2002

SEGMENTATION STUDY

March 2000

TR-02-E-BPA-02

2002 TRANSMISSION RATE CASE
SEGMENTATION STUDY

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COMMONLY USED ACRONYMS

AC	Alternating Current
ACS	Ancillary Services and Control Area Services (Rate)
AF	Advance Funding (Rate)
AFUDC	Allowance for Funds Used During Construction
AGC	Automatic Generation Control
aMW	Average Megawatt
ASC	Average System Cost
BOR	U.S. Bureau of Reclamation
BPA	Bonneville Power Administration
Btu	British Thermal Unit
CA	Control Area
CAISO	California Independent System Operator
California PX	California Power Exchange
CAS	Control Area Service
COB	California-Oregon Border
COE	U.S. Army Corps of Engineers
CPTC	Columbia Power Trades Council
CRAC	Cost Recovery Adjustment Clause
CSL	Customer-Served Load
CY	Calendar Year (Jan-Dec)
DC	Direct Current
DOE	Department of Energy
DOI	Department of Interior
DSIs	Direct Service Industrial Customers
EIA	Energy Information Administration
Energy Northwest	Formerly Washington Public Power Supply System Project
F&O	Financial and Operating Reports
FCCF	Fish Cost Contingency Fund
FCRPS	Federal Columbia River Power System
FCRTS	Federal Columbia River Transmission System
FERC	Federal Energy Regulatory Commission
FPT	Formula Power Transmission Rate
FTE	Full-time Equivalent
FY	Fiscal Year (Oct-Sep)
GDP	Gross Domestic Product
GI	Generation Integration
GRSPs	General Rate Schedule Provisions
GSU	Generator Step-Up Transformers
GTA	General Transfer Agreement
GWh	Gigawatthour

HLH	Heavy Load Hours
HNF	Hourly Non-Firm
IDC	Interest During Construction
IE	Eastern Intertie (Rate)
IM	Montana Intertie (Rate)
IOUs	Investor-Owned Utilities
IP	Industrial Firm Power (Rate)
IR	Integration of Resources (Rate)
IS	Southern Intertie (Rate)
ISC	Investment Service Coverage
ISO	Independent System Operator
kcfs	kilo (thousands) of cubic feet per second
kV	Kilovolt (1000 volts)
kVAr	Kilovoltampere Reactive
kW	Kilowatt (1000 watts)
kWh	Kilowatthour
LLH	Light Load Hours
m/kWh	Mills per kilowatthour
MAF	Million Acre Feet
MORC	Minimum Operating Reliability Criteria
MTPL	Monthly Transmission Peak Load
MW	Megawatt (1 million watts)
MWh	Megawatthour
NCD	Network Contract Demand (Service and Rate)
NERC	North American Electric Reliability Council
NF	Nonfirm Energy
NOB	Nevada-Oregon Border
NORM	Non-Operating Risk Model
Northwest Power Act	Pacific Northwest Electric Power Planning and Conservation Act
NT	Network Integration Transmission (Service and Rate)
NTSA	Non-Treaty Storage Agreement
NWPP	Northwest Power Pool
NWPPC	Northwest Power Planning Council
O&M	Operation and Maintenance
OASIS	Open Access Same-Time Information System
OATT	Open Access Transmission Tariff
OMB	Office of Management and Budget
OY	Operating Year (Aug-Jul)
PA	Public Agency
PBL	Power Business Line
PNCA	Pacific Northwest Coordination Agreement
PNRR	Planned Net Revenues for Risk
PNUCC	Pacific Northwest Utilities Conference Committee

PNW	Pacific Northwest
POD	Point of Delivery
POI	Point of Integration (or, Interconnection)
POR	Point of Receipt
PSW	Pacific Southwest
PTP	Point to Point (Service and Rate)
PUD	Public or People's Utility District
Reclamation	Bureau of Reclamation
RiskMod	Risk Analysis Model (computer model)
RiskSim	Risk Simulation Model
RMS	Remote Metering System
ROD	Record of Decision
RPSA	Residential Purchase Sale Agreement
RRS	Revenue Requirement Study
RTO	Regional Transmission Organization
SCADA	Supervisory Control And Data Acquisition System
Tariff	Open Access Transmission Tariff
TBL	Transmission Business Line
TCH	Transmission Contract Holder
TGT	Townsend-Garrison Transmission (Rate)
TPP	Treasury Payment Probability
TRAP	Transmission Risk Analysis Processor
TRS	Transmission Rate Study
TTSL	Total Transmission System Loading
UIC	Unauthorized Increase Charge
UFT	Use of Facilities (Rate)
USBOR	U.S. Bureau of Reclamation
VOR	Value of Reserves
WEFA	Wharton Econometric Forecasting Associates
WSCC	Western Systems Coordinating Council
WSPP	Western System Power Pool
1CP	One Coincidental Peak
12CP	Twelve Coincidental Peak

INTRODUCTION

The purpose of this study is to classify the facilities of the Federal Columbia River Transmission System (FCRTS) by assigning them to the segments according to the types of services they provide, and to derive the associated costs. The outcome of this study is the Bonneville Power Administration (BPA) Transmission Business Line (TBL) transmission investment base and historical operation and maintenance (O&M) expense for each transmission segment. In addition to the transmission segments, investment and O&M costs are developed and identified for a new ancillary services segment, and are further subdivided into specific ancillary subsegments. From these results, projected O&M, depreciation, interest expenses, other expenses, and planned net revenues functionalized to transmission are associated with the segments to establish the segmented revenue requirements and the costs of the transmission and ancillary services. That is, the results of the Segmentation Study are the starting point for segmenting costs in the Revenue Requirement Study (TR-02-E-BPA-01).

This document is organized into two portions. The text explains the theory and methodology used to segment the FCRTS and displays the results; and the supporting data and analyses are shown in the study documentation chapters. The documentation for segmentation of transmission facilities are shown in the chapters 1 through 7 and the documentation for the segmentation of ancillary services in chapters 8 through 10.

The segment definitions and methodology used in this study are described in sections 2 and 3. This study follows the definitions and methodology used in the Segmentation Study of BPA's previous rate filings. The major changes from previous filings are:

- Including the former Fringe facilities in the Network;

- Combining Northern Intertie facilities in the Network;
- Including facilities below 34.5-kV in a Utility Delivery or DSI Delivery segment; and
- Establishing a new segment and subsegment for Ancillary Services.

The investment costs in this study have been updated to correspond with plant investment records as of September 30, 1998. The costs will be further updated in the final study.

This study does not include two items that were included in previous rate cases. The transmission facilities of the Corps of Engineers (COE) and US Bureau of Reclamation (BOR) are not included in this study. These facilities were segmented in the 2002 Power Business Line (PBL) Case and the annual costs are included in the transmission revenue requirement as expenses for the appropriate segment. In addition, the study does not include the sub-segmentation of the Network used to calculate the FPT rates in prior rate proceedings. TBL's proposal to determine the FPT rate is explained in the Transmission Rate Study (TR-02-E-BPA-03).

THE SEGMENTS

For rate-setting purposes, TBL allocates the rate period transmission revenue requirement to the various transmission services according to their projected use of the transmission system. To ensure that the allocated costs correspond to the services provided, the facilities and associated costs of the transmission system are divided into segments and assigned among different categories of service. Because the entire transmission system is not needed to provide each type of service, this method of cost allocation is more equitable than one that does not segment facilities and their associated costs.

The six TBL transmission segments and the ancillary service segment that TBL proposes to establish in this rate proceeding are defined below. The ancillary service segment is divided into subsegments for each of the services provided. This segmentation study covers only those facilities owned by TBL.

Generation Integration Segment

The Generation Integration Segment consists of all facilities that connect the Federal generating plants to the integrated TBL transmission network. The Generation Integration Segment includes transmission lines and equipment between the generator bus and the first TBL transmission system substation encountered by the generated power. Substation terminal equipment such as disconnect switches, circuit breakers, and lightning arresters are included in the segment. The federal generator step-up transformers, owned by the COE and BOR, are used to transform the voltage from the generator to that of the local transmission facilities, and are included in this segment. However, all COE and BOR costs are segmented in the Power Rate Case so the step-up costs are not included in this study. The costs of the Generation Integration Segment are assigned to the PBL, as proposed in the 2002 Power Rate case initial proposal.

Integrated Network Segment

The Network segment consists of the transmission facilities that transfer bulk power between utility service areas in the NW and the Delivery, Southern, and Eastern Intertie segments. These facilities integrate major system resources in conjunction with either TBL's Generation Integration facilities, customer provided facilities, or interconnections with other

utilities. The Network provides voltage regulation and overall reliability resulting from alternative transmission pathways.

The Network segment consists almost entirely of lines and substation equipment at voltages ranging from 34.5-kV to 500-kV owned or operated by TBL. The annual costs for the COE and BOR facilities that function as part of the Network are included as an expense in the Network revenue requirement. The facilities that were assigned to IOU Delivery, Fringe, and Northern Intertie segments in previous filing are assigned to the Network.

Pacific Northwest-Southwest (Southern) Intertie Segment

The Southern Intertie Segment is a system of transmission lines that interconnect the PNW to California power systems at the Oregon border. The Southern Intertie consists of a 1000-kV direct-current (DC) line originating at the Celilo Converter Station near The Dalles, and a set of 500-kV alternating-current (AC) lines originating in North Central Oregon. TBL owns most of the Intertie facilities north of the California-Oregon and Nevada-Oregon borders except for:

1. One of the AC lines (from Malin to Grizzly substation in central Oregon), and associated terminals owned by Portland General Electric Company; and
2. The Meridian-Captain Jack-Malin line and Summer Lake-Malin line owned by PacifiCorp. TBL has rights to use these facilities for Intertie purposes.

The Southern Intertie Segment includes the following major facilities:

1. The Celilo converter station and the DC line from Celilo to the Nevada-Oregon border;

2. The supply lines for the Celilo converter station from John Day to Big Eddy to Celilo at 500 kV and from Big Eddy to Celilo at 230 kV and associated substation facilities;

3. The two John Day-Grizzly 500 kV lines and a Grizzly-Captain Jack-Malin 500-kV line with associated terminal facilities;

4. Series compensation stations at Sycan, Fort Rock, and Sand Spring;

5. Fifty-seven percent of the Buckley-Summer Lake 500-kV line and associated substation facilities (the remaining 43 percent is allocated to the Network). This allocation is based on past usage, which may change in future filings;

6. The braking resistor at Chief Joseph, used for Intertie stability control; and

7. The Third AC Intertie project facilities which consist of:

   a. Modifications to existing AC Intertie facilities;

   b. Existing facilities originally segmented to Network but currently dedicated to Intertie use since commercial operation of the last 800 MW of the upgrade (One half of Marion-Alvey line and one quarter of Buckley-Marion line along with corresponding terminal facilities);

   c. Captain Jack Substation in Southern Oregon; and

   d. The one half of the Alvey-Meridian 500-kV line and associated terminal facilities owned by TBL.

Eastern Intertie Segment

The Eastern Intertie segment consists of the Garrison-Townsend 500 kV line and the associated substation facilities at Garrison. These facilities are used to connect power generated

at Colstrip to the TBL Network and to transfer power between the Northwest and Montana. These facilities are defined by contract.

Delivery Segments

The Delivery Segment consists primarily of substation facilities required to "step down" (reduce voltage) from transmission voltages to voltages below 34.5kV for delivery to the transmission customers distribution system. These facilities are generally located at the points of delivery. Step-down transformers and associated switching and protection equipment constitute the primary facilities included in these segments.

These facilities are subdivided into Utility Delivery and Industrial Delivery Segments. The facilities in each of these segments are substantially different in size and use. There are a few facilities used to deliver to IOU customers below 34.5 kV where the delivery costs are covered in older contracts. These facilities are combined with the Network segment.

Utility Delivery Segment

This segment consists of the facilities required to supply power at delivery voltages to TBL's public utility customers. The facilities consist mostly of substations that step-down transmission voltage to voltages below 34.5-kV. In addition to substation equipment, these facilities include a few short lines typically at 12.5 or 13.8-kV.

Industrial Delivery (DSI) Segment

This Delivery segment consists of facilities required to deliver power to Direct Service Industrial customers. The facilities consist of substations that reduce transmission voltage to delivery voltages below 34.5-kV.

Ancillary Services Segment

The TBL offers ancillary services necessary for reliable transmission service on the FCRTS. The six services are listed below. The facilities that provide these services are the control equipment located primarily at the control centers, and the communications system and SCADA equipment connecting to the facilities being controlled. In order to determine the revenue requirement for separate ancillary service rates the facilities that provide these services are included in a separate Ancillary Service Segment, with the facilities further divided into a subsegment for each service. The ancillary services segment contains only facilities in general plant accounts, primarily communications and control equipment. The investment for this type of equipment is allocated to each ancillary service sub-segment or the transmission segments based on its use. The investment allocated to the transmission system is assigned to each transmission segment proportional to the segments net plant.

The six Ancillary Services are:

Scheduling, System Control, and Dispatch
Reactive Supply and Voltage Control from Generation Sources
Regulation and Frequency Response
Energy Imbalance
Operating Reserves – Spinning
Operating Reserves – Supplemental

METHODOLOGY

TBL transmission facilities are classified to segments on the basis of voltage and function. In some cases, as for the Interties, contracts define some or all of the facilities in a segment. The segmentation study developed in prior rate proceedings is the starting point for this study. A

number of technical sources are relied on to identify facilities for specific services. After the facilities are identified by segment, the investment cost of each segmented facility is determined from accounting records. Some substation facilities are common to more than one segment. In that case, the facility costs are divided among the major segments based on the use of each major component of the substation.

In order to identify the facilities and the associated costs that provide a specific type of service, the segmentation process considers:

- Power flow studies, one-line diagrams and other technical data that indicate the operating voltage of each facility and type of service.
- Contracts for specific services.
- Work orders under which each of the facilities were constructed, standard costing procedures and accounting principles, and standard utility business practices.
- The accounting records maintained by BPA for plant in service.
- The cost studies that provide the cost breakdown for major equipment installations and indicate the relationship of equipment cost to the total cost, including installation and costs associated with specific accessory equipment that form integral units such as line terminals.

The O&M expenses for each transmission line and substation are obtained from the plant records for the latest 3 years for which data is available and then averaged. For example, the FY 1998 study uses data for FYs 1996, 1997, and 1998. Use of these historical 3-year

averages minimizes potential biases resulting from scheduling or weather anomalies in a particular year.

The facilities and associated costs assigned to the Ancillary Services Segment are those associated with control equipment and the communication system. The investment and O&M for the equipment associated with providing the ancillary service costs were assigned to each subsegment by TBL staff working in these areas based on plant records, staffing plans, and their experience with use of the equipment.

SALE OF DELIVERY FACILITIES

TBL adopted a policy in 1996 allowing customers, both utilities and DSIs, to buy the delivery substations that serve them. This resulted in the sale of about 45 substations by the end of FY98, the period covered by this study. The facilities that have been sold through FY98 have been removed from the study for both investment and O&M purposes. TBL currently plans to extend the sale policy through the next rate period. TBL made a forecast of substations to be sold during the period FY99 through FY03 so similar adjustments could be made for the test years. The forecast is based on staff knowledge of sales in progress and of interest shown by the customers in purchasing additions substations. The forecast of sales were used to reduce the forecasted segment investment base and average O&M for the test period.

RESULTS OF SEGMENTATION STUDY ANALYSIS

The results of the segmentation analysis are contained in Tables A through E that follow. The individual line and substation investments as of September 30, 1998 are summarized in Table A. These investments are used to distribute the actual FY 1998 substation spares and

accumulated depreciation in Table B. The 3-year average of O&M costs for each segment is listed in Table C. Table C results are used to calculate percentages for allocating projected transmission O&M to the transmission segments. In Table D the forecasted additions are added to the investment base to determine the TBL segmented transmission plant investment through FY 2003. The summary of Delivery facilities forecast to be sold are shown in Table E and used in Table D to adjust plant in service.

TABLE A

SUMMARY OF SEGMENTED INVESTMENT

As of September 30, 1998

($)

Segment	ID	Lines	Substations	Total
DSI Delivery	D	0	88,154,482	88,154,482
Generation integration	G	16,556,553	43,361,401	59,917,954
Eastern Intertie	IE	97,890,490	23,866,195	121,756,685
Southern AC Intertie	ISAC	168,283,191	160,697,655	328,980,846
Southern DC Intertie	ISDC	29,095,036	309,856,051	338,951,087
Network	N	1,650,320,068	1,292,779,262	2,943,099,330
Utility Delivery	P	31,483	88,282,645	88,314,128
Total		1,962,176,821	2,006,997,690	3,969,174,511

The details for line investment is shown in chapter 1.
The details for substation investment is shown in chapter 2.

TABLE B
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)	16,557	1,651,410	197,378	97,890	31	0			185			1,963,451
9. ACCUMULATED DEPRECIATION	(10,727)	(1,069,952)	(74,271)	(41,637)	(20)	0			(175)			(1,196,782)
10. NET LINES	5,830	581,458	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	60,378	2,957,906	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/	60,378	2,957,906	669,505	121,756	89,251	89,089	728,900	60,337	189		3,245	4,780,556
18. ACCUMULATED DEPRECIATION	(15,422)	(1,209,922)	(171,243)	(47,432)	(9,579)	(9,545)	(205,916)	(6,464)	(179)		0	(1,675,702)
19. NET COMPLETED PLANT	44,956	1,747,984	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.

TABLE C

SUMMARY OF SEGMENTED THREE-YEAR AVERAGE O&M

For the Period 1996-1998

($)

Segment	ID	Lines	%	Substations	%
DSI Delivery 1/	D	0	0.00%	1,421,696	3.06%
Generation integration	G	578,458	0.99%	776,887	1.67%
Eastern Intertie	IE	923,895	1.58%	215,064	0.46%
Southern AC Intertie	ISAC	2,528,390	4.33%	1,686,416	3.62%
Southern DC Intertie	ISDC	1,494,271	2.56%	8,493,890	18.26%
Network	N	52,801,201	90.52%	31,426,679	67.54%
Utility Delivery 2/	P	4,155	0.01%	2,507,953	5.39%
Total		58,330,370	100.00%	46,528,584	100.00%

The percent by segment will be used to assign budgeted O&M costs for the test period. The segmented O&M costs are primarily direct costs and do not include all overheads.

Notes:
1/ DSI Delivery O&M has been reduced for those facilities forecast to be sold after 9/30/98. See Table E for amounts.
2/ Utility Delivery O&M has been reduced for those facilities forecast to be sold after 9/30/98. See Table E for amounts.

