	198732.
2033	168912.	200499.
2034	170416.	202283.
2035	171856.	203993.
2036	173197.	205585.
2037	174427.	207045.
2038	175551.	208379.
2039	176528.	209539.
2040	177408.	210583.
2041	178232.	211562.
2042	179003.	212476.

2043	179850.	213481.
2044	180725.	214520.
2045	181686.	215662.
2046	182699.	216864.
2047	183838.	218216.
2048	185011.	219608.

CHAPTER 9

Financial Risk and Mitigation

9.1 BACKGROUND

BPA adopted a long-term policy in its 1993 Final Rate Proposal calling for setting rates that build and maintain financial reserves sufficient for the agency to achieve a 95 percent probability of meeting U.S. Treasury payments in full and on time for each two-year rate period. *See* 1993 Final Rate Proposal, Administrator's Record of Decision, WP-93-A-02 at page 72.

In 1996, the Comprehensive Review highlighted the need for a high Treasury payment probability (TPP) as part of a strategy to keep the benefits of the federal power system in the region. The Comprehensive Review recommendations were developed with three goals in mind. One of these goals was to "ensure repayment of the debt to the U.S. Treasury with a greater probability than currently exists . . ." At the time, BPA faced an 80 percent TPP for the upcoming 5-year rate period instead of the 88 percent TPP equivalent to the two-year TPP standard of 95 percent.

In this rate proposal, BPA for the first time has analyzed its transmission risks and is proposing risk mitigation tools designed to achieve the 95 percent probability standard for the transmission function.

To achieve this Treasury payment probability, the following risk mitigation "tools" were considered in the rate proposal:

1. Starting reserves: Starting financial reserves include cash in the BPA Fund and the deferred borrowing balance attributed to the transmission function. The risk-adjusted values for starting reserves is projected to average $45.2 million at the beginning of FY 2002.

2. Planned Net Revenues for Risk (PNRR). PNRR is a component of the revenue requirement that is added to annual expenses. PNRR adds to cash flows so that financial reserves mitigate short run cost and revenue risk and achieve the TPP goal.

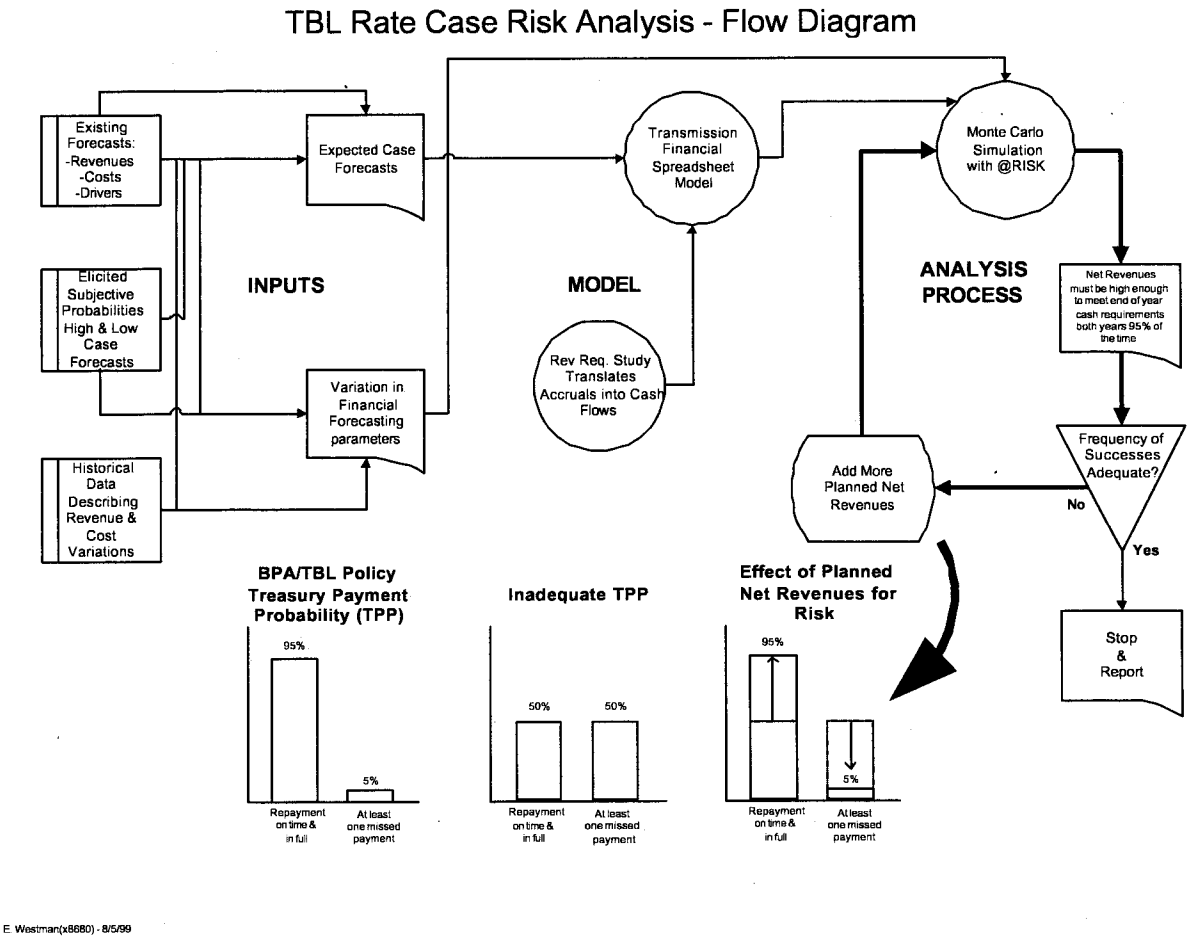
3. Two Year Rate Period. A two-year rate period was adopted by BPA for transmission rates to cover a transition period during which an RTO may be formed in the Northwest. However, the ability to revise rates after two years, or more frequently if need be, serves as an important risk mitigation tool for BPA's transmission function. The impact of adopting rates for a two year rate period is to limit the effects of uncertainty which must be mitigated by other risk mitigation tools to the period of time from the date of the initial proposal through FY 2003. Longer run risks are mitigated by the ability to change rate levels.

9.2 TRANSMISSION RISK ANALYSIS

To quantify the effects of risk on the finances of BPA's transmission function, BPA analyzes the effects of uncertainty in costs and revenues on transmission cash flows using a Monte Carlo simulation method. *See* Figure 9.1. The analysis is used to estimate the probability of successful Treasury payment on time and in full consistently during the rate period (FY 2002 and FY 2003). Successful Treasury payment occurs when the end of year cash reserve for the transmission function is at least sufficient to cover the BPA-TBL's working capital requirement of $20 million per year. The working capital threshold was based on historical monthly net cash flow patterns and requirements for the BPA-TBL.

The risk analysis is used in an iterative process with the Revenue Requirements Study (RRS) and the Transmission Rate Study (TRS). The risk analysis uses inputs that come from both of these studies and contributes inputs to those studies in the form of cash reserves at the beginning of the rate period and PNRR if cash reserves are insufficient to meet the TPP standard of 95%. Initial input values for point estimates of costs and revenues come from the RRS and the TRS and when combined with inputs describing uncertainty in costs and revenues, provide the basis for the initial estimate of PNRR. The PNRR is in turn provided as an expense input to the RRS and the TRS, changing the transmission revenue requirement and transmission rates.

Figure 9.1



The adjusted transmission rates provide the basis for estimating expected revenues during the rate period for various transmission services. The revised estimates of expected revenues

combined with the original uncertainties are used to update the risk analysis and the PNRR. This iterative analysis process is continued until estimates of PNRR converge and additional iterations no longer change the estimate of PNRR. When successive changes in PNRR diminish the risk analysis process is halted and the final estimate of PNRR is used to set the PNRR expense for the RRS and TRS.

The risk analysis covers the period of FY 1999 through FY 2003. The analysis begins with a historical period, FY1999. The change in revenues, costs, and accrual to cash adjustments that are expected to occur between the time the initial rate proposal is developed and the end of the next rate period is analyzed. The advantage to this approach is that cash reserves at the end of the current rate period may be directly estimated, with uncertainty, to appropriately model the starting conditions for the next rate period. The amount of cash reserves at the start of the next rate period has a direct effect on the amount of PNRR needed to achieve BPA's TPP standard. The FY 1999 information reflects actual data, FY 2000 and 2001 are transition years, and FY 2002 and 2003 represent the next rate period. The transition year of 2001 is analyzed with uncertainty in revenues and costs so that uncertainty in cash reserves at the beginning of the next rate period (FY 2002-2003) may be accounted for in the risk analysis.

9.3 TRANSMISSION RISK ANALYSIS PROCESSOR SPREADSHEET

The foundation of the risk analysis is a transmission financial spreadsheet model, called the Transmission Risk Analysis Processor (TRAP). This model was developed in Microsoft Excel to estimate the effects of risk and risk mitigation on end of year cash reserves and likelihood of successful Treasury payment during the rate period. Cash reserve levels at the end of a FY determine whether BPA is able to meet its Treasury payment obligation. End-of-year cash balances during the rate period are therefore the main outcome of interest. The TRAP is organized as a "workbook" with individual work sheets including: an input matrix of revenues

and costs, an income statement, a cash flow statement, and individual work sheets for the variables specified with uncertainty in the model.

The calculation of end of year cash reserves starts with historical data on start of year cash reserves, revenues earned and expenses paid during FY 1999 (Table 9.5). Actual transmission revenues and expenses are based on audited results of BPA's 1999 Fourth Quarter Review. The accrual based revenues and costs shown in the income statement are then converted to cash flows in the cash flow statement worksheet. The year-end cash balance in FY 1999 becomes the beginning year cash balance for FY 2000. The structure of the income statement and cash flow statement parallel those contained in the RRS. The net cash flow results in an estimate of the annual change in cash balance which, when added to the beginning cash balance, yields the year-end cash balance. Since no deferred borrowing occurs between FY 2000 and the end of FY 2003, the year-end cash balance is the total reserve at the end of the fiscal year. This flow of computations is repeated sequentially for each year from FY 1999 through FY 2003.

Simulating transmission cash flows in this manner permits the direct estimation of start of year reserves at the beginning of the rate period instead of defining FY 2002 start of year reserves as a stochastic variable, described by an input distribution in the analysis. TRAP estimates the start of year FY 2002 cash reserves based on transmission function historical cash flows, current forecasts of costs and revenues in FY 2000, and uncertainty in costs and revenues explicitly modeled for FY 2001 (Table 9.5). Table 9.5 shows the point estimate forecasts of expenses and revenues used in the RRS and TRS. In some cases these point estimates are different than the expected values for the same model inputs because the uncertainty, surrounding the point estimates is not symmetric about the point estimate.

9.4 RISK ANALYSIS COMPUTER SOFTWARE

The model used to perform the risk analysis was developed with Microsoft Excel, version 97, and @RISK, version 3.5. Microsoft Excel is a basic 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 that reflect the variability in a parameter of interest. With model parameters specified as distributions instead of as point estimates, @RISK samples values from the probability distributions and then carries out the spreadsheet computations. 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 describe a distribution of outcomes or results, such as net revenues or cash reserves. The values sampled from the distributions are drawn with probability based on their relative likelihood of occurrence as specified in the input distributions. While @RISK provides tools that enable users to turn spreadsheet models into Monte Carlo simulation models, the user still has the burden of determining the input distributions for uncertain variables in the model. This is done in analyses external to the @RISK computer program.

9.5 RISK FACTORS

Transmission risk factors used in the risk analysis include:

(1) Network firm revenues;

(2) Network hourly non-firm revenues;

(3) Southern Intertie firm revenues;

(4) Southern Intertie hourly non-firm revenues;

(5) scheduling, system control & dispatch revenues;

(6) reactive supply & voltage control revenues;

(7) regulation & frequency response revenues;

(8) Delivery segment revenues;

(9) revenue from leasing dark fiber capacity;

(10) total transmission expense annual variation, excluding between business line expenses paid to the PBL and Corporate expense;

(11) BPA Corporate expenses paid by the transmission function;

(12) effects of interest rates on interest expense associated with new borrowing; and

(13) retained net proceeds from the sale of delivery facilities.

These are the model variables specified in the TRAP with uncertainty.

The risk factors analyzed were those judged to represent a significant impact on net revenues and cash flows, and that reasonably bear on estimating the amount of required PNRR during the next rate period. They are expected to influence beginning cash reserves at the start of the next rate period, as well. These risks are regarded as normal operating risks for the transmission function and mainly affect short-run variability in transmission cash flows between FY 2000 and FY 2003. Other long run risks such as variation in capital investment patterns, environmental effects on generation and load patterns that may change transmission costs and capacity availability, and potential changes in transmission industry structure due to formation of a Regional Transmission Organization are not included in the analysis. These exogenous risks are mitigated by the BPA-TBL's ability to change rate levels in response to fundamental changes in business environment and long term changes in cost structure.

BPA relied on two approaches to forecasting the uncertainty in risk factors modeled in the TRAP. When historical data were present on which to base the estimation of uncertainty in a risk factor, BPA directly estimated the uncertainty or deviation in the historical data as the basis for forecasting the uncertainty in the risk factor. The underlying rationale for this approach is that the variation in the recent past is a reasonable basis for forecasting the short run future

(5 years or less). When historical data were not reasonably available, BPA relied on the judgment of staff familiar with specific areas of transmission risk as the basis for forecasting the uncertainty in those risk factors. In contrast to BPA's 2002 power rate case, the risk analysis for the transmission rate case does not rely on econometric models for forecasting the uncertainty due to various risk factors. The transmission function relied on a statistical approach to estimating the uncertainty in risk factors when historical data are available. This distinction is similar to the difference between the disciplines of time series analysis and econometric modeling. Time series analysis methods do not attempt to explain underlying causality leading to variation, but instead rely strictly on the variation in the sample data from the past as an indication of the variation expected in the near term future. As in the field of econometrics, the reliance on a time series or statistical approach is dependent on the focus of the forecasting being short term rather than long term.

Uncertainty for some of the risk factors was defined in terms of proportional deviations from the point estimates (expected values) used in the RRS and TRS. This was done by transforming the estimated standard deviations from the historical data into proportional deviations relative to the historical means by dividing the standard deviation by the mean. This allowed calibrating point estimates of expected revenues and costs used in the TRAP to the point estimates from the RRS and TRS without having to revise model parameters that define the uncertainty in revenues and costs in the TRAP. The calibration of the risk analysis to the RRS and TRS ensures that the risk analysis is consistent with the assumptions underlying the RRS and TRS. Point estimate revenue forecasts from the TRS used for calibration purposes specifically exclude PNRR to avoid double counting PNRR in the risk analysis.

Network and Intertie Transmission Revenue Uncertainties

Although the Network and Intertie rates are fixed during the rate period, the amount of revenue earned can be expected to vary due to uncertainty surrounding the quantity of service purchased

by transmission customers. This is generally referred to as volumetric risk. Various underlying factors can effect the quantity of transmission service purchased. Some of these factors are related to weather patterns such as the effect of temperature upon electric load and precipitation upon stream flows, determining the amount of generation output at hydro facilities in the Northwest. The same kinds of factors in effect outside the Northwest can influence the amount of transmission purchased to move power between regions. Other factors such as growth rates in the regional economy also influence the quantity of electricity usage and the amount of transmission needed to serve the demand for electricity. Within BPA's power function, there is a long history of modeling and analysis aimed at understanding the effects of these factors on the demand for electricity, both at the retail and wholesale level. However, the same cannot be said for BPA's transmission function, requiring another means for forecasting the variability in the volume of transmission services sales and resultant revenues.

One source of information available for assessing transmission service volumetric risk is historical usage of the transmission system, called Total Transmission System Load or TTSL. This source of information approximates hourly loading for the transmission system defined as a whole, including the effects of interchange loads. Although these data are available over a period going back to 1985, the data are not defined and collected by segment (Network versus Intertie) or by type of service (e.g., point to point versus network integration service). The other shortcoming of historical usage data is that customers generally buy firm transmission capacity on a take or pay basis and do not always use all of the capacity that they are entitled to use. They do however pay for all of the capacity they've reserved. As a consequence, transmission usage statistics are not a good predictor of variability in transmission service revenues and can be expected to overstate the uncertainty in transmission service revenue.

Preferably, at least a decade of historical transmission billing data would be used to extrapolate future variation in transmission revenues. Unfortunately, prior to 1997, BPA billed most

customers for delivered power with transmission charges embedded in the delivered bill amount. Even the bills for wheeling customers for this period offer an incomplete picture of the patterns of monthly and annual transmission revenues earned by BPA. So much has changed affecting the operation of BPA's transmission function since the 1992 Energy Policy Act and more recent FERC open access transmission orders that relatively little useful historical data are available on which to base forecasts of revenue uncertainty.

Data were available for 24 months of billed transmission revenue, by segment and type of service, for FY 1998 and 1999. If only the annual data could be used to estimate revenue variations, this analysis would be limited to only two years of annual bills. Two observations are not sufficient to estimate the standard deviation for annual revenues. An alternative method uses data comprised of monthly observations. Although an approximation of annual variability the method focuses on the 24 monthly observations as a sample of revenues that does still reflect underlying factors, such as weather and economic activity, that drive customer transmission demand. Each of the 24 monthly observations is a consequence of those factors at play in each month of the two fiscal years for which BPA has consistently reported revenue data. The values for these months represent a sample distribution of monthly transmission revenues. For the 24 historical months for which data were available, the absolute range of monthly revenues, the minimum monthly revenue and the maximum monthly revenue are known for that period. The average monthly transmission revenue and the total annual transmission revenue can be estimated as well. The frequency with which revenues fall within particular ranges of revenue can be considered an indication of the frequency or probability that similar values will occur in future near term months. A histogram can be constructed based on the historical data that shows the frequency distribution for different ranges of transmission revenue by type of service. However, the number of observations remains limited and the precision with which one may describe an estimate of the underlying distribution is not great.

In order to maximize the value of the limited data available, BPA adopted a statistical technique referred to as the "bootstrap." Dr. Bradly Efron developed this technique at Stanford University in 1977. The bootstrap is one of a variety of statistical techniques referred to under the heading of "resampling." The techniques rely on the use of repeated samples drawn, in the case of the bootstrap, with replacement from sample populations for the purposes of building simulated data sets with much larger sample sizes used to empirically estimate measures of statistical inference, such as means, standard errors, or confidence intervals.

The purpose of the bootstrap is to enable the analyst to make statistical inferences without the necessity of the traditional distribution assumption of normality. The bootstrap instead treats the sample as a direct analogy to the population and then empirically estimates the statistic's sampling distribution. BPA used the bootstrap technique to empirically build a sample distribution of annual network firm revenues by drawing a large number of replicate random samples (5000) of sample size 12 (for the number of months in a year) from the original sample distribution of 24 historical monthly revenues. From this distribution the statistic annual Network firm revenue is estimated. The resulting frequency distribution of 5000 annual Network firm revenue samples is an estimate of the sampling distribution of annual Network firm revenues based on FY 1998 and 1999 monthly Network firm revenues. The sampling distribution allows an estimate to be made of the uncertainty associated with the statistic annual Network firm revenue. The bootstrap treats the sample (24 monthly revenues) as the population. *See* Efron, B. 1993, *An Introduction to the Bootstrap,* Chapman & Hall/CRC, Boca Raton; and Mooney, C. and R. Duval, 1993. *Bootstrapping: A Nonparametric Approach to Statistical Inference*, Sage Publications, Newbury Park.

The bootstrap estimated sampling distributions for Network and Southern Intertie annual firm revenues and annual hourly nonfirm revenues were used to select @RISK sampling distribution functions and input parameters for these transmission revenue categories. Network and

Southern Intertie annual firm revenue uncertainties were described with a normal distribution, while annual hourly nonfirm revenue uncertainties were described using the log normal distribution. In both cases a mean and standard deviation were required to specify the distribution. The forecasted point estimates of revenues from the TRS were used for the mean and the standard deviation was based on the bootstrap sampling distributions. The specific input values for the Network and Intertie Revenue Risks are in Tables 9.9 and 9.10 respectively.

Although the bootstrap is a relatively recent nonparametric technique for statistical inference, it is applied today elsewhere in electric transmission industry. The bootstrap is used by the BPA-TBL System Operations and Planning Group to estimate "control limits" for quality assurance, that describe the normal range of variation expected in transmission outage frequency and duration. Control limits are much like confidence intervals from statistical inference. The BPA-TBL adopted this technique following the same practice established by the California Independent System Operator (CAISO). The use of the bootstrap to set control limits, or "Control References" is also contained in the WSCC proposal for procedures for measuring and reporting transmission availability under the Reliability Management System.

Delivery Segment Revenues

Uncertainty in delivery segment revenues was estimated in the same manner as the uncertainty in transmission for the Network and Intertie segments. The bootstrap technique was applied to the 24 monthly historical observations from FY 1998 and 1999 to generate a simulated sample distribution used to specify the rate period uncertainty in delivery segment revenues. The specific input values for Delivery Segment Revenue risk are presented in Table 9.12.

Fiber Revenues

The probabilities and deviations quantifying fiber revenue risk were developed by members of the BPA-TBL transmission staff responsible for fiber optics program. These subject-matter experts developed the distribution of future revenues associated with the lease of dark fiber capacity surplus to BPA's operational needs during the next rate period. The specific input values for Fiber Revenue Risks are presented in Table 9.13.

Transmission Operations and Maintenance Expense

The uncertainty in transmission O&M expense was estimated using 21 years of historical data from FY 1978 through FY 1998. Historical expense data only were available for the total O&M expense. It was assumed that the variety of factors that have influenced year to year variations in transmission O&M expense in the historical period can reasonably be expected to prevail during the future, particularly the near term future. Like transmission revenues, the objective was to describe short run volatility and not long run variability or variation in trend that may be due to factors, such as, changes in the structure of the transmission industry in the Northwest. Such long-term changes are expected to be mitigated by the ability to change rate levels. Because the risk analysis is a short run analysis, long-term trend variation was not directly estimated. Instead, the short run volatility in expense was applied to the expected forecasts, which include a prediction of expense trends. To estimate the short run variability in expense the trend in the data was first removed, and then the variation in the historical data was estimated. The trend in the historical data was removed by first fitting a Lowess smooth curve to the data. The Lowess smooth is a robust non-parametric smooth that is insensitive to outliers and not dependent on underlying parametric distribution assumptions. A nonlinear curve could be ascribed to the data to represent the long-term trend in total O&M expense. The trend was then subtracted from the historical observations and the resulting data, or residuals, were used to estimate the standard deviation for total O&M expense.

Since the TRAP includes subcategories of transmission O&M expense with forecasted point estimates of expenses, the volatility in total O&M expense was distributed proportionally based on the relative size of individual expense categories to the total O&M expense. Individual expense category point estimates could be revised without compromising the integrity of the uncertainty in expenses quantified on the basis of historical variation in total O&M expense. The variation associated with individual categories of expenses cannot be assumed to be the same as the uncertainty in total O&M expense. The specific input values for Transmission O&M Expense are shown in Table 9.9.

Finally, two other categories of expenses were analyzed using different methods and were separated from the analysis of transmission O&M expense. They include Corporate overhead expenses paid by BPA's TBL, and inter-business line expenses, comprised primarily of the expense for generation inputs for ancillary services

Corporate Expense

An estimate for Corporate expense was determined jointly by Corporate services and BPA-TBL. The distribution assumption underlying the uncertainty in this category of expense is proportional to the assumption used in the power rate case, adjusted by BPA-TBL's expectations of the use of overhead services and expenses associated with those services. The uncertainty in Corporate expenses follows the assumption used in BPA's 2002 power rate case. It is based on expectations of the likelihood of being able to achieve the BPA Cost Review recommendations for efficiency improvements in administrative and internal support services costs. The point estimates used in determining the revenue requirement include an estimate of Corporate expense, including Shared Services expense that is based on a "stretch target" budget forecast. This means that the likelihood of this expense exceeding the forecast is higher than under running the forecast. *See* Risk Analysis Study Documentation, Chapter 2, Attachment 1, WP-02-FS-BPA-03A.

The forecast of transmission's Corporate and Shared Services expense is $30 million in FY 2002 and $28.1 million in FY 2003. The estimate of the expected expense is $2 million higher than the point estimate budget forecast used in the Revenue Requirements Study to reflect the uncertainty surrounding this expense budget. The uncertainty is modeled as an uncertain deviation in Corporate overhead expense that is applied to the Corporate overhead expense point estimate. The @RISK function RiskDiscrete was used to specify this uncertainty and the input parameters are shown in Table 9.8.

Ancillary Services Revenue

The risk associated with BPA-TBL's inter-business line expense is implicitly treated in the ancillary services revenue risk assessment. Three of the six ancillary services revenue categories were modeled with uncertainty in the risk analysis. They are 1) Scheduling, System Control, and Dispatch; 2) Reactive Supply & Voltage Control from Generation; and 3) Regulation and Frequency Response Service. The remaining three ancillary services revenues were treated as either risks borne by BPA's power marketing function because the transmission function only buys what it sells or the amount of revenue expected to be earned from the sale of the service was too small to warrant modeling revenue uncertainty.

Scheduling, System Control and Dispatch is a surcharge on transmission rates and transmission customers are not permitted to self supply this service. There is no price risk since the rate for this service is set in the rates process. The volumetric risk is assumed to vary in a manner directly proportional to the uncertainty in the total of transmission revenue. Since the majority of transmission wheeling revenue uncertainty is modeled as a normal distribution, Scheduling, System Control and Dispatch uncertainty is assumed to be normally distributed with mean equal to the point estimate forecast for revenues from the TRS and standard deviation equal to 1.6% of mean forecasted revenue. The standard deviation is based on the simulated variation of total

Network and Southern Intertie revenues from the TRAP. This revenue uncertainty is modeled with the @RISK function RiskNormal. See Table 9.11.

Reactive Supply and Voltage Control service also is a mandatory service required for each transmission transaction. This service must be acquired from BPA-TBL unless the transmission customers demonstrates that it can self supply a portion of its requirements. This factor creates a larger down side revenue risk for the service compared with Scheduling, System Control and Dispatch service. BPA's TBL does not have prior experience selling a Reactive Supply and Voltage Control ancillary services. Therefore, it is difficult to quantify the uncertainty in future revenues expected from services like Reactive Supply and Voltage Control where customer's ability to self supply poses a clear risk. As a result the @RISK function RiskTriang was adopted to quantify the uncertainty in this revenue as a triangular distribution with inputs defining the minimum revenue, the most likely revenue and the maximum revenue. The @RISK program identifies the triangular distribution for applications where little data is available and where only rough estimates of uncertainty are feasible. The input assumptions were obtained from BPA-TBL staff familiar with the ancillary services tariffs and rates. The most likely revenue input is the point estimate used in the RRS and the minimum and maximum values are found in Table 9.11.