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

		A	B	C	D	E	F	G	H	I	J	K
		TOTAL		TOTAL		TOTAL		TOTAL		TOTAL		TOTAL
		1998	1999	1999	2000	2000	2001	2001	2002	2002	2003	2003
		INVEST	ADDITIONS	INVEST	ADDITIONS	INVEST	ADDITIONS	INVEST	ADDITIONS	INVEST	ADDITIONS	INVEST
1	GENER-INTEGRATION	60,378	361	60,739	581	61,320	648	61,968	643	62,611	638	63,249
2	NETWORK	2,957,906	59,183	3,017,089	86,528	3,103,617	135,524	3,239,141	158,587	3,397,728	186,012	3,583,740
3	SOUTHERN INTERTIE	669,505	2,958	672,463	5,015	677,478	4,944	682,422	4,580	687,002	4,587	691,589
4	EASTERN INTERTIE	121,756	0	121,756	636	122,392	616	123,008	585	123,593	571	124,164
5	UTILITY DELIVERY	89,251	(1,170)	88,081	1,555	89,636	(26,682)	62,954	1,801	64,755	1,791	66,546
6	DSI DELIVERY	89,089	(5,361)	83,728	1,555	85,283	(28,354)	56,929	1,801	58,730	1,791	60,521
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	40,046	829,283	62,924	892,207	65,263	957,470	67,342	1,024,812	58,288	1,083,100
10	TOTAL BPA	4,780,556	96,017	4,876,573	158,794	5,035,367	151,959	5,187,326	235,339	5,422,665	253,678	5,676,343

NOTES:
Additions for 1999 and 2001 include a reduction for Delivery facilities forecast to be sold. See table E.
Line 9, general plant, includes Corporate general plant allocated to TBL.

TABLE E
SUMMARY OF DELIVERY FACILITIES FORECAST TO BE SOLD

	9/30/98 Investment	Average O&M Costs
DSI Delivery Facilities		
Sold in FY1999	6,338,949	377,748
Sold in FY2001	30,074,427	1,069,774
Total	36,413,376	1,447,522
Utility Delivery Facilities		
Sold in FY1999	2,147,751	259,216
Sold in FY2001	28,402,398	913,114
Total	30,550,149	1,172,330

Details of the forecast are shown in Chapter 6.

STUDY DOCUMENTATION

DOCUMENTATION

OF SEGMENTATION FOR TRANSMISSION FACILITIES

INTRODUCTION

The FCRTS is segmented according to the types of services provided by the specific facilities. Various technical sources, such as one line diagrams and plans of service and the existing contracts provide a basis for classification. Each facility, as represented on system one-line diagrams, is assigned to one of the segments. Only those services constituting the significant use of the facilities are considered in this analysis; incidental services are ignored, as are emergency uses of the facilities. The cost of each facility is determined from accounting records, and the total investment of the segment is determined from the facilities it contains.

Chapters 1 and 2 of the Documentation list the investment as of September 30, 1998, for each TBL transmission line and substation in each segment. Some substations are divided among more than one segment. These substations are referred to as multisegmented substations. Chapter 3 delineates the relevant data and computations used to make the allocation to the appropriate segments. The historic O&M expenses of the facilities for the latest 3 years for which data is available, i.e., FYs 1996 through 1998, are shown with their averages in Chapters 4 (lines) and 5 (substations) of. Chapter 6 lists the Delivery facilities forecast to be sold through the rate period. Chapter 7 displays the proposed segmented additions to TBL facilities for the FYs 1999 through 2003.

CHAPTER 1

LINE INVESTMENT BY SEGMENT

As of September 30, 1998

All TBL lines are listed on the following pages along with their cost. In some instances cost of one line may be combined with the cost of another. This is likely to happen where two lines are on the same set of towers or where the line is sectionalized and renamed.

Table 1.1 shows investment costs of each transmission line by segment as of September 30, 1998. Costs are derived from the plant investment records. With the exception of three multisegmented lines, each transmission line falls within a single segment. The 3-year average O&M for each line, determined in chapter 4, is also shown for convenience.

Network lines transferred to the Southern Intertie from the Network after commercial operation of the second 800 MW upgrade to the AC Intertie system are listed in footnote 1 at the end of Table 1.1. The adjustment to the segment investment is shown at the end of the Network and Southern Intertie segments in the table.

Table 1.2 shows the segmentation of the three multisegmented lines. These have been split into segments based on the line miles in each segment except for the Buckley-Summer Lake line. The costs of the Buckley-Summer Lake line are allocated 57 percent to Southern Intertie and 43 percent to Network, which has remained unchanged from the 1985 rate filing. This allocation is based on its past usage and may change in future rate filing.

TABLE 1.1
TRANSMISSION LINE INVESTMENT ($)
As of September 30, 1998

ID	NAME	INVESTMENT	O&M AVERAGE
GENERATION INTEGRATION SEGMENT			
11608	Anderson Ranch-Mountain Home	293,126	77,768
1311	Big Clif-Detroit #1	373,972	9,965
6916	Black Canyon-Emmett	58,728	13,064
23115	Bonneville #2P.H.-No. Bonneville	1,214,223	2,763
23011	Bonneville-No. Bonneville #1	90,258	2,796
23012	Bonneville-No. Bonneville #2	86,775	2,763
11624	Chandler Tap	67,095	12,476
23024	Chief Joseph P.H. #1-4	344,487	13,217
50024	Chief Joseph P.H. #5,6	914,763	7,733
11528	Cougar-Wilakenzie	244,568	10,163
23034	Detroit P.H. #1,2	87,090	3,196
23030	Detroit-Santiam #1,2	2,466,186	72,344
11630	Dexter Tap	30,424	3,304
50031	Dworshak Powerhouse	1,320,143	18,428
11634	Green Peter-Lebanon	828,232	44,567
11642	Hills Creek-Oakridge	270,001	107,429
11732	Ice Harbor-Franklin #3	1,499,171	30,229
50035	John Day P.H. #1-4	1,942,583	17,474
23143	Libby P.H. #1,2	556,652	8,789
50092	Little Goose P.H.	318,194	8,385
11650	Lookout Point PH-Lookout Pt	10,293	52,502
50057	Lower Granite P.H.	447,946	3,766
50049	Lower Monumental P.H.	237,828	4,870
23151	McNary P.H.-McNary #1,2	1,375,072	7,258
23152	McNary P.H.-McNary #3,4	123,612	4,627
23153	McNary P.H.-McNary #5	92,251	4,095
11651	McNary P.H.-McNary #6	96,825	7,025
11678	The Dalles P.H.-Big Eddy #1	96,163	2,697
23086	The Dalles P.H.-Big Eddy #2-6	587,149	14,782
50008	WNP 2-Ashe	330,593	7,524
23092	WNP2-Ashe #2	152,150	2,460
	TOTAL Generation Integration	**16,556,553**	**578,458**
EASTERN INTERTIE			
50085	Townsend-Garrison	97,890,490	923,895
SOUTHERN INTERTIE			
50004	Alvey-Dixonville	26,815,943	0
50012	Buckley-Summer Lake	28,883,490	295,852
50016	Captain Jack-Olinda	7,759,679	34,445
50025	Dixonville-Meridian	36,984,782	0
50037	Grizzly-Malin	21,782,759	896,229
50043	John Day-Grizzly #1	11,094,572	443,922
50044	John Day-Grizzly #2	8,900,810	443,871
	Network to AC Intertie 1/	26,061,156	414,071
	Total AC Intertie	**168,283,191**	**2,528,390**
23111	Big Eddy-Celilo	622,829	3,113
50013	Big Eddy-Celilo #3	1,284,742	5,473

TABLE 1.1
TRANSMISSION LINE INVESTMENT ($)
As of September 30, 1998

ID	NAME	INVESTMENT	O&M AVERAGE
50014	Big-Eddy-Celilo #4	1,428,787	4,820
75020	Celilo-Sylmar	23,640,794	1,385,763
50039	John Day-Big Eddy #1	2,117,884	95,101
	Total DC Intertie	**29,095,036**	**1,494,271**
	Total Southern Intertie	**197,378,227**	**4,022,660**
NETWORK			
11605	Aberdeen Tap	1,603,250	51,408
11601	Adair Tap	65,494	4,390
11782	Addy Loop	83,538	65,968
23120	Addy-Cusick	5,210,169	105,254
11507	Albany-Burnt Woods	472,805	76,139
11503	Albany-Eugene	1,570,126	173,519
11501	Albany-Lebanon	608,910	73,899
11705	Alderwood Tap	1,163,570	40,036
3345	Almira Tap	94,741	67,288
23002	Alvey-Lane	2,632,181	44,645
23003	Alvey-Reston	4,544,676	226,120
11602	Alvey-Springfield	297,741	19,772
23004	Anaconda-Silver Bow	363,688	55,163
23006	Ashe Tap	1,082,442	28,498
50006	Ashe-Hanford	5,532,663	86,917
50007	Ashe-Slatt	49,924,863	713,006
23106	Ashe-White Bluffs	1,247,958	31,694
11606	Badger Canyon Loop	665,641	14,128
11609	Badger Canyon-Reata	910,754	22,830
23009	Bandon-Gold Beach #2	5,420,205	172,420
11510	Bandon-Port Orford	1,092,711	80,167
11516	Bayshore Tap	98,196	3,347
23010	Bell-Boundary #1	6,412,403	305,022
23019	Bell-Boundary #2	3,810,028	366,586
23128	Bell-Boundary #3	29,904,241	366,499
11586	Bell-Colville	4,991,359	220,061
23074	Bell-Hot Springs	7,772,892	544,326
23014	Bellingham-Custer-Blaine	145,615	54,946
11588	Bell-Trentwood #1	560,147	48,991
11589	Bell-Trentwood #2	386,929	49,121
11607	Benton-DOE451B	199,431	20,648
11518	Benton-FFTF	199,431	25,560
11541	Benton-Franklin #1	513,715	90,700
11611	Benton-Franklin #2	762,776	91,000
11613	Benton-Richland	582,848	48,873
11612	Benton-Scootney	772,961	87,914
23017	Big Eddy-Chenoweth #1	793,309	5,326
23018	Big Eddy-Chenoweth #2	1,070,049	26,581
11610	Big Eddy-DeMoss	783,051	100,720
50010	Big Eddy-Keeler	11,106,609	548,462
23015	Big Eddy-Maupin	1,277,224	97,879
34511	Big Eddy-McLoughlin	6,731,232	391,748
23016	Big Eddy-Midway	4,480,740	342,243

TABLE 1.1
TRANSMISSION LINE INVESTMENT ($)
As of September 30, 1998

ID	NAME	INVESTMENT	O&M AVERAGE
28775	Big Eddy-Oregon City	2,761,753	303,624
28711	Big Eddy-Troutdale	8,280,075	257,781
6910	Boardman-Ione	771,563	105,950
11512	Bonners Ferry-Troy	1,275,134	100,642
23013	Bonneville-No. Bonneville #3	98,469	4,527
11514	Bonneville-No.Bonneville #4	109,074	4,428
11515	Bonneville-The Dalles	1,615,820	128,574
11517	Bonneville-Vancouver #5,6	1,773,293	143,855
11614	Box Canyon Tap	87,885	10,389
50012	Buckley-Summer Lake	21,789,300	223,186
11520	Camas Tap	89,189	0
13802	Canal Tap	868,496	24,778
23157	Canby Tap	2,395,486	34,124
11620	Cardwell-Cowlitz	393,134	33,061
23008	Carlton-McMinnville	558,739	18,066
23007	Carlton-Tillamook	5,655,236	162,522
11616	Carson Tap	417,425	4,128
23121	Cathlamet-Naselle	4,208,954	95,182
6911	Chehalis-Centralia #1	466,107	38,732
6912	Chehalis-Centralia #2	771,822	52,535
23021	Chehalis-Covington	2,339,348	231,047
11523	Chehalis-Longview	557,112	52,136
23023	Chehalis-Mayfield	1,149,066	92,895
23022	Chehalis-Olympia	1,067,985	131,714
11545	Chehalis-Raymond	1,403,091	198,093
23131	Chemawa-Salem	5,973,973	35,489
11621	Chemawa-Salem #1	2,034	8,323
11720	Cheney Tap	560,625	39,253
11623	Chenoweth-Harvey #1,2	173,792	3,828
23042	Chief Joseph-East Omak #1,2	12,877,015	113,160
50021	Chief Joseph-Monroe	20,544,671	610,574
50022	Chief Joseph-Sickler	4,891,807	226,053
34521	Chief Joseph-Sultan #3,4	16,150,028	813,659
6913	Coburg Tap	162,866	13,028
11629	Columbia Falls-Trego	1,399,788	199,788
23026	Columbia-Coulee	1,534,362	241,734
11526	Columbia-Ellensburg	1,226,416	116,622
11625	Columbia-Valhalla #1	132,967	22,865
11626	Columbia-Valhalla #2	134,755	22,648
11572	Colville-Metaline Falls	5,260,055	143,356
11627	Colville-Republic	1,497,610	192,812
11721	Connell Tap	205,327	33,255
11527	Cottage Grove-Drain	671,415	66,770
11528	Cougar-Wilakenzie	3,055,417	63,924
23025	Covingtn-Duwamish-Creston	238,936	30,063
23028	Covingtn-Grand Coulee	2,939,322	609,944
28720	Covington-Columbia #3	4,802,192	366,746
34576	Covington-Maple Valley	1,224,461	87,292
23020	Covington-Maple Valley #1	635,478	48,939
3320	Creston-Davenport	175,025	83,450

TABLE 1.1
TRANSMISSION LINE INVESTMENT ($)
As of September 30, 1998

ID	NAME	INVESTMENT	O&M AVERAGE
6914	Creswell Tap	10,708	14,507
50019	Custer-Ingledow #1	1,560,101	45,291
50020	Custer-Ingledow #2	1,943,296	45,693
23029	Custer-Intalco #1,2	1,244,837	46,110
11726	Davis Creek Tap	208,342	2,087
11632	DeMoss-Fossil	1,391,629	186,373
11730	Dorena Tap	226,577	20,300
23033	Driscoll-Clatsop	1,928,627	732
11731	Dworshak P.H.-Orofino	213,499	2,763
50030	Dworshak-Hot Springs	28,960,825	724,003
11781	East Ellensburg Tap	480,842	13,954
23095	East Omak-Tonasket	6,596,669	113,160
11793	Elbe Tap	2,188,918	29,168
11729	Eltopia Tap	458,381	16,649
11555	Eugene-Alvey #1	310,198	42,181
11556	Eugene-Alvey #2	372,232	55,076
11534	Eugene-Mapleton	1,811,550	129,306
23041	Fairmount-Port Angeles #1	2,015,300	115,149
11736	Fairmount-Port Angeles #2	1,126,933	115,988
11737	Fairview-Bandon #1	1,218,564	108,251
11598	Fairview-Bandon #2	661,496	129,787
23136	Fairview-Bandon #3	1,080,061	83,763
23135	Fairview-Rogue	5,717,119	217,331
11734	Fidalgo-Lopez	4,735,595	29,476
11733	Filbert Tap	323,729	3,130
11637	Florence Tap	155,220	16,953
11537	Forest Grove-McMinnville	605,572	98,218
11636	Forest Grove-Tillamook	1,752,079	124,280
11738	Foster Tap	284,966	12,551
11635	Four Lakes Tap	120,862	25,734
11786	Franklin-Badger Canyon	2,774,345	55,946
11641	Franklin-Hedges	449,689	20,493
11638	Franklin-Riverview	1,366,158	21,126
11565	Franklin-Walla Walla	416,593	119,652
11739	Franz Holmes Tap	251,506	3,869
50084	Garrison-Taft	183,067,618	1,600,498
16101	Goshen-Drummond	3,544,102	242,200
11531	Grand Coulee-Bell #1	1,402,950	356,014
11532	Grand Coulee-Bell #2	1,002,261	356,145
23035	Grand Coulee-Bell #3,4	4,099,304	275,592
23036	Grand Coulee-Bell #5	3,429,590	276,824
11539	Grand Coulee-Brewster	862,220	107,434
50033	Grand Coulee-Chief Joseph	4,303,558	159,824
23037	Grand Coulee-Chief Joseph #1,2	2,213,285	137,728
50055	Grand Coulee-Hanford #1	12,381,423	482,183
11735	Grand Coulee-Okanogan #2	919,046	176,662
50032	Grand Coulee-Raver	106,928,256	1,749,526
11540	Grandview-Richland	1,151,727	124,415
11538	Green Bluff Tap	248,141	31,950
11634	Green Peter-Lebanon	291,001	15,659

TABLE 1.1
TRANSMISSION LINE INVESTMENT ($)
As of September 30, 1998

ID	NAME	INVESTMENT	O&M AVERAGE
11740	Hanford Tap #2	88,049	67
11558	Hanford-Benton	190,385	36,422
50041	Hanford-John Day	9,196,954	488,409
50052	Hanford-Ostrander	30,731,875	905,317
11658	Hatton Tap	909,226	51,103
50036	Hatwai-Dworshak	7,111,161	143,204
13851	Hay Mill Tap	750,110	30,255
11656	Hedges Tap #2	108,672	1,435
13853	Heyburn-Haymill	1,892,620	15,048
11671	Highlands-Franklin	1,106,109	32,626
11542	Holcomb-Naselle	1,001,997	91,678
11697	Horn Rapids Tap	30,591	435
23139	Hot Springs-Anaconda	1,296,809	196,357
23039	Hot Springs-Anaconda	5,293,472	291,505
23040	Hungry Horse-Hot Springs	4,891,722	270,798
11543	Hungry Horse-Kalispell	549,509	63,322
11639	Ice Harbor-Franklin #1&2	1,193,503	24,936
50040	John Day-Big Eddy #2	7,746,883	100,223
50042	John Day-Marion	18,206,252	640,701
11546	Kalispell-Kerr	4,765,145	179,922
11645	Keeler Tap #1	125,258	17,475
11646	Keeler Tap #2	1,238,566	78,365
50045	Keeler-Allston	6,156,941	212,646
11513	Keeler-Forest Grove #1	554,761	68,182
11644	Keeler-Forest Grove #2	388,685	45,687
11748	Keeler-Pennwalt	542,251	38,471
23183	Keller Tap	5,380,035	78,365
23082	Kelso-Chehalis	1,343,626	116,889
23046	Kelso-Longview Loop	2,383,495	24,370
11548	Kennewick Tap	28,154	2,347
11655	Kitsap-Fairmount-Bangor	681,129	46,676
23047	Lane-Wendson	3,199,919	178,357
11743	Lapine-Fort Rock	7,341,821	160,064
11686	Latham Tap	1,061,302	6,858
11746	Libby (PPL)-Libby	606,430	40,816
23043	Libby Tap	6,275,469	169,257
50029	Little Goose-Lower Granite #1	8,058,308	164,695
50038	Little Goose-Lower Granite #2	5,636,629	164,795
23105	Longview-Allston #3	908,438	16,213
11575	Longview-Astoria	4,848,486	10,853
23045	Longview-Chehalis #3	1,884,703	116,323
11549	Longview-Cowlitz	319,942	15,520
23146	Longview-Driscoll	4,640,778	237,606
11648	Lookout Point-Alvey #1	556,268	68,856
11649	Lookout Point-Alvey #2	627,128	68,552
23148	Lost River-Round Valley	6,800,051	231,217
50034	Lower Granite-Hatwai	6,795,846	165,046
50062	Lower Monumental-Ashe	12,330,986	198,738
50047	Lower Monumental-Hanford	4,993,971	268,582
50046	Lower Monumental-John Day	12,740,014	693,173

TABLE 1.1
TRANSMISSION LINE INVESTMENT ($)
As of September 30, 1998

ID	NAME	INVESTMENT	O&M AVERAGE
50091	Lower Monumental-Little Goose #	2,969,524	120,709
50053	Lower Monumental-Little Goose #	3,422,616	122,115
11745	Lynch Creek Tap	831,353	14,084
11747	Macks Inn-Madison	2,925,069	74,421
23156	Malin-Warner	9,612,826	294,248
11550	Mapleton-Reedsport	1,599,342	110,197
50051	Marion-Alvey	8,995,230	324,016
50050	Marion-Lane	10,599,393	346,160
50056	Marion-Santiam	1,391,773	12,252
28758	Maupin-Detroit #1	6,993,201	23,704
23059	Maupin-Redmond	2,106,345	226,486
6953	Maupin-Tygh Valley	168,190	11,444
11741	McCullough Tap	301,558	7,258
50059	McNary Loop	930,387	8,536
11787	McNary-Badger Canyon	326,442	114,011
23055	McNary-Big Eddy	4,214,255	300,861
23056	McNary-Franklin #2	3,496,810	108,206
28751	McNary-Maupin #1	1,620,006	55,298
28752	McNary-Maupin #2	3,600,796	67,616
11552	McNary-Richland	662,104	24,536
34551	McNary-Ross	12,282,255	581,513
23057	McNary-Roundup	1,160,797	166,882
28730	McNary-Santiam #,2	1,405,363	667,273
11553	Midway-Benton	854,773	96,614
23088	Midway-Benton #2	1,962,658	95,715
23054	Midway-Eagle Lake	1,976,586	64,287
23050	Midway-Grand Coulee #1	1,997,913	341,344
23052	Midway-Grand Coulee #3	3,359,322	334,619
11554	Midway-Grandview	535,664	108,979
11551	Midway-Moxee	469,140	147,711
1351	Midway-Riverland	21,591	8,310
23053	Midway-Vantage	1,379,184	170,822
6951	Milton Tap	194,820	19,261
13850	Minidoka P.H.-Unity	2,241,438	82,930
3351	Minidoka Project	1,148,619	182,992
50075	Monroe-Custer #1	11,138,786	435,988
50048	Monroe-Custer #2	23,129,345	430,867
34550	Monroe-Sammamish	1,909,665	64,087
23058	Monroe-Snohomish #1,2	287,908	73,842
50054	Monroe-Snoking	3,991,411	64,472
23044	Mossy Rock-Chehalis	1,282,397	91,896
11595	Moxee-Ellensburg	1,425,801	102,507
11557	Moxee-Roza	61,083	24,169
23154	Mt. Vernon Tap	83,778	16,313
11654	Naselle-Long Beach #1	2,365,719	68,987
11657	Naselle-Long Beach #2	4,431,522	75,247
23163	Newberg-Carlton-Sherwood	1,037,987	29,763
11559	Newport-Sandpoint	1,356,779	81,632
23060	No. Bonneville-Midway #1	7,161,397	448,411
23061	No. Bonneville-Midway #2	670,849	341,177

TABLE 1.1
TRANSMISSION LINE INVESTMENT ($)
As of September 30, 1998

ID	NAME	INVESTMENT	O&M AVERAGE
23062	No. Bonneville-Ross #1	867,586	120,917
23063	No. Bonneville-Ross #2	500,073	119,818
23077	No. Bonneville-Troutdale #1,2	6,074,678	184,472
23160	Noxon-Conkelley	6,492,729	341,177
11647	Oakridge-Lookout Point	950,952	82,564
11661	Olympia-Aberdeen	1,442,992	155,607
23068	Olympia-Aberdeen #2	4,174,602	70,413
23168	Olympia-Aberdeen #3	6,952,225	155,874
11560	Olympia-Cosmopolis	1,071,934	137,031
23155	Olympia-Fairmount #1,4	10,179,122	534,971
28755	Olympia-Grand Coulee	15,590,025	756,929
23065	Olympia-Kitsap #3	3,456,121	172,639
11563	Olympia-Shelton #1	1,100,076	64,953
11564	Olympia-Shelton #2	651,255	80,524
23066	Olympia-White River-Covington	8,736,791	171,187
11561	Oregon City-Chemawa #1	516,434	109,371
11562	Oregon City-Chemawa #2	1,592,973	109,110
50061	Oregon City-Marion	5,008,103	197,734
23067	Oregon Cty-Chemawa #3	1,299,640	83,896
50063	Ostrander-McLoughlin	1,506,011	44,287
50060	Ostrander-Troutdale	7,028,222	119,454
11663	Palisades-Goshen #1	1,809,340	172,153
11668	Palisades-Goshen #2	4,695,993	195,924
50065	Paul-Allston #1	7,714,307	240,916
50064	Paul-Allston #2	10,791,102	240,464
50066	Paul-Olympia	4,202,036	101,629
23165	Ponderosa-Pilot Butte	5,434,819	94,982
11662	Port Angeles-Sappho	2,214,325	182,521
11664	Port Orford-Gold Beach	1,169,353	91,154
11764	Priest River Tap	368,281	13,389
11665	Prosser Tap	121,721	27,560
11766	Rainbow Valley Tap	4,696,414	14,302
11767	Ralston Tap to WWP	505,085	25,821
50073	Raver-Covington #1	2,767,047	51,869
50069	Raver-Covington #2	1,282,810	51,618
50070	Raver-Monroe	19,385,941	420,874
50071	Raver-Paul	10,461,516	348,018
11670	Raymond-Cosmopolis	529,537	61,320
6972	Raymond-Tide Flats	87,117	9,988
11674	Raymond-Willapa River	369,920	19,086
11669	Redmond-Burns-Harney	2,297,412	417,483
23071	Redmond-Yamsey	3,102,877	304,723
11597	Reedsport-Fairview	2,050,304	144,854
23080	Reston-Fairview #1	2,301,626	98,345
23087	Reston-Fairview #2	1,868,013	98,112
28771	Rocky Reach-Columbia	1,298,720	69,714
34566	Rocky Reach-Maple Valley	13,543,524	429,368
13801	Roe's Corner Tap	813,399	5,660
11505	Ross-Alcoa #1,2	1,186,991	3,129
23171	Ross-Alcoa #3,4	1,168,303	14,282

TABLE 1.1
TRANSMISSION LINE INVESTMENT ($)
As of September 30, 1998

ID	NAME	INVESTMENT	O&M AVERAGE
11506	Ross-Alcoa #3,4	134,004	27,699
11582	Ross-Carborundum	102,801	15,522
23081	Ross-Kelso	1,444,732	137,197
23072	Ross-St. Johns #1,2	1,698,425	4,361
11584	Ross-Vancouver Shipyard	464,647	15,714
23070	Roundup-La Grande	1,482,942	24,170
50079	Sacajawea Tap	2,322,825	30,478
11778	Sacheen-Albeni Falls	2,853,080	59,752
11578	Salem-Albany #1	1,700,114	103,174
11579	Salem-Albany #2	690,745	121,064
11574	Salem-Alumina Tap	245,067	14,345
11583	Salem-Tillamook	3,051,152	217,564
34577	Sammamish-Maple Valley	2,004,400	80,367
2376	San Juan Is. Service	3,853,946	24,536
23196	Sandpoint-Bonners Ferry	13,610,323	219,728
11596	Sandpoint-Bonners Ferry	4,941,343	146,581
23083	Santiam-Albany	1,217,900	95,016
23049	Santiam-Alvey #1	2,469,662	189,865
28777	Santiam-Alvey #2	3,345,698	171,354
23084	Santiam-Chemawa	1,896,210	81,466
23175	Santiam-Toledo	4,805,643	160,468
50077	Satsop-Paul	31,669,280	102,984
11773	Schrag Tap	808,662	36,788
11681	Scooteney-Eagle Lake	220,030	30,529
23177	Sedro Wooley Tap	0	1,739
11569	Shelton-Fairmount #1	2,487,364	200,552
11679	Shelton-Fairmount #2	2,192,844	200,319
23093	Shelton-Kitsap #4	4,377,482	112,694
11508	Shelton-Kitsap-Bremerton	1,109,388	131,671
50072	Sickler-Raver #1	17,108,619	584,967
23174	Sifton Loop	542,086	4,332
11683	Sifton-Fishers Road	77,324	7,357
6915	Silver Creek-Leonard Road	46,692	21,831
6952	Silver Creek-Morton	461,463	51,831
50074	Slatt-Marion	129,381,246	1,512,376
23097	Snohomish-Beverly Park	4,764,200	32,060
11593	Snohomish-Beverly Park #1	54,434	17,917
11594	Snohomish-Beverly Park #2	207,521	19,658
11677	Snohomish-Beverly Park #3,4	630,169	31,927
23076	Snohomish-Bothel #1	384,514	4,985
23176	Snohomish-Bothel #2	338,120	5,417
23075	Snohomish-Murray-Bellingham	1,550,796	226,386
23078	South Tacoma Tap #1	328,129	20,808
23178	South Tacoma Tap #2	336,470	20,974
11675	Spearfish Tap	477,785	10,720
11590	Spirit Lake-Athol	173,658	17,412
23079	St. Johns-Keeler	1,028,769	9,988
11774	St.Johns-Longview	1,548,948	144,621
11576	St.Johns-Oregon City #1,2	724,829	75,040
11577	St.Johns-Oregon City #2	286,264	93,218

TABLE 1.1
TRANSMISSION LINE INVESTMENT ($)
As of September 30, 1998

ID	NAME	INVESTMENT	O&M AVERAGE
34575	Sultan-Snohomish	1,428,191	78,569
11775	Sun Harbor Tap	339,613	8,889
11770	Swan Valley-Teton	2,990,115	130,548
28778	Tacoma-Covington 3 4	2,713,366	298,364
50076	Tacoma-Raver	9,244,449	167,054
50083	Taft-Bell	87,881,132	484,242
11685	Tahkenitch-Gardiner	126,478	7,129
11776	Targhee Tap	1,683,772	47,556
11779	Taylor Flats Tap	773,736	37,352
11570	The Dalles-Goldendale	1,128,504	88,657
11676	Timber Tap	475,448	37,320
23085	Toledo-Wendson	5,823,554	165,262
11573	Trentwood-Valley Way	124,862	9,056
23180	Trojan-Allston #1,2	3,621,526	31,528
11777	Underwood Tap	325,782	66,518
13875	Unity-Heyburn	632,907	28,236
13876	Unity-West Burley	376,476	24,003
50080	Vantage-Raver #1	15,565,908	562,974
11682	Vera Tap	224,129	12,651
11585	Wagner Lake Tap	548,576	35,456
11591	Walla Walla-Lewiston	1,574,364	349,718
11690	Walla Walla-Milton Freewater	1,520,492	28,332
6991	Walla Walla-Pendleton	557,363	137,886
11694	Walnut City Tap	206,494	24,474
23005	Wendson-Tahkenitch	1,553,152	218,337
11693	Westport-Cathlamet	366,600	1,498
11695	White Bluffs Loop	683,182	24,170
23096	White Bluffs-451B	1,025,555	26,908
11696	White Bluffs-Horn Rapids	1,220,856	31,994
11691	Winthrop Tap	834,611	46,295
	Total Network (see adj below)	1,676,381,224	53,215,272
	Transfer from Network to Southern AC Intertie 1/		
	Slatt-Marion	-21,563,541	-252,063
	Marion-Alvey	-4,497,615	-162,008
	Total Transfer	-26,061,156	-414,071
	Total Network w transfer	**1,650,320,068**	**52,801,201**
UTILITY DELIVERY SEGMENT			
1201	Albany Bureau of Mines	7,671	1,092
1239	Hood River Electric Co-op	23,812	3,063
	Total Utility Delivery	**31,483**	**4,155**
	TOTAL - ALL SEGMENTS	**1,962,176,821**	**58,330,370**

1/ Facilities transferred from the Network to the Southern AC Intertie based on NFP contract
50% of Buckley-Marion line which is 100 miles of 150 miles of the Slatt-Marion line
50% of Marion-Alvey line

TABLE 1.2
MULTI-SEGMENTED LINES - As of 9/30/1998

TRANSMISSION LINE INVESTMENT

		Miles	Per cent	Cost($)	Segment
50012	Buckley-Summer Lake		57	28,883,490	IS
50012	Buckley-Summer Lake		43	21,789,300	N
50012	Buckley-Summer Lake		100	50,672,790	Z
11528	Cougar-Wilakenzie	2.10	5	150,651	GI
11528	Cougar-Wilakenzie	43.90	95	3,149,334	N
11528	Cougar-Wilakenzie	46.00		3,299,985	Z
11634	Green Peter-Lebanon	6.31	35	390,401	GI
11634	Green Peter-Lebanon	11.78	65	728,832	N
11634	Green Peter-Lebanon	18.09		1,119,233	Z

TRANSMISSION LINE O&M (3 year average)

		Miles	Per cent	Cost($)	Segment
50012	Buckley-Summer Lake		57	295,852	IS
50012	Buckley-Summer Lake		43	223,186	N
50012	Buckley-Summer Lake			519,038	Z
11528	Cougar-Wilakenzie	2.10	5	3,353	GI
11528	Cougar-Wilakenzie	43.90	95	70,104	N
11528	Cougar-Wilakenzie	46.00		73,457	Z
11634	Green Peter-Lebanon	6.31	35	21,008	GI
11634	Green Peter-Lebanon	11.78	65	39,218	N
11634	Green Peter-Lebanon	18.09		60,226	Z

Note:
Z is total for all segments.
Line costs are allocated to each segment based on line miles in that segment.
Buckley-Summer Lake allocation based on percent use.

CHAPTER 2

SUBSTATION INVESTMENT BY SEGMENT

As of September 30, 1998

Table 2.1 shows the cost of each TBL substation by segment as of September 30, 1998. The cost data are from the Plant Investment Records. The three year average O&M, as determined in chapter 5, is also shown in Table 2.1 for convenience.

A large number of major substations, utilized by more than a single type of service, are placed in more than one segment. They have been multisegmented as described in Chapter 3. When a substation is multisegmented, each segment includes only the costs associated with the substation facilities that provide service for the specified segment.

The Network substation investment that was transferred to the Southern Intertie upon commercial operation of the second 800 MW upgrade to the AC Intertie system are listed in footnote 1 at the end of table 2.1. The adjustment to the segment investment is shown at the end of the Network and Southern Intertie segments in the table.

TABLE 2.1
SUBSTATION INVESTMENT ($) as of 9/30/98

ID	NAME of SUB	SUB INVEST 98	AVG O&M COSTS
DSI Delivery			
13305	Addy	2,697,041	53,603
10605	Alcoa	6,338,949	377,748
13271	Bell	14,545,296	420,350
41517	Conkelley	5,539,872	384,612
21031	Hanna	2,360,198	79,946
12040	Harvalum	4,161,516	100,847
23331	Harvey	1,666,706	43,110
13735	Intalco	7,598,258	264,461
10841	Longview	20,298,977	435,926
22659	Penn Walt	733,542	170,139
12775	Tacoma	3,890,334	79,124
13275	Trentwood	3,738,726	105,742
22675	Troutdale	10,652,866	179,248
10485	Valhalla	3,932,201	174,360
	Total DSI Delivery	**88,154,482**	**2,869,217**
Generation Integration			
30905	Albeni Falls	146,070	1,519
10311	Ashe	5,541,912	42,724
23311	Big Eddy	2,959,271	47,252
10917	Chief Joseph	4,425,917	232,423
22017	Cougar	264,696	319
22421	Detroit	875,267	5,989
31820	Dworshak	2,767,900	34,303
22232	Foster	60,774	846
11131	Franklin	1,122,799	41,417
22230	Green Peter	72,986	9,145
22030	Hills Creek	175,800	9,145
22836	John Day	5,887,455	51,688
42742	Libby	863,037	20,164
13841	Little Goose	3,136,247	25,286
22041	Lookout Point	270,158	5,314
11240	Lower Granite	2,974,935	20,005
13641	Lower Monumental	4,708,680	29,641
23046	McNary	2,488,121	86,449
32046	Mountain Home	345,101	42,465
13051	North Bonneville	2,843,582	42,929
22055	Oakridge	158,029	7,132
13690	Sacajewea	219,760	2,388
22271	Santiam	505,827	11,150
10391	WPPSS WNP #2	547,078	7,192
	Total Generation Integr	**43,361,401**	**776,887**
Eastern Intertie			
43925	Garrison	23,866,195	215,064
Southern Intertie			
22006	Alvey	9,536,686	520,036
23310	Bakeoven	840,993	3,428

TABLE 2.1
SUBSTATION INVESTMENT ($) as of 9/30/98

ID	NAME of SUB	SUB INVEST 98	AVG O&M COSTS
22810	Buckley	5,079,067	43,759
21813	Captain Jack	21,884,789	178,695
10917	Chief Joseph	961,240	50,479
21015	Dixonville	10,448,678	0
21930	Fort Rock Caps.	16,126,153	63,238
21630	Grizzly	28,783,401	258,934
22837	John Day	5,887,455	51,688
21845	Malin	14,035,044	331,205
21542	Meridian	10,030,520	0
20970	Sand Springs Caps.	16,937,001	77,461
21960	Summer Lake	3,266,365	8,015
21972	Sycan Cap. Stn.	14,647,764	77,046
	Network to Intertie 1/	2,232,500	38,522
	Total AC Intertie	**160,697,655**	**1,702,506**
23311	Big Eddy	48,401,498	772,854
23316	Celilo	258,510,826	7,695,192
22836	John Day	2,943,727	25,844
	Total DC Intertie	**309,856,051**	**8,493,890**
Total Southern Intertie		**470,553,706**	**10,196,396**
Network			
11405	Aberdeen	5,202,116	143,064
20205	Adair	318,543	44,980
13305	Addy	6,001,481	176,517
22205	Albany	9,017,624	171,553
30905	Albeni Falls	1,168,557	12,758
10605	Alcoa	2,781,718	559,877
20505	Allston	34,616,329	404,821
22005	Alvey	17,130,092	275,394
41205	Anaconda	2,854,165	177,400
10307	Angus	7,523	53,279
10311	Ashe	19,767,421	186,563
10317	Badger Canyon	1,956,475	38,335
20612	Bandon	2,467,368	92,660
12311	Belfair	2,857	20,633
13271	Bell	27,363,003	1,138,521
13712	Bellingham	6,553,169	243,699
10315	Benton	7,540,971	119,552
23311	Big Eddy	9,199,521	934,712
22510	Boardman	2,335,069	46,764
31111	Bonners Ferry	972,681	45,570
12611	Boundary	4,250,305	82,852
31611	Bridge	1,074,381	36,676
22710	Brush College	37,933	22,069
22810	Buckley	3,831,576	33,012
31651	Burley	413,179	88,338
52520	Canby	1,564,861	18,410
10816	Cardwell	1,061,706	48,307
23615	Carlton	4,156,980	73,337