Regulation and Frequency Response service is a load-based service that only is applied to load in BPA's control area. The amount of revenue earned from this service is dependent on the amount of load that exists within BPA-TBL's control area and the rate of load growth. Similarly, the BPA-TBL adopted the triangular distribution as a means of approximating the uncertainty that is expected to be associated with revenues earned from this service. BPA-TBL staff familiar with ancillary services based their estimate of the variation in Regulation and Frequency Response revenue on their assessment of the potential for load leaving the BPA-TBL's load control area and potential for load growth. The estimated variation defined the

minimum revenue and maximum revenue for this service. The specific input values for the @RISK RiskTriang function are in Table 9.11.

Interest Rate Risk

Annual volatility in Treasury borrowing rates can effect short run interest expense for new debt required to finance transmission capital program additions. This effect was modeled by defining Treasury borrowing rates as an uncertain variable using the same distribution assumptions as in BPA's power rate case and estimating the effects of the uncertain interest rates on incremental transmission interest expense each year from FY 2001 through FY 2003. *See* Risk Analysis Study Documentation, Chapter 2, WP-02-FS-BPA-03A. In each year, a randomly sampled interest rate is drawn in each game for the debt added in that year. The extent to which the interest rate is above or below the expected rate determines whether there is an increase or decrease in interest expense compared to the expected interest expense for that new investment. The change in interest expense applies only to the new debt for the year in which the debt was incurred and for subsequent years during which interest payments are made on the debt. Since new debt is assumed to be issued midway through the fiscal year, the interest expense deviation for the first year is only half of the total interest expense deviation expected to occur for an entire year. The entire deviation in interest expense affects subsequent years. New debt in each successive year is treated similarly. Randomly sampled interest rates are drawn independently for each year in which new debt is added and for each game of the simulation in the TRAP. The specific input values for Interest Rate Risk are shown in Table 9.14.

Sale of Delivery Facilities Risk

Transmission customers who take service through delivery facilities the opportunity to acquire those facilities instead of paying the Delivery charge. BPA sold roughly 45 substations by the end of FY 1998. The proceeds from these facilities have in some instances exceeded the book value of the facilities. More sales are expected. There is uncertainty in the pricing of the

facilities that BPA expects will be sold and therefore uncertainty in the amount of proceeds from those future sales. The net proceeds over depreciated book value of any facilities sold will be applied to the transmission function's share of cash reserves for the upcoming rate period. The net proceeds therefore affect transmission cash reserves at the beginning of the next rate period, as well as the need for PNRR. Given this relationship, the net proceeds from the sale of facilities was modeled as an uncertain variable in TRAP. The uncertainty in net proceeds from the sale of facilities was estimated based on the judgement of staff directly involved in the sale of facilities. That assessment takes into account affects of the number of facilities that may be sold and the potential for differences between sale price and book value of the facilities. The specific input values for Sale of Facilities Net Proceeds Risk are shown in Table 9.15.

9.6 RISK CORRELATIONS

The TRAP models revenue and cost risks as diversified risks. The chances of outcomes for individual risk factors are therefore independent of each other. The result is that the chance of consistently good luck or consistently bad luck across all of the risks is very low. More frequently in any individual simulation game the chances are that some risks will harm the BPA-TBL's financial reserves while others will benefit or increase financial reserves. However, the TPP standard is focused on the downside risk or the chances of the BPA-TBL not being able to meet it Treasury payment obligations.

If there were significant correlations between risk factors the assumption of diversified risks could serve to either bias the risk analysis in the direction of excessive risk mitigation or insufficient risk mitigation depending on the direction of the correlation. Risks can either be positively correlated or negatively correlated. Where data were available BPA analyzed risk factor correlation and found no compelling basis for explicitly modeling the effects of risk

correlations in the TRAP. Because the underlying uncertainties may not be normally distributed, BPA used both Pearson's correlation coefficient and the Spearman Rank Order correlation coefficient method to evaluate risk correlations (Table 9.2 and 9.3). Correlations were not large enough in either case to warrant modeling them in the TRAP.

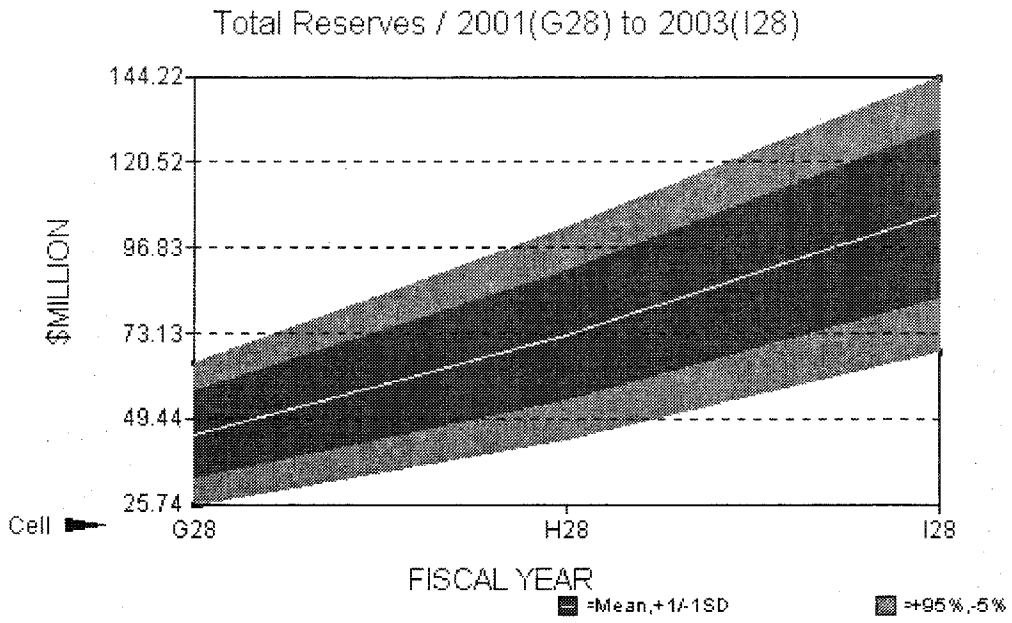
9.7 RISK ANALYSIS RESULTS

The transmission risk analysis simulation completed in the iterative process with the RRS and the TRS resulted in 2,996 games out of 3000 in which end of year financial reserves were sufficient in both years of the rate period to successfully meet BPA's obligation to pay Treasury on time and in full. This represents a greater than 95% TPP for the FY 2002 through 2003 rate period. These results were obtained with a pseudo random number seed value of 20 and the @RISK sampling option set for Latin Hypercube sampling. This option uses stratified random sampling of the risk factor sampling distributions instead of strict random sampling. This method is considered a more efficient method by ensuring that the full range of the sampling distribution is represented in the set of sampled values for a given number of simulation games.

Financial Reserves and PNRR

The expected year-end cash balances for FYs 2002 and 2003 are estimated to be $71.1 million and $103.0 million, respectively (Table 9.7). The year-end cash balance at the end of the second year of the rate period is higher than the first year. The growth in year-end cash balance is principally due to settlement rate levels which accumulate cash reserves each year and the fact that a single rate level is set for both years of the two year rate period. The range of possible financial reserves at the end of the current rate period and each year of the next rate period is shown in Figure 9.2.

Figure 9.2



Planned Net Revenues for Risk

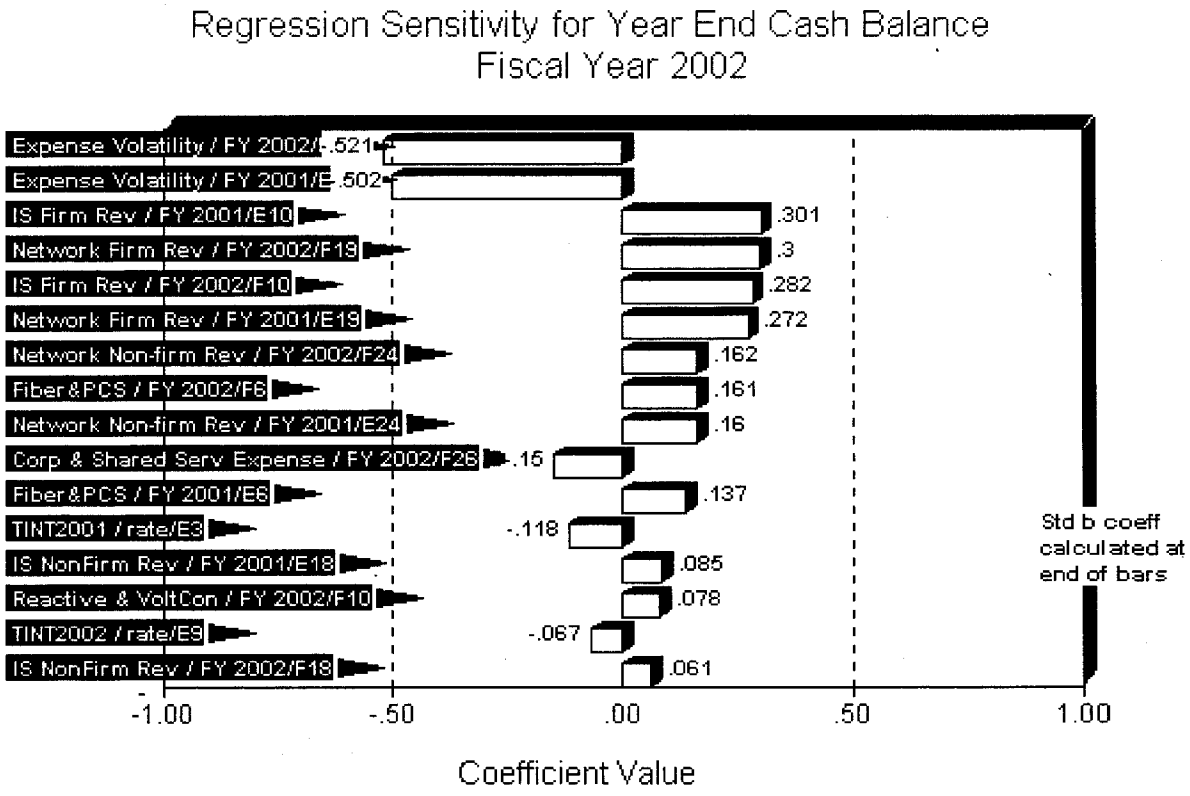
The risk analysis of settlement rates reveals that financial reserves are sufficient under a wide range of possible outcomes to meet the 95% TPP standard, and that no additional net revenue, called Planned Net Revenue for Risk, is needed in transmission revenue requirement to achieve BPA's Treasury payment standard.

9.8 INFLUENCE OF RISK FACTORS

The significance of various risk factors in determining the TPP can be seen in figure 9.3. This figure shows normalized regression coefficients for each risk factor identified. The @RISK computer program provides this diagnostic feature as part of the simulation system. A value of zero indicates that there is no significant relationship between the risk factor and the rate period TPP. A value of one indicates that a one standard deviation change in rate period TPP occurs

for a one standard deviation change in the risk factor. Negative values indicate inverse relationships between TPP and risk factors.

Figure 9.3



@RISK ranks risk factors displayed in order of their impact on an outcome of interest, in this case TPP. Risks with the largest effects are listed first with others following in order of decreasing effect on TPP. The figure shows that expense volatility during the rate period contributes more of the uncertainty in transmission financial reserves than other factors. Firm transmission revenue risks are the next largest risk factors because, despite the modest variation in year to year firm revenues, this category of revenue represents a large share of total transmission revenue.

TABLE 9.1: TBL Monthly Revenues Fiscal Year 1998 Through Fiscal Year 1999.

	Fiscal Year	Month	IS Firm	IS NonFirm	Network Firm	Network NonFirm	Delivery Segment
1.	1998	Oct	$3,785,865	$204,946	$28,247,823	$1,460,507	$1,856,510
2.	1998	Nov	$3,931,972	$364,296	$27,757,159	$1,367,711	$1,572,698
3.	1998	Dec	$4,222,016	$135,414	$31,035,381	$722,910	$1,786,286
4.	1998	Jan	$3,966,324	$33,363	$30,140,261	$732,968	$1,959,539
5.	1998	Feb	$3,815,927	$167,289	$29,640,042	$897,848	$1,830,378
6.	1998	Mar	$3,528,648	$311,487	$30,431,843	$575,144	$1,656,320
7.	1998	Apr	$5,108,627	$143,745	$28,324,352	$672,204	$1,374,036
8.	1998	May	$5,674,996	$97,098	$28,948,419	$881,297	$1,492,878
9.	1998	Jun	$4,566,511	$210,071	$29,460,531	$2,041,663	$1,494,661
10.	1998	Jul	$5,900,923	$213,277	$29,742,962	$1,086,404	$1,479,602
11.	1998	Aug	$7,493,556	$155,991	$33,702,236	$957,199	$1,789,471
12.	1998	Sep	$5,590,485	$97,942	$27,148,031	$277,736	$1,616,191
13.	1999	Oct	$3,750,787	$98,044	$27,400,615	-$176,533	$1,612,522
14.	1999	Nov	$3,488,611	$264,812	$26,148,503	$268,823	$1,339,489
15.	1999	Dec	$3,383,447	$230,751	$29,536,010	$807,826	$1,978,827
16.	1999	Jan	$3,456,999	$1,082,044	$29,485,914	$3,546,397	$1,692,691
17.	1999	Feb	$4,056,416	$285,861	$30,180,462	$1,700,501	$1,627,405
18.	1999	Mar	$5,296,298	$90,529	$29,417,463	$2,371,597	$1,545,525
19.	1999	Apr	$5,627,876	$171,042	$30,281,774	$661,460	$1,506,312
20.	1999	May	$6,703,886	$152,299	$31,441,546	$382,794	$1,467,091
21.	1999	Jun	$6,017,799	$227,588	$29,396,937	$874,722	$1,474,063
22.	1999	Jul	$6,750,222	$814,170	$29,279,792	$612,589	$1,227,898
23.	1999	Aug	$6,283,334	$247,450	$28,234,214	$545,791	$1,333,633
24.	1999	Sep	$5,929,036	$239,273	$26,651,945	$552,701	$1,341,653

TABLE 9.2: Correlation Matrix for TBL Monthly Revenue (Fiscal Year 1998 - 1999)

	Netfirm	NetNonFirm	IS Firm	ISNonFirm	Delivery
1. Netfirm	1	0.182	0.307	-0.032	0.394
2. NetNonFirm	0.182	1	-0.227	0.521	0.177
3. IS Firm	0.307	-0.227	1	-0.095	-0.504
4. ISNonFirm	-0.032	0.521	-0.095	1	-0.194
5. Delivery	0.394	0.177	-0.504	-0.194	1

TABLE 9.3: Spearman's Rank Order Correlation Matrix for TBL Monthly Revenue (Fiscal Year 1998 - Fiscal Year 1999)

	Netfirm	NetNonFirm	IS Firm	ISNonFirm	Delivery
1. Netfirm	1	0.287	0.118	-0.110	0.426
2. NetNonFirm	0.287	1	-0.143	0.105	0.391
3. IS Firm	0.118	-0.143	1	-0.166	-0.557
4. ISNonFirm	-0.110	0.105	-0.166	1	-0.194
5. Delivery	0.426	0.391	-0.557	-0.194	1

TABLE 9.4: TRANSMISSION O&M EXPENSE VARIABILITY

	A Fiscal Year	B Transmission Total O&M Expense ($1,000)	C Lowess Smoothed O&M Expense (Tension = 3.5)	D Residuals Col. B - C
1.	1978	69,767	68,609	1,158
2.	1979	73,801	74,249	(448)
3.	1980	77,594	79,973	(2,379)
4.	1981	87,243	85,769	1,474
5.	1982	91,562	92,456	(894)
6.	1983	99,520	100,623	(1,103)
7.	1984	101,406	115,629	(14,223)
8.	1985	141,623	128,408	13,215
9.	1986	144,438	142,855	1,583
10.	1987	148,596	153,632	(5,036)
11.	1988	167,102	163,955	3,147
12.	1989	175,240	175,073	167
13.	1990	183,512	186,369	(2,857)
14.	1991	199,668	194,477	5,191
15.	1992	209,868	197,571	12,297
16.	1993	189,926	200,226	(10,300)
17.	1994	202,309	199,830	2,479
18.	1995	200,501	201,302	(801)
19.	1996	202,730	207,468	(4,738)
20.	1997	197,259	214,566	(17,307)
21.	1998	228,803	221,926	6,877
22.	Mean	152,022		(595)
23.	Std. Dev.	52,903		7,373

TABLE 9.5: Data Matrix

	TBL Risk Analysis ($1,000)	FY 1999 (Actuals)	FY 2000 (Transition)	FY 2001 (Transition)	FY 2002 (Rate Period)	FY 2003 (Rate Period)	
	Transmission Revenues						
1.	Network Firm Revenues	320,055	325,036	336,890	376,274	387,193	S
2.	Network NonFirm Revenues	12,325	14,620	15,454	24,620	24,624	S
3.	Intertie Firm Revenues	60,745	69,788	67,545	65,510	63,798	S
4.	Intertie NonFirm Revenues	3,904	3,649	2,659	5,385	6,333	S
5.	Ancillary Services Revenues	28,739	33,481	28,481	127,211	127,447	S
6.	Delivery Segment Revenues	31,515	23,979	24,577	14,951	15,058	S
7.	Fiber & PCS Revenues	6,593	24,000	18,000	19,570	21,930	S
8.	Other Revenues	75,506	36,658	46,191	37,310	37,933	
9.	NR Adjust to meet Exp Min Cash Flow				0	0	
10.	**TBL Planned NR for Risk**				0	0	
11.	Total Operating Revenues	539,381	531,211	539,797	670,832	684,316	
	Total Oper Revs w/o Cash Adj & PNRR						
	Transmission Expenses						
12.	Transmission G&A	16,025	18,700	21,100	22,200	23,800	
13.	Transmission Marketing and Scheduling	13,847	17,700	15,500	15,246	15,703	
14.	Transmission System Operations	27,637	29,200	31,100	30,996	32,106	
15.	Transmission System Maintenance	64,522	67,300	69,100	71,300	73,400	
16.	Transmission System Development	11,328	16,000	19,400	21,354	21,554	S
17.	Support Services	9,959	12,700	12,500	11,890	12,246	
18.	Environment	5,474	5,000	5,000	5,100	5,300	
19.	TBL Corporate Expenses	27,185	36,000	34,300	30,000	28,100	S
20.	Between Business Line Expenses	40,630	37,900	38,900	77,320	77,303	
21.	TBL Pension Expense	2,050	3,000	3,950	27,600	17,600	
22.	Total System Operation & Maint	218,657	243,500	250,850	313,006	307,112	
23.	Interest on Long-Term Debt (Treasury)	196,200	112,568	125,647	138,609	144,768	S
24.	Capitalization Adjustment - Transmission	19615	19720	20763	19618	20174	
	Capital Outlays and Financing						
25.	Transmission Plant in Service	120,551	171,139	244,230	251,069	324,700	
26.	Total Transmission Outlays	120,551	171,139	244,230	251,069	324,700	
27.	revenue financing	0	0	0	0	0	

TABLE 9.6: Statement of Revenues and Expenses - Transmission Business

	($ millions)	1999	2000	2001	2002	2003
	Operating Revenues	(Actuals)				
1.	Transmission Revenues	397.0	413.1	422.5	471.8	481.9
2.	Ancillary Services Revenues	28.7	33.5	28.5	127.2	127.4
3.	Delivery Segment Revenues	31.5	24.0	24.6	15.0	15.1
4.	Fiber & PCS Revenues	6.6	24.0	18.0	19.6	21.9
5.	Other Revenues & Credits	75.5	36.7	46.2	37.3	37.9
6.	**Total Operating Revenues**	**539.4**	**531.2**	**539.8**	**670.8**	**684.3**
	Operating Expenses					
7.	Transmission G&A	16.0	18.7	21.1	22.2	23.8
8.	Transmission Marketing and Scheduling	13.8	17.7	15.5	15.2	15.7
9.	Transmission System Operations	27.6	29.2	31.1	31.0	32.1
10.	Transmission System Maintenance	64.5	67.3	69.1	71.3	73.4
11.	Transmission System Development	11.3	16.0	19.4	21.4	21.6
12.	Support Services	10.0	12.7	12.5	11.9	12.2
13.	Environment	5.5	5.0	5.0	5.1	5.3
14.	Corporate Expenses	27.2	36.0	34.3	33.6	31.7
15.	Between Business Line Expenses	40.6	37.9	38.9	77.3	77.3
16.	CSRS Pension Expense	2.1	3.0	4.0	27.6	17.6
17.	**Total System Operation & Maintenance**	**218.7**	**243.5**	**250.9**	**316.6**	**310.7**
18.	**Net Operating Margin**	**320.7**	**287.7**	**288.9**	**354.2**	**373.6**
19.	Federal Projects Depreciation	147.2	154.5	175.0	181.7	194.0
20.	**Total Operating Expenses**	**365.9**	**398.0**	**425.9**	**498.4**	**504.8**
21.	**Net Operating Revenue**	**173.5**	**133.2**	**113.9**	**172.5**	**179.6**
	Interest Expense					
22.	Interest on Appropriated Funds	0.0	73.0	71.6	66.9	65.3
23.	Interest on Long-Term Debt Issued to Treasury	196.2	112.6	125.6	138.6	144.8
24.	Interest Credit on Cash Reserves				(7.7)	(10.0)
25.	Amortization of Capitalized Bond Premiums				3.2	3.2
26.	Capitalization Adjustment	(19.6)	(19.7)	(20.8)	(19.6)	(20.2)
27.	AFUDC	(3.0)	(4.4)	(4.7)	(5.0)	(5.2)
28.	Net Interest Expense	173.6	163.1	172.2	176.4	177.9
29.	**Total Operating & Net Interest Expenses**	**539.4**	**561.1**	**598.0**	**674.8**	**682.7**
30.	**Net Revenues**	**(0.0)**	**(29.9)**	**(58.2)**	**(4.0)**	**1.7**

TABLE 9.7: Statement of Cash Flows - Transmission Business

	($ millions)	1999	2000	2001	2002	2003
	Cash Provided by Current Operations	(Actuals)				
1.	Net Revenues	(0.0)	(29.9)	(58.2)	(4.0)	1.7
	Expenses not Requiring Cash					
2.	Depreciation/Amortization	147.2	154.5	175.0	181.7	194.0
3.	Amort of Capitalized Bond Premiums	4.2	4.1	3.2	3.2	3.2
4.	Capitalization Adjustment	(19.6)	(19.7)	(20.8)	(19.6)	(20.2)
5.	Accrual Revenues (AC Intertie & Fiber)	(3.5)	(3.5)	(3.5)	(4.0)	(4.0)
6.	Retained Net Proceeds from Sale of Facilities			11.0		
7.	Clark Settlement	2.5	1.5	0.7		
8.	Cash Provided by Current Operations	130.7	107.0	107.4	157.3	174.7
	Cash Used for Capital Investments					
	Investment in					
9.	Gross Utility Plant and CWIP	(120.6)	(171.1)	(244.2)	(252.3)	(248.4)
10.	Cash Used for Capital Investments	(120.6)	(167.9)	(244.2)	(252.3)	(248.4)
	Cash From Borrowing and Appropriations					
11.	Incre Cash from Borrowing & Appropriations	131.4	167.9	244.2	252.3	248.4
12.	Repayment of Long-term debt	(96.7)	(92.5)	(12.3)	(107.6)	(116.5)
13.	Repayment of Capital Appropriations	(41.9)	(22.1)	(46.8)	(23.9)	(26.2)
14.	Subtotal Cash from Borrowing & Approp	(7.2)	53.3	185.2	120.8	105.6
15.	**Annual Change in Cash Balance**	3.0	(7.6)	48.4	25.8	31.9
16.	Plus Beginning Cash Balance	(12.9)	4.5	(3.1)	45.2	71.1
17.	Year End Cash Balance	(24.2)	(3.1)	45.2	71.1	103.0
18.	Deferred Borrowing	28.7	0.0	0.0	0.0	0.0
19.	Total Reserves	4.5	(3.1)	45.2	71.1	103.0

20.	Treasury Payment Indicator for Individual Years (1 = Yes, 0 = No):	1	1
21.	Treasury Payment Indicator for the FY 2002 - 2003 Rate Period (1 = Yes, 0 = No):		1

TABLE 9.8: Transmission Expense Risk

	Operating Expenses ($1,000)	(Actuals) FY 1999	(Transition) FY 2000	FY 2001	(Rate Period) FY 2002	FY 2003
1.	**Trans O&M Expense Change From Exp Value**			0.0	0.0	0.0
2.	Total Trans O&M Expense (With Uncertainty)			173,700	178,086	184,109
3.	Transmission O&M Expense Standard Deviation			9,206	9,439	9,758
4.	Sd as pct of mean			5.3%	5.3%	5.3%
	Transmission O&M Expenses (With Uncertainty)					
5.	Transmission G&A	16,025	18,700	21,100	22,200	23,800
6.	Transmission Marketing and Scheduling	13,847	17,700	15,500	15,246	15,703
7.	Transmission System Operations	27,637	29,200	31,100	30,996	32,106
8.	Transmission System Maintenance	64,522	67,300	69,100	71,300	73,400
9.	Transmission System Development	11,328	16,000	19,400	21,354	21,554
10.	Support Services	9,959	12,700	12,500	11,890	12,246
11.	Environment	5,474	5,000	5,000	5,100	5,300
12.	**Trans Exp excl Corp,BBL & CSRS**	148,792	166,600	173,700	178,086	184,109
13.	TBL Corp & Shared Serv. Expenses (Determ.)	27,185	36,000	34,300	33,637	31,737
14.	TBL Corp & Shared Serv Expense (With Uncert.)				3,637	3,637
15.	Discrete Value x1				-1,281	-1,281
16.	x2				359	359
17.	x3				3,637	3,637
18.	x4				8,555	8,555
19.	Probability p1				0.1	0.1
20.	p2				0.5	0.5
21.	p3				0.3	0.3
22.	p4				0.1	0.1
23.	Between Business Line Expenses	40,630	37,900	38,900	77,320	77,303

TABLE 9.9: Network Transmission Revenue Risk

	Operating Revenues ($1,000)	(Actuals) FY 1999	(Transition) FY 2000	(Transition) FY 2001	(Rate Period) FY 2002	(Rate Period) FY 2003
	Firm					
1.	LT Firm		300,036	311,890		
2.	ST Firm		25,000	25,000		
3.	Network Firm Revenue (Deterministic)	320,055	325,036	336,890	376,274	387,193
4.	Network Firm Rev (With Uncertainty)			336,890	376,274	387,193
5.	Standard Deviation			5,053	5,644	5,808
6.	Sd as pct of mean			1.5%	1.5%	1.5%
	Nonfirm					
7.	RNF Short Term (1 to 30 days)	0	0	0	0	0
8.	ET Hourly	12,325	14,620	15,454	24,620	24,624
9.	Network Hourly Nonfirm (Deterministic)	12,325	14,620	15,454	24,620	24,624
10.	Network Hourly Nonfirm (With Uncertainty)			15,454	24,620	24,624
11.	Standard Deviation			3,245	5,170	5,171
12.	Sd as pct of mean			21%	21%	21%
13.	**Network Grand Total**	332,380	339,656	352,344	400,894	411,817