TABLE 2.1
SUBSTATION INVESTMENT ($) as of 9/30/98

ID	NAME of SUB	SUB INVEST 98	AVG O&M COSTS
52525	Cedarville Junction	892,812	60,662
12114	Centralia	1,315,030	15,074
12115	Chehalis	14,646,425	465,052
22415	Chemawa	8,814,506	306,006
23315	Chenoweth	2,647,703	56,944
10917	Chief Joseph	15,586,129	994,811
20416	Clatsop	1,957,358	130,833
10915	Columbia	19,285,736	428,343
41516	Columbia Falls	9,246,706	96,031
13316	Colville	1,763,366	14,969
41517	Conkelley	5,035,305	737,054
11415	Cosmopolis	1,611,136	39,434
11715	Covington	18,423,243	294,039
10815	Cowlitz	466,266	131,556
12615	Cusick	1,697,275	8,748
13715	Custer	32,183,471	431,886
22821	Demoss	1,532,238	29,046
21025	Drain	2,624,036	68,004
20417	Driscoll	808,382	20,273
32220	Drummond	3,249,372	138,407
31820	Dworshak	4,288,576	53,149
12421	East Omak	3,577,625	100,485
11778	Echo Lake	21,537,809	227,244
11925	Ellensburg	1,400,109	69,309
11427	Elma	710,385	49,121
22025	Eugene	4,034,606	87,504
11631	Fairmount	10,813,775	141,583
20632	Fairview	7,895,480	282,739
12931	Fidalgo	2,148,237	42,377
41530	Flathead	1,352,990	45,532
22032	Florence	500,238	30,628
23432	Forest Grove	1,126,522	35,408
23531	Fossil	1,197,066	17,779
10916	Foster Creek	551,887	31,375
11131	Franklin	6,398,830	236,037
23030	Freewater	433,635	12,500
43925	Garrison	34,566,604	311,488
20831	Gold Beach	141,371	639
12034	Goldendale	1,090,329	66,744
12433	Goose Lake	11,518	20,106
30631	Goshen	3,859,637	57,492
13931	Grandview	2,374,105	62,617
10331	Hanford	13,400,321	146,153
10520	Happy Valley	3,051,513	29,013
21330	Harney	2,138,033	46,140
23031	Hat Rock	1,686,938	141,663
33530	Hatwai	8,051,218	169,288
13230	Hayford	17,640	13,165
33432	Heyburn	1,783,289	34,325
10332	Highlands	43,307	56,087

TABLE 2.1
SUBSTATION INVESTMENT ($) as of 9/30/98

ID	NAME of SUB	SUB INVEST 98	AVG O&M COSTS
12531	Holcomb	511,534	4,294
21431	Hood River	378,474	20,442
10333	Horse Heaven	2,784,589	62,169
44531	Hot Springs	10,189,870	227,252
13735	Intalco	767,230	26,704
22836	John Day	10,303,046	90,454
41535	Kalispell	2,261,844	50,330
23435	Keeler	52,526,934	699,788
10335	Kennewick	51,043	54,217
42435	Kerr	427,299	2,761
11835	Kitsap	8,479,932	331,585
23141	La Grande	4,303,303	57,048
22043	Lane	7,679,405	407,298
20941	Lapine	9,878,324	104,604
22241	Lebanon	908,838	25,296
10341	Ledbeder	63,170	33,924
11140	Levey	388,991	9,464
10835	Lexington	3,620,946	110,765
42742	Libby	4,430,187	103,507
13841	Little Goose	4,704,370	37,929
12441	Lone Pine	4,111	6,795
10841	Longview	16,511,887	354,598
21041	Lookingglass	77,218	4,796
22041	Lookout Point	1,080,633	21,258
12840	Lopez Island	2,202,018	56,344
31240	Lost River	1,853,400	22,202
11240	Lower Granite	2,974,935	20,005
13641	Lower Monumental	11,411,638	71,836
41650	Madison	1,347,811	21,270
21845	Malin	766,787	18,095
11746	Maple Valley	60,519,874	668,857
22445	Marion	19,359,465	142,553
22044	Martin Creek	3,123,430	60,592
12346	Mason	1,428	47,119
23345	Maupin	1,382,835	23,486
20361	McLoughlin	2,452,926	111,771
23646	McMinnville	1,119,869	57,943
23046	McNary	23,492,174	816,230
12645	Metaline Falls	1,091	40,957
10345	Midway	10,868,318	411,052
13145	Monroe	25,080,141	318,293
12141	Morton	4,854	27,625
13945	Moxee	1,466,073	50,461
13146	Murray	7,320,643	457,732
12552	Naselle	2,946,364	66,531
12451	Nespelem	1,383	32,952
20650	No. Brooking	753,976	1,186
12036	No. John Day Caps.	68,137	9,429
13051	North Bonneville	2,843,582	42,929
13455	Olympia	26,842,876	864,972

TABLE 2.1
SUBSTATION INVESTMENT ($) as of 9/30/98

ID	NAME of SUB	SUB INVEST 98	AVG O&M COSTS
23455	Oregon City	1,868,253	120,588
20356	Ostrander	18,735,826	298,994
43960	Ovando	1,680,939	58,134
22062	Parker	11,743	13,325
12160	Paul C.W.	11,554,530	125,546
12161	Pe Eell	16,481	19,947
20355	Pearl 500 kV	16,849,008	285,131
23061	Pendleton	342,003	11,526
11262	Pomeroy	473,582	32,700
20760	Ponderosa	11,324,013	194,998
10561	Port Angeles	11,840,183	446,866
11363	Potholes	3,673,485	187,499
11766	Raver	32,432,196	520,036
12565	Raymond	1,605,128	61,658
10367	Reata	84,656	16,473
20965	Redmond	8,637,925	188,117
21065	Reedsport	756,797	22,369
21066	Reston	282,701	2,539
10365	Richland	2,220,130	52,620
10967	Rocky Reach	1,906,863	317,666
20865	Rogue	6,695,862	86,027
10651	Ross	23,489,023	1,218,205
31965	Round Valley	1,277,696	19,719
23065	Roundup	3,006,715	139,078
13690	Sacajewea	5,287,131	57,444
12690	Sacheen	2,135,685	74,955
22771	Salem	6,243,858	130,335
30971	Sandpoint	483,117	22,213
22271	Santiam	12,319,415	271,570
10570	Sappho	1,532,353	187,911
11470	Satsop	15,921,250	187,232
11965	Schultz	35,148,548	30,361
12371	Shelton	12,017,487	124,977
10970	Sickler	5,328,800	150,431
10670	Sifton	5,779,194	178,147
44771	Silver Bow	2,282,085	113,452
12170	Silver Creek	2,084,605	57,950
21120	Slatt	20,275,580	99,323
13171	Snohomish	23,582,742	1,334,255
13173	Snoking	13,119,167	319,131
11472	South Elma	223,991	2,990
12772	South Tacoma	3,589,067	639
31973	Spar Canyon	529,779	12,744
12071	Spearfish	193,892	21,801
13274	Springhill	6,547	22,931
22671	St. Johns	5,327,983	355,502
10371	Stevens Drive	85,524	162,880
21960	Summer Lake	2,184,977	11,983
31071	Swan Valley	2,906,837	83,407
12775	Tacoma	10,412,285	211,770

TABLE 2.1
SUBSTATION INVESTMENT ($) as of 9/30/98

ID	NAME of SUB	SUB INVEST 98	AVG O&M COSTS
43175	Taft	32,118,443	226,850
21075	Tahkenitch	4,392,863	95,269
34175	Targhee	485,328	43,981
62075	Teton	2,360,080	19,048
10375	Thayer Drive	63,615	151,443
23375	The Dalles	679,703	34,593
22976	Tillamook	5,954,946	102,995
61230	Tincup-Lower Valley	529,522	7,683
22175	Toledo	11,269,993	178,897
42776	Trego	240,754	10,933
13275	Trentwood	2,969,231	83,978
22675	Troutdale	18,931,118	318,541
12698	USK	189,542	18,424
10485	Valhalla	1,455,373	64,534
11385	Vantage	16,242,221	382,677
13691	Walla Walla	3,085,105	123,644
52590	Warner	2,469,403	52,622
20494	Wauna	1,289,556	90,869
22090	Wendson	5,770,054	104,016
31692	West Burley	186,096	47,055
31090	Westside	2,416,963	30,099
10390	White Bluffs	3,691,173	110,966
20292	Wren	1,362,630	19,654
32918	Brinckens Corner	796,785	13,804
	34.5 kV Facilities in Network		
22005	Alvey	878,393	13,433
31611	Bridge	579,597	13,586
41516	Columbia Falls	726,973	6,505
41516	Columbia Falls	726,973	6,505
31626	East Hills	495,594	61,754
22025	Eugene	246,896	5,355
41530	Flathead	1,022,711	34,418
13931	Grandview	288,377	7,606
41535	Kalispell	525,188	11,686
41535	Kalispell	465,441	10,357
22045	Mapleton	344,137	42,636
30971	Potlach	649,431	38,777
11171	Scooteney	526,455	99,234
13905	Alfalfa	823,855	25,540
13816	Clarkston	392,126	19,947
12215	Creston	463,845	23,774
22022	Dorena	248,316	20,647
31640	Idahome	246,439	19,787
12235	Irby	337,307	13,165
22035	Junction City	336,840	46,977
11040	Keller	537,909	14,312
12255	Odessa	523,784	59,256
30910	Priest River	707,990	20,647
11065	Republic	642,524	33,272
23475	Timber	539,194	19,787

TABLE 2.1
SUBSTATION INVESTMENT ($) as of 9/30/98

ID	NAME of SUB	SUB INVEST 98	AVG O&M COSTS
12290	Wagner Lake	481,180	20,647
20592	Warren	643,041	22,053
	Subtotal	14,400,516	711,662
	IOU Delivery in Network		
22205	Albany	753,576	13,511
20612	Bandon	421,023	12,726
13221	Deer Park	370,084	19,246
10165	Ritzville	191,533	9,082
	Subtotal	1,736,217	54,565
	Network to Intertie 1/	(2,232,500)	(38,522)
	Total Network	**1,292,779,262**	**31,410,589**
Utility Delivery			
22672	Acton	193,290	23,342
22205	Albany	753,576	13,511
22003	Alderwood	653,125	14,645
32805	Athol	780,463	33,828
20612	Bandon	465,436	14,069
11111	Baxter	177,919	22,120
12310	Bayshore	315,689	19,787
22911	Beaver	214,526	48,611
10316	Benton City	386,960	39,239
13210	Bigelow	396,982	20,266
10309	Black Rock	242,116	3,753
22010	Blue River	296,601	20,791
31111	Bonners Ferry	1,032,347	24,573
13611	Burbank	461,116	27,268
22113	Burnt Woods	321,464	19,787
10613	Camas	428,866	41,242
13072	Cape Horn	406,082	22,849
10621	Carborundum	850,420	40,561
13070	Carson	403,853	20,615
21415	Cascade Locks	137,334	19,360
13516	Cathlamet	336,600	22,849
13817	Chambers	174,498	22,453
10615	Chelatchie	267,606	18,959
10817	Chemical	938,422	70,418
13215	Cheney	759,638	60,981
22063	Cheshire	1,541,496	16,100
20516	Clatskanie	81,173	15,138
43220	Clinton	98,031	13,165
11115	Connell	611,356	23,684
44115	Corvallis	551,776	10,987
80210	Curlew	582,237	14,486
52530	Davis Creek	126,405	13,166
10720	Dayton	387,531	10,987
13221	Deer Park	669,697	34,826
10111	Delight	252,628	13,165
22021	Dexter	357,290	22,102
21025	Drain	191,215	4,956

TABLE 2.1
SUBSTATION INVESTMENT ($) as of 9/30/98

ID	NAME of SUB	SUB INVEST 98	AVG O&M COSTS
11620	Duckabush	321,401	20,806
11125	Eagle Lake	79,443	27,324
32529	East Grangeville	608,289	14,486
31626	East Hills	210,901	18,435
42425	Elmo	290,557	21,961
11127	Eltopia	832,026	14,486
22034	Fern Ridge	153,787	19,947
23430	Filbert	637,021	14,486
12730	Fircrest	1,080,988	23,790
10630	Fishers Road	485,000	39,604
22032	Florence	355,439	21,763
23432	Forest Grove	443,597	13,943
13231	Four Lakes	982,537	49,157
11131	Franklin	1,150,298	42,432
23030	Freewater	693,317	19,986
43230	Frenchtown	533,933	17,103
22234	Froman	186,437	13,165
12243	Gaffney	57,335	13,165
21030	Gardiner	760,339	65,299
22931	Garibaldi	665,029	22,647
20815	Geisel Monument	77,887	13,165
11133	Glade	519,609	25,581
13931	Grandview	182,540	4,814
44131	Grantsdale	67,521	9,667
13520	Grays River	596,737	16,178
13232	Green Bluff	138,873	22,134
21432	Guthrie	932,137	18,411
20931	Hampton	144,637	19,947
13234	Hangman	583,070	20,474
22231	Harrisburg	224,002	20,633
41533	Haskill	935,830	14,285
10130	Hatton	691,121	14,312
20631	Hauser	534,246	146,282
33434	Hay Mill	1,153,328	29,609
22930	Hebo	1,061,185	36,265
22029	Hideaway	2,004,402	19,196
21431	Hood River	338,313	18,273
43248	Huson	111,389	13,165
22535	Ione	787,483	25,419
13840	Jerita	35,978	29,000
12335	Kamilche	543,988	20,106
31151	Laclede	69,837	13,165
20841	Langlois	236,823	26,281
12242	Larene	55,491	13,165
12840	Lopez Island	1,835,841	46,975
12735	Lynch Creek	988,736	25,421
13933	Mabton	881,574	14,463
22045	Mapleton	311,877	20,270
11245	Mayview	54,893	9,667
23646	McMinnville	537,242	27,798

TABLE 2.1
SUBSTATION INVESTMENT ($) as of 9/30/98

ID	NAME of SUB	SUB INVEST 98	AVG O&M COSTS
11145	Mesa	296,208	20,106
13246	Mica	73,573	13,165
10645	Mill Plain	559,461	22,905
23045	Milton	2,562,506	28,314
33440	Minico	776,451	14,645
33445	Minidoka	126,927	22,138
22945	Mohler	643,221	20,106
22746	Monmouth	607,569	46,489
21550	Mountain Avenue	3,289,181	29,679
31145	Moyie	119,073	13,165
12748	Narrows.	1,370,928	17,436
20495	Necanium	115,994	13,165
31650	Newcomb	561,618	16,966
30952	Newport	1,016,503	27,706
31150	North Bench	552,599	13,165
13051	North Bonneville	253,033	3,820
22216	North Butte	168,857	12,746
20652	Norway	330,078	20,120
22055	Oakridge	623,665	28,149
21461	Parkdale	1,290,726	18,953
23061	Pendleton	21,656	730
23360	Pine Hollow	197,135	18,635
11262	Pomeroy	169,559	11,708
20861	Port Orford	470,338	25,098
30971	Potlach	89,848	4,713
10361	Prosser	893,919	46,034
31668	Raft	553,034	14,979
22065	Rainbow Valley	265,682	19,787
10164	Ralston	541,524	14,486
13968	Rattlesnake	76,322	13,165
21065	Reedsport	1,022,845	30,232
11166	Ringold	307,594	25,581
13865	Riparia	84,869	18,635
10165	Ritzville	225,771	10,705
33431	Riverton	544,450	27,651
11165	Riverview	566,169	39,891
33467	Roes Corner	1,887,120	1,166
12690	Sacheen	202,565	7,109
11134	Sagehill	475,304	19,787
30970	Samuels	127,301	3,293
30971	Sandpoint	89,664	4,123
32870	Scarcello	935,764	19,787
10170	Schrag	547,839	14,312
11171	Scooteney	309,424	36,734
30975	Selle	573,232	17,548
10372	Snipes	442,817	17,548
23071	Stateline	361,501	9,667
12761	Steilacoom	834,145	23,790
13073	Stevenson	370,953	19,947
44171	Stevensville	273,898	20,649

TABLE 2.1
SUBSTATION INVESTMENT ($) as of 9/30/98

ID	NAME of SUB	SUB INVEST 98	AVG O&M COSTS
41572	Stillwater	961,160	19,787
13670	Sun Harbor	993,193	140,835
12765	Surprise Lake	583,428	19,787
31071	Swan Valley	98,936	2,839
43275	Tarkio	322,339	19,787
11175	Taylor Flats	477,206	22,690
23476	Thatcher Junction	252,576	19,787
23375	The Dalles	729,787	37,142
22976	Tillamook	1,070,158	18,509
42776	Trego	657,910	29,875
42775	Troy	856,570	34,309
22475	Tumble Creek	760,590	13,444
20680	Two Mile Road	1,494,453	19,189
23376	Tygh Valley	120,064	18,635
13081	Underwood	414,565	20,647
31680	Unity	1,245,501	21,349
10685	Vancouver Shipyard	711,969	40,966
44185	Victor	104,071	9,667
13691	Walla Walla	706,577	28,318
22091	Walton	570,342	20,633
13990	White Swan	689,804	19,079
23691	Windishar	117,079	13,644
12490	Winthrop	1,407,436	20,283
42795	Yaak	126,489	21,912
	Total Utility Delivery	**88,282,645**	**3,680,283**
	Total all Segments	**2,006,997,690**	**49,148,436**

1/ Facilities transferred from Network to Southern Intertie based on NFP contract.

	Investment	O&M
Buckley Sub - 50% of Buckley-Marion terminal		
Buckley	920,000	16,231
Marion Sub - 50% of Buckley-Marion terminal and 50% of Marion-Alvey terminal		
Marion	1,312,500	22,291
Total to transfer	2,232,500	38,522

CHAPTER 3

MULTISEGMENTED SUBSTATION INVESTMENT

Although most substations are assigned entirely to a single segment, the costs of a substantial number of substations are divided among two or more segments because of the variety of transmission services that they provide. This segmentation is based on an analysis of these services and the costs of the major pieces of equipment at these substations. The list of mulitsegmented stations and the associated total investment is shown in Table 3.1. The investment and O&M costs of the multisegmented stations by segment are shown in Table 3.2. The costs for the multisegmented stations are included in Table 2.1 with single segment stations to determine total segment investment and O&M.

Major substation equipment items are transformers, power circuit breakers (PCBs) and reactive blocks. These items are identified from the multi-page Dispatcher Jurisdiction Diagram (DJD) and other documents such as the System Engineering Data Book, Materials & Procurement records, and construction one-line diagrams. A DJD is used to distinguish different segments and indicates the allocation of a particular substation bay or terminal. The equipment at each station is assigned to a segment based on its function and voltage.

For multisegmented substations, major equipment is identified by its tag number as well as by the specific function served. This includes circuit breakers, transformers, capacitors, and reactors. The actual cost of each item is taken from plant investment. Using the cost studies developed by the cost estimating staff and the itemized plant, the cost of the major equipment is computed. This includes the purchase cost as well as the costs of installation and of the associated subsidiary items, such as control and protection equipment and supporting structures.

The costs not included in the major equipment such as control houses, bus work, fences, gravel, and site development, are called "common facilities". The costs of the common facilities in a substation are prorated among the various segments in the same proportion as the costs of the major equipment. This is done by an analysis that takes into consideration the costs of the major equipment and the total substation cost. The analysis then provides the total cost of each segment for that substation. The procedure is explained and a sample calculation shown in the following section on methodology. The total O&M costs are allocated to each segment in the same way.