TABLE 9.10: Intertie Transmission Revenue Risk

Operating Revenues ($1,000)	(Actuals) FY 1999	(Transition) FY 2000	FY 2001	(Rate Period) FY 2002	FY 2003
IS Firm Revenue					
1. IS Long Term		49,066	46,053		
2. IS Short Term		14,560	10,957		
3. IS Assured Delivery (Pre 10/1/96)		6,162	9,925		
4. IS Firm Revenue (Deterministic)	60,745	69,788	66,935	68,441	64,951
5. IS Firm Revenue (With Uncertainty)			67,545	65,510	63,798
6. Standard Deviation			4,746	4,852	4,605
7. Sd as pct of mean			7.1%	7.1%	7.1%
8. min			62,000	50,000	50,000
9. max			74,000	70,000	70,000
IS Hourly Nonfirm Revenue					
10. IS Short Term	0	0	0	0	0
11. IS Hourly Nonfirm Revenue	3,904	3,649	2,659	5,385	6,333
12. IS Hourly NonFirm Revenue (Deterministic)	3,904	3,649	2,659	5,385	6,333
13. IS Hourly NonFirm Revenue (With Uncertainty)			2,659	5,385	6,333
14. Standard Deviation			689	1,395	1,640
15. Sd as pct of mean			26%	26%	26%
16. IS Total		73,437	69,594	73,826	71,284

TABLE 9.11: Ancillary Services Revenue Risk

Operating Revenues ($1,000)	(Actuals) FY 1999	(Transition) FY 2000	(Transition) FY 2001	(Rate Period) FY 2002	(Rate Period) FY 2003
1. Scheduling, System Control, & Dispatch (Determ.)				53,609	55,063
2. Sch, Sys Con, & Disp (With Uncertainty)				53,609	55,063
3. Standard Deviation				804	826
4. Reactive Supply & Voltage Control from Gen. (Determ.)				20,633	21,258
5. Reactive Supply & Volt. Control (With Uncertainty)				19,945	20,840
6. Min				17,125	19,132
7. Max				22,077	22,130
8. Regulation and Frequency Response Service (Deterministic)				16,038	15,650
9. Regulation & Freq Response (With Uncertainty)				15,665	15,754
10. Min				12,918	14,085
11. Max				18,038	17,528
12. Energy Imbalance Service				0	0
13. Operating Reserve - Spinning Reserve Service				18,996	17,902
14. Operating Reserve - Supplemental Reserve Serv.				18,996	17,888
15. Total Ancillary Services (Deterministic)	28,739	33,481	28,481	128,272	127,761
16. Total Ancillary Services (With Uncertainty)				127,211	127,447

TABLE 9.12: Delivery Segment Revenue Risk

Operating Revenues ($1,000)	(Actuals) FY 1999	(Transition) FY 2000	(Transition) FY 2001	(Rate Period) FY 2002	(Rate Period) FY 2003
1. Utility	18,147	8,521	9,009	9,161	9,268
2. Utility PBL Payments	6,376	6,462	6,621	0	0
3. Industrial (UFT Method)	6,992	8,996	8,947	5,790	5,790
4. Delivery Segment Revenue (Deterministic)	31,515	23,979	24,577	14,951	15,058
5. Delivery Segment Revenue (With Uncertainty)			24,577	14,951	15,058
6. Standard Deviation			885	538	542
7. Sd as pct of mean			3.60%	3.60%	3.60%

TABLE 9.13: Fiber & PCS Revenue Risk

	Operating Revenues ($1,000)		(Actuals) FY 1999	(Transition) FY 2000	(Transition) FY 2001	(Rate Period) FY 2002	(Rate Period) FY 2003
	Fiber						
1.	Fiber&PCS Revenue (Deterministic)		6593	15,000	18,000	19,570	21,930
2.	Fiber&PCS Revenue (With Uncertainty)				18,000	19,570	21,930
3.	**PCS**		2,913	4,000	4,000	4,070	4,430
	RiskCumul Distribution Values						
4.	Min				1,425	1,425	1,425
5.	Max				19,000	23,000	27,000
6.	Cummulative Value	x1			10,690	11,750	13,315
7.		x2			13,290	14,640	16,115
8.		x3			15,030	16,250	18,475
9.	Cummulative Probability	p1			0.05	0.05	0.05
10.		p2			0.2	0.2	0.2
11.		p3			0.8	0.8	0.8

TABLE 9.14: Treasury Borrowing Rate Interest Expense Risk

	Bond type	Principal original	Principal outstanding	E(rate)	Bonds rate	Bonds due	Bonds issued	annual interest	Fiscal Year Interest Expense Impact 2001	2002	2003
1.	TINT2001	213,504	213,504	7.29%	7.29%	2036	2001	15,564	7,782	15,564	15,564
2.	ZAFW	9,086	9,086	6.92%	6.92%	2016	2001	629	314	629	629
3.	Subtotal								8,097	16,193	16,193
4.	Subtotal Based on E(rate)								8,097	16,193	16,193
5.	Deviation in Net Interest Expense (Bonds Issued in 2001)								0	0	0
6.	TINT2002	243,185	243,185	7.08%	7.08%	2037	2002	17,217		8,609	17,217
7.	ZAFW	9,047	9,047	6.69%	6.69%	2017	2002	605		303	605
8.	Subtotal									8,911	17,823
9.	Subtotal Based on E(rate)									8,911	17,823
10.	Deviation in Net Interest Expense (Bonds Issued in 2002)									0	0
11.	TINT2003	240,231	240,231	6.89%	6.89%	2038	2003	16,552			8,276
12.	ZAFW	9,274	9,274	6.50%	6.50%	2018	2003	603			301
13.	Subtotal										8,577
14.	Subtotal Based on E(Interest Rate)										8,577
15.	Deviation in Net Interest Expense (Bonds Issued in 2003)										0
16.	**Total Annual Variation in Net Interest Expense for New Debt**								0	0	0

	Uncertainty in Treasury Borrowing Rates Δ r	p(Δ r)
17.	-2.00%	0.05
18.	-1.25%	0.1
19.	-0.75%	0.2
20.	0.00%	0.3
21.	0.75%	0.2
22.	1.25%	0.1
23.	2.00%	0.05

TABLE 9.15: Sale of Facilities Net Proceeds Risk

Net Proceeds Above Book Value ($1,000)	(Actuals) FY 1999	(Transition) FY 2000	(Transition) FY 2001	(Rate Period) FY 2002	(Rate Period) FY 2003
1. Retained Net Proceeds from Sale of Facilities			11,000		
BetaSubj Distribution Parameters					
2. Most Likely Value			11,000		
3. Mean			11,000		
4. Maximum			6,500		
5. Minimum			15,500		

CHAPTER 10

REPAYMENT STUDY INPUT FILES
CURRENT STUDY
FY 2002

The data in Computer File Form Used in the FY 2002 Current Repayment Study for Transmission

```
1INPUT CARDS ONLY
 N1 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RATE CASE
 N2          OCTOBER 1,2001 - SEPTEMBER 30,2002 COST EVALUATION PERIOD
 N3   REPAY 02 TB9 - TRANSMISSION
 N0 TRANSMISSION

 11999             0         0         0     200220372037
0HISTORICAL YEAR:                                      1999
 HISTORICAL CUMULATIVE REVENUES:                          0
 HISTORICAL CUMULATIVE PURCHASE & EXCHANGE:               0
 HISTORICAL CUMULATIVE IRRIGATION INVESTMENT:             0
 YEAR OF THE RATE CHANGE:                              2002
 LAST YEAR OF REPAYMENT PERIOD:                        2037

 INTEREST RATES OF INTEREST INCOME

 1X06574 06608 06697 06747

 INTEREST RATES OF NEW DEFERRALS

 1Y07520 07620 07540 07290

 OPERATING YEAR FACTORS

 1F75000 75000 75000 75000

 PROJECTED REVENUE

 22000         296347    251900    335220    335220    335220    335220    335220    2224347
 22007         335220    335220    335220    335220    335220    335220    335220    2346540
 22014         335220    335220    335220    335220    335220    335220    335220    2346540
 22021         335220    335220    335220    335220    335220    335220    335220    2346540
 22028         335220    335220    335220    335220    335220    335220    335220    2346540
 22035         335220    335220    335220    335220    335220    335220    335220    2346540
 22042         335220    335220    335220    335220    335220    335220    335220    2346540
 22049         335220    335220    335220    335220    335220    335220    335220    2346540
               2642887   2598440   2681760   2681760   2681760   2681760   2681760   18650127 = TOTAL FOR 2

 PROJECTED IRRIGATION ASSISTANCE

             NEW                NEW                NEW
          INVESTMENT         INVESTMENT         INVESTMENT

 32000             0                  0                  0                  0
 32003             0                  0                  0                  0
 32006             0                  0                  0                  0
 32009             0                  0                  0                  0
 32012             0                  0                  0                  0
 32015             0                  0                  0                  0
 32018             0                  0                  0                  0
 32021             0                  0                  0                  0
 32024             0                  0                  0                  0
 32027             0                  0                  0                  0
 32030             0                  0                  0                  0
 32033             0                  0                  0                  0
 32036             0                  0                  0                  0
 32039             0                  0                  0                  0
 32042             0                  0                  0                  0
 32045             0                  0                  0                  0
 32048             0                  0                  0                  0
                   0                  0                  0                  0 = TOTAL FOR 3

 CAPITALIZED CONTRACTUAL OBLIGATIONS

 42000             0         0         0     -1009     -1041     -1073     -1104     -4227
 42007         -1134     -1164     -1193     -1221     -1249     -1277     -1303     -8541
 42014         -1329     -1355     -1380     -1404     -1428     -1451     -1474     -9821
 42021         -1496     -1517     -1538     -1557     -1576     -1594     -1613     -10891
 42028         -1629     -1644     -1659     -1674     -1685     -1696     -1706     -11693
 42035         -1715     -1721     -1727     -1732     -1732     -1728     -1724     -12079
 42042         -1718     -1716     -1714     -1712     -1714                         -8574
               -9021     -9117     -9211    -10309    -10425     -8819     -8924     -65826 = TOTAL FOR 4


 5    ALBE                          ALBENI FALLS
 5    BOIS                              BOISE
 5    BON2                BONNEVILLE - 2ND POWER HOUSE
 5    BONN                          BONNEVILLE
 5    CHIE                          CHIEF JOSEPH
 5    COL3          COLUMBIA BASIN- 3RD POWER HOUSE
 5    COLU                       COLUMBIA BASIN
 5    COUG                           COUGAR
 5    CRFB             COLUMBIA RIVER FISH MITIGATION
 5    DETR                    DETROIT-BIG CLIFF
 5    DWOR                           DWORSHAK
 5    GREE                    GREEN PETER-FOSTER
 5    HILL                       HILLS CREEK
 5    HUNG                       HUNGRY HORSE
```

5	ICEH	ICE HARBOR
5	JOHN	JOHN DAY
5	LIBB	LIBBY
5	LITT	LITTLE GOOSE
5	LOOK	LOOKOUT POINT-DEXTER
5	LOST	LOST CREEK
5	LOWG	LOWER GRANITE
5	LOWM	LOWER MONUMENTAL
5	LSFW	LOWER SNAKE F AND W
5	MCNA	MCNARY
5	MINI	MINIDOKA
5	STRU	STRUBE
5	THED	THE DALLES
5	YAKC	YAKIMA-CHANDLER
5	YAKR	YAKIMA-ROZA
5	ZABF	BPA PROGRAM
5	ZADB	BUREAU DIRECT FUND
5	ZAFW	FISH, WILDLIFE & ENVIRONMENTAL
5	ZBPA	BONNEVILLE POWER ADMINISTRATION

		HISTORICAL O & M	INTEREST		
5	ALBEX	0	0	0	
5	BOISX	0	0	0	
5	BONNX	0	0	0	
5	CHIEX	0	0	0	
5	COLUX	0	0	0	
5	COUGX	0	0	0	
5	DETRX	0	0	0	
5	DWORX	0	0	0	
5	GREEX	0	0	0	
5	HILLX	0	0	0	
5	HUNGX	0	0	0	
5	ICEHX	0	0	0	
5	JOHNX	0	0	0	
5	LIBBX	0	0	0	
5	LITTX	0	0	0	
5	LOOKX	0	0	0	
5	LOSTX	0	0	0	
5	LOWGX	0	0	0	
5	LOWMX	0	0	0	
5	MCNAX	0	0	0	
5	MINIX	0	0	0	
5	THEDX	0	0	0	
5	YAKCX	0	0	0	
5	YAKRX	0	0	0	
5	ZBPAX	0	0	0	
5	ZACOX	0	0	0	
		0	0	0	= TOTAL FOR 5

PROJECTED O & M

0	0	= TOTAL FOR 6

61994ZABF	0	
	0	= TOTAL FOR 6

HISTORICAL FEDERAL INVESTMENTS

		PROJECT	ORIGINAL PRINCIPAL	CURRENT PRINCIPAL	INTEREST RATE	DUE DATE		INSERVICE DATE	CALENDAR MONTH
6	1996	ZBPA X	6812	0	.02500	1985		1940	
6	1996	ZBPA X	18906	0	.02500	1986		1941	
6	1996	ZBPA X	461	0	.02500	1986	R	1941	
6	1996	ZBPA X	8446	0	.02500	1987		1942	
6	1996	ZBPA X	1052	0	.02500	1987	R	1942	
6	1996	ZBPA X	16083	0	.02500	1988		1943	
6	1996	ZBPA X	4538	0	.02500	1988	R	1943	
6	1996	ZBPA X	583	0	.02500	1989		1944	
6	1996	ZBPA X	249	0	.02500	1989	R	1944	
6	1996	ZBPA X	1306	0	.02500	1990		1945	
6	1996	ZBPA X	3366	0	.02500	1990	R	1945	
6	1996	ZBPA X	2488	0	.02500	1991		1946	
6	1996	ZBPA X	732	0	.02500	1991	R	1946	
6	1996	ZBPA X	1330	0	.02500	1992		1947	
6	1996	ZBPA X	1773	0	.02500	1992	R	1947	
6	1996	ZBPA X	7468	0	.02500	1993		1948	
6	1996	ZBPA X	2290	0	.02500	1993	R	1948	
6	1996	ZBPA X	6809	0	.02500	1994		1949	
6	1996	ZBPA X	2719	0	.02500	1994	R	1949	
6	1996	ZBPA X	24111	0	.02500	1995		1950	
6	1996	ZBPA X	6124	0	.02500	1995	R	1950	
6	1996	ZBPA X	7040	0	.02500	1996		1951	
6	1996	ZBPA X	13266	0	.02500	1996	R	1951	
6	1996	ZBPA X	18610	0	.02500	1997		1952	

6	1996	ZBPA	X	8979	0	.02500	1997	R	1952	
6	1996	ZBPA	X	32262	0	.06330	1998		1953	
6	1996	ZBPA	X	15899	0	.06330	1998	R	1953	
6	1996	ZBPA	X	23614	0	.06510	1999		1954	
6	1996	ZBPA	X	17370	0	.06510	1999	R	1954	
6	1996	ZBPA	X	11827	11827	.06620	2000		1955	
6	1996	ZBPA	X	10283	10283	.06620	2000	R	1955	
6	1996	ZBPA	X	14573	14573	.06710	2001		1956	
6	1996	ZBPA	X	32221	32221	.06710	2001	R	1956	
6	1996	ZBPA	X	7933	7933	.06790	2002		1957	
6	1996	ZBPA	X	15980	15980	.06790	2002	R	1957	
6	1996	ZBPA	X	15593	15593	.06840	2003		1958	
6	1996	ZBPA	X	10654	10654	.06840	2003	R	1958	
6	1996	ZBPA	X	8157	8157	.06880	2004		1959	
6	1996	ZBPA	X	8863	8863	.06880	2004	R	1959	
6	1996	ZBPA	X	3598	3598	.06910	2005		1960	
6	1996	ZBPA	X	4218	4218	.06910	2005	R	1960	
6	1996	ZBPA	X	4468	4468	.06950	2006		1961	
6	1996	ZBPA	X	11271	11271	.06950	2006	R	1961	
6	1996	ZBPA	X	19597	19597	.06980	2007		1962	
6	1996	ZBPA	X	4877	4877	.06980	2007	R	1962	
6	1996	ZBPA	X	4876	4876	.07020	2008		1963	
6	1996	ZBPA	X	4330	4330	.07020	2008	R	1963	
6	1996	ZBPA	X	904	904	.07020	2008		1963	
6	1996	ZBPA	X	803	803	.07020	2008	R	1963	
6	1996	ZBPA	X	4151	4151	.07060	2009		1964	
6	1996	ZBPA	X	5738	5738	.07060	2009	R	1964	
6	1996	ZBPA	X	3706	3706	.07090	2010		1965	
6	1996	ZBPA	X	7248	7248	.07090	2010	R	1965	
6	1996	ZBPA	X	5202	5202	.07090	2010		1965	
6	1996	ZBPA	X	10171	10171	.07090	2010	R	1965	
6	1996	ZBPA	X	11830	11830	.07130	2011		1966	
6	1996	ZBPA	X	3049	3049	.07130	2011	R	1966	
6	1996	ZBPA	X	6647	6647	.07130	2011		1966	
6	1996	ZBPA	X	1714	1714	.07130	2011	R	1966	
6	1996	ZBPA	X	19003	19003	.07160	2012		1967	
6	1996	ZBPA	X	4566	4566	.07160	2012	R	1967	
6	1996	ZBPA	X	14300	14300	.07160	2012		1967	
6	1996	ZBPA	X	3436	3436	.07160	2012	R	1967	
6	1996	ZBPA	X	41070	41070	.07200	2013		1968	
6	1996	ZBPA	X	8076	8076	.07200	2013	R	1968	
6	1996	ZBPA	X	23202	23202	.07200	2013		1968	
6	1996	ZBPA	X	4562	4562	.07200	2013	R	1968	
6	1996	ZBPA	X	42237	42237	.07230	2014		1969	
6	1996	ZBPA	X	22537	22537	.07230	2014	R	1969	
6	1996	ZBPA	X	384	384	.07230	2014		1969	
6	1996	ZBPA	X	205	205	.07230	2014	R	1969	
6	1996	ZBPA	X	64977	64977	.07270	2015		1970	
6	1996	ZBPA	X	7995	7995	.07270	2015	R	1970	
6	1996	ZBPA	X	24412	24412	.07270	2015		1970	
6	1996	ZBPA	X	3003	3003	.07270	2015	R	1970	
6	1996	ZBPA	X	12025	12025	.07290	2016		1971	
6	1996	ZBPA	X	17766	17766	.07290	2016	R	1971	
6	1996	ZBPA	X	12149	12051	.07290	2016		1971	
6	1996	ZBPA	X	17949	17805	.07290	2016	R	1971	
6	1996	ZBPA	X	29326	29326	.07290	2017		1972	
6	1996	ZBPA	X	21170	21170	.07290	2017	R	1972	
6	1996	ZBPA	X	3980	3980	.07290	2017		1972	
6	1996	ZBPA	X	2873	2873	.07290	2017	R	1972	
6	1996	ZBPA	X	40207	33788	.07280	2018		1973	
6	1996	ZBPA	X	25770	21656	.07280	2018	R	1973	
6	1996	ZBPA	X	24826	16368	.07280	2018		1973	
6	1996	ZBPA	X	15912	10491	.07280	2018	R	1973	
6	1996	ZBPA	X	12079	12079	.07270	2019		1974	
6	1996	ZBPA	X	20984	20984	.07270	2019	R	1974	
6	1996	ZBPA	X	12563	12563	.07270	2019		1974	
6	1996	ZBPA	X	21826	21826	.07270	2019	R	1974	
6	1996	ZBPA	X	32026	32026	.07250	2020		1975	
6	1996	ZBPA	X	21916	21916	.07250	2020	R	1975	
6	1996	ZBPA	X	17158	17158	.07250	2020		1975	
6	1996	ZBPA	X	11742	11742	.07250	2020	R	1975	
6	1996	ZBPA	X	61025	61025	.07230	2021		1976	
6	1996	ZBPA	X	2212	2212	.07230	2021	R	1976	
6	1996	ZBPA	X	3948	3948	.07210	2022		1977	
6	1996	ZBPA	X	5380	5380	.07210	2022	R	1977	
6	1996	ZBPA	X	33702	33702	.07210	2022		1977	
6	1996	ZBPA	X	51049	4981	.07210	2022	R	1977	
				1324696	999288					325408 = TOTAL FOR 6
						60.08800			198126	
							202671			

6	1995	ZABF	X	17770	0	.08950	2013		1978	09
6	1995	ZABF	X	24222	0	.08950	2013	R	1978	09
6	1998	ZABF	X	3389	0	.08950	2013		1978	09
6	1998	ZABF	X	4619	0	.08950	2013	R	1978	09
6	1995	ZABF	X	7010	0	.09450	2014		1979	06
6	1995	ZABF	X	9804	0	.09450	2014	R	1979	06
6	1995	ZABF	X	26690	0	.09450	2014		1979	06

6	1995	ZABF	X	21977	0	.09450	2014	R	1979	06	
6	1995	ZABF	X	6026	0	.09450	2014	R	1979	06	
6	1995	ZABF	X	21228	0	.09900	2014		1979	09	
6	1995	ZABF	X	14340	0	.09900	2014	R	1979	09	
6	1995	ZABF	X	10610	0	.09900	2014		1979	09	
6	1995	ZABF	X	2888	0	.09900	2014	R	1979	09	
6	1998	ZABF	X	1371	0	.09450	2014		1979	06	
6	1998	ZABF	X	1870	0	.09450	2014	R	1979	06	
6	1998	ZABF	X	150	0	.09450	2014		1979	06	
6	1998	ZABF	X	102	0	.09450	2014	R	1979	06	
6	1998	ZABF	X	98	0	.09900	2014		1979	09	
6	1998	ZABF	X	66	0	.09900	2014	R	1979	09	
6	1998	ZABF	X	605	0	.09900	2014		1979	09	
6	1998	ZABF	X	165	0	.09900	2014	R	1979	09	
6	1995	ZABF	X	39696	0	.13000	2015		1980	09	
6	1995	ZABF	X	10806	0	.13000	2015	R	1980	09	
6	1995	ZABF	X	44811	0	.13000	2015		1980	09	
6	1995	ZABF	X	1469	0	.13000	2015	R	1980	09	
6	1995	ZABF	X	9292	0	.13000	2015		1980	09	
6	1995	ZABF	X	4253	0	.13000	2015	R	1980	09	
6	1998	ZABF	X	2263	0	.13000	2015		1980	09	
6	1998	ZABF	X	616	0	.13000	2015	R	1980	09	
6	1998	ZABF	X	1707	0	.13000	2015		1980	09	
6	1998	ZABF	X	56	0	.13000	2015	R	1980	09	
6	1998	ZABF	X	21	0	.13000	2015		1980	09	
6	1998	ZABF	X	10	0	.13000	2015	R	1980	09	
6	1995	ZABF	X	119775	0	.16600	2016		1981	09	
6	1995	ZABF	X	54821	0	.16600	2016	R	1981	09	
6	1998	ZABF	X	277	0	.16600	2016		1981	09	
6	1998	ZABF	X	127	0	.16600	2016	R	1981	09	
6	1995	ZABF	X	34221	0	.14400	2017		1982	12	
6	1995	ZABF	X	15663	0	.14400	2017	R	1982	12	
6	1995	ZABF	X	9975	0	.14400	2017		1982	04	
6	1995	ZABF	X	4566	0	.14400	2017	R	1982	04	
6	1995	ZABF	X	46980	0	.14400	2017		1982	04	
6	1995	ZABF	X	37455	0	.14400	2017	R	1982	04	
6	1995	ZABF	X	3677	0	.14150	2017		1982	07	
6	1995	ZABF	X	-3677	0	.14150	2017		1987	07	
6	1995	ZABF	X	2932	0	.14150	2017	R	1982	07	
6	1995	ZABF	X	-2932	0	.14150	2017	R	1987	07	
6	1995	ZABF	X	77807	0	.14150	2017		1982	07	
6	1995	ZABF	X	-77807	0	.14150	2017		1987	07	
6	1998	ZABF	X	80	0	.14400	2017		1982	12	
6	1998	ZABF	X	36	0	.14400	2017	R	1982	12	
6	1998	ZABF	X	23	0	.14400	2017		1982	04	
6	1998	ZABF	X	11	0	.14400	2017	R	1982	04	
6	1998	ZABF	X	551	0	.14400	2017		1982	04	
6	1998	ZABF	X	439	0	.14400	2017	R	1982	04	
6	1998	ZABF	X	43	0	.14150	2017		1982	07	
6	1998	ZABF	X	-43	0	.14150	2017		1987	07	
6	1998	ZABF	X	34	0	.14150	2017	R	1982	07	
6	1998	ZABF	X	-34	0	.14150	2017	R	1987	07	
6	1998	ZABF	X	402	0	.14150	2017		1982	07	
6	1998	ZABF	X	-402	0	.14150	2017		1987	07	
6	1998	ZABF	X	105	0	.14150	2017	R	1982	07	
6	1998	ZABF	X	-105	0	.14150	2017	R	1987	07	
6	1995	ZABF	X	39741	0	.10850	2018		1983	11	
6	1995	ZABF	X	-39741	0	.10850	2018		1988	02	
6	1995	ZABF	X	29806	0	.11700	2018		1983	06	
6	1995	ZABF	X	814	0	.12250	2018		1983	09	
6	1995	ZABF	X	37235	0	.12250	2018		1983	09	
6	1995	ZABF	X	6708	0	.12250	2018	R	1983	09	
6	1998	ZABF	X	205	0	.10850	2018		1983	11	
6	1998	ZABF	X	-205	0	.10850	2018		1988	02	
6	1998	ZABF	X	54	0	.10850	2018	R	1983	11	
6	1998	ZABF	X	-54	0	.10850	2018	R	1988	02	
6	1998	ZABF	X	154	0	.11700	2018		1983	06	T
6	1998	ZABF	X	40	0	.11700	2018	R	1983	06	T
6	1998	ZABF	X	4	0	.12250	2018		1983	09	
6	1998	ZABF	X	1	0	.12250	2018	R	1983	09	
6	1998	ZABF	X	203	0	.12250	2018		1983	09	
6	1998	ZABF	X	35	0	.12250	2018	R	1983	09	
6	1995	ZABF	X	25283	0	.12300	2019		1984	11	
6	1995	ZABF	X	4555	0	.12300	2019	R	1984	11	
6	1995	ZABF	X	50567	0	.13050	2019		1984	09	
6	1995	ZABF	X	9109	0	.13050	2019	R	1984	09	
6	1998	ZABF	X	138	0	.12300	2019		1984	11	
6	1998	ZABF	X	24	0	.12300	2019	R	1984	11	
6	1998	ZABF	X	276	0	.13050	2019		1984	09	
6	1998	ZABF	X	48	0	.13050	2019	R	1984	09	
6	1995	ZABF	X	84278	0	.11250	2029		1985	06	
6	1995	ZABF	X	15182	0	.11250	2029	R	1985	06	
6	1998	ZABF	X	460	0	.11250	2029		1985	06	
6	1998	ZABF	X	80	0	.11250	2029	R	1985	06	
6	1995	ZABF	X	870	0	.08150	1996		1986	03	T
6	1995	ZABF	X	157	0	.08150	1996	R	1986	03	T
6	1995	ZABF	X	30161	0	.08150	1996		1986	03	T
6	1995	ZABF	X	68194	0	.08150	1996	R	1986	03	T
6	1995	ZABF	X	5161	0	.08950	2030		1986	06	

6	1995	ZABF	X	-5161	0	.08950	2030		1992	08	
6	1995	ZABF	X	11668	0	.08950	2030	R	1986	06	
6	1995	ZABF	X	-11668	0	.08950	2030	R	1992	08	
6	1995	ZABF	X	180054	0	.08950	2030		1986	06	
6	1995	ZABF	X	-180054	0	.08950	2030		1992	08	
6	1995	ZABF	X	3117	0	.08950	2030	R	1986	06	
6	1995	ZABF	X	-3117	0	.08950	2030	R	1992	08	
6	1995	ZABF	X	40000	0	.08950	2030	R	1986	06	
6	1995	ZABF	X	-40000	0	.08950	2030	R	1994	05	
6	1995	ZABF	X	57354	0	.08950	2030	R	1986	06	
6	1998	ZABF	X	5	0	.08150	1996		1986	03	T
6	1998	ZABF	X	1	0	.08150	1996	R	1986	03	T
6	1998	ZABF	X	443	0	.08150	1996		1986	03	T
6	1998	ZABF	X	169	0	.08150	1996	R	1986	03	T
6	1998	ZABF	X	76	0	.08950	2030		1986	06	
6	1998	ZABF	X	29	0	.08950	2030	R	1986	06	
6	1998	ZABF	X	1819	0	.08950	2030		1986	06	
6	1998	ZABF	X	722	0	.08950	2030	R	1986	06	
6	1995	ZABF	X	43236	0	.09300	2031		1987	04	
6	1995	ZABF	X	-43236	0	.09300	2031		1992	04	
6	1995	ZABF	X	54409	0	.09300	2031	R	1987	04	
6	1995	ZABF	X	-54409	0	.09300	2031	R	1992	04	
6	1995	ZABF	X	96519	0	.08350	1992		1987	06	T
6	1995	ZABF	X	4113	0	.09550	2017		1987	07	
6	1995	ZABF	X	3274	0	.09550	2017	R	1987	07	
6	1995	ZABF	X	86958	0	.09550	2017		1987	07	
6	1995	ZABF	X	7903	0	.09550	2032		1987	07	
6	1995	ZABF	X	3109	0	.09550	2032	R	1987	07	
6	1995	ZABF	X	37342	0	.09550	2032		1987	07	
6	1998	ZABF	X	111	0	.09300	2031		1987	04	
6	1998	ZABF	X	-111	0	.09300	2031		1992	04	
6	1998	ZABF	X	281	0	.09300	2031		1987	04	
6	1998	ZABF	X	-281	0	.09300	2031		1992	04	
6	1998	ZABF	X	554	0	.09300	2031		1987	04	
6	1998	ZABF	X	-554	0	.09300	2031		1992	04	
6	1998	ZABF	X	1409	0	.09300	2031		1987	04	
6	1998	ZABF	X	-1409	0	.09300	2031		1992	04	
6	1998	ZABF	X	2498	0	.08350	1992		1987	06	T
6	1998	ZABF	X	983	0	.08350	1992	R	1987	06	T
6	1998	ZABF	X	48	0	.09550	2017		1987	07	
6	1998	ZABF	X	38	0	.09550	2017	R	1987	07	
6	1998	ZABF	X	569	0	.09550	2017		1987	07	
6	1998	ZABF	X	285	0	.09550	2032		1987	07	
6	1998	ZABF	X	112	0	.09550	2032	R	1987	07	
6	1998	ZABF	X	631	0	.09550	2032		1987	07	
6	1998	ZABF	X	618	0	.09550	2032	R	1987	07	
6	1995	ZABF	X	43417	0	.09500	2018		1988	02	
6	1995	ZABF	X	28513	0	.09500	2033		1988	02	
6	1995	ZABF	X	-28513	0	.09500	2033		1994	10	
6	1995	ZABF	X	27887	0	.09500	2033	R	1988	02	
6	1995	ZABF	X	-27887	0	.09500	2033	R	1994	10	
6	1995	ZABF	X	20677	0	.09500	2033		1988	02	
6	1995	ZABF	X	-20677	0	.09500	2033		1994	10	
6	1995	ZABF	X	22923	0	.09500	2033	R	1988	02	
6	1995	ZABF	X	-22923	0	.09500	2033	R	1994	10	
6	1995	ZABF	X	45870	0	.09500	2033	R	1988	02	
6	1995	ZABF	X	-45870	0	.09500	2033	R	1994	05	
6	1995	ZABF	X	9018	0	.09900	2033		1988	06	
6	1995	ZABF	X	30004	0	.09900	2033	R	1988	06	
6	1998	ZABF	X	618	0	.09550	2032	R	1987	07	
6	1998	ZABF	X	283	0	.09500	2018		1988	02	
6	1998	ZABF	X	954	0	.09500	2033		1988	02	
6	1998	ZABF	X	-954	0	.09500	2033		1994	05	
6	1998	ZABF	X	933	0	.09500	2033	R	1988	02	
6	1998	ZABF	X	-933	0	.09500	2033	R	1994	05	
6	1998	ZABF	X	518	0	.09500	2033		1988	02	
6	1998	ZABF	X	-518	0	.09500	2033		1994	05	
6	1998	ZABF	X	1725	0	.09500	2033	R	1988	02	
6	1998	ZABF	X	-1725	0	.09500	2033	R	1994	05	
6	1998	ZABF	X	226	0	.09900	2033		1988	06	
6	1998	ZABF	X	752	0	.09900	2033	R	1988	06	
6	1995	ZABF	X	16909	0	.08950	1999		1989	05	T
6	1995	ZABF	X	56257	0	.08950	1999	R	1989	05	T
6	1998	ZABF	X	424	0	.08950	1999		1989	05	T
6	1998	ZABF	X	1410	0	.08950	1999	R	1989	05	T
6	1999	ZABF	X	-1149	0	.09250	2030		2000	01	
6	1995	ZABF	X	3824	0	.09250	2030	R	1990	01	10
6	1999	ZABF	X	-3824	0	.09250	2030	R	2000	01	
6	1995	ZABF	X	41894	0	.09250	2030		1990	01	10
6	1999	ZABF	X	-41894	0	.09250	2030		2000	01	
6	1998	ZABF	X	29	0	.09250	2030		1990	01	10
6	1999	ZABF	X	-29	0	.09250	2030		2000	01	
6	1998	ZABF	X	96	0	.09250	2030	R	1990	01	10
6	1999	ZABF	X	-96	0	.09250	2030	R	2000	01	
6	1998	ZABF	X	3008	0	.09250	2030		1990	01	10
6	1999	ZABF	X	-3008	0	.09250	2030		2000	01	
6	1995	ZABF	X	54145	0	.07550	1995		1991	02	T
6	1998	ZABF	X	5855	0	.07550	1995		1991	02	T
6	1995	ZABF	X	147521	0	.08800	2032		1992	04	

6	1995	ZABF	X	50000	0	.07000	1997	1992	04	T
6	1995	ZABF	X	80000	0	.06200	1995	1992	04	T
6	1995	ZABF	X	28300	0	.07000	1997	1992	04	T
6	1995	ZABF	X	150000	0	.08130	2032	1992	07	
6	1995	ZABF	X	-103000	0	.08130	2032	1997	07	
6	1995	ZABF	X	-70300	0	.08130	2032	1998	04	
6	1995	ZABF	X	-67900	0	.08130	2032	1998	05	
6	1995	ZABF	X	107800	92125	.06600	2000	1992	08	T
6	1999	ZABF	X	-15675	0	.06600	2000	1999	03	T
6	1995	ZABF	X	107700	0	.07250	2007	1992	08	
6	1995	ZABF	X	-107700	0	.07250	2007	1998	08	
6	1995	ZABF	X	50000	0	.06050	1997	1992	10	T
6	1995	ZABF	X	99962	0	.08350	2032	1992	10	
6	1998	ZABF	X	2479	0	.08800	2032	1992	04	
6	1995	ZABF	X	50000	50000	.06850	2034	1994	10	
6	1995	ZABF	X	130000	0	.07800	2033	1993	02	
6	1995	ZABF	X	-130000	0	.07800	2033	1998	05	
6	1995	ZABF	X	100000	0	.07500	2033	1993	04	
6	1995	ZABF	X	-100000	0	.07500	2033	1998	08	
6	1995	ZABF	X	110000	110000	.06950	2033	1993	08	
6	1995	ZABF	X	108400	108400	.06850	2034	1994	10	
6	1995	ZABF	X	43155	0	.07100	1998	1994	05	01 P
6	1995	ZABF	X	49489	0	.07100	1998	1994	05	01 P
6	1995	ZABF	X	50000	50000	.07050	2034	1994	01	
6	1995	ZABF	X	50000	0	.08200	2034	1994	05	
6	1995	ZABF	X	55000	0	.07650	1999	1994	09	01 P
6	1995	ZABF	X	55000	0	.08350	2001	1995	01	01 P
6	1995	ZABF	X	41491	41491	.07700	2025	1995	07	05
6	1995	ZABF	X	65000	65000	.07700	2025	1995	08	05
6	1995	ZAFW	X	12100	12100	.07200	2010	1995	08	05
6	1998	ZABF	X	8442	8442	.07700	2025	1995	07	05
6	1996	ZABF	X	50000	50000	.05900	2003	1996	01	
6	1996	ZABF	X	70000	70000	.07050	2006	1996	08	T
6	1997	ZAFW	X	40000	40000	.06950	2012	1997	11	05
6	1998	ZABF	X	4378	4378	.05900	2003	1996	01	T
6	1997	ZABF	X	22600	22600	.06800	2004	1997	01	T
6	1997	ZABF	X	80000	80000	.06900	2005	1997	05	T
6	1997	ZABF	X	111254	111254	.06650	2007	1997	08	T
6	1998	ZABF	X	75300	75300	.06000	2008	1998	04	T
6	1998	ZABF	X	50000	50000	.06650	2028	1998	04	10
6	1998	ZABF	X	72700	72700	.06000	2009	1998	05	T
6	1998	ZABF	X	40000	40000	.06200	2011	1998	05	T
6	1998	ZABF	X	98900	98900	.06700	2032	1998	05	10
6	1998	ZABF	X	106600	106600	.05850	2023	1998	08	T
6	1998	ZABF	X	112400	112400	.05850	2028	1998	08	T
6	1998	ZABF	X	40000	40000	.05750	2008	1998	08	T
6	1999	ZABF	X	48920	48920	.05900	2014	1999	02	T
6	1999	ZABF	X	26200	26200	.05950	2004	1999	05	T
6	1999	ZABF	X	40000	40000	.06200	2002	1999	09	T
				3749685	1626810					
						233.03700		465153		
							472547			

PROJECTED HISTORICAL INVESTMENTS

		PROJECT		ORIGINAL PRINCIPAL	CURRENT PRINCIPAL	INTEREST RATE	DUE DATE	INSERVICE DATE	CALENDAR MONTH	
6	2000	ZABF	X	40000	40000	.06400	2003	2000	11	T
6	2000	ZABF	X	53500	53500	.07150	2005	2000	01	T
6	2000	ZABF	X	149593	149593	.07540	2035	2000	03	
6	2000	ZABF	X	15675	15675	.07540	2031	2000	03	
6	2000	ZAFW	X	19603	19603	.07240	2015	2000	03	
6	2001	ZABF	X	201604	201604	.07290	2036	2001	03	
6	2001	ZAFW	X	9086	9086	.06920	2016	2001	03	
6	2002	ZABF	X	231985	231985	.07080	2037	2002	03	
6	2002	ZAFW	X	9047	9047	.06690	2017	2002	03	
				730093	730093					
						6.38500		18006		
							18195			

CHAPTER 11

REPAYMENT STUDY RESULTS
CURRENT STUDY
FY 2002

Summary of Interest Expense
Transmission
FY 2002 Current Repayment Study

SUMMARY OF INTEREST EXPENSE TRANSMISSION FY 2002 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
BUREAU OF RECLAMATION										
BOISE										
COLUMBIA BASIN										
COLUMBIA BASIN- 3RD										
HUNGRY HORSE										
MINIDOKA										
YAKIMA-CHANDLER										
YAKIMA-ROZA										
TOTAL BUREAU										
CORPS OF ENGINEERS										
ALBENI FALLS										
BONNEVILLE										
BONNEVILLE - 2ND POW										
CHIEF JOSEPH										
COUGAR										
COLUMBIA RIVER FISH										
DETROIT-BIG CLIFF										
DWORSHAK										
GREEN PETER-FOSTER										
HILLS CREEK										
ICE HARBOR										
JOHN DAY										
LIBBY										
LITTLE GOOSE										
LOOKOUT POINT-DEXTER										
LOST CREEK										
LOWER GRANITE										
LOWER MONUMENTAL										
MCNARY										
STRUBE										
THE DALLES										
TOTAL CORPS										
LOWER SNAKE F AND W										
BONNEVILLE POWER ADM	71,508	70,044	66,904	65,280	63,484	58,221	57,681	56,587	54,879	54,114
TOTAL APPROPRIATIONS	71,508	70,044	66,904	65,280	63,484	58,221	57,681	56,587	54,879	54,114
BPA BORROWING										
BPA PROGRAM	113,809	122,982	137,598	138,122	135,485	139,737	139,305	139,474	140,850	142,273
BUREAU DIRECT FUND										

FISH, WILDLIFE & ENV	4,361	5,384	6,002	6,304	6,304	6,304	6,304	6,304	6,304	6,304
PREMIUMS	23	755	3,993	891	1,018	91	3,416	515	1,040	3,283
LESS										
AFUDC										
INTEREST INCOME	7,941	6,329	9,024	8,968	9,050	8,980	8,989	8,988	8,967	8,945
TOTAL BPA BORROWING	110,252	122,792	138,569	136,349	133,757	137,152	140,036	137,305	139,227	142,915
TOTALS	181,760	192,836	205,473	201,629	197,241	195,373	197,717	193,892	194,106	197,029

SUMMARY OF INTEREST EXPENSE TRANSMISSION FY 2002 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
BUREAU OF RECLAMATION										
BOISE										
COLUMBIA BASIN										
COLUMBIA BASIN- 3RD										
HUNGRY HORSE										
MINIDOKA										
YAKIMA-CHANDLER										
YAKIMA-ROZA										
TOTAL BUREAU										
CORPS OF ENGINEERS										
ALBENI FALLS										
BONNEVILLE										
BONNEVILLE - 2ND POW										
CHIEF JOSEPH										
COUGAR										
COLUMBIA RIVER FISH										
DETROIT-BIG CLIFF										
DWORSHAK										
GREEN PETER-FOSTER										
HILLS CREEK										
ICE HARBOR										
JOHN DAY										
LIBBY										
LITTLE GOOSE										
LOOKOUT POINT-DEXTER										
LOST CREEK										
LOWER GRANITE										
LOWER MONUMENTAL										
MCNARY										
STRUBE										
THE DALLES										
TOTAL CORPS										
LOWER SNAKE F AND W										
BONNEVILLE POWER ADM	53,416	45,690	38,104	30,539	20,064	13,114	4,086			
TOTAL APPROPRIATIONS	53,416	45,690	38,104	30,539	20,064	13,114	4,086			
BPA BORROWING										
BPA PROGRAM	143,226	151,266	158,771	168,881	179,118	186,603	197,115	202,287	203,664	204,883
BUREAU DIRECT FUND										

FISH, WILDLIFE & ENV	6,304	5,433	5,433	2,653	2,653	2,653	1,234	605		
PREMIUMS	1,258						3,134	5,124	5,286	4,535
LESS										
AFUDC										
INTEREST INCOME	8,930	8,811	8,685	8,563	8,392	8,267	8,115	8,040	8,028	8,009
TOTAL BPA BORROWING	141,858	147,888	155,519	162,971	173,379	180,989	193,368	199,976	200,922	201,409
TOTALS	195,274	193,578	193,623	193,510	193,443	194,103	197,454	199,976	200,922	201,409

SUMMARY OF INTEREST EXPENSE TRANSMISSION FY 2002 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
BUREAU OF RECLAMATION										
BOISE										
COLUMBIA BASIN										
COLUMBIA BASIN- 3RD										
HUNGRY HORSE										
MINIDOKA										
YAKIMA-CHANDLER										
YAKIMA-ROZA										
TOTAL BUREAU										
CORPS OF ENGINEERS										
ALBENI FALLS										
BONNEVILLE										
BONNEVILLE - 2ND POW										
CHIEF JOSEPH										
COUGAR										
COLUMBIA RIVER FISH										
DETROIT-BIG CLIFF										
DWORSHAK										
GREEN PETER-FOSTER										
HILLS CREEK										
ICE HARBOR										
JOHN DAY										
LIBBY										
LITTLE GOOSE										
LOOKOUT POINT-DEXTER										
LOST CREEK										
LOWER GRANITE										
LOWER MONUMENTAL										
MCNARY										
STRUBE										
THE DALLES										
TOTAL CORPS										
LOWER SNAKE F AND W										
BONNEVILLE POWER ADM										

TOTAL APPROPRIATIONS										
BPA BORROWING										
BPA PROGRAM	206,295	208,036	210,143	212,698	216,365	220,187	224,347	228,860	233,750	239,312
BUREAU DIRECT FUND										
FISH, WILDLIFE & ENV										
PREMIUMS	3,137	3,015	2,416	582	4,398	4,266	4,097	3,906	1	3,361
LESS										
AFUDC										
INTEREST INCOME	7,987	7,959	7,925	7,883	7,822	7,759	7,689	7,614	7,533	7,440
TOTAL BPA BORROWING	201,445	203,092	204,634	205,397	212,941	216,694	220,755	225,152	226,218	235,233
TOTALS	201,445	203,092	204,634	205,397	212,941	216,694	220,755	225,152	226,218	235,233

SUMMARY OF INTEREST EXPENSE TRANSMISSION FY 2002 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

	2030	2031	2032	2033	2034	2035	2036	2037
BUREAU OF RECLAMATION								
BOISE								
COLUMBIA BASIN								
COLUMBIA BASIN- 3RD								
HUNGRY HORSE								
MINIDOKA								
YAKIMA-CHANDLER								
YAKIMA-ROZA								
TOTAL BUREAU								
CORPS OF ENGINEERS								
ALBENI FALLS								
BONNEVILLE								
BONNEVILLE - 2ND POW								
CHIEF JOSEPH								
COUGAR								
COLUMBIA RIVER FISH								
DETROIT-BIG CLIFF								
DWORSHAK								
GREEN PETER-FOSTER								
HILLS CREEK								
ICE HARBOR								
JOHN DAY								
LIBBY								
LITTLE GOOSE								
LOOKOUT POINT-DEXTER								
LOST CREEK								
LOWER GRANITE								
LOWER MONUMENTAL								
MCNARY								
STRUBE								

THE DALLES								
TOTAL CORPS								
LOWER SNAKE F AND W								
BONNEVILLE POWER ADM								
TOTAL APPROPRIATIONS								
BPA BORROWING								
BPA PROGRAM	245,040	251,230	257,911	265,113	272,872	281,218	290,185	299,803
BUREAU DIRECT FUND								
FISH, WILDLIFE & ENV								
PREMIUMS	3,151	2,911	2,627	2,398	2,078	1,815	1,502	1,176
LESS								
AFUDC								
INTEREST INCOME	7,344	7,241	7,129	7,008	6,878	6,738	6,588	6,426
TOTAL BPA BORROWING	240,847	246,900	253,409	260,503	268,072	276,295	285,099	294,553
TOTALS	240,847	246,900	253,409	260,503	268,072	276,295	285,099	294,553

SUMMARY OF INTEREST EXPENSE TRANSMISSION FY 2002 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

	TOTALS
BUREAU OF RECLAMATION	
BOISE	
COLUMBIA BASIN	
COLUMBIA BASIN- 3RD	
HUNGRY HORSE	
MINIDOKA	
YAKIMA-CHANDLER	
YAKIMA-ROZA	
TOTAL BUREAU	
CORPS OF ENGINEERS	
ALBENI FALLS	
BONNEVILLE	
BONNEVILLE - 2ND POW	
CHIEF JOSEPH	
COUGAR	
COLUMBIA RIVER FISH	
DETROIT-BIG CLIFF	
DWORSHAK	
GREEN PETER-FOSTER	
HILLS CREEK	
ICE HARBOR	
JOHN DAY	
LIBBY	
LITTLE GOOSE	
LOOKOUT POINT-DEXTER	
LOST CREEK	
LOWER GRANITE	
LOWER MONUMENTAL	
MCNARY	
STRUBE	
THE DALLES	
TOTAL CORPS	
LOWER SNAKE F AND W	
TOTAL APPROPRIATIONS	
BONNEVILLE POWER ADM	823,715
BPA BORROWING	
BPA PROGRAM	7,508,814
BUREAU DIRECT FUND	
FISH, WILDLIFE & ENV	86,843
PREMIUMS	81,199
LESS	
AFUDC	
INTEREST INCOME	302,984
TOTAL BPA BORROWING	7,373,872
TOTALS	8,197,587

Application of Amortization
Transmission
FY 2002 Current Repayment Study

YEAR ----------INVESTMENT PAID----------

(ALL AMOUNT IN $1000)

YEAR	PROJECT	IN-SERVICE	DUE	GROSS	NET	RATE	REPLACEMENT	AMOUNT
2000	BONNEVILLE POWER ADMINISTRATION	1955	2000	11,827	11,827	.06620		11,827
	BPA PROGRAM	1992	2000	92,125	92,125	.06600		92,125
	BONNEVILLE POWER ADMINISTRATION	1955	2000	10,283	10,283	.06620	R	10,283
	BPA PROGRAM	1995	2025	8,442	8,442	.07700		352
	TOTAL							114,587
2001	BONNEVILLE POWER ADMINISTRATION	1956	2001	14,573	14,573	.06710		14,573
	BONNEVILLE POWER ADMINISTRATION	1956	2001	32,221	32,221	.06710	R	32,221
	BPA PROGRAM	1995	2025	8,442	8,090	.07700		8,090
	BPA PROGRAM	1995	2025	65,000	65,000	.07700		4,180
	TOTAL							59,064
2002	BONNEVILLE POWER ADMINISTRATION	1957	2002	7,933	7,933	.06790		7,933
	BPA PROGRAM	1999	2002	40,000	40,000	.06200		40,000
	BONNEVILLE POWER ADMINISTRATION	1957	2002	15,980	15,980	.06790	R	15,980
	BPA PROGRAM	1995	2025	65,000	60,820	.07700		60,820
	BPA PROGRAM	1995	2025	41,491	41,491	.07700		6,824
	TOTAL							131,557
2003	BPA PROGRAM	2000	2003	40,000	40,000	.06400		40,000
	BPA PROGRAM	1996	2003	4,378	4,378	.05900		4,378
	BPA PROGRAM	1996	2003	50,000	50,000	.05900		50,000
	BONNEVILLE POWER ADMINISTRATION	1958	2003	15,593	15,593	.06840		15,593
	BONNEVILLE POWER ADMINISTRATION	1958	2003	10,654	10,654	.06840	R	10,654
	BPA PROGRAM	1995	2025	41,491	34,667	.07700		15,785
	TOTAL							136,410
2004	BPA PROGRAM	1999	2004	26,200	26,200	.05950		26,200
	BPA PROGRAM	1997	2004	22,600	22,600	.06800		22,600
	BONNEVILLE POWER ADMINISTRATION	1959	2004	8,157	8,157	.06880		8,157
	BONNEVILLE POWER ADMINISTRATION	1959	2004	8,863	8,863	.06880	R	8,863
	BPA PROGRAM	1995	2025	41,491	18,882	.07700		18,882
	BONNEVILLE POWER ADMINISTRATION	1971	2016	17,805	17,805	.07290	R	17,805
	BONNEVILLE POWER ADMINISTRATION	1971	2016	12,051	12,051	.07290		12,051
	BONNEVILLE POWER ADMINISTRATION	1971	2016	17,766	17,766	.07290	R	17,766
	BONNEVILLE POWER ADMINISTRATION	1971	2016	12,025	12,025	.07290		8,506
	TOTAL							140,830
2005	BPA PROGRAM	2000	2005	53,500	53,500	.07150		53,500
	BPA PROGRAM	1997	2005	80,000	80,000	.06900		80,000
	BONNEVILLE POWER ADMINISTRATION	1960	2005	3,598	3,598	.06910		3,598
	BONNEVILLE POWER ADMINISTRATION	1960	2005	4,218	4,218	.06910	R	4,218
	BPA PROGRAM	2000	2035	149,593	149,593	.07540		1,414
	TOTAL							142,730
2006	BPA PROGRAM	1996	2006	70,000	70,000	.07050		70,000
	BONNEVILLE POWER ADMINISTRATION	1961	2006	4,468	4,468	.06950		4,468
	BONNEVILLE POWER ADMINISTRATION	1961	2006	11,271	11,271	.06950	R	11,271
	BPA PROGRAM	2000	2035	149,593	148,179	.07540		54,678
	TOTAL							140,417
2007	BONNEVILLE POWER ADMINISTRATION	1962	2007	19,597	19,597	.06980		19,597
	BPA PROGRAM	1997	2007	111,254	111,254	.06650		111,254
	BONNEVILLE POWER ADMINISTRATION	1962	2007	4,877	4,877	.06980	R	4,877
	BPA PROGRAM	2000	2035	149,593	93,501	.07540		8,544

YEAR ----------INVESTMENT PAID----------

(ALL AMOUNT IN $1000)