TABLE 3.1
MULTI-SEGMENT SUBS - Substation Investment

ID	NAME of SUB	INVESTMENT
13305	Addy	8,698,522
22205	Albany	10,524,777
30905	Albeni Falls	1,314,627
10605	Alcoa	9,120,667
22005	Alvey	27,545,171
10311	Ashe	25,309,333
20612	Bandon	3,353,827
13271	Bell	41,908,299
23311	Big Eddy	60,560,290
31111	Bonners Ferry	2,005,028
31611	Bridge	1,653,978
22810	Buckley	8,910,643
10917	Chief Joseph	20,973,285
41516	Columbia Falls	10,700,652
41517	Conkelley	10,575,177
10815	Cowlitz	1,572,590
13221	Deer Park	1,039,781
21025	Drain	2,815,251
31820	Dworshak	7,056,476
22025	Eugene	4,281,502
41530	Flathead	2,375,701
22032	Florence	855,677
23432	Forest Grove	1,570,119
11131	Franklin	8,671,928
23030	Freewater	1,126,952
43925	Garrison	58,432,799
13931	Grandview	2,845,021
21431	Hood River	716,787
13735	Intalco	8,365,488
22836	John Day	25,021,682
41535	Kalispell	3,252,473
42742	Libby	5,293,224
13841	Little Goose	7,840,617
10841	Longview	36,810,864
22041	Lookout Point	1,350,791
12840	Lopez Island	4,037,859
11240	Lower Granite	5,949,869
13641	Lower Monumental	16,120,318
21845	Malin	14,801,831
23646	McMinnville	1,657,111
23046	McNary	25,980,295
13051	No. Bonneville	5,940,196
22055	Oakridge	781,694
23061	Pendleton	363,659
11262	Pomeroy	643,141
12565	Raymond	2,259,167
21065	Reedsport	1,779,642
10165	Ritzville	417,304
13690	Sacajawea	5,506,891
12690	Sacheen	2,338,250

TABLE 3.1
MULTI-SEGMENT SUBS - Substation Investment

ID	NAME of SUB	INVESTMENT
30971	Sandpoint	572,781
22271	Santiam	12,825,242
22671	St. Johns	5,327,983
21960	Summer Lake	5,451,342
31071	Swan Valley	3,005,773
12775	Tacoma	14,302,619
23375	The Dalles	1,409,490
22976	Tillamook	7,025,104
42776	Trego	898,664
13275	Trentwood	6,707,957
22675	Troutdale	29,583,984
10485	Valhalla	5,387,574
13691	Walla Walla	3,791,682
31626	East Hills	706,495
22045	Mapleton	656,014
12361	Potlatch	739,279
11171	Scooteney	835,879
	SUM	**612,255,088**

Table 3.2
MULTI-SEGMENT SUBS - Investment and O and M by Segment

	Segment One			Segment Two			Segment Three		
NAME	Code	Investment	O&M	Code	Investment	O&M	Code	Investment	O&M
Addy	N	6,001,481	176,517	D	2,697,041	53,603	L	0	0
Albany	N	9,017,624	171,553	P	753,576	13,511	IU	753,576	13,511
Albeni Falls	N	1,168,557	12,758	G	146,070	1,519	L	0	0
Alcoa	N	2,781,718	559,877	D	6,338,949	377,748	L	0	0
Alvey	N	17,130,092	261,961	NP	878,393	13,433	L		
Ashe	N	19,767,421	186,563	G	5,541,912	42,724	L	0	0
Bandon	N	2,467,368	92,660	IU	421,023	12,726	P	465,436	14,069
Bell	N	27,363,003	1,138,521	D	14,545,296	420,350	L		
Big Eddy	N	9,199,521	934,712	IS	48,401,498	772,854	G	2,959,271	47,252
Bonners Ferry	N	972,681	45,570	P	1,032,347	24,573	L		
Bridge	N	1,074,381	36,676	NP	579,597	13,586	L		
Buckley	N	3,831,576	33,012	IS	5,079,067	43,759	L		
Chief Joseph	N	15,586,129	994,811	G	4,425,917	232,423	IS	961,240	50,479
Columbia Falls	N	9,246,706	96,031	NP	726,973	6,505	NP	726,973	6,505
Conkelley	N	5,035,305	737,054	D	5,539,872	384,612	L	0	0
Cowlitz	N	466,266	131,556	P	1,106,324	93,254	L	0	0
Deer Park	P	669,697	34,826	IU	370,084	19,246	L		
Drain	N	2,624,036	68,004	P	191,215	4,956	L		
Dworshak	N	4,288,576	53,149	G	2,767,900	34,303	L	0	0
Eugene	N	4,034,606	87,504	NP	246,896	5,355	L		
Flathead	N	1,352,990	45,532	NP	511,356	17,209	NP	511,356	17,209
Florence	N	500,238	30,628	P	355,439	21,763	L		
Forest Grove	N	1,126,522	35,408	P	443,597	13,943	L	0	0
Franklin	N	6,398,830	236,037	P	1,150,298	42,432	G	1,122,799	41,417
Freewater	N	433,635	12,500	P	693,317	19,986	L		
Garrison	N	34,566,604	311,488	IE	23,866,195	215,064	L	0	0
Grandview	N	2,374,105	62,617	PX	470,916	12,420	L	0	0
Hood River	N	378,474	20,442	P	338,313	18,273	L	0	0
Intalco	N	767,230	26,704	D	7,598,258	264,461	L	0	0
John Day	N	10,303,046	90,454	G	5,887,455	51,688	IS	8,831,182	77,532
Kalispell	N	2,261,844	50,330	NP	525,188	11,686	NP	465,441	10,357
Libby	N	4,430,187	103,507	G	863,037	20,164	L	0	0
Little Goose	N	4,704,370	37,929	G	3,136,247	25,286	L	0	0
Longview	N	16,511,887	354,598	D	20,298,977	435,926	L	0	0
Lookout Point	N	1,080,633	21,258	G	270,158	5,314	L	0	0
Lopez Island	N	2,202,018	56,344	P	1,835,841	46,975	L		
Lower Granite	N	2,974,935	20,005	G	2,974,935	20,005	L	0	0
Lower Monumental	N	11,411,638	71,836	G	4,708,680	29,641	L	0	0
Malin	N	766,787	18,095	IS	14,035,044	331,205	L	0	0
McMinnville	N	1,119,869	57,943	P	537,242	27,798	L	0	0
McNary	N	23,492,174	816,230	G	2,488,121	86,449	L		
North Bonneville	N	2,843,582	42,929	G	2,843,582	42,929	P	253,033	3,820
Oakridge	G	158,029	7,132	P	623,665	28,149	L		
Pendleton	N	342,003	11,526	P	21,656	730	L		
Pomeroy	N	473,582	32,700	P	169,559	11,708	L		
Raymond	N	1,605,128	61,658	P	654,039	25,124	L	0	0
Reedsport	N	756,797	22,369	P	1,022,845	30,232	L	0	0
Ritzville	P	225,771	10,705	IU	191,533	9,082	L		
Sacajewea	N	5,287,131	57,444	G	219,760	2,388	L	0	0
Sacheen	N	2,135,685	74,955	P	202,565	7,109	L	0	0
Sandpoint	N	483,117	22,213	P	89,664	4,123	L		
Santiam	N	12,319,415	271,570	G	505,827	11,150	L		
Summer Lake	N	2,184,977	11,983	IS	3,266,365	8,015	L		
Swan Valley	N	2,906,837	83,407	P	98,936	2,839	L	0	0
Tacoma	N	10,412,285	211,770	D	3,890,334	79,124	L	0	0

Table 3.2
MULTI-SEGMENT SUBS - Investment and O and M by Segment

	Segment One			Segment Two			Segment Three		
NAME	Code	Investment	O&M	Code	Investment	O&M	Code	Investment	O&M
The Dalles	N	679,703	34,593	P	729,787	37,142	L		
Tillamook	N	5,954,946	102,995	P	1,070,158	18,509	L	0	0
Trego	N	240,754	10,933	P	657,910	29,875	L		
Trentwood	N	2,969,231	83,978	D	3,738,726	105,742	L	0	0
Troutdale	N	18,931,118	318,541	D	10,652,866	179,248	L	0	0
Valhalla	N	1,455,373	64,534	D	3,932,201	174,360	L	0	0
Walla Walla	N	3,085,105	123,644	P	706,577	28,318	L	0	0
East Hills	NP	495,594	61,754	P	210,901	18,435	L		
Grandview	NP	288,377	7,606	P	182,540	4,814	L		
Mapleton	NP	344,137	42,636	P	311,877	20,270	L		
Potlach	NP	649,431	38,777	P	89,848	4,713	L		
Scooteney	NP	526,455	99,234	P	309,424	36,734	L		
TOTAL		349,639,319	10,244,786		231,171,710	5,209,589		17,050,306	282,150

CODE KEY for Segment Identification
N is Network
G is Generation Integration
P is Utility Delivery
D is DSI Delivery
IU is IOU Delivery
IS is Southern Intertie
NP is Network stations with 34.5 kV equipment
L indicates no third segment
PX indicates Grandview is split between N, P, and NP

METHODOLOGY FOR MULTISEGMENTED SUBSTATION

Cost Detail of Segments

Although TBL plant investment records list the material and labor costs associated with the individual items of equipment as well as the total investment for each substation, the cost of the facilities associated with a specific segment cannot always be determined directly. The cost accounting and work order systems were not specifically designed to segregate costs for segmentation purposes. The method used in this study is to identify the costs of the major pieces of equipment by segment for each station, determine the total installed cost of each piece of equipment using the cost ratios described later, and summing the costs by segment. The ratio of cost by segment to the total cost for each station is multiplied times the total current plant investment to get the current cost by segment.

The steps in this method are shown in the tables in this section. Table 3.3 shows the average cost of circuit breakers by voltage class by station. This is multiplied by the number of breakers in each segment to determine the investment by segment. Table 3.4 shows the number of breakers by segment and the direct cost of breakers, transformers and reactive equipment by segment for each station. Table 3.5 shows the major cost by segment by equipment type and the segmented cost. The "MAJcomp" column is the sum of the major equipment by segment, which is used to derive the percent investment by segment. This is illustrated in the example below.

This method is not used to segment Buckley, Summer Lake, Malin, and Garrison Intertie Substations. When actual costs are available for segments, as for Garrison and Malin substations, they have been used directly from the plant investment records. The costs for

Buckley and Summer Lake substations are allocated 57 per cent to the Southern Intertie and the rest to Network segment as indicated earlier.

Example of Multisegment Method

The methodology is illustrated here for the computation of the costs for Ashe Substation. The source of cost ratios is explained later.

Network (N)

Average cost of 230-kV PCB		$59,851	Table 3.3
No. of PCBs in segment		x 3	Table 3.4
		$179,553	
Cost ratio for 230-kV PCB		x 3.76	Cost Ratios
Component cost for Breaker		$675,119	
Average cost of 500-kV PCB		$489,309	Table 3.3
No. of PCBs in segment		x 5	Table 3.4
		$2,446,545	
Cost ratio for 500-kV PCB		x 3.65	Cost Ratios
Component cost for Breaker		$8,929,890	
Total PCB cost for Network		$9,605,009	Table 3.4
Reactive purchase cost	$2,247,000		Table 3.4
Reactive cost factor		x 2.11	Cost Ratios
Component cost for Reactive		$4,741,170	Table 3.5
Major component cost for Network		$14,346,179	Table 3.5
Percent of total major component cost	78.1%		

Generation Integration (G)

Average cost of 230-kV PCB		$59,851	Table 3.3
No. of PCBs in segment		x 2	Table 3.4
			$119,702
Cost ratio for 230-kV PCB		x 3.76	Cost Ratios
Component cost for Breaker		$450,080	

Average cost of 500-kV PCB		$489,309	Table 3.3
No. of 500-kV PCB in segment		x 2	Table 3.4
Cost ratio for 500 kV PCB		x 3.65	Cost Ratios
Component cost for 500-kV PCB		$3,571,956	
Major component cost for Gen. Integration		$4,022,035	Table 3.5
Percent of total major component cost	21.9%		
Major component cost for substation		$18,368,214	Network + GI

The investment for each segment is obtained by multiplying the total investment at Ashe shown in Table 3.1 by the percent of major component costs shown above. O&M costs by segment are calculated in the same way. The resulting costs by segment are shown in Table 3.2.

Cost of Major Equipment

Major equipment at each substation is identified by tag number and segmented according to the transmission service provided. The actual cost of each item is taken from TBL plant investment records. Costs are adjusted for some substations where significant but partial replacements have taken place or special equipment such as PCBs with high amperage or high-speed closing are installed. These adjustments are based on the knowledge of TBL substations, equipment requirements, and engineering judgment.

Cost Ratios for Segmenting Process

The cost ratios relate the cost of installing a major piece of equipment to the purchase price of the piece of equipment. The cost studies of typical installations on the TBL system indicate that ratios relating the purchase price of the major equipment to the total installed costs generally

fall within a narrow range for equipment in each class. These cost ratios have been rounded off as follows:

Major Equipment		Cost Ratio
Terminals with Power Circuit Breakers		
500-kV	3.65	
230-kV	3.76	
115-kV	4.14	
69-kV and under	4.54	
Transformers (depending on location)		1.5-2.5
Reactive blocks (capacitors or reactors)		2.11

The cost ratios include costs of installation, protection, and a variety of accessories required for the functioning of a major power system component, such as a power circuit breaker. Because the accounting records do not aggregate the costs of these incidental items by major components, their costs must be allocated by means of ratios.

The accumulated costs listed in the plant investment records do not directly reflect the segmentation criteria. For example, the installation of a 500-kV/230-kV transformer may require the replacement of most 230-kV power circuit breakers in a substation if the fault-current rating of the existing circuit breakers is exceeded. Although the addition of the transformer might result from an increase in the load of a specific service, it would not be appropriate to assign all the costs to the service that triggered the change because all services utilizing the transformer and the new switchgear would benefit from the addition. The procedure assigns the cost of terminals on the basis of the costs of the switchgear.

Bulk purchase of items, as well as the common use of some of the facilities, complicates the distribution of recorded costs. Some materials, such as insulators, are purchased in bulk and

then used in more than a single substation. Since some of the substation facilities are used in common by more than one type of service, their costs have to be prorated.

The cost ratios are obtained from a study of the cost estimates prepared for typical installations. The cost estimates available in the files were analyzed and the ratios of the total installed cost of the functional unit to the purchase price of the principal components were computed and averaged for the period of time starting from about 1940 through 1996.

There is a wide variation in the sizes, purchase prices, voltage ranges and installation conditions for transformers at different substations. Based on the judgment of substation and control engineers, a range of cost ratios varying between 1.5 and 2.5 is used depending on specific conditions at individual locations. The higher ratio is suitable for installations with a single transformer whereas those with a series of banks of uniform size indicate lower ratios. The ratios for terminals are for those that include circuit breakers. For terminals that do not include circuit breakers, the cost ratio is half of what it would be with circuit breakers.

TABLE 3.3
MULTI-SEGMENT SUBS - Average Cost of Circuit Breakers

		Breakers by Voltage Class					
NOSTN	NAME	B-115	B-230	BSM	B-500	B-69	B-34.5
13305	Addy	46,580		23,701			
22205	Albany	42,796		15,000			
30905	Albeni Falls	73,810					
10605	Alcoa	34,320		28,213			
22005	Alvey	37,321	82,539	4,820	242,243		
10311	Ashe		59,851		489,309		
20612	Bandon	21,271		3,105			
13271	Bell	24,417	89,613	37,440	196,679		
23311	Big Eddy	29,484	133,494	7,196	426,307		
31111	Bonners Ferry	72,650					
31611	Bridge	56,881		8,928			
22810	Buckley						
10917	Chief Joseph		111,844	3,945	235,563		
41516	Columbia Falls	60,316		14,365			
41517	Conkelley		74,939	22,936			
10815	Cowlitz	30,096		9,979			
13221	Deer Park			14,164			
21025	Drain	29,030		6,298		23,480	
31820	Dworshak				232,097		
22025	Eugene	24,439		4,189		19,908	
41530	Flathead		77,486	7,649			
22032	Florence			3,644		10,857	
23432	Forest Grove	61,500		3,487			
11131	Franklin	34,231		6,309			
23030	Freewater	30,300		5,772		19,908	
43925	Garrison		88,411		252,508		
13931	Grandview	20,317		7,866			
21431	Hood River	18,275		2,260			
13735	Intalco		68,245	18,409			
22836	John Day				243,251		
41535	Kalispell	54,427		9,420			
42742	Libby	73,041	55,198				
13841	Little Goose				270,931		
10841	Longview	35,793	81,443	26,697		35,000	
22041	Lookout Point	50,130					
12840	Lopez Island			15,196		17,715	
11240	Lower Granite				187,142		
13641	Lower Monumental				238,031		
21845	Malin						
23646	McMinnville	37,753		5,339			
23046	McNary	39,038	100,900	8,413	220,580	29,900	
13051	North Bonneville		61,324				
22055	Oakridge	16,760		12,100			
23061	Pendleton			2,120		33,480	
11262	Pomeroy			15,000		45,000	
12565	Raymond	42,634		2,710			
21065	Reedsport	17,096		3,911			
10165	Ritzville			14,365			
13690	Sacajewea	60,279					
12690	Sacheen	65,015	50,020	5,979			
30971	Sandpoint						
22271	Santiam		74,029			28,212	

TABLE 3.3
MULTI-SEGMENT SUBS - Average Cost of Circuit Breakers

		Breakers by Voltage Class					
NOSTN	NAME	B-115	B-230	BSM	B-500	B-69	B-34.5
21960	Summer Lake						
31071	Swan Valley	38,122					
12775	Tacoma		80,302	21,580			
23375	The Dalles	36,562		3,239			
22976	Tillamook	64,721		8,166			
42776	Trego			4,200			
13275	Trentwood	66,806					
22675	Troutdale		69,802	22,092			
10485	Valhalla	53,468		19,261			
13691	Walla Walla	43,957		3,350		17,550	
31626	East Hills			9,894			13,071
13931	Grandview			3,945			13,471
22045	Mapleton			7,700			18,801
30971	Potlach			2,540			26,129
11171	Scooteney			3,945			8,350

TABLE 3.4
MULTI-SEGMENT SUBS - Equipment Costs

		Breakers in Segment by Voltage					Transformer		Reactive	Breaker
NAME	SEG	NB115	NB230	NB500	NB69	NBS	Cost	FTX	Cost	Cost
Addy	D					3	440,652	2.5		322,808
Addy	N	7					487,419	2.5	284,946	1,349,888
Albany	IU	1				1	23,425	1.9		245,275
Albany	N	8					797,811	1.9	253,282	1,417,404
Albany	P	1				1	23,425	1.9		245,275
Albeni Falls	G	0.5								152,787
Albeni Falls	N	4								1,222,294
Alcoa	D	7				10	507,676	2.5	178,106	2,275,464
Alcoa	N	2					459,000	2.5	136,845	284,170
Alvey	N	11	9			1	1,753,783	1.9	895,455	4,514,601
Alvey	NP	1				1	179,366	1.8		176,392
Ashe	G		2	2						4,022,035
Ashe	N		3	5					2,247,000	9,605,009
Bandon	IU	0.5				1	39,740	1.9		58,128
Bandon	N	4							204,218	352,248
Bandon	P	0.5				2	39,740	1.9		72,224
Bell	D		6			15	1,718,650	1.8	1,177,480	4,571,333
Bell	N	10	16	1			4,500,143	1.9	1,622,354	7,119,860
Big Eddy	G	2	4							2,251,877
Big Eddy	IS		7	8		15	10,923,038	1.8	340,380	16,451,774
Big Eddy	N	6	10				657,200	1.9		5,751,757
Bonners Ferry	N	1							29,328	300,771
Bonners Ferry	P	1					52,580	1.6	340,380	300,771
Bridge	N	2							207,183	
Bridge	NP					1	108,500	1.8		40,533
Buckley	IS									0
Buckley	N									0
Chief Joseph	G		4	2		1				3,419,654
Chief Joseph	IS		1			1			144,195	438,444
Chief Joseph	N		9	6			816,684	1.4	926,790	8,943,631
Columbia Falls	N	5					380,496	1.9	368,118	1,248,541
Columbia Falls	NP	0.5					48,005	1.9		124,854
Columbia Falls	NP	0.5					48,005	1.9		124,854
Conkelley	D		5			3	1,014,966	1.7		1,721,242
Conkelley	N		8						416,397	2,254,165
Cowlitz	N	3								373,792
Cowlitz	P	2				3	203,615	1.9	54,470	385,109
Deer Park	IU					1	55,940	1.8		64,305
Deer Park	P					1	130,150	1.8		64,305
Drain	N	1			2		140,000	1.8	770,370	333,383
Drain	P					2	57,734	1.8		57,186
Dworshak	G			2						1,694,308
Dworshak	N			2					441,160	1,694,308
Eugene	N	7			2		157,720	1.8		889,007
Eugene	NP					3	7,748	1.9		57,054
Flathead	N		2							582,695
Flathead	NP					1	74,200	2.5		34,726
Flathead	NP					1	74,200	2.5		34,726
Florence	N				1		62,975	1.8		49,291
Florence	P					1	52,117	1.9		16,544
Forest Grove	N	3								763,830
Forest Grove	P					2	141,640	1.9		31,662