YEAR	PROJECT	IN-SERVICE	DUE	GROSS	NET	RATE	REPLACEMENT	AMOUNT
	TOTAL							144,272
2008	BPA PROGRAM	1998	2008	75,300	75,300	.06000		75,300
	BPA PROGRAM	1998	2008	40,000	40,000	.05750		40,000
	BONNEVILLE POWER ADMINISTRATION	1963	2008	4,876	4,876	.07020		4,876
	BONNEVILLE POWER ADMINISTRATION	1963	2008	803	803	.07020	R	803
	BONNEVILLE POWER ADMINISTRATION	1963	2008	4,330	4,330	.07020	R	4,330
	BONNEVILLE POWER ADMINISTRATION	1963	2008	904	904	.07020		904
	BPA PROGRAM	2000	2035	149,593	84,957	.07540		17,875
	TOTAL							144,088
2009	BONNEVILLE POWER ADMINISTRATION	1964	2009	5,738	5,738	.07060	R	5,738
	BPA PROGRAM	1998	2009	72,700	72,700	.06000		72,700
	BONNEVILLE POWER ADMINISTRATION	1964	2009	4,151	4,151	.07060		4,151
	BPA PROGRAM	2000	2035	149,593	67,082	.07540		58,605
	TOTAL							141,194
2010	BONNEVILLE POWER ADMINISTRATION	1965	2010	7,248	7,248	.07090	R	7,248
	BONNEVILLE POWER ADMINISTRATION	1965	2010	3,706	3,706	.07090		3,706
	FISH, WILDLIFE & ENVIRONMENTAL	1995	2010	12,100	12,100	.07200		12,100
	BONNEVILLE POWER ADMINISTRATION	1965	2010	5,202	5,202	.07090		5,202
	BONNEVILLE POWER ADMINISTRATION	1965	2010	10,171	10,171	.07090	R	10,171
	BPA PROGRAM	2000	2035	149,593	8,477	.07540		8,477
	BPA PROGRAM	2000	2031	15,675	15,675	.07540		15,675
	BONNEVILLE POWER ADMINISTRATION	1971	2016	12,025	3,519	.07290		3,519
	BONNEVILLE POWER ADMINISTRATION	1972	2017	2,873	2,873	.07290	R	2,873
	BONNEVILLE POWER ADMINISTRATION	1972	2017	3,980	3,980	.07290		3,980
	BONNEVILLE POWER ADMINISTRATION	1972	2017	21,170	21,170	.07290	R	21,170
	BONNEVILLE POWER ADMINISTRATION	1972	2017	29,326	29,326	.07290		29,326
	BONNEVILLE POWER ADMINISTRATION	1973	2018	10,491	10,491	.07280	R	10,491
	BONNEVILLE POWER ADMINISTRATION	1973	2018	16,368	16,368	.07280		9,039
	TOTAL							142,977
2011	BONNEVILLE POWER ADMINISTRATION	1966	2011	11,830	11,830	.07130		11,830
	BPA PROGRAM	1998	2011	40,000	40,000	.06200		40,000
	BONNEVILLE POWER ADMINISTRATION	1966	2011	3,049	3,049	.07130	R	3,049
	BONNEVILLE POWER ADMINISTRATION	1966	2011	6,647	6,647	.07130		6,647
	BONNEVILLE POWER ADMINISTRATION	1966	2011	1,714	1,714	.07130	R	1,714
	BONNEVILLE POWER ADMINISTRATION	1973	2018	21,656	21,656	.07280	R	21,656
	BONNEVILLE POWER ADMINISTRATION	1973	2018	33,788	33,788	.07280		33,788
	BONNEVILLE POWER ADMINISTRATION	1973	2018	16,368	7,329	.07280		7,329
	BONNEVILLE POWER ADMINISTRATION	1970	2015	3,003	3,003	.07270	R	3,003
	BONNEVILLE POWER ADMINISTRATION	1970	2015	24,412	24,412	.07270		15,685
	TOTAL							144,701
2012	FISH, WILDLIFE & ENVIRONMENTAL	1997	2012	40,000	40,000	.06950		40,000
	BONNEVILLE POWER ADMINISTRATION	1967	2012	19,003	19,003	.07160		19,003
	BONNEVILLE POWER ADMINISTRATION	1967	2012	4,566	4,566	.07160	R	4,566
	BONNEVILLE POWER ADMINISTRATION	1967	2012	14,300	14,300	.07160		14,300
	BONNEVILLE POWER ADMINISTRATION	1967	2012	3,436	3,436	.07160	R	3,436
	BONNEVILLE POWER ADMINISTRATION	1970	2015	24,412	8,727	.07270		8,727
	BONNEVILLE POWER ADMINISTRATION	1970	2015	7,995	7,995	.07270	R	7,995
	BONNEVILLE POWER ADMINISTRATION	1970	2015	64,977	64,977	.07270		46,657
	TOTAL							144,684
2013	BONNEVILLE POWER ADMINISTRATION	1968	2013	41,070	41,070	.07200		41,070

YEAR ----------INVESTMENT PAID----------

(ALL AMOUNT IN $1000)

YEAR	PROJECT	IN-SERVICE	DUE	GROSS	NET	RATE	REPLACEMENT	AMOUNT
	BONNEVILLE POWER ADMINISTRATION	1968	2013	8,076	8,076	.07200	R	8,076
	BONNEVILLE POWER ADMINISTRATION	1968	2013	23,202	23,202	.07200		23,202
	BONNEVILLE POWER ADMINISTRATION	1968	2013	4,562	4,562	.07200	R	4,562
	BONNEVILLE POWER ADMINISTRATION	1970	2015	64,977	18,320	.07270		18,320
	BONNEVILLE POWER ADMINISTRATION	1974	2019	21,826	21,826	.07270	R	21,826
	BONNEVILLE POWER ADMINISTRATION	1974	2019	12,563	12,563	.07270		12,563
	BONNEVILLE POWER ADMINISTRATION	1974	2019	12,079	12,079	.07270		12,079
	BONNEVILLE POWER ADMINISTRATION	1974	2019	20,984	20,984	.07270	R	3,125
	TOTAL							144,823
2014	BONNEVILLE POWER ADMINISTRATION	1969	2014	22,537	22,537	.07230	R	22,537
	BPA PROGRAM	1999	2014	48,920	48,920	.05900		48,920
	BONNEVILLE POWER ADMINISTRATION	1969	2014	42,237	42,237	.07230		42,237
	BONNEVILLE POWER ADMINISTRATION	1969	2014	384	384	.07230		384
	BONNEVILLE POWER ADMINISTRATION	1969	2014	205	205	.07230	R	205
	BONNEVILLE POWER ADMINISTRATION	1974	2019	20,984	17,859	.07270	R	17,859
	BONNEVILLE POWER ADMINISTRATION	1975	2020	21,916	21,916	.07250	R	12,774
	TOTAL							144,916
2015	FISH, WILDLIFE & ENVIRONMENTAL	2000	2015	19,603	19,603	.07240		19,603
	BONNEVILLE POWER ADMINISTRATION	1975	2020	21,916	9,142	.07250	R	9,142
	BONNEVILLE POWER ADMINISTRATION	1975	2020	32,026	32,026	.07250		32,026
	BONNEVILLE POWER ADMINISTRATION	1975	2020	17,158	17,158	.07250		17,158
	BONNEVILLE POWER ADMINISTRATION	1975	2020	11,742	11,742	.07250	R	11,742
	BONNEVILLE POWER ADMINISTRATION	1976	2021	61,025	61,025	.07230		54,611
	TOTAL							144,282
2016	FISH, WILDLIFE & ENVIRONMENTAL	2001	2016	9,086	9,086	.06920		9,086
	BONNEVILLE POWER ADMINISTRATION	1976	2021	61,025	6,414	.07230		6,414
	BONNEVILLE POWER ADMINISTRATION	1976	2021	2,212	2,212	.07230	R	2,212
	BONNEVILLE POWER ADMINISTRATION	1977	2022	3,948	3,948	.07210		3,948
	BONNEVILLE POWER ADMINISTRATION	1977	2022	5,380	5,380	.07210	R	5,380
	BONNEVILLE POWER ADMINISTRATION	1977	2022	33,702	33,702	.07210		33,702
	BONNEVILLE POWER ADMINISTRATION	1977	2022	4,981	4,981	.07210	R	4,981
	BPA PROGRAM	2001	2036	201,604	201,604	.07290		75,233
	TOTAL							140,956
2017	FISH, WILDLIFE & ENVIRONMENTAL	2002	2017	9,047	9,047	.06690		9,047
	BPA PROGRAM	2001	2036	201,604	126,371	.07290		126,371
	BPA PROGRAM	2002	2037	231,985	231,985	.07080		3,040
	TOTAL							138,458
2018	BPA PROGRAM	2002	2037	231,985	228,945	.07080		137,536
	TOTAL							137,536
2019	BPA PROGRAM	2002	2037	231,985	91,409	.07080		91,409
	BPA PROGRAM	1994	2034	50,000	50,000	.07050		45,663
	TOTAL							137,072
2020	BPA PROGRAM	1994	2034	50,000	4,337	.07050		4,337
	BPA PROGRAM	1993	2033	110,000	110,000	.06950		110,000
	BPA PROGRAM	1994	2034	50,000	50,000	.06850		22,722
	TOTAL							137,059

YEAR ----------INVESTMENT PAID----------

(ALL AMOUNT IN $1000)

YEAR	PROJECT	IN-SERVICE	DUE	GROSS	NET	RATE	REPLACEMENT	AMOUNT
2021	BPA PROGRAM	1994	2034	50,000	27,278	.06850		27,278
	BPA PROGRAM	1994	2034	108,400	108,400	.06850		108,156
	TOTAL							135,434
2022	BPA PROGRAM	1994	2034	108,400	244	.06850		244
	BPA PROGRAM	1998	2032	98,900	98,900	.06700		98,900
	BPA PROGRAM	1998	2028	50,000	50,000	.06650		34,769
	TOTAL							133,913
2023	BPA PROGRAM	1998	2023	106,600	106,600	.05850		106,600
	BPA PROGRAM	1998	2028	50,000	15,231	.06650		15,231
	BPA PROGRAM	2004	2049	137,969	137,969	.06300	R	11,340
	TOTAL							133,171
2024	BPA PROGRAM	2004	2049	137,969	126,629	.06300	R	125,646
	TOTAL							125,646
2025	BPA PROGRAM	2004	2049	137,969	983	.06300	R	983
	BPA PROGRAM	2005	2050	141,467	141,467	.06300	R	120,929
	TOTAL							121,912
2026	BPA PROGRAM	2005	2050	141,467	20,538	.06300	R	20,538
	BPA PROGRAM	2006	2051	144,854	144,854	.06300	R	97,331
	TOTAL							117,869
2027	BPA PROGRAM	2006	2051	144,854	47,523	.06300	R	47,523
	BPA PROGRAM	2007	2052	148,057	148,057	.06300	R	65,968
	TOTAL							113,491
2028	BPA PROGRAM	1998	2028	112,400	112,400	.05850		112,400
	BPA PROGRAM	2007	2052	148,057	82,089	.06300	R	41
	TOTAL							112,441
2029	BPA PROGRAM	2007	2052	148,057	82,048	.06300	R	82,048
	BPA PROGRAM	2008	2053	150,933	150,933	.06300	R	21,393
	TOTAL							103,441
2030	BPA PROGRAM	2008	2053	150,933	129,540	.06300	R	97,842
	TOTAL							97,842
2031	BPA PROGRAM	2008	2053	150,933	31,698	.06300	R	31,698
	BPA PROGRAM	2009	2054	153,462	153,462	.06300	R	60,106
	TOTAL							91,804
2032	BPA PROGRAM	2009	2054	153,462	93,356	.06300	R	85,306
	TOTAL							85,306
2033	BPA PROGRAM	2009	2054	153,462	8,050	.06300	R	8,050
	BPA PROGRAM	2010	2055	155,555	155,555	.06300	R	70,173

APPLICATION OF AMORTIZATION TRANSMISSION FY 2002 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

YEAR ----------INVESTMENT PAID----------

(ALL AMOUNT IN $1000)

	PROJECT	IN-SERVICE	DUE	GROSS	NET	RATE	REPLACEMENT	AMOUNT
	TOTAL							78,223
2034	BPA PROGRAM	2010	2055	155,555	85,382	.06300	R	70,664
	TOTAL							70,664
2035	BPA PROGRAM	2010	2055	155,555	14,718	.06300	R	14,718
	BPA PROGRAM	2011	2056	157,500	157,500	.06300	R	47,732
	TOTAL							62,450
2036	BPA PROGRAM	2011	2056	157,500	109,768	.06300	R	53,652
	TOTAL							53,652
2037	BPA PROGRAM	2011	2056	157,500	56,116	.06300	R	44,204
	TOTAL							44,204
	GRAND TOTAL							4,534,076
	TOTAL DEFERRAL							0
	NET							4,534,076

CHAPTER 12

REPAYMENT STUDY INPUT FILES
CURRENT STUDY

FY 2003

The data in Computer File Form Used in the FY 2003 Current Repayment Study for Transmission

```
1INPUT CARDS ONLY
 N1 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RATE CASE
 N2          OCTOBER 1,2002 - SEPTEMBER 30,2003 COST EVALUATION PERIOD
 N3   REPAY 03 TB9 - TRANSMISSION
 N0 TRANSMISSION

 11999             0         0         0     200320382038
0HISTORICAL YEAR:                                      1999
 HISTORICAL CUMULATIVE REVENUES:                          0
 HISTORICAL CUMULATIVE PURCHASE & EXCHANGE:               0
 HISTORICAL CUMULATIVE IRRIGATION INVESTMENT:             0
 YEAR OF THE RATE CHANGE:                              2003
 LAST YEAR OF REPAYMENT PERIOD:                        2038

 INTEREST RATES OF INTEREST INCOME

 1X06574 06608 06697 06747 06779

 INTEREST RATES OF NEW DEFERRALS

 1Y07520 07620 07540 07290 07080

 OPERATING YEAR FACTORS

 1F75000 75000 75000 75000 75000

 PROJECTED REVENUE

 22000        300169    256261    335220    335220    335220    335220    335220   2232530
 22007        335220    335220    335220    335220    335220    335220    335220   2346540
 22014        335220    335220    335220    335220    335220    335220    335220   2346540
 22021        335220    335220    335220    335220    335220    335220    335220   2346540
 22028        335220    335220    335220    335220    335220    335220    335220   2346540
 22035        335220    335220    335220    335220    335220    335220    335220   2346540
 22042        335220    335220    335220    335220    335220    335220    335220   2346540
 22049        335220    335220    335220    335220    335220    335220    335220   2346540
             2646709   2602801   2681760   2681760   2681760   2681760   2681760  18658310 = TOTAL FOR 2

 PROJECTED IRRIGATION ASSISTANCE

             NEW               NEW               NEW
          INVESTMENT        INVESTMENT        INVESTMENT

 32000             0                 0                 0                 0
 32003             0                 0                 0                 0
 32006             0                 0                 0                 0
 32009             0                 0                 0                 0
 32012             0                 0                 0                 0
 32015             0                 0                 0                 0
 32018             0                 0                 0                 0
 32021             0                 0                 0                 0
 32024             0                 0                 0                 0
 32027             0                 0                 0                 0
 32030             0                 0                 0                 0
 32033             0                 0                 0                 0
 32036             0                 0                 0                 0
 32039             0                 0                 0                 0
 32042             0                 0                 0                 0
 32045             0                 0                 0                 0
 32048             0                 0                 0                 0
                   0                 0                 0                 0 = TOTAL FOR 3

 CAPITALIZED CONTRACTUAL OBLIGATIONS

 42000             0         0         0         0     -1041     -1073     -1104     -3218
 42007         -1134     -1164     -1193     -1221     -1249     -1277     -1303     -8541
 42014         -1329     -1355     -1380     -1404     -1428     -1451     -1474     -9821
 42021         -1496     -1517     -1538     -1557     -1576     -1594     -1613    -10891
 42028         -1629     -1644     -1659     -1674     -1685     -1696     -1706    -11693
 42035         -1715     -1721     -1727     -1732     -1732     -1728     -1724    -12079
 42042         -1718     -1716     -1714     -1712     -1714                        -8574
               -9021     -9117     -9211     -9300    -10425     -8819     -8924    -64817 = TOTAL FOR 4
```

5	ALBE	ALBENI FALLS
5	BOIS	BOISE
5	BON2	BONNEVILLE - 2ND POWER HOUSE
5	BONN	BONNEVILLE
5	CHIE	CHIEF JOSEPH
5	COL3	COLUMBIA BASIN- 3RD POWER HOUSE
5	COLU	COLUMBIA BASIN
5	COUG	COUGAR
5	CRFB	COLUMBIA RIVER FISH MITIGATION
5	DETR	DETROIT-BIG CLIFF
5	DWOR	DWORSHAK
5	GREE	GREEN PETER-FOSTER
5	HILL	HILLS CREEK
5	HUNG	HUNGRY HORSE
5	ICEH	ICE HARBOR
5	JOHN	JOHN DAY
5	LIBB	LIBBY
5	LITT	LITTLE GOOSE
5	LOOK	LOOKOUT POINT-DEXTER
5	LOST	LOST CREEK
5	LOWG	LOWER GRANITE
5	LOWM	LOWER MONUMENTAL
5	LSFW	LOWER SNAKE F AND W
5	MCNA	MCNARY
5	MINI	MINIDOKA
5	STRU	STRUBE
5	THED	THE DALLES
5	YAKC	YAKIMA-CHANDLER
5	YAKR	YAKIMA-ROZA
5	ZABF	BPA PROGRAM
5	ZADB	BUREAU DIRECT FUND
5	ZAFW	FISH, WILDLIFE & ENVIRONMENTAL
5	ZBPA	BONNEVILLE POWER ADMINISTRATION

		HISTORICAL O & M	INTEREST		
5	ALBEX	0	0	0	
5	BOISX	0	0	0	
5	BONNX	0	0	0	
5	CHIEX	0	0	0	
5	COLUX	0	0	0	
5	COUGX	0	0	0	
5	DETRX	0	0	0	
5	DWORX	0	0	0	
5	GREEX	0	0	0	
5	HILLX	0	0	0	
5	HUNGX	0	0	0	
5	ICEHX	0	0	0	
5	JOHNX	0	0	0	
5	LIBBX	0	0	0	
5	LITTX	0	0	0	
5	LOOKX	0	0	0	
5	LOSTX	0	0	0	
5	LOWGX	0	0	0	
5	LOWMX	0	0	0	
5	MCNAX	0	0	0	
5	MINIX	0	0	0	
5	THEDX	0	0	0	
5	YAKCX	0	0	0	
5	YAKRX	0	0	0	
5	ZBPAX	0	0	0	
5	ZACOX	0	0	0	
		0	0	0	= TOTAL FOR 5

PROJECTED O & M

	0	0	= TOTAL FOR 6

61994ZABF	0		
	0	0	= TOTAL FOR 6

HISTORICAL FEDERAL INVESTMENTS

		PROJECT	ORIGINAL PRINCIPAL	CURRENT PRINCIPAL	INTEREST RATE	DUE DATE		INSERVICE DATE	CALENDAR MONTH
6	1996	ZBPA X	6812	0	.02500	1985		1940	
6	1996	ZBPA X	18906	0	.02500	1986		1941	
6	1996	ZBPA X	461	0	.02500	1986	R	1941	
6	1996	ZBPA X	8446	0	.02500	1987		1942	
6	1996	ZBPA X	1052	0	.02500	1987	R	1942	
6	1996	ZBPA X	16083	0	.02500	1988		1943	
6	1996	ZBPA X	4538	0	.02500	1988	R	1943	
6	1996	ZBPA X	583	0	.02500	1989		1944	
6	1996	ZBPA X	249	0	.02500	1989	R	1944	
6	1996	ZBPA X	1306	0	.02500	1990		1945	
6	1996	ZBPA X	3366	0	.02500	1990	R	1945	
6	1996	ZBPA X	2488	0	.02500	1991		1946	
6	1996	ZBPA X	732	0	.02500	1991	R	1946	
6	1996	ZBPA X	1330	0	.02500	1992		1947	
6	1996	ZBPA X	1773	0	.02500	1992	R	1947	
6	1996	ZBPA X	7468	0	.02500	1993		1948	
6	1996	ZBPA X	2290	0	.02500	1993	R	1948	
6	1996	ZBPA X	6809	0	.02500	1994		1949	
6	1996	ZBPA X	2719	0	.02500	1994	R	1949	
6	1996	ZBPA X	24111	0	.02500	1995		1950	
6	1996	ZBPA X	6124	0	.02500	1995	R	1950	
6	1996	ZBPA X	7040	0	.02500	1996		1951	
6	1996	ZBPA X	13266	0	.02500	1996	R	1951	
6	1996	ZBPA X	18610	0	.02500	1997		1952	
6	1996	ZBPA X	8979	0	.02500	1997	R	1952	
6	1996	ZBPA X	32262	0	.06330	1998		1953	
6	1996	ZBPA X	15899	0	.06330	1998	R	1953	
6	1996	ZBPA X	23614	0	.06510	1999		1954	
6	1996	ZBPA X	17370	0	.06510	1999	R	1954	
6	1996	ZBPA X	11827	11827	.06620	2000		1955	
6	1996	ZBPA X	10283	10283	.06620	2000	R	1955	
6	1996	ZBPA X	14573	14573	.06710	2001		1956	
6	1996	ZBPA X	32221	32221	.06710	2001	R	1956	
6	1996	ZBPA X	7933	7933	.06790	2002		1957	
6	1996	ZBPA X	15980	15980	.06790	2002	R	1957	
6	1996	ZBPA X	15593	15593	.06840	2003		1958	
6	1996	ZBPA X	10654	10654	.06840	2003	R	1958	
6	1996	ZBPA X	8157	8157	.06880	2004		1959	
6	1996	ZBPA X	8863	8863	.06880	2004	R	1959	
6	1996	ZBPA X	3598	3598	.06910	2005		1960	
6	1996	ZBPA X	4218	4218	.06910	2005	R	1960	
6	1996	ZBPA X	4468	4468	.06950	2006		1961	
6	1996	ZBPA X	11271	11271	.06950	2006	R	1961	
6	1996	ZBPA X	19597	19597	.06980	2007		1962	
6	1996	ZBPA X	4877	4877	.06980	2007	R	1962	
6	1996	ZBPA X	4876	4876	.07020	2008		1963	
6	1996	ZBPA X	4330	4330	.07020	2008	R	1963	
6	1996	ZBPA X	904	904	.07020	2008		1963	
6	1996	ZBPA X	803	803	.07020	2008	R	1963	
6	1996	ZBPA X	4151	4151	.07060	2009		1964	
6	1996	ZBPA X	5738	5738	.07060	2009	R	1964	
6	1996	ZBPA X	3706	3706	.07090	2010		1965	
6	1996	ZBPA X	7248	7248	.07090	2010	R	1965	
6	1996	ZBPA X	5202	5202	.07090	2010		1965	
6	1996	ZBPA X	10171	10171	.07090	2010	R	1965	
6	1996	ZBPA X	11830	11830	.07130	2011		1966	
6	1996	ZBPA X	3049	3049	.07130	2011	R	1966	
6	1996	ZBPA X	6647	6647	.07130	2011		1966	
6	1996	ZBPA X	1714	1714	.07130	2011	R	1966	
6	1996	ZBPA X	19003	19003	.07160	2012		1967	
6	1996	ZBPA X	4566	4566	.07160	2012	R	1967	
6	1996	ZBPA X	14300	14300	.07160	2012		1967	
6	1996	ZBPA X	3436	3436	.07160	2012	R	1967	
6	1996	ZBPA X	41070	41070	.07200	2013		1968	
6	1996	ZBPA X	8076	8076	.07200	2013	R	1968	
6	1996	ZBPA X	23202	23202	.07200	2013		1968	
6	1996	ZBPA X	4562	4562	.07200	2013	R	1968	
6	1996	ZBPA X	42237	42237	.07230	2014		1969	

6	1996	ZBPA	X	22537	22537	.07230	2014	R	1969
6	1996	ZBPA	X	384	384	.07230	2014		1969
6	1996	ZBPA	X	205	205	.07230	2014	R	1969
6	1996	ZBPA	X	64977	64977	.07270	2015		1970
6	1996	ZBPA	X	7995	7995	.07270	2015	R	1970
6	1996	ZBPA	X	24412	24412	.07270	2015		1970
6	1996	ZBPA	X	3003	3003	.07270	2015	R	1970
6	1996	ZBPA	X	12025	12025	.07290	2016		1971
6	1996	ZBPA	X	17766	17766	.07290	2016	R	1971
6	1996	ZBPA	X	12149	12051	.07290	2016		1971
6	1996	ZBPA	X	17949	17805	.07290	2016	R	1971
6	1996	ZBPA	X	29326	29326	.07290	2017		1972
6	1996	ZBPA	X	21170	21170	.07290	2017	R	1972
6	1996	ZBPA	X	3980	3980	.07290	2017		1972
6	1996	ZBPA	X	2873	2873	.07290	2017	R	1972
6	1996	ZBPA	X	40207	33788	.07280	2018		1973
6	1996	ZBPA	X	25770	21656	.07280	2018	R	1973
6	1996	ZBPA	X	24826	16368	.07280	2018		1973
6	1996	ZBPA	X	15912	10491	.07280	2018	R	1973
6	1996	ZBPA	X	12079	12079	.07270	2019		1974
6	1996	ZBPA	X	20984	20984	.07270	2019	R	1974
6	1996	ZBPA	X	12563	12563	.07270	2019		1974
6	1996	ZBPA	X	21826	21826	.07270	2019	R	1974
6	1996	ZBPA	X	32026	32026	.07250	2020		1975
6	1996	ZBPA	X	21916	21916	.07250	2020	R	1975
6	1996	ZBPA	X	17158	17158	.07250	2020		1975
6	1996	ZBPA	X	11742	11742	.07250	2020	R	1975
6	1996	ZBPA	X	61025	61025	.07230	2021		1976
6	1996	ZBPA	X	2212	2212	.07230	2021	R	1976
6	1996	ZBPA	X	3948	3948	.07210	2022		1977
6	1996	ZBPA	X	5380	5380	.07210	2022	R	1977
6	1996	ZBPA	X	33702	33702	.07210	2022		1977
6	1996	ZBPA	X	51049	4981	.07210	2022	R	1977
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325408 = TOTAL FOR 6