TABLE 3.4
MULTI-SEGMENT SUBS - Equipment Costs

		Breakers in Segment by Voltage					Transformer		Reactive	Breaker
NAME	SEG	NB115	NB230	NB500	NB69	NBS	Cost	FTX	Cost	Cost
Franklin	G	3								425,149
Franklin	N	11					480,024	1.8		1,558,880
Franklin	P	1				2	124,505	1.9		199,002
Freewater	N				0.5				100,800	45,191
Freewater	P					2	189,421	1.9		52,410
Garrison	IE									0
Garrison	N		4	2			3,128,652		3,105,120	3,173,010
Grandview	N	3							327,573	252,337
Grandview	PX					2	82,663	1.4		71,423
Hood River	N	2								151,317
Hood River	P					1	50,000	2.5		10,260
Intalco	D		7			9	779,852	1.9	498,756	2,548,400
Intalco	N		2							513,202
John Day	G			4						3,551,465
John Day	IS			6						5,327,197
John Day	N			7						6,215,063
Kalispell	N	5							48,852	1,126,639
Kalispell	NP					2	80,000	2.5		85,534
Kalispell	NP					1.5	75,560	2.5		64,150
Libby	G		2							415,089
Libby	N	1	4				332,730	3		1,132,568
Little Goose	G			2						1,977,796
Little Goose	N			3						2,966,694
Longview	D		5			7	3,195,336	1.9	501,088	2,379,559
Longview	N	6	12		1		1,304,649	1.8	314,244	4,722,706
Lookout Point	G	1								207,538
Lookout Point	N	4								830,153
Lopez Island	N				1		783,527	2		80,426
Lopez Island	P				2	2	565,624	1.9		298,832
Lower Granite	G			2						1,366,137
Lower Granite	N			2						1,366,137
Lower Monumental	G			3						2,606,439
Lower Monumental	N			4					1,346,700	3,475,253
Malin	IS									0
Malin	N									0
McMinnville	N	5							115,764	781,487
McMinnville	P	1				2	151,218	1.9		204,776
McNary	G	1	4							1,679,153
McNary	N	4	13	1	1	1	3,786,651	1.9	996,189	6,557,519
North Bonneville	G		5							1,152,891
North Bonneville	N		5							1,152,891
North Bonneville	P						53,994	1.9		0
Oakridge	G	1								69,386
Oakridge	P					1	121,612	1.8		54,934
Pendleton	N				1					151,999
Pendleton	P					1				9,625
Pomeroy	N				1		36,114	1.9		204,300
Pomeroy	P					1	15,586	1.9		68,100
Raymond	N	4								706,019
Raymond	P	0.5				1	74,850	2.5		100,556
Reedsport	N	2							40,509	141,555
Reedsport	P					2	108,531	2.5		35,512

TABLE 3.4
MULTI-SEGMENT SUBS - Equipment Costs

		Breakers in Segment by Voltage					Transformer		Reactive	Breaker
NAME	SEG	NB115	NB230	NB500	NB69	NBS	Cost	FTX	Cost	Cost
Ritzville	IU					0.5	74,906	2		32,609
Ritzville	P					1	74,906	2		65,217
Sacajewea	G	0.5								124,778
Sacajewea	N	2					1,317,300	1.9		499,110
Sacheen	N	2	2				297,964	2.5		914,475
Sacheen	P					2	41,240	2.5		54,289
Sandpoint	N								142,260	
Sandpoint	P						29,321	1.9		
Santiam	G		1							278,349
Santiam	N		9		4		1,380,816	1.9	539,418	3,017,471
Summer Lake	IS									0
Summer Lake	N									0
Swan Valley	N	2.5					564,758	1.9		394,563
Swan Valley	P						26,290	1.9		0
Tacoma	D		1.5			2	447,674	1.9	466,392	648,850
Tacoma	N		9				1,349,469	1.8	711,159	2,717,420
The Dalles	N	3.5								529,783
The Dalles	P	0.5				4	289,545	1.5		134,504
Tillamook	N	5					635,112	1.9	239,235	1,339,725
Tillamook	P	0.5				3	159,547	1.9		245,193
Trego	N								51,201	0
Trego	P					1	110,463	2.5		19,068
Trentwood	D	2					522,372	1.9	257,754	553,154
Trentwood	N	6								1,659,461
Troutdale	D		4			8	685,377	1.9	567,754	1,852,204
Troutdale	N		8				2,684,000	1.9	253,713	2,099,644
Valhalla	D	2				12	675,800	1.4	545,154	1,492,054
Valhalla	N	6								1,328,145
Walla Walla	N	6			5		76,800	1.9	121,000	1,490,277
Walla Walla	P					1	220,000	1.9		15,209
East Hills	NP					1	91,007	1.9		59,342
East Hills	P					1	28,378	1.9		44,919
Grandview	NP					1	43,916	1.9		61,158
Grandview	P					1	38,747	1.9		17,910
Mapleton	NP					1	33,647	1.9		85,357
Mapleton	P					1	52,807	1.9		34,958
Potlach	NP					1	131,677	1.9		118,626
Potlach	P					1	20,786	1.9		11,532
Scooteney	NP					2	32,910	1.9		75,818
Scooteney	P					1	33,370	1.9		17,910
NOTE:										
FTX is cost ratio for transformers										

TABLE 3.5
MULTI-SEGMENT SUBS - Segmented Costs

		Total Cost by Major Component				Segment	Segment
NAME	SEG	Breakers	Transfmer	Reactive	MAJcomp	Investment	O&M
Addy	D	322,808	1,101,630	0	1,424,438	2,697,041	53,603
Addy	N	1,349,888	1,218,548	601,236	3,169,672	6,001,481	176,517
Albany	IU	245,275	44,508		289,783	753,576	13,511
Albany	N	1,417,404	1,515,841	534,425	3,467,669	9,017,624	171,553
Albany	P	245,275	44,508	0	289,783	753,576	13,511
Albeni Falls	G	152,787	0	0	152,787	146,070	1,519
Albeni Falls	N	1,222,294	0	0	1,222,294	1,168,557	12,758
Alcoa	D	2,275,464	1,269,190	375,804	3,920,457	6,338,949	377,748
Alcoa	N	284,170	1,147,500	288,743	1,720,413	2,781,718	559,877
Alvey	N	4,514,601	3,332,188	1,889,410	9,736,199	17,130,092	261,961
Alvey	NP	176,392	322,859	0	499,251	878,393	13,433
Ashe	G	4,022,035	0	0	4,022,035	5,541,912	42,724
Ashe	N	9,605,009	0	4,741,170	14,346,179	19,767,421	186,563
Bandon	IU	58,128	75,506	0	133,634	421,023	12,726
Bandon	N	352,248	0	430,900	783,148	2,467,368	92,660
Bandon	P	72,224	75,506		147,730	465,436	14,069
Bell	D	4,571,333	3,093,570	2,484,483	10,149,386	14,545,296	420,350
Bell	N	7,119,860	8,550,272	3,423,167	19,093,299	27,363,003	1,138,521
Big Eddy	G	2,251,877	0		2,251,877	2,959,271	47,252
Big Eddy	IS	16,451,774	19,661,468	718,202	36,831,444	48,401,498	772,854
Big Eddy	N	5,751,757	1,248,680	0	7,000,437	9,199,521	934,712
Bonners Ferry	N	300,771	0	61,882	362,653	972,681	45,570
Bonners Ferry	P	300,771	84,128		384,899	1,032,347	24,573
Bridge	N		0	437,156	437,156	1,074,381	36,676
Bridge	NP	40,533	195,300	0	235,833	579,597	13,586
Buckley	IS	0	0	0	0	5,079,067	43,759
Buckley	N	0	0	0	0	3,831,576	33,012
Chief Joseph	G	3,419,654	0	0	3,419,654	4,425,917	232,423
Chief Joseph	IS	438,444	0	304,251	742,695	961,240	50,479
Chief Joseph	N	8,943,631	1,143,358	1,955,527	12,042,515	15,586,129	994,811
Columbia Falls	N	1,248,541	722,942	776,729	2,748,213	9,246,706	96,031
Columbia Falls	NP	124,854	91,210	0	216,064	726,973	6,505
Columbia Falls	NP	124,854	91,210		216,064	726,973	6,505
Conkelley	D	1,721,242	1,725,442	0	3,446,684	5,539,872	384,612
Conkelley	N	2,254,165	0	878,598	3,132,763	5,035,305	737,054
Cowlitz	N	373,792	0	0	373,792	466,266	131,556
Cowlitz	P	385,109	386,869	114,932	886,909	1,106,324	93,254
Deer Park	IU	64,305	100,692		164,997	370,084	19,246
Deer Park	P	64,305	234,270	0	298,575	669,697	34,826
Drain	N	333,383	252,000	1,625,481	2,210,863	2,624,036	68,004
Drain	P	57,186	103,921		161,107	191,215	4,956
Dworshak	G	1,694,308	0	0	1,694,308	2,767,900	34,303
Dworshak	N	1,694,308	0	930,848	2,625,156	4,288,576	53,149
Eugene	N	889,007	283,896	0	1,172,903	4,034,606	87,504
Eugene	NP	57,054	14,721	0	71,775	246,896	5,355
Flathead	N	582,695	0	0	582,695	1,352,990	45,532
Flathead	NP	34,726	185,500	0	220,226	511,356	17,209
Flathead	NP	34,726	185,500		220,226	511,356	17,209
Florence	N	49,291	113,355	0	162,646	500,238	30,628
Florence	P	16,544	99,022	0	115,566	355,439	21,763
Forest Grove	N	763,830	0	0	763,830	1,126,522	35,408
Forest Grove	P	31,662	269,116	0	300,778	443,597	13,943

TABLE 3.5
MULTI-SEGMENT SUBS - Segmented Costs

		Total Cost by Major Component				Segment	Segment
NAME	SEG	Breakers	Transfmer	Reactive	MAJcomp	Investment	O&M
Franklin	G	425,149	0		425,149	1,122,799	41,417
Franklin	N	1,558,880	864,043	0	2,422,923	6,398,830	236,037
Franklin	P	199,002	236,560	0	435,562	1,150,298	42,432
Freewater	N	45,191	0	212,688	257,879	433,635	12,500
Freewater	P	52,410	359,900	0	412,310	693,317	19,986
Garrison	IE	0	0	0	0	23,866,195	215,064
Garrison	N	3,173,010	0	6,551,803	9,724,813	34,566,604	311,488
Grandview	N	252,337	0	691,179	943,516	2,374,105	62,617
Grandview	PX	71,423	115,728	0	187,151	470,916	12,420
Hood River	N	151,317	0	0	151,317	378,474	20,442
Hood River	P	10,260	125,000	0	135,260	338,313	18,273
Intalco	D	2,548,400	1,481,719	1,052,375	5,082,494	7,598,258	264,461
Intalco	N	513,202	0	0	513,202	767,230	26,704
John Day	G	3,551,465	0	0	3,551,465	5,887,455	51,688
John Day	IS	5,327,197	0		5,327,197	8,831,182	77,532
John Day	N	6,215,063	0	0	6,215,063	10,303,046	90,454
Kalispell	N	1,126,639	0	103,078	1,229,717	2,261,844	50,330
Kalispell	NP	85,534	200,000	0	285,534	525,188	11,686
Kalispell	NP	64,150	188,900		253,050	465,441	10,357
Libby	G	415,089	0	0	415,089	863,037	20,164
Libby	N	1,132,568	998,190	0	2,130,758	4,430,187	103,507
Little Goose	G	1,977,796	0	0	1,977,796	3,136,247	25,286
Little Goose	N	2,966,694	0	0	2,966,694	4,704,370	37,929
Longview	D	2,379,559	6,071,138	1,057,296	9,507,993	20,298,977	435,926
Longview	N	4,722,706	2,348,368	663,055	7,734,129	16,511,887	354,598
Lookout Point	G	207,538	0	0	207,538	270,158	5,314
Lookout Point	N	830,153	0	0	830,153	1,080,633	21,258
Lopez Island	N	80,426	1,567,054	0	1,647,480	2,202,018	56,344
Lopez Island	P	298,832	1,074,686	0	1,373,517	1,835,841	46,975
Lower Granite	G	1,366,137	0	0	1,366,137	2,974,935	20,005
Lower Granite	N	1,366,137	0	0	1,366,137	2,974,935	20,005
Lower Monumental	G	2,606,439	0	0	2,606,439	4,708,680	29,641
Lower Monumental	N	3,475,253	0	2,841,537	6,316,790	11,411,638	71,836
Malin	IS	0	0	0	0	14,035,044	331,205
Malin	N	0	0	0	0	766,787	18,095
McMinnville	N	781,487	0	244,262	1,025,749	1,119,869	57,943
McMinnville	P	204,776	287,314	0	492,090	537,242	27,798
McNary	G	1,679,153	0	0	1,679,153	2,488,121	86,449
McNary	N	6,557,519	7,194,637	2,101,959	15,854,115	23,492,174	816,230
North Bonneville	G	1,152,891	0	0	1,152,891	2,843,582	42,929
North Bonneville	N	1,152,891	0	0	1,152,891	2,843,582	42,929
North Bonneville	P	0	102,589		102,589	253,033	3,820
Oakridge	G	69,386	0	0	69,386	158,029	7,132
Oakridge	P	54,934	218,902	0	273,836	623,665	28,149
Pendleton	N	151,999	0	0	151,999	342,003	11,526
Pendleton	P	9,625	0	0	9,625	21,656	730
Pomeroy	N	204,300	68,617	0	272,917	473,582	32,700
Pomeroy	P	68,100	29,613	0	97,713	169,559	11,708
Raymond	N	706,019	0	0	706,019	1,605,128	61,658
Raymond	P	100,556	187,125	0	287,681	654,039	25,124
Reedsport	N	141,555	0	85,474	227,029	756,797	22,369
Reedsport	P	35,512	271,328	0	306,839	1,022,845	30,232

TABLE 3.5
MULTI-SEGMENT SUBS - Segmented Costs

		Total Cost by Major Component				Segment	Segment
NAME	SEG	Breakers	Transfmer	Reactive	MAJcomp	Investment	O&M
Ritzville	IU	32,609	149,812		182,421	191,533	9,082
Ritzville	P	65,217	149,812		215,029	225,771	10,705
Sacajewea	G	124,778	0	0	124,778	219,760	2,388
Sacajewea	N	499,110	2,502,870	0	3,001,980	5,287,131	57,444
Sacheen	N	914,475	744,910	0	1,659,385	2,135,685	74,955
Sacheen	P	54,289	103,100	0	157,389	202,565	7,109
Sandpoint	N			300,169	300,169	483,117	22,213
Sandpoint	P		55,710		55,710	89,664	4,123
Santiam	G	278,349	0	0	278,349	505,827	11,150
Santiam	N	3,017,471	2,623,550	1,138,172	6,779,194	12,319,415	271,570
Summer Lake	IS	0	0	0	0	3,266,365	8,015
Summer Lake	N	0	0	0	0	2,184,977	11,983
Swan Valley	N	394,563	1,073,040	0	1,467,603	2,906,837	83,407
Swan Valley	P	0	49,951	0	49,951	98,936	2,839
Tacoma	D	648,850	850,581	984,087	2,483,517	3,890,334	79,124
Tacoma	N	2,717,420	2,429,044	1,500,545	6,647,009	10,412,285	211,770
The Dalles	N	529,783	0	0	529,783	679,703	34,593
The Dalles	P	134,504	434,318	0	568,821	729,787	37,142
Tillamook	N	1,339,725	1,206,713	504,786	3,051,223	5,954,946	102,995
Tillamook	P	245,193	303,139	0	548,333	1,070,158	18,509
Trego	N	0	0	108,034	108,034	240,754	10,933
Trego	P	19,068	276,158	0	295,226	657,910	29,875
Trentwood	D	553,154	992,507	543,861	2,089,521	3,738,726	105,742
Trentwood	N	1,659,461	0	0	1,659,461	2,969,231	83,978
Troutdale	D	1,852,204	1,302,216	1,197,961	4,352,381	10,652,866	179,248
Troutdale	N	2,099,644	5,099,600	535,334	7,734,579	18,931,118	318,541
Valhalla	D	1,492,054	946,120	1,150,275	3,588,449	3,932,201	174,360
Valhalla	N	1,328,145	0	0	1,328,145	1,455,373	64,534
Walla Walla	N	1,490,277	145,920	255,310	1,891,507	3,085,105	123,644
Walla Walla	P	15,209	418,000	0	433,209	706,577	28,318
East Hills	NP	59,342	172,913		232,256	495,594	61,754
East Hills	P	44,919	53,918		98,837	210,901	18,435
Grandview	NP	61,158	83,440		144,599	288,377	7,606
Grandview	P	17,910	73,619		91,530	182,540	4,814
Mapleton	NP	85,357	63,929		149,286	344,137	42,636
Mapleton	P	34,958	100,333		135,291	311,877	20,270
Potlach	NP	118,626	250,186		368,812	649,431	38,777
Potlach	P	11,532	39,493		51,025	89,848	4,713
Scooteney	NP	75,818	62,529		138,347	526,455	99,234
Scooteney	P	17,910	63,403		81,313	309,424	36,734

CHAPTER 4

LINE O&M BY SEGMENT

The O&M costs for the FYs 1996 through 1998 are listed for each transmission line in Table 4.1. The average of the 3 years is computed for each of the lines. If a line did not exist for all 3 years, the average is computed on the basis of the years during which the line existed. The 3 year average O&M cost is also includes in Table 1.1.

For lines falling in more than a single segment, the 3-year average is calculated prior to segmenting. The three lines in more than one segment are listed at the end of the Chapter 1. O&M for these lines are assigned to each segment on the same basis as the investment.

TABLE 4.1

TRANSMISSION LINE O and M ($)

As of September 30, 1998

ID	NAME	OM98	OM97	OM96	OMAVG
GENERATION INTEGRATION SEGMENT					
11608	Anderson Ranch-Mountain Home	81,865	77,768	73,671	77,768
1311	Big Clif-Detroit #1	10,489	9,964	9,441	9,965
6916	Black Canyon-Emmett	13,751	13,063	12,377	13,064
23115	Bonneville #2P.H.-No. Bonneville	2,909	2,763	2,618	2,763
23011	Bonneville-No. Bonneville #1	2,944	2,796	2,649	2,796
23012	Bonneville-No. Bonneville #2	2,909	2,763	2,618	2,763
11624	Chandler Tap	13,133	12,476	11,819	12,476
23024	Chief Joseph P.H. #1-4	13,913	13,216	12,521	13,217
50024	Chief Joseph P.H. #5,6	8,140	7,732	7,326	7,733
11528	Cougar-Wilakenzie	10,163	10,163	10,163	10,163
23034	Detroit P.H. #1,2	3,364	3,196	3,028	3,196
23030	Detroit-Santiam #1,2	76,156	72,339	68,536	72,344
11630	Dexter Tap	3,478	3,304	3,130	3,304
50031	Dworshak Powerhouse	19,398	18,427	17,458	18,428
11634	Green Peter-Lebanon	46,915	44,564	42,221	44,567
11642	Hills Creek-Oakridge	113,089	107,429	101,770	107,429
11732	Ice Harbor-Franklin #3	31,822	30,227	28,638	30,229
50035	John Day P.H. #1-4	18,394	17,473	16,554	17,474
23143	Libby P.H. #1,2	9,252	8,789	8,327	8,789
50092	Little Goose P.H.	8,827	8,385	7,944	8,385
11650	Lookout Point PH-Lookout Pt	55,268	52,498	49,739	52,502
50057	Lower Granite P.H.	3,964	3,766	3,568	3,766
50049	Lower Monumental P.H.	5,127	4,870	4,614	4,870
23151	McNary P.H.-McNary #1,2	7,640	7,257	6,876	7,258
23152	McNary P.H.-McNary #3,4	4,871	4,627	4,384	4,627
23153	McNary P.H.-McNary #5	4,311	4,095	3,879	4,095
11651	McNary P.H.-McNary #6	7,395	7,024	6,655	7,025
11678	The Dalles P.H.-Big Eddy #1	2,839	2,696	2,555	2,697
23086	The Dalles P.H.-Big Eddy #2-6	15,561	14,781	14,004	14,782
50008	WNP 2-Ashe	7,920	7,524	7,128	7,524
23092	WNP2-Ashe #2	2,590	2,460	2,331	2,460
	TOTAL Generation Integration	**608,397**	**578,435**	**548,542**	**578,458**
EASTERN INTERTIE					
50085	Townsend-Garrison	972,534	923,864	875,288	923,895
SOUTHERN INTERTIE					
50004	Alvey-Dixonville	0	0	0	0
50012	Buckley-Summer Lake	311,427	295,842	280,287	295,852
50016	Captain Jack-Olinda	36,259	34,444	32,633	34,445
50025	Dixonville-Meridian	0	0	0	0
50037	Grizzly-Malin	943,411	896,198	849,077	896,229
50043	John Day-Grizzly #1	467,292	443,907	420,566	443,922
50044	John Day-Grizzly #2	467,239	443,856	420,519	443,871
	Network to AC Intertie 1/	435,870	414,057	392,286	414,071
	Total AC Intertie	**2,661,498**	**2,528,304**	**2,395,368**	**2,528,390**
23111	Big Eddy-Celilo	3,277	3,113	2,949	3,113
50013	Big Eddy-Celilo #3	5,761	5,473	5,185	5,473

TABLE 4.1

TRANSMISSION LINE O and M ($)

As of September 30, 1998

ID	NAME	OM98	OM97	OM96	OMAVG
50014	Big-Eddy-Celilo #4	5,074	4,820	4,567	4,820
75020	Celilo-Sylmar	1,458,786	1,385,725	1,312,778	1,385,763
50039	John Day-Big Eddy #1	100,108	95,098	90,098	95,101
	Total DC Intertie	**1,573,006**	**1,494,229**	**1,415,577**	**1,494,271**
	Total Southern Intertie	**4,234,504**	**4,022,533**	**3,810,945**	**4,022,660**
Network					
11605	Aberdeen Tap	54,112	51,407	48,706	51,408
11601	Adair Tap	4,622	4,390	4,159	4,390
11782	Addy Loop	69,443	65,968	62,493	65,968
23120	Addy-Cusick	110,799	105,253	99,710	105,254
11507	Albany-Burnt Woods	80,151	76,134	72,132	76,139
11503	Albany-Eugene	182,660	173,519	164,378	173,519
11501	Albany-Lebanon	77,792	73,899	70,006	73,899
11705	Alderwood Tap	42,145	40,036	37,927	40,036
3345	Almira Tap	70,828	67,286	63,751	67,288
23002	Alvey-Lane	46,997	44,642	42,295	44,645
23003	Alvey-Reston	238,034	226,106	214,220	226,120
11602	Alvey-Springfield	20,814	19,772	18,731	19,772
23004	Anaconda-Silver Bow	58,069	55,163	52,257	55,163
23006	Ashe Tap	30,000	28,496	26,998	28,498
50006	Ashe-Hanford	91,492	86,914	82,344	86,917
50007	Ashe-Slatt	750,542	712,982	675,494	713,006
23106	Ashe-White Bluffs	33,364	31,692	30,026	31,694
11606	Badger Canyon Loop	14,872	14,128	13,384	14,128
11609	Badger Canyon-Reata	24,032	22,830	21,627	22,830
23009	Bandon-Gold Beach #2	181,505	172,409	163,346	172,420
11510	Bandon-Port Orford	84,391	80,162	75,948	80,167
11516	Bayshore Tap	3,524	3,347	3,171	3,347
23010	Bell-Boundary #1	321,094	305,003	288,969	305,022
23019	Bell-Boundary #2	385,902	366,565	347,292	366,586
23128	Bell-Boundary #3	385,810	366,478	347,210	366,499
11586	Bell-Colville	231,656	220,047	208,479	220,061
23074	Bell-Hot Springs	573,007	544,292	515,679	544,326
23014	Bellingham-Custer-Blaine	57,841	54,946	52,052	54,946
11588	Bell-Trentwood #1	51,572	48,991	46,410	48,991
11589	Bell-Trentwood #2	51,709	49,121	46,533	49,121
11607	Benton-DOE451B	21,736	20,648	19,561	20,648
11518	Benton-FFTF	26,907	25,560	24,214	25,560
11541	Benton-Franklin #1	95,478	90,700	85,922	90,700
11611	Benton-Franklin #2	95,794	91,000	86,206	91,000
11613	Benton-Richland	51,448	48,870	46,301	48,873
11612	Benton-Scootney	92,545	87,914	83,282	87,914
23017	Big Eddy-Chenoweth #1	5,607	5,326	5,046	5,326
23018	Big Eddy-Chenoweth #2	27,982	26,581	25,181	26,581
11610	Big Eddy-DeMoss	106,026	100,720	95,414	100,720
50010	Big Eddy-Keeler	577,336	548,444	519,607	548,462
23015	Big Eddy-Maupin	103,036	97,873	92,728	97,879
34511	Big Eddy-McLoughlin	412,390	391,723	371,131	391,748
23016	Big Eddy-Midway	360,276	342,221	324,231	342,243

TABLE 4.1

TRANSMISSION LINE O and M ($)

As of September 30, 1998

ID	NAME	OM98	OM97	OM96	OMAVG
28775	Big Eddy-Oregon City	319,622	303,605	287,645	303,624
28711	Big Eddy-Troutdale	271,364	257,764	244,214	257,781
6910	Boardman-Ione	111,524	105,947	100,380	105,950
11512	Bonners Ferry-Troy	105,945	100,636	95,345	100,642
23013	Bonneville-No. Bonneville #3	4,766	4,527	4,289	4,527
11514	Bonneville-No.Bonneville #4	4,661	4,428	4,195	4,428
11515	Bonneville-The Dalles	135,349	128,566	121,807	128,574
11517	Bonneville-Vancouver #5,6	151,435	143,846	136,284	143,855
11614	Box Canyon Tap	10,937	10,389	9,842	10,389
50012	Buckley-Summer Lake	234,936	223,179	211,444	223,186
11520	Camas Tap	0	0	0	0
13802	Canal Tap	26,083	24,778	23,473	24,778
23157	Canby Tap	35,922	34,124	32,326	34,124
11620	Cardwell-Cowlitz	34,803	33,062	31,319	33,061
23008	Carlton-McMinnville	19,018	18,065	17,115	18,066
23007	Carlton-Tillamook	171,084	162,519	153,963	162,522
11616	Carson Tap	4,346	4,128	3,911	4,128
23121	Cathlamet-Naselle	100,197	95,176	90,173	95,182
6911	Chehalis-Centralia #1	40,770	38,731	36,696	38,732
6912	Chehalis-Centralia #2	55,299	52,533	49,773	52,535
23021	Chehalis-Covington	243,221	231,033	218,888	231,047
11523	Chehalis-Longview	54,883	52,132	49,392	52,136
23023	Chehalis-Mayfield	97,789	92,895	88,002	92,895
23022	Chehalis-Olympia	138,653	131,714	124,775	131,714
11545	Chehalis-Raymond	208,528	198,093	187,657	198,093
23131	Chemawa-Salem	37,359	35,487	33,622	35,489
11621	Chemawa-Salem #1	8,762	8,323	7,885	8,323
11720	Cheney Tap	41,321	39,253	37,186	39,253
11623	Chenoweth-Harvey #1,2	4,030	3,828	3,627	3,828
23042	Chief Joseph-East Omak #1,2	119,122	113,153	107,204	113,160
50021	Chief Joseph-Monroe	642,718	610,554	578,451	610,574
50022	Chief Joseph-Sickler	237,954	226,045	214,160	226,053
34521	Chief Joseph-Sultan #3,4	856,532	813,608	770,838	813,659
6913	Coburg Tap	13,713	13,028	12,343	13,028
11629	Columbia Falls-Trego	210,313	199,788	189,263	199,788
23026	Columbia-Coulee	254,471	241,719	229,012	241,734
11526	Columbia-Ellensburg	122,767	116,615	110,485	116,622
11625	Columbia-Valhalla #1	24,070	22,865	21,661	22,865
11626	Columbia-Valhalla #2	23,841	22,648	21,455	22,648
11572	Colville-Metaline Falls	150,909	143,347	135,811	143,356
11627	Colville-Republic	202,969	192,812	182,655	192,812
11721	Connell Tap	35,006	33,255	31,503	33,255
11527	Cottage Grove-Drain	70,287	66,770	63,252	66,770
11528	Cougar-Wilakenzie	63,924	63,924	63,924	63,924
23025	Covingtn-Duwamish-Creston	31,647	30,061	28,481	30,063
23028	Covingtn-Grand Coulee	642,083	609,906	577,844	609,944
28720	Covington-Columbia #3	386,070	366,723	347,445	366,746
34576	Covington-Maple Valley	91,891	87,286	82,698	87,292
23020	Covington-Maple Valley #1	51,518	48,936	46,364	48,939
3320	Creston-Davenport	87,840	83,448	79,063	83,450

TABLE 4.1

TRANSMISSION LINE O and M ($)

As of September 30, 1998

ID	NAME	OM98	OM97	OM96	OMAVG
6914	Creswell Tap	15,270	14,507	13,744	14,507
50019	Custer-Ingledow #1	47,675	45,289	42,908	45,291
50020	Custer-Ingledow #2	48,098	45,691	43,289	45,693
23029	Custer-Intalco #1,2	48,539	46,107	43,683	46,110
11726	Davis Creek Tap	2,196	2,087	1,977	2,087
11632	DeMoss-Fossil	196,177	186,367	176,574	186,373
11730	Dorena Tap	21,370	20,300	19,231	20,300
23033	Driscoll-Clatsop	771	732	694	732
11731	Dworshak P.H.-Orofino	2,909	2,763	2,618	2,763
50030	Dworshak-Hot Springs	762,118	723,978	685,912	724,003
11781	East Ellensburg Tap	14,689	13,954	13,219	13,954
23095	East Omak-Tonasket	119,122	113,153	107,204	113,160
11793	Elbe Tap	30,705	29,168	27,632	29,168
11729	Eltopia Tap	17,526	16,649	15,772	16,649
11555	Eugene-Alvey #1	44,404	42,178	39,961	42,181
11556	Eugene-Alvey #2	57,978	55,076	52,175	55,076
11534	Eugene-Mapleton	136,120	129,298	122,501	129,306
23041	Fairmount-Port Angeles #1	121,215	115,149	109,083	115,149
11736	Fairmount-Port Angeles #2	122,098	115,988	109,878	115,988
11737	Fairview-Bandon #1	113,954	108,251	102,548	108,251
11598	Fairview-Bandon #2	136,625	129,779	122,956	129,787
23136	Fairview-Bandon #3	88,176	83,758	79,355	83,763
23135	Fairview-Rogue	228,782	217,317	205,893	217,331
11734	Fidalgo-Lopez	31,029	29,475	27,924	29,476
11733	Filbert Tap	3,295	3,130	2,965	3,130
11637	Florence Tap	17,846	16,953	16,060	16,953
11537	Forest Grove-McMinnville	103,392	98,217	93,045	98,218
11636	Forest Grove-Tillamook	130,828	124,272	117,739	124,280
11738	Foster Tap	13,212	12,550	11,891	12,551
11635	Four Lakes Tap	27,090	25,734	24,379	25,734
11786	Franklin-Badger Canyon	58,893	55,945	52,999	55,946
11641	Franklin-Hedges	21,573	20,493	19,414	20,493
11638	Franklin-Riverview	22,239	21,126	20,013	21,126
11565	Franklin-Walla Walla	125,956	119,644	113,355	119,652
11739	Franz Holmes Tap	4,073	3,869	3,665	3,869
50084	Garrison-Taft	1,684,756	1,600,444	1,516,294	1,600,498
16101	Goshen-Drummond	254,962	242,185	229,454	242,200
11531	Grand Coulee-Bell #1	374,770	356,014	337,259	356,014
11532	Grand Coulee-Bell #2	374,907	356,145	337,383	356,145
23035	Grand Coulee-Bell #3,4	290,113	275,575	261,088	275,592
23036	Grand Coulee-Bell #5	291,410	276,806	262,255	276,824
11539	Grand Coulee-Brewster	113,094	107,427	101,780	107,434
50033	Grand Coulee-Chief Joseph	168,238	159,818	151,415	159,824
23037	Grand Coulee-Chief Joseph #1,2	144,984	137,727	130,473	137,728
50055	Grand Coulee-Hanford #1	507,568	482,167	456,815	482,183
11735	Grand Coulee-Okanogan #2	185,969	176,662	167,356	176,662
50032	Grand Coulee-Raver	1,841,630	1,749,467	1,657,482	1,749,526
11540	Grandview-Richland	130,969	124,415	117,861	124,415
11538	Green Bluff Tap	33,634	31,950	30,267	31,950
11634	Green Peter-Lebanon	16,484	15,658	14,835	15,659

TABLE 4.1

TRANSMISSION LINE O and M ($)

As of September 30, 1998

ID	NAME	OM98	OM97	OM96	OMAVG
11740	Hanford Tap #2	70	67	63	67
11558	Hanford-Benton	38,341	36,419	34,505	36,422
50041	Hanford-John Day	514,122	488,393	462,713	488,409
50052	Hanford-Ostrander	952,977	905,286	857,687	905,317
11658	Hatton Tap	53,796	51,100	48,414	51,103
50036	Hatwai-Dworshak	150,743	143,199	135,670	143,204
13851	Hay Mill Tap	31,849	30,255	28,661	30,255
11656	Hedges Tap #2	1,510	1,435	1,359	1,435
13853	Heyburn-Haymill	15,841	15,047	14,256	15,048
11671	Highlands-Franklin	34,345	32,624	30,909	32,626
11542	Holcomb-Naselle	96,508	91,678	86,849	91,678
11697	Horn Rapids Tap	458	435	412	435
23139	Hot Springs-Anaconda	206,703	196,344	186,023	196,357
23039	Hot Springs-Anaconda	306,865	291,487	276,164	291,505
23040	Hungry Horse-Hot Springs	285,067	270,781	256,546	270,798
11543	Hungry Horse-Kalispell	66,658	63,318	59,989	63,322
11639	Ice Harbor-Franklin #1&2	26,250	24,934	23,623	24,936
50040	John Day-Big Eddy #2	105,499	100,219	94,950	100,223
50042	John Day-Marion	674,431	640,680	606,993	640,701
11546	Kalispell-Kerr	189,401	179,922	170,444	179,922
11645	Keeler Tap #1	18,396	17,475	16,554	17,475
11646	Keeler Tap #2	82,494	78,363	74,239	78,365
50045	Keeler-Allston	223,841	212,639	201,459	212,646
11513	Keeler-Forest Grove #1	71,775	68,178	64,594	68,182
11644	Keeler-Forest Grove #2	48,094	45,687	43,280	45,687
11748	Keeler-Pennwalt	40,498	38,471	36,444	38,471
23183	Keller Tap	82,494	78,363	74,239	78,365
23082	Kelso-Chehalis	123,048	116,881	110,737	116,889
23046	Kelso-Longview Loop	25,654	24,368	23,087	24,370
11548	Kennewick Tap	2,471	2,347	2,224	2,347
11655	Kitsap-Fairmount-Bangor	49,135	46,673	44,219	46,676
23047	Lane-Wendson	187,753	178,357	168,962	178,357
11743	Lapine-Fort Rock	168,498	160,054	151,639	160,064
11686	Latham Tap	7,220	6,858	6,497	6,858
11746	Libby (PPL)-Libby	42,967	40,814	38,668	40,816
23043	Libby Tap	178,175	169,246	160,349	169,257
50029	Little Goose-Lower Granite #1	173,365	164,689	156,030	164,695
50038	Little Goose-Lower Granite #2	173,470	164,789	156,125	164,795
23105	Longview-Allston #3	17,068	16,212	15,360	16,213
11575	Longview-Astoria	11,425	10,853	10,282	10,853
23045	Longview-Chehalis #3	122,452	116,315	110,201	116,323
11549	Longview-Cowlitz	16,337	15,520	14,702	15,520
23146	Longview-Driscoll	250,125	237,591	225,101	237,606
11648	Lookout Point-Alvey #1	72,484	68,856	65,229	68,856
11649	Lookout Point-Alvey #2	72,164	68,552	64,941	68,552
23148	Lost River-Round Valley	243,397	231,217	219,036	231,217
50034	Lower Granite-Hatwai	173,735	165,040	156,363	165,046
50062	Lower Monumental-Ashe	209,200	198,731	188,282	198,738
50047	Lower Monumental-Hanford	282,722	268,573	254,452	268,582
50046	Lower Monumental-John Day	729,665	693,149	656,704	693,173

TABLE 4.1

TRANSMISSION LINE O and M ($)