60.08800 198126

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6	1995	ZABF	X	24222	0	.08950	2013	R	1978	09
6	1998	ZABF	X	3389	0	.08950	2013		1978	09
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6	1995	ZABF	X	9804	0	.09450	2014	R	1979	06
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6	1995	ZABF	X	21977	0	.09450	2014	R	1979	06
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6	1998	ZABF	X	150	0	.09450	2014		1979	06
6	1998	ZABF	X	102	0	.09450	2014	R	1979	06
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6	1998	ZABF	X	165	0	.09900	2014	R	1979	09
6	1995	ZABF	X	39696	0	.13000	2015		1980	09
6	1995	ZABF	X	10806	0	.13000	2015	R	1980	09
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6	1995	ZABF	X	1469	0	.13000	2015	R	1980	09
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6	1995	ZABF	X	4253	0	.13000	2015	R	1980	09
6	1998	ZABF	X	2263	0	.13000	2015		1980	09
6	1998	ZABF	X	616	0	.13000	2015	R	1980	09
6	1998	ZABF	X	1707	0	.13000	2015		1980	09
6	1998	ZABF	X	56	0	.13000	2015	R	1980	09
6	1998	ZABF	X	21	0	.13000	2015		1980	09
6	1998	ZABF	X	10	0	.13000	2015	R	1980	09
6	1995	ZABF	X	119775	0	.16600	2016		1981	09
6	1995	ZABF	X	54821	0	.16600	2016	R	1981	09
6	1998	ZABF	X	277	0	.16600	2016		1981	09

6	1998	ZABF	X	127	0	.16600	2016	R	1981	09	
6	1995	ZABF	X	34221	0	.14400	2017		1982	12	
6	1995	ZABF	X	15663	0	.14400	2017	R	1982	12	
6	1995	ZABF	X	9975	0	.14400	2017		1982	04	
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6	1998	ZABF	X	-43	0	.14150	2017		1987	07	
6	1998	ZABF	X	34	0	.14150	2017	R	1982	07	
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6	1998	ZABF	X	-402	0	.14150	2017		1987	07	
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6	1998	ZABF	X	-105	0	.14150	2017	R	1987	07	
6	1995	ZABF	X	39741	0	.10850	2018		1983	11	
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6	1995	ZABF	X	29806	0	.11700	2018		1983	06	
6	1995	ZABF	X	814	0	.12250	2018		1983	09	
6	1995	ZABF	X	37235	0	.12250	2018		1983	09	
6	1995	ZABF	X	6708	0	.12250	2018	R	1983	09	
6	1998	ZABF	X	205	0	.10850	2018		1983	11	
6	1998	ZABF	X	-205	0	.10850	2018		1988	02	
6	1998	ZABF	X	54	0	.10850	2018	R	1983	11	
6	1998	ZABF	X	-54	0	.10850	2018	R	1988	02	
6	1998	ZABF	X	154	0	.11700	2018		1983	06	T
6	1998	ZABF	X	40	0	.11700	2018	R	1983	06	T
6	1998	ZABF	X	4	0	.12250	2018		1983	09	
6	1998	ZABF	X	1	0	.12250	2018	R	1983	09	
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6	1998	ZABF	X	35	0	.12250	2018	R	1983	09	
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6	1995	ZABF	X	9109	0	.13050	2019	R	1984	09	
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6	1998	ZABF	X	24	0	.12300	2019	R	1984	11	
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6	1998	ZABF	X	48	0	.13050	2019	R	1984	09	
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6	1998	ZABF	X	80	0	.11250	2029	R	1985	06	
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6	1995	ZABF	X	157	0	.08150	1996	R	1986	03	T
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6	1995	ZABF	X	68194	0	.08150	1996	R	1986	03	T
6	1995	ZABF	X	5161	0	.08950	2030		1986	06	
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6	1995	ZABF	X	11668	0	.08950	2030	R	1986	06	
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6	1995	ZABF	X	3117	0	.08950	2030	R	1986	06	
6	1995	ZABF	X	-3117	0	.08950	2030	R	1992	08	
6	1995	ZABF	X	40000	0	.08950	2030	R	1986	06	
6	1995	ZABF	X	-40000	0	.08950	2030	R	1994	05	
6	1995	ZABF	X	57354	0	.08950	2030	R	1986	06	
6	1998	ZABF	X	5	0	.08150	1996		1986	03	T
6	1998	ZABF	X	1	0	.08150	1996	R	1986	03	T
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6	1998	ZABF	X	169	0	.08150	1996	R	1986	03	T

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6  1998  ZABF X       76        0  .08950  2030      1986  06
6  1998  ZABF X       29        0  .08950  2030 R    1986  06
6  1998  ZABF X     1819        0  .08950  2030      1986  06
6  1998  ZABF X      722        0  .08950  2030 R    1986  06
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6  1995  ZABF X    54409        0  .09300  2031 R    1987  04
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6  1995  ZABF X    96519        0  .08350  1992      1987  06  T
6  1995  ZABF X     4113        0  .09550  2017      1987  07
6  1995  ZABF X     3274        0  .09550  2017 R    1987  07
6  1995  ZABF X    86958        0  .09550  2017      1987  07
6  1995  ZABF X     7903        0  .09550  2032      1987  07
6  1995  ZABF X     3109        0  .09550  2032 R    1987  07
6  1995  ZABF X    37342        0  .09550  2032      1987  07
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6  1998  ZABF X     -111        0  .09300  2031      1992  04
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6  1998  ZABF X      569        0  .09550  2017      1987  07
6  1998  ZABF X      285        0  .09550  2032      1987  07
6  1998  ZABF X      112        0  .09550  2032 R    1987  07
6  1998  ZABF X      631        0  .09550  2032      1987  07
6  1998  ZABF X      618        0  .09550  2032 R    1987  07
6  1995  ZABF X    43417        0  .09500  2018      1988  02
6  1995  ZABF X    28513        0  .09500  2033      1988  02
6  1995  ZABF X   -28513        0  .09500  2033      1994  10
6  1995  ZABF X    27887        0  .09500  2033 R    1988  02
6  1995  ZABF X   -27887        0  .09500  2033 R    1994  10
6  1995  ZABF X    20677        0  .09500  2033      1988  02
6  1995  ZABF X   -20677        0  .09500  2033      1994  10
6  1995  ZABF X    22923        0  .09500  2033 R    1988  02
6  1995  ZABF X   -22923        0  .09500  2033 R    1994  10
6  1995  ZABF X    45870        0  .09500  2033 R    1988  02
6  1995  ZABF X   -45870        0  .09500  2033 R    1994  05
6  1995  ZABF X     9018        0  .09900  2033      1988  06
6  1995  ZABF X    30004        0  .09900  2033 R    1988  06
6  1998  ZABF X      618        0  .09550  2032 R    1987  07
6  1998  ZABF X      283        0  .09500  2018      1988  02
6  1998  ZABF X      954        0  .09500  2033      1988  02
6  1998  ZABF X     -954        0  .09500  2033      1994  05
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6  1998  ZABF X     -518        0  .09500  2033      1994  05
6  1998  ZABF X     1725        0  .09500  2033 R    1988  02
6  1998  ZABF X    -1725        0  .09500  2033 R    1994  05
6  1998  ZABF X      226        0  .09900  2033      1988  06
6  1998  ZABF X      752        0  .09900  2033 R    1988  06
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6  1995  ZABF X    56257        0  .08950  1999 R    1989  05  T
6  1998  ZABF X      424        0  .08950  1999      1989  05  T
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6  1995  ZABF X     1149        0  .09250  2030      1990  01  10
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6  1995  ZABF X     3824        0  .09250  2030 R    1990  01  10
6  1999  ZABF X    -3824        0  .09250  2030 R    2000  01
6  1995  ZABF X    41894        0  .09250  2030      1990  01  10
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6	1995	ZABF	X	150000	0	.08130	2032	1992	07		
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6	1995	ZABF	X	107700	0	.07250	2007	1992	08		
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6	1995	ZABF	X	50000	0	.06050	1997	1992	10	T	
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6	1999	ZABF	X	40000	40000	.06200	2002	1999	09	T	
				3750834	1626810						
						233.96200		467143			
							474577				

PROJECTED HISTORICAL INVESTMENTS

		PROJECT	ORIGINAL PRINCIPAL	CURRENT PRINCIPAL	INTEREST RATE	DUE DATE	INSERVICE DATE	CALENDAR MONTH	
6	2000	ZABF X	40000	40000	.06400	2003	2000	11	T
6	2000	ZABF X	149593	149593	.07540	2035	2000	03	
6	2000	ZABF X	53500	53500	.07150	2005	2000	01	T
6	2000	ZABF X	15675	15675	.07540	2031	2000	03	
6	2000	ZAFW X	19603	19603	.07240	2015	2000	03	
6	2001	ZABF X	201604	201604	.07290	2036	2001	03	
6	2001	ZAFW X	9086	9086	.06920	2016	2001	03	
6	2002	ZABF X	231985	231985	.07080	2037	2002	03	
6	2002	ZAFW X	9047	9047	.06690	2017	2002	03	
6	2003	ZABF X	237931	237931	.06890	2038	2003	03	
6	2003	ZAFW X	9274	9274	.06500	2018	2003	03	
			977298	977298			22012		
					77.240				
						22251			

CHAPTER 13

REPAYMENT STUDY RESULTS
CURRENT STUDY
FY 2003

Summary of Interest Calculations
Transmission
FY 2003 Current Repayment Study

INTEREST CALCULATION FOR FY 2000 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	1,574,710	X	.06534	=	102,895	23	
	NEW 2/	258,768	X	.04218	=	10,914		
								113,832
FISH, WILDLIFE & ENVIRONMENTAL	HISTORICAL	52,100	X	.07008	=	3,651		
	NEW 2/	19,603	X	.03620	=	710		
								4,361
BONNEVILLE POWER ADMINISTRATION	HISTORICAL	999,288	X	.07156	=	71,508		
								71,508
								189,701
AFUDC								0
INTEREST INCOME	(REVENUE - A.O. - P.P. - BOND INT.) X RATE X 0.5							-7,941
	(296,347 - 0 - 0 - 54,764) X .03287							
NET								181,760

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2001 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	1,741,001	X	.06642	=	115,634	755	
	NEW 2/	201,604	X	.03645	=	7,348		
								123,737
FISH, WILDLIFE & ENVIRONMENTAL	HISTORICAL	71,703	X	.07071	=	5,070		
	NEW 2/	9,086	X	.03460	=	314		
								5,384
BONNEVILLE POWER ADMINISTRATION	HISTORICAL	977,178	X	.07168	=	70,044		
								70,044
								199,165
AFUDC								0
INTEREST INCOME	(REVENUE - A.O. - P.P. - BOND INT.) X RATE X 0.5							-6,329
	(251,900 - 0 - 0 - 60,353) X .03304							

NET 192,836

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2002 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	1,930,335	X	.06703	=	129,386	3,993	
	NEW 2/	231,985	X	.03540	=	8,212		
								141,591
FISH, WILDLIFE & ENVIRONMENTAL	HISTORICAL	80,789	X	.07054	=	5,699		
	NEW 2/	9,047	X	.03345	=	303		
								6,002
BONNEVILLE POWER ADMINISTRATION	HISTORICAL	930,384	X	.07191	=	66,904		
								66,904
								214,497

AFUDC 0

INTEREST INCOME (REVENUE - A.O. - P.P. - BOND INT.) X RATE X 0.5 -9,024
(337,030 - 0 - 0 - 67,544) X .03348

NET 205,473

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2003 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	2,054,676	X	.06722	=	138,122	1,255	
	NEW 2/	237,931	X	.03445	=	8,197		
								147,574
FISH, WILDLIFE & ENVIRONMENTAL	HISTORICAL	89,836	X	.07018	=	6,304		
	NEW 2/	9,274	X	.03250	=	301		
								6,605
BONNEVILLE POWER ADMINISTRATION	HISTORICAL	906,471	X	.07201	=	65,280		
								65,280

								219,459
AFUDC								0
INTEREST INCOME	(REVENUE - A.O. - P.P. - BOND INT.)	X	RATE	X	0.5			-9,467
	(352,839 - 0 - 0 - 72,215)	X	.03373					
NET								209,992

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2004 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	2,176,007	X	.06757	=	147,036	671	
	NEW 2/	137,969	X	.03150	=	4,346		
								152,053
FISH, WILDLIFE & ENVIRONMENTAL	HISTORICAL	99,110	X	.06969	=	6,907		
								6,907
BONNEVILLE POWER ADMINISTRATION	HISTORICAL	880,224	X	.07212	=	63,484		
								63,484
								222,444
AFUDC								0
INTEREST INCOME	(REVENUE - A.O. - P.P. - BOND INT.)	X	RATE	X	0.5			-9,349
	(352,839 - 0 - -1,041 - 78,060)	X	.03390					
NET								213,095

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2005 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	2,252,731	X	.06733	=	151,674	65	
	NEW 2/	141,467	X	.03150	=	4,456		

								156,195
FISH, WILDLIFE & ENVIRONMENTAL	HISTORICAL	99,110	X	.06969	=	6,907		
								6,907
BONNEVILLE POWER ADMINISTRATION	HISTORICAL	800,684	X	.07213	=	57,755		
								57,755
								220,857
AFUDC								0
INTEREST INCOME	(REVENUE - A.O. - P.P. - BOND INT.) X RATE X 0.5							-9,270
	(352,839 - 0 - -1,073 - 80,407) X .03390							
NET								211,587

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2006 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	2,259,689	X	.06690	=	151,165	3,389	
	NEW 2/	144,854	X	.03150	=	4,563		
								159,117
FISH, WILDLIFE & ENVIRONMENTAL	HISTORICAL	99,110	X	.06969	=	6,907		
								6,907
BONNEVILLE POWER ADMINISTRATION	HISTORICAL	792,868	X	.07216	=	57,215		
								57,215
								223,239
AFUDC								0
INTEREST INCOME	(REVENUE - A.O. - P.P. - BOND INT.) X RATE X 0.5							-9,279
	(352,839 - 0 - -1,104 - 80,179) X .03390							
NET								213,960

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2007 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	2,280,299	X	.06634	=	151,266	487	
	NEW 2/	148,057	X	.03150	=	4,664		
								156,417
FISH, WILDLIFE & ENVIRONMENTAL	HISTORICAL	99,110	X	.06969	=	6,907		
								6,907
BONNEVILLE POWER ADMINISTRATION	HISTORICAL	777,129	X	.07222	=	56,121		
								56,121
								219,445
AFUDC								0
INTEREST INCOME (REVENUE - A.O. - P.P. - BOND INT.) X RATE X 0.5								-9,278
(352,839 - 0 - -1,134 - 80,254) X .03390								
NET								210,167

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2008 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	2,309,024	X	.06608	=	152,587	1,011	
	NEW 2/	150,933	X	.03150	=	4,754		
								158,352
FISH, WILDLIFE & ENVIRONMENTAL	HISTORICAL	99,110	X	.06969	=	6,907		
								6,907
BONNEVILLE POWER ADMINISTRATION	HISTORICAL	752,655	X	.07229	=	54,413		
								54,413
								219,672
AFUDC								0
INTEREST INCOME (REVENUE - A.O. - P.P. - BOND INT.) X RATE X 0.5								-9,256
(352,839 - 0 - -1,164 - 80,937) X .03390								
NET								210,416

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT

2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2009 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	2,327,283	X	.06616	=	153,968	3,252	
	NEW 2/	153,462	X	.03150	=	4,834		
								162,054
FISH, WILDLIFE & ENVIRONMENTAL	HISTORICAL	99,110	X	.06969	=	6,907		
								6,907
BONNEVILLE POWER ADMINISTRATION	HISTORICAL	741,742	X	.07233	=	53,648		
								53,648
								222,609
AFUDC								0
INTEREST INCOME (REVENUE - A.O. - P.P. - BOND INT.) X RATE X 0.5								-9,232
(352,839 - 0 - -1,193 - 81,647) X .03390								
NET								213,377

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2010 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	2,349,979	X	.06591	=	154,896	1,384	
	NEW 2/	155,555	X	.03150	=	4,900		
								161,180
FISH, WILDLIFE & ENVIRONMENTAL	HISTORICAL	99,110	X	.06969	=	6,907		
								6,907
BONNEVILLE POWER ADMINISTRATION	HISTORICAL	731,853	X	.07235	=	52,950		
								52,950
								221,037

AFUDC		0
INTEREST INCOME	(REVENUE - A.O. - P.P. - BOND INT.) X RATE X 0.5	-9,217
	(352,839 - 0 - -1,221 - 82,127) X .03390	
NET		211,820

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2011 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	2,479,037	X	.06563	=	162,698		
	NEW 2/	157,500	X	.03150	=	4,961		
								167,659
FISH, WILDLIFE & ENVIRONMENTAL	HISTORICAL	87,010	X	.06937	=	6,036		
								6,036
BONNEVILLE POWER ADMINISTRATION	HISTORICAL	628,210	X	.07235	=	45,449		
								45,449
								219,144

AFUDC		0
INTEREST INCOME	(REVENUE - A.O. - P.P. - BOND INT.) X RATE X 0.5	-9,100
	(352,839 - 0 - -1,249 - 85,607) X .03390	
NET		210,044

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2012 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	2,596,537	X	.06553	=	170,141		
	NEW 2/	159,468	X	.03150	=	5,023		
								175,164
FISH, WILDLIFE & ENVIRONMENTAL	HISTORICAL	87,010	X	.06937	=	6,036		
								6,036
BONNEVILLE POWER ADMINISTRATION	HISTORICAL	524,166	X	.07233	=	37,912		
								37,912
								219,112
AFUDC								0
INTEREST INCOME	(REVENUE - A.O. - P.P. - BOND INT.) X RATE X 0.5							-8,974
	(352,839 - 0 - -1,277 - 89,344) X .03390							
NET								210,138

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2013 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	2,756,005	X	.06538	=	180,187		
	NEW 2/	161,479	X	.03150	=	5,087		
								185,274
FISH, WILDLIFE & ENVIRONMENTAL	HISTORICAL	47,010	X	.06926	=	3,256		
								3,256
BONNEVILLE POWER ADMINISTRATION	HISTORICAL	420,188	X	.07234	=	30,397		
								30,397
								218,927
AFUDC								0
INTEREST INCOME	(REVENUE - A.O. - P.P. - BOND INT.) X RATE X 0.5							-8,852
	(352,839 - 0 - -1,303 - 92,993) X .03390							
NET								210,075

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2014 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	2,917,484	X	.06525	=	190,360		
	NEW 2/	163,526	X	.03150	=	5,151		
								195,511
FISH, WILDLIFE & ENVIRONMENTAL	HISTORICAL	47,010	X	.06926	=	3,256		
								3,256
BONNEVILLE POWER ADMINISTRATION	HISTORICAL	276,121	X	.07235	=	19,978		
								19,978
								218,745
AFUDC								0
INTEREST INCOME (REVENUE - A.O. - P.P. - BOND INT.) X RATE X 0.5								-8,680
(352,839 - 0 - -1,329 - 98,096) X .03390								
NET								210,065

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2015 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	3,032,090	X	.06523	=	197,776		
	NEW 2/	165,720	X	.03150	=	5,220		
								202,996
FISH, WILDLIFE & ENVIRONMENTAL	HISTORICAL	47,010	X	.06926	=	3,256		
								3,256
BONNEVILLE POWER ADMINISTRATION	HISTORICAL	180,938	X	.07232	=	13,086		
								13,086

									219,338
AFUDC									0
INTEREST INCOME	(REVENUE	- A.O.	- P.P.	- BOND INT.)	X	RATE X	0.5		-8,554
	(352,839	- 0	- -1,355	- 101,821)	X	.03390			
NET									210,784

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2016 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	3,197,810	X	.06511	=	208,216	3,077	
	NEW 2/	168,004	X	.03150	=	5,292		
								216,585
FISH, WILDLIFE & ENVIRONMENTAL	HISTORICAL	27,407	X	.06702	=	1,837		
								1,837
BONNEVILLE POWER ADMINISTRATION	HISTORICAL	57,131	X	.07213	=	4,121		
								4,121
								222,543
AFUDC								0
INTEREST INCOME	(REVENUE	- A.O.	- P.P.	- BOND INT.)	X	RATE X	0.5	-8,402
	(352,839	- 0	- -1,380	- 106,349)	X	.03390		
NET								214,141

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2017 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL	RATE 1/	INTEREST	PREMIUM	TOTAL

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	3,291,953	X	.06483	=	213,415	5,084	
	NEW 2/	170,318	X	.03150	=	5,365		
								223,864
FISH, WILDLIFE & ENVIRONMENTAL	HISTORICAL	18,321	X	.06594	=	1,208		
								1,208
								225,072
AFUDC								0
INTEREST INCOME	(REVENUE - A.O. - P.P. - BOND INT.) X RATE X 0.5							-8,324
	(352,839 - 0 - -1,404 - 108,653) X .03390							
NET								216,748

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2018 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	3,333,823	X	.06443	=	214,783	4,903	
	NEW 2/	172,710	X	.03150	=	5,440		
								225,126
FISH, WILDLIFE & ENVIRONMENTAL	HISTORICAL	9,274	X	.06500	=	603		
								603
								225,729
AFUDC								0
INTEREST INCOME	(REVENUE - A.O. - P.P. - BOND INT.) X RATE X 0.5							-8,312
	(352,839 - 0 - -1,428 - 109,053) X .03390							
NET								217,417

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2019 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	3,378,957	X	.06411	=	216,631	4,625	
	NEW 2/	175,079	X	.03150	=	5,515		
								226,771
								226,771
AFUDC								0
INTEREST INCOME	(REVENUE - A.O. - P.P. - BOND INT.) X RATE X 0.5							-8,291
	(352,839 - 0 - -1,451 - 109,695) X .03390							
NET								218,480

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2020 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	3,418,226	X	.06379	=	218,056	3,205	
	NEW 2/	177,412	X	.03150	=	5,588		
								226,849
								226,849
AFUDC								0
INTEREST INCOME	(REVENUE - A.O. - P.P. - BOND INT.) X RATE X 0.5							-8,267
	(352,839 - 0 - -1,474 - 110,425) X .03390							
NET								218,582

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2021 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	3,459,907	X	.06352	=	219,786	4,440	
	NEW 2/	179,650	X	.03150	=	5,659		
								229,885
								229,885
AFUDC								0
INTEREST INCOME	(REVENUE - A.O. - P.P. - BOND INT.) X RATE X 0.5							-8,237
	(352,839 - 0 - -1,496 - 111,308) X .03390							
NET								221,648

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2022 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	3,506,870	X	.06329	=	221,962	3,761	
	NEW 2/	181,731	X	.03150	=	5,725		
								231,448
								231,448
AFUDC								0
INTEREST INCOME	(REVENUE - A.O. - P.P. - BOND INT.) X RATE X 0.5							-8,201
	(352,839 - 0 - -1,517 - 112,412) X .03390							
NET								223,247

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2023 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	3,557,492	X	.06308	=	224,391	476	
	NEW 2/	183,690	X	.03150	=	5,786		
								230,653
								230,653
AFUDC								0
INTEREST INCOME	(REVENUE - A.O. - P.P. - BOND INT.) X RATE X 0.5							-8,160
	(352,839 - 0 - -1,538 - 113,643) X .03390							
NET								222,493

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2024 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	3,609,298	X	.06317	=	227,996	2,129	
	NEW 2/	185,513	X	.03150	=	5,844		
								235,969
								235,969
AFUDC								0
INTEREST INCOME	(REVENUE - A.O. - P.P. - BOND INT.) X RATE X 0.5							-8,099
	(352,839 - 0 - -1,557 - 115,459) X .03390							
NET								227,870

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2025 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	3,668,285	X	.06299	=	231,057	1,400	
	NEW 2/	187,148	X	.03150	=	5,895		
								238,352
								238,352
AFUDC								0
INTEREST INCOME	(REVENUE - A.O. - P.P. - BOND INT.) X RATE X 0.5							-8,047
	(352,839 - 0 - -1,576 - 117,003) X .03390							
NET								230,305

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2026 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	3,731,323	X	.06286	=	234,566	3,803	
	NEW 2/	188,720	X	.03150	=	5,945		
								244,314
								244,314
AFUDC								0
INTEREST INCOME	(REVENUE - A.O. - P.P. - BOND INT.) X RATE X 0.5							-7,988
	(352,839 - 0 - -1,594 - 118,769) X .03390							
NET								236,326

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2027 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	3,801,936	X	.06287	=	239,014	3,637	
	NEW 2/	190,316	X	.03150	=	5,995		
								248,646
								248,646
AFUDC								0
INTEREST INCOME	(REVENUE - A.O. - P.P. - BOND INT.) X RATE X 0.5							-7,913
	(352,839 - 0 - -1,613 - 121,007) X .03390							
NET								240,733

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2028 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	3,878,533	X	.06287	=	243,840		
	NEW 2/	191,894	X	.03150	=	6,045		
								249,885
								249,885
AFUDC								0
INTEREST INCOME	(REVENUE - A.O. - P.P. - BOND INT.) X RATE X 0.5							-7,831
	(352,839 - 0 - -1,629 - 123,432) X .03390							
NET								242,054

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2029 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	3,958,013	X	.06300	=	249,353	3,129	
	NEW 2/	193,510	X	.03150	=	6,096		
								258,578
								258,578
AFUDC								0
INTEREST INCOME	(REVENUE - A.O. - P.P. - BOND INT.) X RATE X 0.5							-7,738
	(352,839 - 0 - -1,644 - 126,201) X .03390							
NET								250,840

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2030 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	4,047,880	X	.06300	=	255,015	2,900	
	NEW 2/	195,226	X	.03150	=	6,150		
								264,065
								264,065
AFUDC								0
INTEREST INCOME	(REVENUE - A.O. - P.P. - BOND INT.) X RATE X 0.5							-7,642
	(352,839 - 0 - -1,659 - 129,045) X .03390							
NET								256,423

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2031 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	4,145,031	X	.06300	=	261,134	2,705	
	NEW 2/	196,977	X	.03150	=	6,205		
								270,044
								270,044
AFUDC								0
INTEREST INCOME	(REVENUE - A.O. - P.P. - BOND INT.) X RATE X 0.5							-7,538
	(352,839 - 0 - -1,674 - 132,120) X .03390							
NET								262,506

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2032 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	4,250,001	X	.06300	=	267,748	2,451	
	NEW 2/	198,732	X	.03150	=	6,260		
								276,459
								276,459
AFUDC								0
INTEREST INCOME	(REVENUE - A.O. - P.P. - BOND INT.) X RATE X 0.5							-7,426
	(352,839 - 0 - -1,685 - 135,440) X .03390							
NET								269,033

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2033 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	4,363,242	X	.06300	=	274,882	2,196	
	NEW 2/	200,499	X	.03150	=	6,316		
								283,394
								283,394
AFUDC								0
INTEREST INCOME	(REVENUE - A.O. - P.P. - BOND INT.)			X RATE X 0.5				-7,305
	(352,839 - 0 - -1,696 - 139,022)			X .03390				
NET								276,089

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2034 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	4,485,295	X	.06300	=	282,571	1,940	
	NEW 2/	202,283	X	.03150	=	6,372		
								290,883
								290,883
AFUDC								0
INTEREST INCOME	(REVENUE - A.O. - P.P. - BOND INT.)			X RATE X 0.5				-7,174
	(352,839 - 0 - -1,706 - 142,881)			X .03390				
NET								283,709

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2035 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	4,616,742	X	.06300	=	290,852	1,666	
	NEW 2/	203,993	X	.03150	=	6,426		
								298,944
								298,944
AFUDC								0
INTEREST INCOME	(REVENUE - A.O. - P.P. - BOND INT.) X RATE X 0.5							-7,034
	(352,839 - 0 - -1,715 - 147,035) X .03390							
NET								291,910

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2036 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	4,758,091	X	.06300	=	299,758	1,360	
	NEW 2/	205,585	X	.03150	=	6,476		
								307,594
								307,594
AFUDC								0
INTEREST INCOME	(REVENUE - A.O. - P.P. - BOND INT.) X RATE X 0.5							-6,883
	(352,839 - 0 - -1,721 - 151,500) X .03390							
NET								300,711

0A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M.
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2037 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	4,909,827	X	.06300	=	309,317	1,117	
	NEW 2/	207,045	X	.03150	=	6,522		
								316,956
								316,956
AFUDC								0
INTEREST INCOME	(REVENUE - A.O. - P.P. - BOND INT.) X RATE X 0.5							-6,721
	(352,839 - 0 - -1,727 - 156,291) X .03390							
NET								310,235

0A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

INTEREST CALCULATION FOR FY 2038 TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

PROJECT	TYPE	PRINCIPAL		RATE 1/		INTEREST	PREMIUM	TOTAL
BPA PROGRAM	HISTORICAL	5,072,541	X	.06300	=	319,568	813	
	NEW 2/	208,379	X	.03150	=	6,564		
								326,945
								326,945
AFUDC								0
INTEREST INCOME	(REVENUE - A.O. - P.P. - BOND INT.) X RATE X 0.5							-6,547
	(352,839 - 0 - -1,732 - 161,428) X .03390							
NET								320,398
GRAND TOTAL								9,077,487

A.O. = ANNUAL OBLIGATIONS - CORPS/BUREAU O & M
P.P. = PURCHASE POWER
1/ WEIGHTED AVERAGE RATE OF INTEREST BY INVESTMENT
2/ INTEREST RATE REFLECTS PARTIAL YEAR

Summary of Interest Expense

Transmission
FY 2003 Current Repayment Study

SUMMARY OF INTEREST EXPENSE TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
BUREAU OF RECLAMATION										
BOISE										
COLUMBIA BASIN										
COLUMBIA BASIN- 3RD										
HUNGRY HORSE										
MINIDOKA										
YAKIMA-CHANDLER										
YAKIMA-ROZA										
TOTAL BUREAU										
CORPS OF ENGINEERS										
ALBENI FALLS										
BONNEVILLE										
BONNEVILLE - 2ND POW										
CHIEF JOSEPH										
COUGAR										
COLUMBIA RIVER FISH										
DETROIT-BIG CLIFF										
DWORSHAK										
GREEN PETER-FOSTER										
HILLS CREEK										
ICE HARBOR										
JOHN DAY										
LIBBY										
LITTLE GOOSE										
LOOKOUT POINT-DEXTER										
LOST CREEK										
LOWER GRANITE										
LOWER MONUMENTAL										
MCNARY										
STRUBE										
THE DALLES										
TOTAL CORPS										
LOWER SNAKE F AND W										
BONNEVILLE POWER ADM	71,508	70,044	66,904	65,280	63,484	57,755	57,215	56,121	54,413	53,648
TOTAL APPROPRIATIONS	71,508	70,044	66,904	65,280	63,484	57,755	57,215	56,121	54,413	53,648
BPA BORROWING										
BPA PROGRAM	113,809	122,982	137,598	146,319	151,382	156,130	155,728	155,930	157,341	158,802
BUREAU DIRECT FUND										
FISH, WILDLIFE & ENV	4,361	5,384	6,002	6,605	6,907	6,907	6,907	6,907	6,907	6,907
PREMIUMS	23	755	3,993	1,255	671	65	3,389	487	1,011	3,252
LESS										
AFUDC										
INTEREST INCOME	7,941	6,329	9,024	9,467	9,349	9,270	9,279	9,278	9,256	9,232
TOTAL BPA BORROWING	110,252	122,792	138,569	144,712	149,611	153,832	156,745	154,046	156,003	159,729
TOTALS	181,760	192,836	205,473	209,992	213,095	211,587	213,960	210,167	210,416	213,377

SUMMARY OF INTEREST EXPENSE — TRANSMISSION FY 2003 — REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
BUREAU OF RECLAMATION										
BOISE										
COLUMBIA BASIN										
COLUMBIA BASIN- 3RD										
HUNGRY HORSE										
MINIDOKA										
YAKIMA-CHANDLER										
YAKIMA-ROZA										
TOTAL BUREAU										
CORPS OF ENGINEERS										
ALBENI FALLS										
BONNEVILLE										
BONNEVILLE - 2ND POW										
CHIEF JOSEPH										
COUGAR										
COLUMBIA RIVER FISH										
DETROIT-BIG CLIFF										
DWORSHAK										
GREEN PETER-FOSTER										
HILLS CREEK										
ICE HARBOR										
JOHN DAY										
LIBBY										
LITTLE GOOSE										
LOOKOUT POINT-DEXTER										
LOST CREEK										
LOWER GRANITE										
LOWER MONUMENTAL										
MCNARY										
STRUBE										
THE DALLES										
TOTAL CORPS										
LOWER SNAKE F AND W										
BONNEVILLE POWER ADM	52,950	45,449	37,912	30,397	19,978	13,086	4,121			
TOTAL APPROPRIATIONS	52,950	45,449	37,912	30,397	19,978	13,086	4,121			
BPA BORROWING										
BPA PROGRAM	159,796	167,659	175,164	185,274	195,511	202,996	213,508	218,780	220,223	222,146
BUREAU DIRECT FUND										
FISH, WILDLIFE & ENV	6,907	6,036	6,036	3,256	3,256	3,256	1,837	1,208	603	
PREMIUMS	1,384						3,077	5,084	4,903	4,625
LESS										
AFUDC										
INTEREST INCOME	9,217	9,100	8,974	8,852	8,680	8,554	8,402	8,324	8,312	8,291
TOTAL BPA BORROWING	158,870	164,595	172,226	179,678	190,087	197,698	210,020	216,748	217,417	218,480
TOTALS	211,820	210,044	210,138	210,075	210,065	210,784	214,141	216,748	217,417	218,480

SUMMARY OF INTEREST EXPENSE TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
BUREAU OF RECLAMATION										
BOISE										
COLUMBIA BASIN										
COLUMBIA BASIN- 3RD										
HUNGRY HORSE										
MINIDOKA										
YAKIMA-CHANDLER										
YAKIMA-ROZA										
TOTAL BUREAU										
CORPS OF ENGINEERS										
ALBENI FALLS										
BONNEVILLE										
BONNEVILLE - 2ND POW										
CHIEF JOSEPH										
COUGAR										
COLUMBIA RIVER FISH										
DETROIT-BIG CLIFF										
DWORSHAK										
GREEN PETER-FOSTER										
HILLS CREEK										
ICE HARBOR										
JOHN DAY										
LIBBY										
LITTLE GOOSE										
LOOKOUT POINT-DEXTER										
LOST CREEK										
LOWER GRANITE										
LOWER MONUMENTAL										
MCNARY										
STRUBE										
THE DALLES										
TOTAL CORPS										
LOWER SNAKE F AND W										
BONNEVILLE POWER ADM										
TOTAL APPROPRIATIONS										
BPA BORROWING										
BPA PROGRAM	223,644	225,445	227,687	230,177	233,840	236,952	240,511	245,009	249,885	255,449
BUREAU DIRECT FUND										
FISH, WILDLIFE & ENV										
PREMIUMS	3,205	4,440	3,761	476	2,129	1,400	3,803	3,637		3,129
LESS										
AFUDC										
INTEREST INCOME	8,267	8,237	8,201	8,160	8,099	8,047	7,988	7,913	7,831	7,738
TOTAL BPA BORROWING	218,582	221,648	223,247	222,493	227,870	230,305	236,326	240,733	242,054	250,840
TOTALS	218,582	221,648	223,247	222,493	227,870	230,305	236,326	240,733	242,054	250,840

SUMMARY OF INTEREST EXPENSE TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

(ALL AMOUNTS IN $1000)

	2030	2031	2032	2033	2034	2035	2036	2037	2038
BUREAU OF RECLAMATION									
BOISE									
COLUMBIA BASIN									
COLUMBIA BASIN- 3RD									
HUNGRY HORSE									
MINIDOKA									
YAKIMA-CHANDLER									
YAKIMA-ROZA									
TOTAL BUREAU									
CORPS OF ENGINEERS									
ALBENI FALLS									
BONNEVILLE									
BONNEVILLE - 2ND POW									
CHIEF JOSEPH									
COUGAR									
COLUMBIA RIVER FISH									
DETROIT-BIG CLIFF									
DWORSHAK									
GREEN PETER-FOSTER									
HILLS CREEK									
ICE HARBOR									
JOHN DAY									
LIBBY									
LITTLE GOOSE									
LOOKOUT POINT-DEXTER									
LOST CREEK									
LOWER GRANITE									
LOWER MONUMENTAL									
MCNARY									
STRUBE									
THE DALLES									
TOTAL CORPS									
LOWER SNAKE F AND W									
BONNEVILLE POWER ADM									
TOTAL APPROPRIATIONS									
BPA BORROWING									
BPA PROGRAM	261,165	267,339	274,008	281,198	288,943	297,278	306,234	315,839	326,132
BUREAU DIRECT FUND									
FISH, WILDLIFE & ENV									
PREMIUMS	2,900	2,705	2,451	2,196	1,940	1,666	1,360	1,117	813
LESS									
AFUDC									
INTEREST INCOME	7,642	7,538	7,426	7,305	7,174	7,034	6,883	6,721	6,547
TOTAL BPA BORROWING	256,423	262,506	269,033	276,089	283,709	291,910	300,711	310,235	320,398
TOTALS	256,423	262,506	269,033	276,089	283,709	291,910	300,711	310,235	320,398

SUMMARY OF INTEREST EXPENSE TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RA

	TOTALS
BUREAU OF RECLAMATION	
BOISE	
COLUMBIA BASIN	
COLUMBIA BASIN- 3RD	
HUNGRY HORSE	
MINIDOKA	
YAKIMA-CHANDLER	
YAKIMA-ROZA	
TOTAL BUREAU	
CORPS OF ENGINEERS	
ALBENI FALLS	
BONNEVILLE	
BONNEVILLE - 2ND POW	
CHIEF JOSEPH	
COUGAR	
COLUMBIA RIVER FISH	
DETROIT-BIG CLIFF	
DWORSHAK	
GREEN PETER-FOSTER	
HILLS CREEK	
ICE HARBOR	
JOHN DAY	
LIBBY	
LITTLE GOOSE	
LOOKOUT POINT-DEXTER	
LOST CREEK	
LOWER GRANITE	
LOWER MONUMENTAL	
MCNARY	
STRUBE	
THE DALLES	
TOTAL CORPS	
LOWER SNAKE F AND W	
TOTAL APPROPRIATIONS	
BONNEVILLE POWER ADM	820,265
BPA BORROWING	
BPA PROGRAM	8,403,813
BUREAU DIRECT FUND	
FISH, WILDLIFE & ENV	96,189
PREMIUMS	77,102
LESS	
AFUDC	
INTEREST INCOME	319,882
TOTAL BPA BORROWING	8,257,222
TOTALS	9,077,487

Application of Amortization
Transmission
FY 2003 Current Repayment Study

APPLICATION OF AMORTIZATION TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RATE

YEAR ----------INVESTMENT PAID----------

(ALL AMOUNT IN $1000)

YEAR	PROJECT	IN-SERVICE	DUE	GROSS	NET	RATE	REPLACEMENT	AMOUNT
2000	BONNEVILLE POWER ADMINISTRATION	1955	2000	11,827	11,827	.06620		11,827
	BPA PROGRAM	1992	2000	92,125	92,125	.06600		92,125
	BONNEVILLE POWER ADMINISTRATION	1955	2000	10,283	10,283	.06620	R	10,283
	BPA PROGRAM	1995	2025	8,442	8,442	.07700		352
	TOTAL							114,587
2001	BONNEVILLE POWER ADMINISTRATION	1956	2001	14,573	14,573	.06710		14,573
	BONNEVILLE POWER ADMINISTRATION	1956	2001	32,221	32,221	.06710	R	32,221
	BPA PROGRAM	1995	2025	8,442	8,090	.07700		8,090
	BPA PROGRAM	1995	2025	65,000	65,000	.07700		4,180
	TOTAL							59,064
2002	BONNEVILLE POWER ADMINISTRATION	1957	2002	7,933	7,933	.06790		7,933
	BPA PROGRAM	1999	2002	40,000	40,000	.06200		40,000
	BONNEVILLE POWER ADMINISTRATION	1957	2002	15,980	15,980	.06790	R	15,980
	BPA PROGRAM	1995	2025	65,000	60,820	.07700		60,820
	BPA PROGRAM	1995	2025	41,491	41,491	.07700		6,824
	TOTAL							131,557
2003	BPA PROGRAM	1996	2003	50,000	50,000	.05900		50,000
	BPA PROGRAM	1996	2003	4,378	4,378	.05900		4,378
	BPA PROGRAM	2000	2003	40,000	40,000	.06400		40,000
	BONNEVILLE POWER ADMINISTRATION	1958	2003	15,593	15,593	.06840		15,593
	BONNEVILLE POWER ADMINISTRATION	1958	2003	10,654	10,654	.06840	R	10,654
	BPA PROGRAM	1995	2025	41,491	34,667	.07700		22,222
	TOTAL							142,847
2004	BPA PROGRAM	1999	2004	26,200	26,200	.05950		26,200
	BPA PROGRAM	1997	2004	22,600	22,600	.06800		22,600
	BONNEVILLE POWER ADMINISTRATION	1959	2004	8,157	8,157	.06880		8,157
	BONNEVILLE POWER ADMINISTRATION	1959	2004	8,863	8,863	.06880	R	8,863
	BPA PROGRAM	1995	2025	41,491	12,445	.07700		12,445
	BONNEVILLE POWER ADMINISTRATION	1971	2016	17,805	17,805	.07290	R	17,805
	BONNEVILLE POWER ADMINISTRATION	1971	2016	12,051	12,051	.07290		12,051
	BONNEVILLE POWER ADMINISTRATION	1971	2016	17,766	17,766	.07290	R	17,766
	BONNEVILLE POWER ADMINISTRATION	1971	2016	12,025	12,025	.07290		12,025
	BONNEVILLE POWER ADMINISTRATION	1972	2017	2,873	2,873	.07290	R	2,873
	TOTAL							140,785
2005	BPA PROGRAM	2000	2005	53,500	53,500	.07150		53,500
	BPA PROGRAM	1997	2005	80,000	80,000	.06900		80,000
	BONNEVILLE POWER ADMINISTRATION	1960	2005	4,218	4,218	.06910	R	4,218
	BONNEVILLE POWER ADMINISTRATION	1960	2005	3,598	3,598	.06910		3,598
	BPA PROGRAM	2000	2035	149,593	149,593	.07540		1,009
	TOTAL							142,325
2006	BPA PROGRAM	1996	2006	70,000	70,000	.07050		70,000
	BONNEVILLE POWER ADMINISTRATION	1961	2006	4,468	4,468	.06950		4,468
	BONNEVILLE POWER ADMINISTRATION	1961	2006	11,271	11,271	.06950	R	11,271
	BPA PROGRAM	2000	2035	149,593	148,584	.07540		54,244
	TOTAL							139,983

APPLICATION OF AMORTIZATION TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RATE

YEAR ----------INVESTMENT PAID----------

(ALL AMOUNT IN $1000)

YEAR	PROJECT	IN-SERVICE	DUE	GROSS	NET	RATE	REPLACEMENT	AMOUNT
2007	BONNEVILLE POWER ADMINISTRATION	1962	2007	19,597	19,597	.06980		19,597
	BPA PROGRAM	1997	2007	111,254	111,254	.06650		111,254
	BONNEVILLE POWER ADMINISTRATION	1962	2007	4,877	4,877	.06980	R	4,877
	BPA PROGRAM	2000	2035	149,593	94,340	.07540		8,078
	TOTAL							143,806
2008	BPA PROGRAM	1998	2008	75,300	75,300	.06000		75,300
	BPA PROGRAM	1998	2008	40,000	40,000	.05750		40,000
	BONNEVILLE POWER ADMINISTRATION	1963	2008	4,876	4,876	.07020		4,876
	BONNEVILLE POWER ADMINISTRATION	1963	2008	904	904	.07020		904
	BONNEVILLE POWER ADMINISTRATION	1963	2008	4,330	4,330	.07020	R	4,330
	BONNEVILLE POWER ADMINISTRATION	1963	2008	803	803	.07020	R	803
	BPA PROGRAM	2000	2035	149,593	86,262	.07540		17,374
	TOTAL							143,587
2009	BPA PROGRAM	1998	2009	72,700	72,700	.06000		72,700
	BONNEVILLE POWER ADMINISTRATION	1964	2009	4,151	4,151	.07060		4,151
	BONNEVILLE POWER ADMINISTRATION	1964	2009	5,738	5,738	.07060	R	5,738
	BPA PROGRAM	2000	2035	149,593	68,888	.07540		58,066
	TOTAL							140,655
2010	BONNEVILLE POWER ADMINISTRATION	1965	2010	7,248	7,248	.07090	R	7,248
	BONNEVILLE POWER ADMINISTRATION	1965	2010	3,706	3,706	.07090		3,706
	BONNEVILLE POWER ADMINISTRATION	1965	2010	5,202	5,202	.07090		5,202
	BONNEVILLE POWER ADMINISTRATION	1965	2010	10,171	10,171	.07090	R	10,171
	FISH, WILDLIFE & ENVIRONMENTAL	1995	2010	12,100	12,100	.07200		12,100
	BPA PROGRAM	2000	2035	149,593	10,822	.07540		10,822
	BPA PROGRAM	2000	2031	15,675	15,675	.07540		15,675
	BONNEVILLE POWER ADMINISTRATION	1972	2017	3,980	3,980	.07290		3,980
	BONNEVILLE POWER ADMINISTRATION	1972	2017	21,170	21,170	.07290	R	21,170
	BONNEVILLE POWER ADMINISTRATION	1972	2017	29,326	29,326	.07290		29,326
	BONNEVILLE POWER ADMINISTRATION	1973	2018	10,491	10,491	.07280	R	10,491
	BONNEVILLE POWER ADMINISTRATION	1973	2018	16,368	16,368	.07280		12,349
	TOTAL							142,240
2011	BPA PROGRAM	1998	2011	40,000	40,000	.06200		40,000
	BONNEVILLE POWER ADMINISTRATION	1966	2011	11,830	11,830	.07130		11,830
	BONNEVILLE POWER ADMINISTRATION	1966	2011	3,049	3,049	.07130	R	3,049
	BONNEVILLE POWER ADMINISTRATION	1966	2011	6,647	6,647	.07130		6,647
	BONNEVILLE POWER ADMINISTRATION	1966	2011	1,714	1,714	.07130	R	1,714
	BONNEVILLE POWER ADMINISTRATION	1973	2018	16,368	4,019	.07280		4,019
	BONNEVILLE POWER ADMINISTRATION	1973	2018	21,656	21,656	.07280	R	21,656
	BONNEVILLE POWER ADMINISTRATION	1973	2018	33,788	33,788	.07280		33,788
	BONNEVILLE POWER ADMINISTRATION	1970	2015	3,003	3,003	.07270	R	3,003
	BONNEVILLE POWER ADMINISTRATION	1970	2015	24,412	24,412	.07270		18,338
	TOTAL							144,044
2012	BONNEVILLE POWER ADMINISTRATION	1967	2012	19,003	19,003	.07160		19,003
	BONNEVILLE POWER ADMINISTRATION	1967	2012	4,566	4,566	.07160	R	4,566
	BONNEVILLE POWER ADMINISTRATION	1967	2012	14,300	14,300	.07160		14,300
	BONNEVILLE POWER ADMINISTRATION	1967	2012	3,436	3,436	.07160	R	3,436
	FISH, WILDLIFE & ENVIRONMENTAL	1997	2012	40,000	40,000	.06950		40,000
	BONNEVILLE POWER ADMINISTRATION	1970	2015	24,412	6,074	.07270		6,074
	BONNEVILLE POWER ADMINISTRATION	1970	2015	7,995	7,995	.07270	R	7,995
	BONNEVILLE POWER ADMINISTRATION	1970	2015	64,977	64,977	.07270		48,604

APPLICATION OF AMORTIZATION TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RATE

YEAR ----------INVESTMENT PAID----------

(ALL AMOUNT IN $1000)

YEAR	PROJECT	IN-SERVICE	DUE	GROSS	NET	RATE	REPLACEMENT	AMOUNT
	TOTAL							143,978
2013	BONNEVILLE POWER ADMINISTRATION	1968	2013	41,070	41,070	.07200		41,070
	BONNEVILLE POWER ADMINISTRATION	1968	2013	8,076	8,076	.07200	R	8,076
	BONNEVILLE POWER ADMINISTRATION	1968	2013	23,202	23,202	.07200		23,202
	BONNEVILLE POWER ADMINISTRATION	1968	2013	4,562	4,562	.07200	R	4,562
	BONNEVILLE POWER ADMINISTRATION	1970	2015	64,977	16,373	.07270		16,373
	BONNEVILLE POWER ADMINISTRATION	1974	2019	12,079	12,079	.07270		12,079
	BONNEVILLE POWER ADMINISTRATION	1974	2019	20,984	20,984	.07270	R	20,984
	BONNEVILLE POWER ADMINISTRATION	1974	2019	12,563	12,563	.07270		12,563
	BONNEVILLE POWER ADMINISTRATION	1974	2019	21,826	21,826	.07270	R	5,158
	TOTAL							144,067
2014	BONNEVILLE POWER ADMINISTRATION	1969	2014	205	205	.07230	R	205
	BPA PROGRAM	1999	2014	48,920	48,920	.05900		48,920
	BONNEVILLE POWER ADMINISTRATION	1969	2014	384	384	.07230		384
	BONNEVILLE POWER ADMINISTRATION	1969	2014	22,537	22,537	.07230	R	22,537
	BONNEVILLE POWER ADMINISTRATION	1969	2014	42,237	42,237	.07230		42,237
	BONNEVILLE POWER ADMINISTRATION	1974	2019	21,826	16,668	.07270	R	16,668
	BONNEVILLE POWER ADMINISTRATION	1975	2020	17,158	17,158	.07250		13,152
	TOTAL							144,103
2015	FISH, WILDLIFE & ENVIRONMENTAL	2000	2015	19,603	19,603	.07240		19,603
	BONNEVILLE POWER ADMINISTRATION	1975	2020	17,158	4,006	.07250		4,006
	BONNEVILLE POWER ADMINISTRATION	1975	2020	11,742	11,742	.07250	R	11,742
	BONNEVILLE POWER ADMINISTRATION	1975	2020	21,916	21,916	.07250	R	21,916
	BONNEVILLE POWER ADMINISTRATION	1975	2020	32,026	32,026	.07250		32,026
	BONNEVILLE POWER ADMINISTRATION	1976	2021	61,025	61,025	.07230		54,117
	TOTAL							143,410
2016	FISH, WILDLIFE & ENVIRONMENTAL	2001	2016	9,086	9,086	.06920		9,086
	BONNEVILLE POWER ADMINISTRATION	1976	2021	61,025	6,908	.07230		6,908
	BONNEVILLE POWER ADMINISTRATION	1976	2021	2,212	2,212	.07230	R	2,212
	BONNEVILLE POWER ADMINISTRATION	1977	2022	3,948	3,948	.07210		3,948
	BONNEVILLE POWER ADMINISTRATION	1977	2022	5,380	5,380	.07210	R	5,380
	BONNEVILLE POWER ADMINISTRATION	1977	2022	33,702	33,702	.07210		33,702
	BONNEVILLE POWER ADMINISTRATION	1977	2022	4,981	4,981	.07210	R	4,981
	BPA PROGRAM	2001	2036	201,604	201,604	.07290		73,861
	TOTAL							140,078
2017	FISH, WILDLIFE & ENVIRONMENTAL	2002	2017	9,047	9,047	.06690		9,047
	BPA PROGRAM	2001	2036	201,604	127,743	.07290		127,743
	BPA PROGRAM	2002	2037	231,985	231,985	.07080		705
	TOTAL							137,495
2018	FISH, WILDLIFE & ENVIRONMENTAL	2003	2018	9,274	9,274	.06500		9,274
	BPA PROGRAM	2002	2037	231,985	231,280	.07080		127,576
	TOTAL							136,850
2019	BPA PROGRAM	2002	2037	231,985	103,704	.07080		103,704
	BPA PROGRAM	1994	2034	50,000	50,000	.07050		32,106

APPLICATION OF AMORTIZATION TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RATE

YEAR ----------INVESTMENT PAID----------

(ALL AMOUNT IN $1000)

YEAR	PROJECT	IN-SERVICE	DUE	GROSS	NET	RATE	REPLACEMENT	AMOUNT
	TOTAL							135,810
2020	BPA PROGRAM	1994	2034	50,000	17,894	.07050		17,894
	BPA PROGRAM	1993	2033	110,000	110,000	.06950		110,000
	BPA PROGRAM	2003	2038	237,931	237,931	.06890		7,837
	TOTAL							135,731
2021	BPA PROGRAM	2003	2038	237,931	230,094	.06890		132,687
	TOTAL							132,687
2022	BPA PROGRAM	2003	2038	237,931	97,407	.06890		97,407
	BPA PROGRAM	1994	2034	50,000	50,000	.06850		33,702
	TOTAL							131,109
2023	BPA PROGRAM	1998	2023	106,600	106,600	.05850		106,600
	BPA PROGRAM	1994	2034	50,000	16,298	.06850		16,298
	BPA PROGRAM	1994	2034	108,400	108,400	.06850		8,986
	TOTAL							131,884
2024	BPA PROGRAM	1994	2034	108,400	99,414	.06850		99,414
	BPA PROGRAM	1998	2032	98,900	98,900	.06700		27,112
	TOTAL							126,526
2025	BPA PROGRAM	1998	2032	98,900	71,788	.06700		71,788
	BPA PROGRAM	1998	2028	50,000	50,000	.06650		50,000
	BPA PROGRAM	2004	2049	137,969	137,969	.06300	R	2,322
	TOTAL							124,110
2026	BPA PROGRAM	2004	2049	137,969	135,647	.06300	R	118,107
	TOTAL							118,107
2027	BPA PROGRAM	2004	2049	137,969	17,540	.06300	R	17,540
	BPA PROGRAM	2005	2050	141,467	141,467	.06300	R	96,179
	TOTAL							113,719
2028	BPA PROGRAM	1998	2028	112,400	112,400	.05850		112,400
	BPA PROGRAM	2005	2050	141,467	45,288	.06300	R	14
	TOTAL							112,414
2029	BPA PROGRAM	2005	2050	141,467	45,274	.06300	R	45,274
	BPA PROGRAM	2006	2051	144,854	144,854	.06300	R	58,369
	TOTAL							103,643
2030	BPA PROGRAM	2006	2051	144,854	86,485	.06300	R	86,485
	BPA PROGRAM	2007	2052	148,057	148,057	.06300	R	11,590
	TOTAL							98,075
2031	BPA PROGRAM	2007	2052	148,057	136,467	.06300	R	92,007

APPLICATION OF AMORTIZATION TRANSMISSION FY 2003 REPAYMENT STUDY FOR TRANSMISSION FINAL PROPOSAL 2002 RATE

YEAR ----------INVESTMENT PAID----------

(ALL AMOUNT IN $1000)

YEAR	PROJECT	IN-SERVICE	DUE	GROSS	NET	RATE	REPLACEMENT	AMOUNT
	TOTAL							92,007
2032	BPA PROGRAM	2007	2052	148,057	44,460	.06300	R	44,460
	BPA PROGRAM	2008	2053	150,933	150,933	.06300	R	41,031
	TOTAL							85,491
2033	BPA PROGRAM	2008	2053	150,933	109,902	.06300	R	78,446
	TOTAL							78,446
2034	BPA PROGRAM	2008	2053	150,933	31,456	.06300	R	31,456
	BPA PROGRAM	2009	2054	153,462	153,462	.06300	R	39,380
	TOTAL							70,836
2035	BPA PROGRAM	2009	2054	153,462	114,082	.06300	R	62,644
	TOTAL							62,644
2036	BPA PROGRAM	2009	2054	153,462	51,438	.06300	R	51,438
	BPA PROGRAM	2010	2055	155,555	155,555	.06300	R	2,411
	TOTAL							53,849
2037	BPA PROGRAM	2010	2055	155,555	153,144	.06300	R	44,331
	TOTAL							44,331
2038	BPA PROGRAM	2010	2055	155,555	108,813	.06300	R	34,173
	TOTAL							34,173
	GRAND TOTAL							4,561,053
	TOTAL DEFERRAL							0
	NET							4,561,053

CHAPTER 14

REPAYMENT STUDY
THEORY AND OPERATION

Repayment Theory of Operation

Introduction

The 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 (FCRTS).

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 (DOE) Order RA 6120.2. The Program is also used to determine by the minimum factor future revenues can be multiplied by to obtain a new set of revenues which will be sufficient to recover amortization costs.

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

This discussion presents the basic theory upon which the operation of the Program is based, using a minimum of terms for clarity. The complications, how they are incorporated into the program and the effects they have upon the operation of the Program are discussed.

Basic Theory

Given sets of annual revenues and annual expenses, a set of (annual) net operating revenues can be immediately obtained by subtracting the expenses from the revenues. These net operating revenues will be used for paying interest expenses and amortization payments on the long-term obligations.

Compliance with RA 6120.2 requires satisfying, for each year (i), the equation:

(1) $\text{net revenues}(i) = \text{interest expense}(i) + \sum_{j} \text{payment}(i, j) \qquad i = 1, 2, \ldots, n$

Note that for each year the payments have been summed over all obligations.

For each obligation (j) the equation:

$$(2)\ \sum_{i=1}^{k} \text{payment}(i, j) < \text{principle}(j) \qquad j = 1,2, \ldots, m,$$

for all k

must be satisfied. Note that for each obligation the payments have been summed over the years.

This set of equations has too many unknowns (payments on the principle balances) to solve simultaneously. RA 6120.2 requires that "to the extent possible, while still complying with the repayment periods established for each investment, amortization of the investment will be accompanied by application to the highest interest-bearing investment first." A method will be established for "complying with the repayment periods established for each investment" and then the investments will be amortized by "application to the highest-interest-bearing investment first" to the extent that compliance permits.

The first equation above is defined for each year and the payments are summed over the investments. The second equation is defined for each investment and the payments are summed over the years. This suggests that if the first set of equations is summed over the years and the second set of equations is summed over the investments, then it may be possible to eliminate the unknown payments between the two sets of equations:

$$(3)\ \sum_{i=1}^{k} \text{net revenues}(i) - \sum_{i=1}^{k} \text{interest expense}(i) \qquad k \text{ is the year the study is working on}$$

$$= \sum_{i=1}^{k} \sum_{j} \text{payment}(i, j) \qquad k = 1, 2, \ldots, n,$$

$$k$$

$$= \sum_{j}\sum_{i=1} \text{payment}(i, j) \qquad k = 1, 2, \ldots, n,$$

$$= \sum_{\text{due}}^{k}\sum_{i=1} \text{payment}(i, j) \quad + \sum_{\text{not due}}^{k}\sum_{j=1} \text{payment}(i, j) \qquad k = 1, 2, \ldots, n,$$

$$= \sum_{\text{due}} \text{payment}(i, j) \quad + \sum_{\text{not due}}^{k}\sum_{j=1} \text{payment}(i, j) \qquad k = 1, 2, \ldots, n.$$

Thus we obtain the *predictor* equation:

$$(4)\ \sum_{\text{not due}}^{k}\sum_{i=1} \text{net revenues}(i) - \sum^{k} \text{interest expense}(i) - \sum \text{principle}(j) = \sum^{k}\sum \text{payment}(i, j)$$

$$k = 1, 2, \ldots, n.$$

For each of the future years the right-hand side of the above equation represents the amount of the accumulated payments on "not due," i.e., "highest interest" investments. The left side indicates how the amount of payments which can be made on these investments in compliance with RA 6120.2 can be evaluated. If, for some future year, this amount is evaluated as being zero or negative, then this equation implies that no payment can be made on an investment which is "not due" until a later year and still comply with RA 6120.2. Accordingly, if the amount is evaluated as being zero or negative for any future year, then payments can be made only on "highest interest" investments which come due on or before the first such year.

Thus, a new equation is obtained for each year (k). Payments will be made on the highest interest-bearing investment which permits compliance with sets of equations (1), (2) and (4). The amount paid will be the maximum amount which permits compliance with these three sets of equations.

Application

The fourth set of equations has the problem that a payment made in the current year will affect interest expenses in future years since interest will no longer have to be paid on that portion of the investment. This problem is currently solved by using an iterative approach (i.e., a method of successive approximations). The program finally includes no future interest in evaluating the left-hand side of the fourth set of equations. Consequently, the evaluation of revenues available for "not due" payments will be excessive. As the years are processed and the interest of a given year becomes known, it is used in the fourth set of equations for all later years. The fourth set of equations is thus modified, and the evaluation of revenues available for "not due" payments is reduced. Amortizing some investment on its due date could violate equations of the first and fourth sets; then a negative balance will occur. A second iteration will be necessary.

In the second iteration, the interest payments from the first iteration will be used for future years. Since "not due" payments were excessive in the first iteration, the interest payments of the first iteration will be less than the true interest payments. But they will be more accurate than no interest at all and negative balances will be reduced.

If the revenues are sufficiently high, then with successive iterations the interest expenses will converge and the balances will be reduced to zero. A solution is found. But, if the revenues are not sufficiently high, then compliance with the fourth set of equations will force payments on high-interest obligations to be delayed into the future. This will cause an increase in the interest charges leaving still less revenues available for the high-interest obligations. With successive iterations, interest expenses will converge and negative balances will increase. No solution is found.

Deferral of Annual Expenses

If a set of revenues determined by a set of basic revenues and an assumed rate change cause deferral of annual expenses in any given year, it is necessary to modify the revenue equation for that year to the form:

deferral + net revenue = interest expense

and, for one or more later years, to the form:

net revenue = interest expense + payment on deferral + amortization.

Any change in the revenue equation will manifest itself in the predictor equation, and equation (4) must be modified accordingly.

These deferrals and payments on deferral are initially assumed to be zero. When their values are actually determined, they are used in equation (4) for future years and they are saved in tables so that in case another iteration is necessary, the deferrals and payments from this iteration can be used in the place of future deferrals and payments for the next iteration.

Historical deferrals are processed similar to other investments with the exception that in accordance with RA 6120.2, they are amortized before any other investment.

Calculation of Interest Expense

Annual interest is computed by applying the applicable interest rate (r) to that portion of the principle (p) which was unpaid at the beginning of the year in accordance with RA 6120.2. The interest on a new obligation is half this amount as specified.

BPA is authorized to accrue an interest credit on its cash balance as an offset against its interest expense. For lack of more detailed information, the net revenues are assumed to accumulate, at a uniform rate throughout the year, except for the interest paid on the bonds at midyear.

If it were assumed that the half-year's interest on new obligations implied that all new obligations came at midyear, then there would never be any mid-year interest on a new bond. It will, instead, be assumed that new bonds have a uniform probability of I/T of coming in at any time of the year, where T is equal to one year. Then the probability that the bond will come in by the time (t) is

$$\int_0^t (1/T)dt = t/T \Big|_{t=0}^{t=t} = t/T.$$

The probability that it will come in by the end of the year T is T/T = 1.

(This result can be seen without calculus). Assume that t and T are expressed in days and the year is not a leap year. By assumption the probability that the bond will come in on any particular day is 1/365. Thus, the probability that the bond has come in on or before day t is

(t)(1/365) = t/365 = t/T.

For example, suppose that we want to find the probability that a given bond came in on or before the 100th day of the year. The desired probability is

(100)(1/365) = 100/365 = t/T.

The amount of interest that the bond will probably incur during a time interval (dt) coming at time (t) is the probability that the bond has come in multiplied by the amount of interest that the bond would incur in that interval:

di = (t/T)rpdt.

The amount of interest which will probably be incurred by time (t) is:

$$i = \int_0^t di = \int_0^t (t/T)rp\, dt = (t2/2T)\, rp \Big|_{t=0}^{t=t} = (t2/2T)\, rp.$$

In particular, the amount of interest incurred by midyear (T/2) would be rpT/8; and the amount incurred by the end of the year would be rpT/2, which is consistent with RA 6120.2.

(Midyear and end-of-year interest on new bonds can also be derived without calculus. We will consider the midyear interest first. To compute probable midyear interest on new bonds, note that the probability of the bond issue date being in the first half year is 1/2. If the bond issue date is in the first half year, it will, on the average, accrue interest for half of the first half the first year. Midyear interest on new bonds will be only 1/2 of the interest of a full year. Since interest for an entire year is

$i = rpT,$

mid-year interest on a new bond will be

$i = (1/2)^3\, rpT = rpT/8.$

Interest on new bonds for the whole year is

$i = rpT/2$

because, on average, the bond will have incurred interest for only half of the year.)

Premiums and Call Provisions

BPA's current bonds either have a provision that they cannot be redeemed for at least five years and that a premium must be paid if they are redeemed before the due date; a provision that they cannot be redeemed for at least five years and that a premium must be paid if they are redeemed five years before the due date; or, a provision that they can be called within five years without paying a premium. The premium calculation is a fraction of one year's interest which is proportional to the life of the bond.

This premium must be included in the revenue equation and, as a consequence, will manifest itself in the predictor equation.

The first method used for incorporating the premiums in the solution method was to save the annual premiums between iterations and use those of the previous iteration to predict the future annual premiums. This resulted in some instability when premiums shifted from one year to another. It resulted in an inability to solve when the revenues were close to the minimum revenues.

The second method was to consider the premium as being the amount which *would be* paid in the current year, but as being "due" when the principle was due. But, since the *would-be* premium decreased each year until actually paid, the predictor equation was adjusted each year to reflect the reduction in the premiums. This tended to introduce an inaccuracy in the predictor equation. Adjustment of the predictor equation for changes in premiums would make a small amount of revenues available in the following year for amortizing high-interest investments.

The premium actually paid is still stored by the year it is paid, for use in the output routines. The premium *actually paid* is now also stored by the year that the principle is due. 'This "predicted penalty" is used in the predictor equation for the following iteration. With this modification any change in premium always affects the predictor equation in the same year, the year that the principle is due. This change only occurs when the premium is actually paid, and the amount of this change decreases as the solution converges.

The premiums also affect the "highest interest first" selection process. If the life of the bond is (T) and the time of redemption is (t), then the premium is given by the equation:

$$\text{premium} = rp(T-t)/T.$$

or if the bond has a callable at par provision in the remaining (t1) Years of its life, the premium is given by the equation:

$$\text{premium} = rp(T-t-t1)/(T-t1) \quad \text{if} \quad t \leq (T-t1) \text{ otherwise premium} = 0$$

The total interest paid on the bond is given by the equation:

$$\text{interest} = rpt.$$

Combining the two we get:

$$\text{interest} + \text{premium} = rpt + rp(T-t)/T$$

$$= rpt(1-1/T) + rp.$$

or, in the case of the bond callable at par

$$\text{interest} + \text{premium} = rpt + rp(T-t-t1)/(T-t1)$$

$$= rpt(1-1/(T-t1)) + rp$$

$$\text{if } t > T-t1 \quad \text{then} \quad = rpt$$

Thus, such a premium is equivalent to a fixed premium together with a reduced interest rate. This fixed premium must be paid (unless bond is callable at par) regardless of when the bond is redeemed. This "reduced" interest rate will be used when comparing obligations to determine which one should be retired first.

Surplus Revenues

In the later years of the Study (and conceivably at any time during the Study), there may be revenues available but nothing on which to expend them on. Thus, a "surplus" term must be included in the revenue equation and will consequently manifest itself in the predictor equation. Since the surplus is not obligatory, it will be carried on the right-hand side of the predictor equation.

Minimizing Revenues

The repayment program has provisions for determining a set of minimum revenues sufficient to meet a given set of annual expenses and cover a given set of long-term obligations.

If unequal maximum and minimum revenue change parameters are supplied to the program, or if the (unequal) default parameters are used, then the program will perform a *binary search* to determine the minimum sufficient revenues. The set of revenues is multiplied by the minimum revenue change and the resulting revenues are tested for sufficiency. If revenues are not sufficient, this is indeed a minimum revenue change, e.g., no lower change will provide sufficient revenues. If sufficient, then this revenue becomes a maximum; it is divided by two to obtain a new minimum candidate and this cycle is repeated, if necessary, until a minimum change is obtained.

If a maximum has not yet been determined, then the given revenues are multiplied by the maximum revenue change and the resulting revenues are tested for sufficiency. If sufficient, this is indeed a maximum revenue change, i.e., the maximum of the range we must consider. If insufficient, then this revenue change becomes a new minimum: it is multiplied by two to obtain a new maximum candidate and this cycle is repeated, if necessary, until a maximum change is obtained.

A revenue change halfway between the present maximum and minimum is now determined and the resulting revenues are tested for sufficiency. If sufficient, this midpoint becomes a new maximum; if insufficient, it becomes a new minimum. In either case, the difference between the maximum and the minimum is only half of what it was previously. If this difference is greater than some specified (or default) accuracy, then this cycle is repeated until the difference is less than the specified accuracy. When this difference is less than the specified accuracy, then the current maximum rate change provides the *minimum sufficient* revenues at this accuracy.

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 which are referred to are:

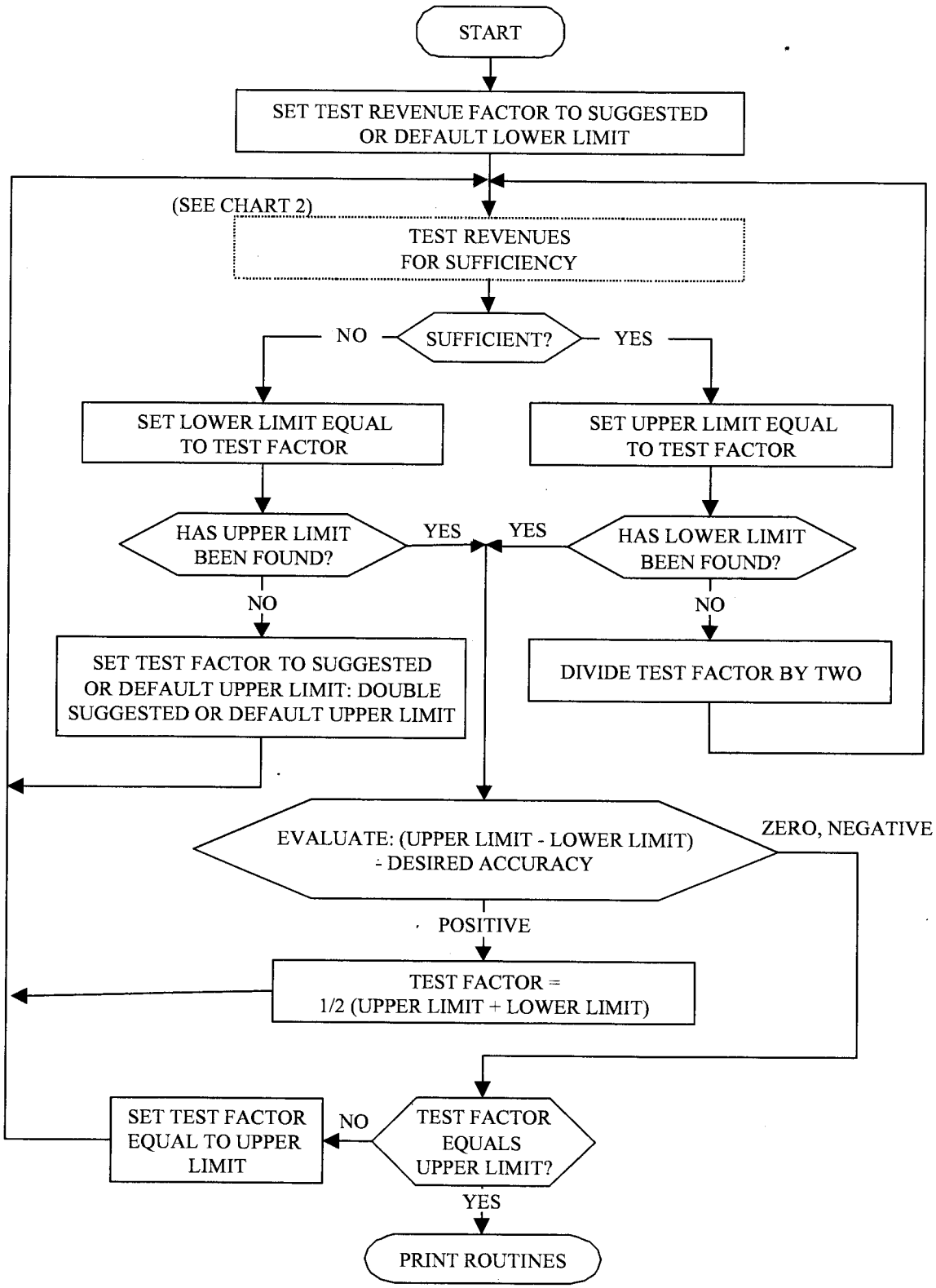
Revenue Equation: Net revenues of each year are expended on interest and payments on the principles.

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

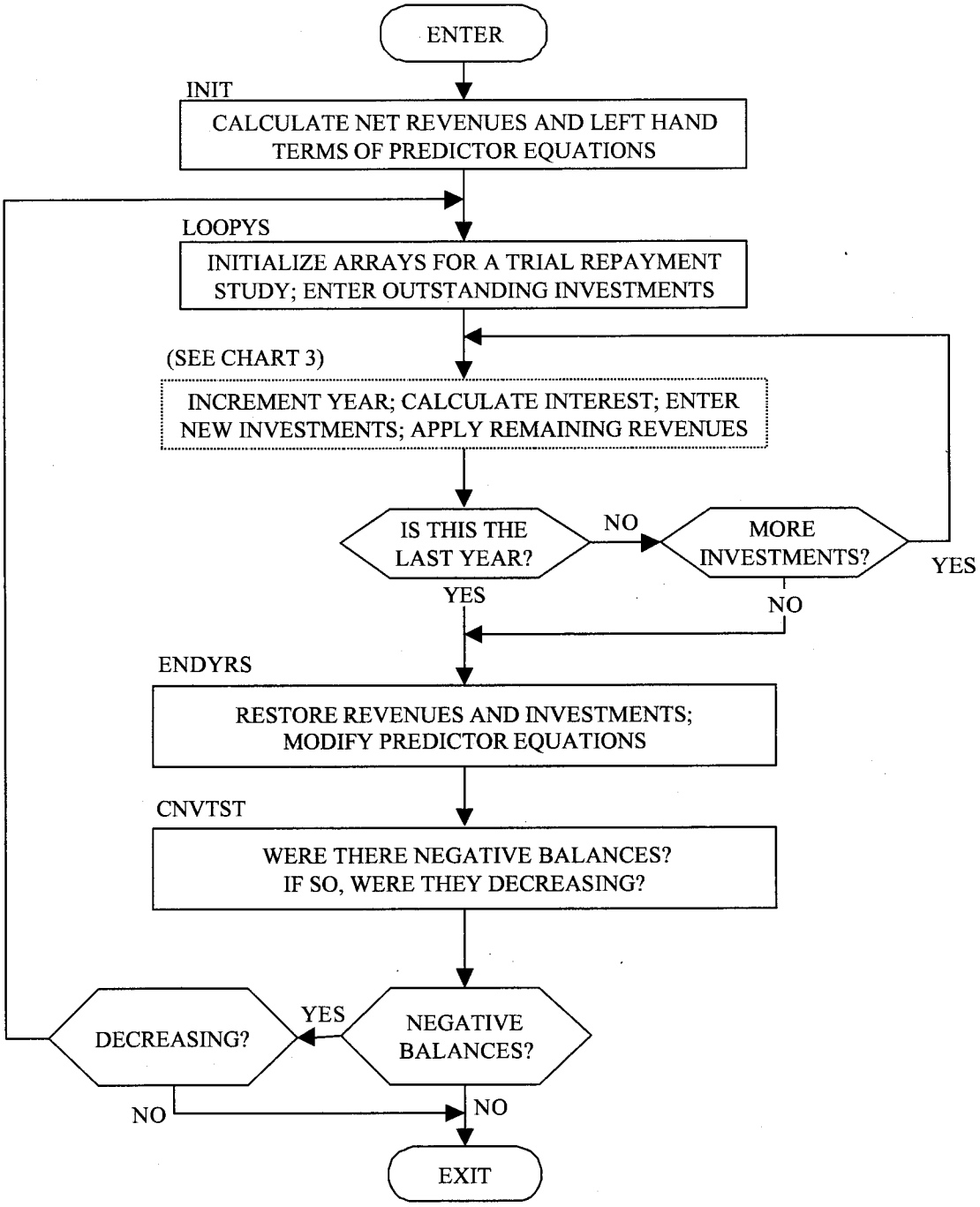
Predictor equation: For each future year the accumulated revenues less the accumulated interest less the accumulated investments due is equal to the accumulated payments on high interest rate investments which are not due.

These equations are developed in more detail elsewhere in both the Study and the Documentation.

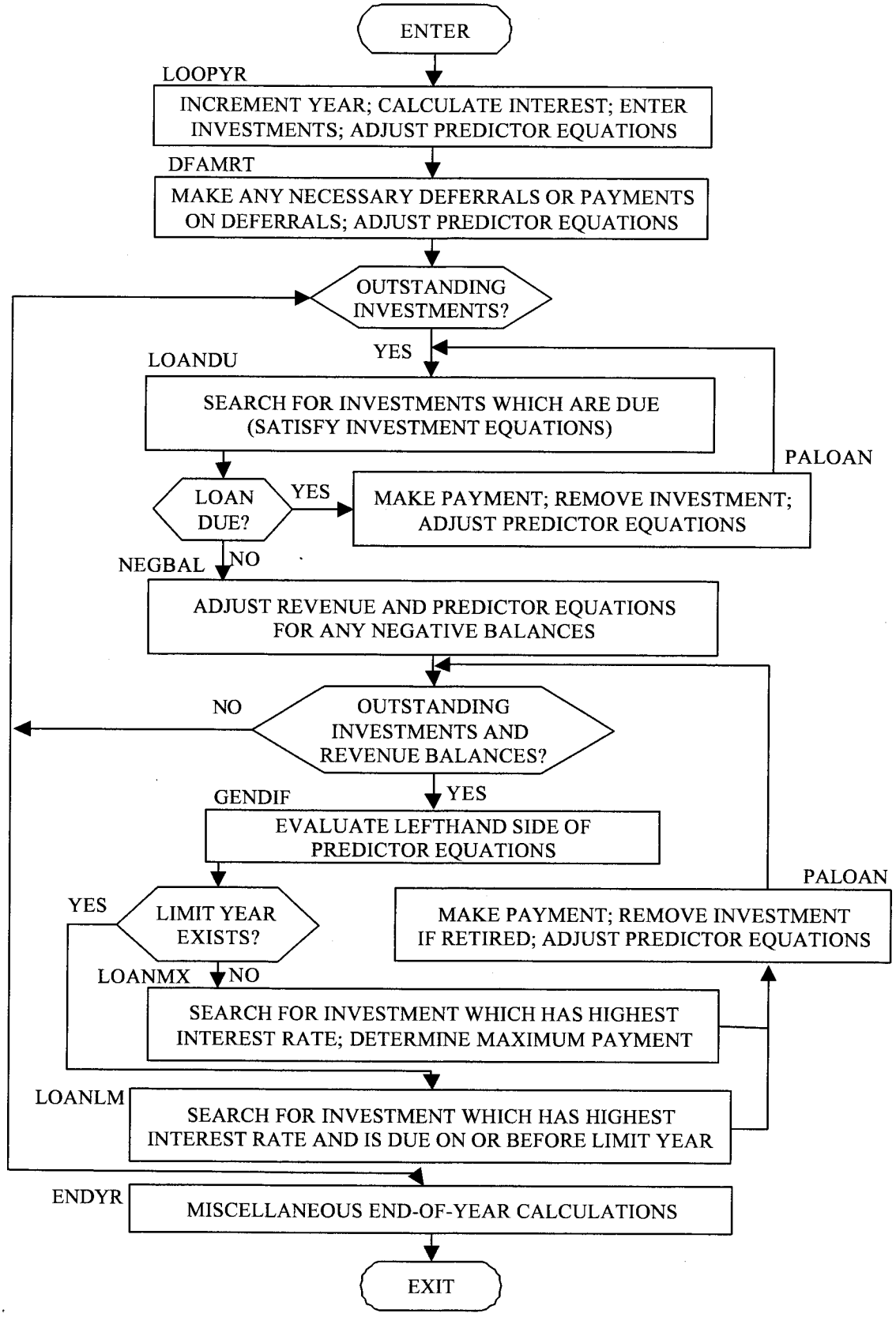
REPAYMENT PROGRAM
(BINARY SEARCH)
CHART 1



REPAYMENT PROGRAM
(TEST FOR SUFFICIENCY)
CHART 2



REPAYMENT PROGRAM
(APPLICATION OF REVENUES)
CHART 3



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