As of September 30, 1998

ID	NAME	OM98	OM97	OM96	OMAVG
50091	Lower Monumental-Little Goose #	127,064	120,705	114,358	120,709
50053	Lower Monumental-Little Goose #	128,544	122,111	115,690	122,115
11745	Lynch Creek Tap	14,826	14,084	13,342	14,084
11747	Macks Inn-Madison	78,341	74,421	70,500	74,421
23156	Malin-Warner	309,749	294,248	278,747	294,248
11550	Mapleton-Reedsport	116,003	110,190	104,397	110,197
50051	Marion-Alvey	341,074	324,005	306,969	324,016
50050	Marion-Lane	364,383	346,148	327,948	346,160
50056	Marion-Santiam	12,897	12,251	11,607	12,252
28758	Maupin-Detroit #1	24,953	23,702	22,456	23,704
23059	Maupin-Redmond	238,420	226,472	214,567	226,486
6953	Maupin-Tygh Valley	12,046	11,443	10,842	11,444
11741	McCullough Tap	7,640	7,257	6,876	7,258
50059	McNary Loop	8,985	8,536	8,087	8,536
11787	McNary-Badger Canyon	120,017	114,009	108,006	114,011
23055	McNary-Big Eddy	316,713	300,842	285,027	300,861
23056	McNary-Franklin #2	113,907	108,204	102,507	108,206
28751	McNary-Maupin #1	58,212	55,295	52,388	55,298
28752	McNary-Maupin #2	71,179	67,612	64,058	67,616
11552	McNary-Richland	25,829	24,535	23,245	24,536
34551	McNary-Ross	612,154	581,476	550,909	581,513
23057	McNary-Roundup	175,674	166,882	158,091	166,882
28730	McNary-Santiam #,2	702,433	667,231	632,156	667,273
11553	Midway-Benton	101,704	96,608	91,529	96,614
23088	Midway-Benton #2	100,758	95,709	90,678	95,715
23054	Midway-Eagle Lake	67,674	64,283	60,904	64,287
23050	Midway-Grand Coulee #1	359,330	341,322	323,380	341,344
23052	Midway-Grand Coulee #3	352,250	334,598	317,009	334,619
11554	Midway-Grandview	114,720	108,979	103,238	108,979
11551	Midway-Moxee	155,492	147,711	139,930	147,711
1351	Midway-Riverland	8,747	8,310	7,873	8,310
23053	Midway-Vantage	179,823	170,811	161,832	170,822
6951	Milton Tap	20,274	19,260	18,248	19,261
13850	Minidoka P.H.-Unity	87,300	82,925	78,566	82,930
3351	Minidoka Project	192,618	182,986	173,372	182,992
50075	Monroe-Custer #1	458,941	435,973	413,050	435,988
50048	Monroe-Custer #2	453,550	430,852	408,198	430,867
34550	Monroe-Sammamish	67,464	64,083	60,715	64,087
23058	Monroe-Snohomish #1,2	77,733	73,837	69,956	73,842
50054	Monroe-Snoking	67,866	64,470	61,080	64,472
23044	Mossy Rock-Chehalis	96,737	91,896	87,055	91,896
11595	Moxee-Ellensburg	107,908	102,500	97,112	102,507
11557	Moxee-Roza	25,443	24,169	22,896	24,169
23154	Mt. Vernon Tap	17,173	16,312	15,455	16,313
11654	Naselle-Long Beach #1	72,621	68,987	65,353	68,987
11657	Naselle-Long Beach #2	79,211	75,247	71,283	75,247
23163	Newberg-Carlton-Sherwood	31,331	29,761	28,197	29,763
11559	Newport-Sandpoint	85,934	81,627	77,336	81,632
23060	No. Bonneville-Midway #1	472,039	448,383	424,812	448,411
23061	No. Bonneville-Midway #2	359,154	341,156	323,222	341,177

TABLE 4.1

TRANSMISSION LINE O and M ($)

As of September 30, 1998

ID	NAME	OM98	OM97	OM96	OMAVG
23062	No. Bonneville-Ross #1	127,288	120,909	114,553	120,917
23063	No. Bonneville-Ross #2	126,132	119,811	113,512	119,818
23077	No. Bonneville-Troutdale #1,2	194,192	184,460	174,763	184,472
23160	Noxon-Conkelley	359,154	341,156	323,222	341,177
11647	Oakridge-Lookout Point	86,915	82,559	78,219	82,564
11661	Olympia-Aberdeen	163,806	155,597	147,418	155,607
23068	Olympia-Aberdeen #2	74,123	70,408	66,707	70,413
23168	Olympia-Aberdeen #3	164,087	155,864	147,670	155,874
11560	Olympia-Cosmopolis	144,251	137,022	129,819	137,031
23155	Olympia-Fairmount #1,4	563,159	534,937	506,816	534,971
28755	Olympia-Grand Coulee	796,813	756,881	717,093	756,929
23065	Olympia-Kitsap #3	181,736	172,629	163,552	172,639
11563	Olympia-Shelton #1	68,375	64,949	61,535	64,953
11564	Olympia-Shelton #2	84,767	80,523	76,283	80,524
23066	Olympia-White River-Covington	180,207	171,176	162,178	171,187
11561	Oregon City-Chemawa #1	115,132	109,371	103,609	109,371
11562	Oregon City-Chemawa #2	114,858	109,110	103,362	109,110
50061	Oregon City-Marion	208,143	197,727	187,331	197,734
23067	Oregon Cty-Chemawa #3	88,317	83,891	79,481	83,896
50063	Ostrander-McLoughlin	46,618	44,285	41,957	44,287
50060	Ostrander-Troutdale	125,742	119,450	113,169	119,454
11663	Palisades-Goshen #1	181,224	172,143	163,093	172,153
11668	Palisades-Goshen #2	206,247	195,912	185,613	195,924
50065	Paul-Allston #1	253,599	240,908	228,241	240,916
50064	Paul-Allston #2	253,123	240,456	227,813	240,464
50066	Paul-Olympia	106,979	101,625	96,282	101,629
23165	Ponderosa-Pilot Butte	99,986	94,982	89,978	94,982
11662	Port Angeles-Sappho	192,137	182,521	172,906	182,521
11664	Port Orford-Gold Beach	95,957	91,148	86,357	91,154
11764	Priest River Tap	14,094	13,389	12,683	13,389
11665	Prosser Tap	29,012	27,560	26,108	27,560
11766	Rainbow Valley Tap	15,055	14,302	13,548	14,302
11767	Ralston Tap to WWP	27,181	25,821	24,461	25,821
50073	Raver-Covington #1	54,599	51,867	49,140	51,869
50069	Raver-Covington #2	54,335	51,616	48,902	51,618
50070	Raver-Monroe	443,031	420,860	398,732	420,874
50071	Raver-Paul	366,339	348,006	329,708	348,018
11670	Raymond-Cosmopolis	64,551	61,316	58,092	61,320
6972	Raymond-Tide Flats	10,514	9,987	9,462	9,988
11674	Raymond-Willapa River	20,091	19,086	18,081	19,086
11669	Redmond-Burns-Harney	439,481	417,457	395,512	417,483
23071	Redmond-Yamsey	320,779	304,703	288,686	304,723
11597	Reedsport-Fairview	152,486	144,845	137,231	144,854
23080	Reston-Fairview #1	103,527	98,339	93,169	98,345
23087	Reston-Fairview #2	103,281	98,106	92,948	98,112
28771	Rocky Reach-Columbia	73,387	69,709	66,045	69,714
34566	Rocky Reach-Maple Valley	451,992	429,341	406,771	429,368
13801	Roe's Corner Tap	5,958	5,659	5,362	5,660
11505	Ross-Alcoa #1,2	3,294	3,129	2,965	3,129
23171	Ross-Alcoa #3,4	15,035	14,281	13,531	14,282

TABLE 4.1

TRANSMISSION LINE O and M ($)

As of September 30, 1998

ID	NAME	OM98	OM97	OM96	OMAVG
11506	Ross-Alcoa #3,4	29,159	27,697	26,241	27,699
11582	Ross-Carborundum	16,340	15,522	14,705	15,522
23081	Ross-Kelso	144,426	137,188	129,976	137,197
23072	Ross-St. Johns #1,2	4,591	4,361	4,132	4,361
11584	Ross-Vancouver Shipyard	16,542	15,713	14,887	15,714
23070	Roundup-La Grande	25,444	24,169	22,898	24,170
50079	Sacajawea Tap	32,083	30,477	28,875	30,478
11778	Sacheen-Albeni Falls	62,901	59,752	56,604	59,752
11578	Salem-Albany #1	108,608	103,174	97,739	103,174
11579	Salem-Albany #2	127,442	121,064	114,686	121,064
11574	Salem-Alumina Tap	15,101	14,345	13,589	14,345
11583	Salem-Tillamook	229,028	217,550	206,114	217,564
34577	Sammamish-Maple Valley	84,602	80,362	76,138	80,367
2376	San Juan Is. Service	25,829	24,535	23,245	24,536
23196	Sandpoint-Bonners Ferry	231,306	219,714	208,164	219,728
11596	Sandpoint-Bonners Ferry	154,303	146,581	138,859	146,581
23083	Santiam-Albany	100,022	95,010	90,015	95,016
23049	Santiam-Alvey #1	199,869	189,853	179,873	189,865
28777	Santiam-Alvey #2	180,383	171,344	162,336	171,354
23084	Santiam-Chemawa	85,758	81,461	77,178	81,466
23175	Santiam-Toledo	168,923	160,458	152,023	160,468
50077	Satsop-Paul	108,406	102,981	97,566	102,984
11773	Schrag Tap	38,726	36,785	34,852	36,788
11681	Scooteney-Eagle Lake	32,137	30,527	28,922	30,529
23177	Sedro Wooley Tap	1,830	1,739	1,647	1,739
11569	Shelton-Fairmount #1	211,119	200,539	189,997	200,552
11679	Shelton-Fairmount #2	210,874	200,306	189,776	200,319
23093	Shelton-Kitsap #4	118,632	112,687	106,763	112,694
11508	Shelton-Kitsap-Bremerton	138,607	131,671	124,734	131,671
50072	Sickler-Raver #1	615,762	584,947	554,191	584,967
23174	Sifton Loop	4,561	4,332	4,104	4,332
11683	Sifton-Fishers Road	7,745	7,357	6,970	7,357
6915	Silver Creek-Leonard Road	22,979	21,830	20,683	21,831
6952	Silver Creek-Morton	54,557	51,829	49,106	51,831
50074	Slatt-Marion	1,591,996	1,512,325	1,432,808	1,512,376
23097	Snohomish-Beverly Park	33,750	32,058	30,373	32,060
11593	Snohomish-Beverly Park #1	18,861	17,917	16,974	17,917
11594	Snohomish-Beverly Park #2	20,694	19,658	18,623	19,658
11677	Snohomish-Beverly Park #3,4	33,609	31,925	30,247	31,927
23076	Snohomish-Bothel #1	5,248	4,984	4,722	4,985
23176	Snohomish-Bothel #2	5,703	5,417	5,132	5,417
23075	Snohomish-Murray-Bellingham	238,315	226,372	214,472	226,386
23078	South Tacoma Tap #1	21,904	20,806	19,713	20,808
23178	South Tacoma Tap #2	22,079	20,973	19,870	20,974
11675	Spearfish Tap	11,285	10,719	10,156	10,720
11590	Spirit Lake-Athol	18,329	17,411	16,495	17,412
23079	St. Johns-Keeler	10,514	9,987	9,462	9,988
11774	St.Johns-Longview	152,241	144,612	137,010	144,621
11576	St.Johns-Oregon City #1,2	78,994	75,036	71,091	75,040
11577	St.Johns-Oregon City #2	98,130	93,212	88,312	93,218

TABLE 4.1

TRANSMISSION LINE O and M ($)

As of September 30, 1998

ID	NAME	OM98	OM97	OM96	OMAVG
34575	Sultan-Snohomish	82,709	78,564	74,434	78,569
11775	Sun Harbor Tap	9,357	8,888	8,421	8,889
11770	Swan Valley-Teton	137,426	130,544	123,675	130,548
28778	Tacoma-Covington 3 4	314,085	298,345	282,661	298,364
50076	Tacoma-Raver	175,849	167,049	158,265	167,054
50083	Taft-Bell	509,735	484,225	458,765	484,242
11685	Tahkenitch-Gardiner	7,505	7,129	6,754	7,129
11776	Targhee Tap	50,061	47,556	45,051	47,556
11779	Taylor Flats Tap	39,320	37,352	35,384	37,352
11570	The Dalles-Goldendale	93,328	88,651	83,991	88,657
11676	Timber Tap	39,287	37,318	35,356	37,320
23085	Toledo-Wendson	173,970	165,252	156,565	165,262
11573	Trentwood-Valley Way	9,533	9,055	8,579	9,056
23180	Trojan-Allston #1,2	33,189	31,526	29,868	31,528
11777	Underwood Tap	70,023	66,513	63,017	66,518
13875	Unity-Heyburn	29,723	28,236	26,749	28,236
13876	Unity-West Burley	25,268	24,002	22,740	24,003
50080	Vantage-Raver #1	592,611	562,955	533,355	562,974
11682	Vera Tap	13,318	12,650	11,985	12,651
11585	Wagner Lake Tap	37,324	35,454	33,590	35,456
11591	Walla Walla-Lewiston	368,141	349,718	331,294	349,718
11690	Walla Walla-Milton Freewater	29,824	28,330	26,841	28,332
6991	Walla Walla-Pendleton	145,140	137,882	130,637	137,886
11694	Walnut City Tap	25,763	24,474	23,184	24,474
23005	Wendson-Tahkenitch	229,842	218,324	206,846	218,337
11693	Westport-Cathlamet	1,577	1,498	1,419	1,498
11695	White Bluffs Loop	25,444	24,169	22,898	24,170
23096	White Bluffs-451B	28,325	26,908	25,490	26,908
11696	White Bluffs-Horn Rapids	33,679	31,992	30,310	31,994
11691	Winthrop Tap	52,029	40,034	46,822	46,295
	Total Network (see adj below)	56,018,138	53,206,769	50,420,908	53,215,272
	Transfer from Network to Southern AC Intertie 1/				
	Slatt-Marion	-265,333	-252,054	-238,801	-252,063
	Marion-Alvey	-170,537	-162,003	-153,485	-162,008
	Total Transfer	-435,870	-414,057	-392,286	-414,071
	Total Network w transfer	**55,582,268**	**52,792,712**	**50,028,622**	**52,801,201**
UTILITY DELIVERY SEGMENT					
1201	Albany Bureau of Mines	1,149	1,092	1,034	1,092
1239	Hood River Electric Co-op	3,225	3,063	2,902	3,063
	Total Utility Delivery	**4,374**	**4,155**	**3,936**	**4,155**
	TOTAL - ALL SEGMENTS	**61,402,077**	**58,321,699**	**55,267,333**	**58,330,370**

1/ Facilities transferred from the Network to the Southern AC Intertie based on NFP contract
50% of Buckley-Marion line which is 100 miles of 150 miles of the Slatt-Marion line
50% of Marion-Alvey line

CHAPTER 5

SUBSTATION O&M BY SEGMENT

The O&M costs of TBL substations for 1996, 1997, and 1998 are shown in Tables 5.1 and 5.2. The 3-year average is computed and shown for each substation. If a substation did not exist for all 3 years, the average is computed on the basis of the years during which it existed.

The majority of TBL substations are in a single segment. The O&M by year and the computed three year average is listed in Table 5.1 for each substation, along with the segment the substation is assigned to. The three year average O&M for these substations is included in Table 2.1 to determine O&M by segment.

Several major substations have facilities in more than one segment. For these multisegment stations, the 3 year average is computed prior to segmentation. The 3 year average O&M is used in chapter 3 to determine O&M costs for each substation by segment. The O&M costs are segmented on the same basis as the investment.

There are several substations owned by TBL where the O&M services are provided by others. These costs are not included in the segmentation study. The costs for this service are included as an expense in the revenue requirement.

Table 5.1
SINGLE SEGMENT SUBSTATION O and M by SEGMENT

ID	NAME SUBS	AVG O&M COSTS	Total Cost	1998 O&M	1997 O&M	1996 O&M
DSI Segment						
21031	Hanna	$79,946	239,837	$80,987	$57,357	$101,493
12040	Harvalum	$100,847	302,541	$90,802	$97,937	$113,802
23331	Harvey	$43,110	129,331	$38,814	$41,869	$48,648
22659	Penn Walt	$170,139	510,416	$153,183	$165,254	$191,979
Generation Integration Segment						
22017	Cougar	$319	958	$288	$310	$360
22421	Detroit	$5,989	17,966	$5,393	$5,816	$6,757
22232	Foster	$846	2,539	$762	$822	$955
22230	Green Peter	$9,145	27,434	$8,233	$8,881	$10,320
22030	Hills Creek	$9,145	27,434	$8,233	$8,881	$10,320
32046	Mountain Home	$42,465	127,394	$38,232	$41,241	$47,921
Southern Intertie Segment						
23310	Bakeoven	$3,428	10,285	$355	$4,590	$5,340
21813	Captain Jack	$178,695	536,085	$160,899	$173,535	$201,651
23316	Celilo	$7,695,192	23,085,575	$6,928,117	$7,473,346	$8,684,112
21015	Dixonville	$0	0	$0	$0	$0
21930	Fort Rock Caps.	$63,238	189,714	$56,958	$61,400	$71,356
21630	Grizzly	$258,934	776,801	$275,113	$232,053	$269,635
21542	Meridian	$0	0	$0	$0	$0
20970	Sand Springs Caps.	$77,461	232,383	$69,777	$75,200	$87,406
21972	Sycan Cap. Stn.	$77,046	231,138	$69,402	$74,798	$86,938
Network Segment						
11405	Aberdeen	$143,064	429,193	$128,812	$138,939	$161,442
20205	Adair	$44,980	134,940	$40,496	$43,684	$50,760
20505	Allston	$404,821	1,214,462	$364,466	$393,161	$456,835
41205	Anaconda	$177,400	532,200	$159,725	$172,283	$200,192
10307	Angus	$207,612	622,836	$47,970	$514,747	$60,119
10317	Badger Canyon	$38,335	115,005	$34,516	$37,229	$43,260
12311	Belfair	$20,633	61,900	$18,577	$20,040	$23,283
13712	Bellingham	$243,699	731,096	$219,430	$236,666	$275,000
10315	Benton	$119,552	358,657	$107,641	$116,103	$134,913
22510	Boardman	$46,764	140,293	$42,105	$45,416	$52,772
22710	Brush College	$22,069	66,207	$19,870	$21,434	$24,903
31651	Burley	$88,338	265,014	$66,736	$91,712	$106,566
52520	Canby	$18,410	55,229	$16,575	$17,879	$20,775
10816	Cardwell	$48,307	144,922	$43,494	$46,914	$54,514
23615	Carlton	$73,337	220,012	$66,028	$71,224	$82,760
52525	Cedarville Junction	$60,662	181,985	$54,615	$58,914	$68,456
12114	Centralia	$15,074	45,221	$13,578	$14,636	$17,007
12115	Chehalis	$465,052	1,395,156	$418,691	$451,655	$524,810
22415	Chemawa	$306,006	918,019	$278,252	$295,918	$343,849
23315	Chenoweth	$56,944	170,831	$51,270	$55,301	$64,260
20416	Clatsop	$130,833	392,498	$117,789	$127,063	$147,646
13316	Colville	$14,969	44,907	$13,488	$14,531	$16,888
11415	Cosmopolis	$39,434	118,302	$35,510	$38,296	$44,496
11715	Covington	$294,039	882,118	$264,798	$285,539	$331,781
12615	Cusick	$8,748	26,244	$7,885	$8,492	$9,867
22821	Demoss	$29,046	87,139	$26,153	$28,209	$32,777
20417	Driscoll	$20,273	60,820	$18,253	$19,690	$22,877
32220	Drummond	$138,407	415,222	$124,613	$134,418	$156,191
11125	Eagle Lake	$27,324	81,972	$22,501	$27,510	$31,961

Table 5.1
SINGLE SEGMENT SUBSTATION O and M by SEGMENT

ID	NAME SUBS	AVG O&M COSTS	Total Cost	1998 O&M	1997 O&M	1996 O&M
12421	East Omak	$100,485	301,456	$90,471	$97,588	$113,397
11778	Echo Lake	$227,244	681,733	$204,706	$220,631	$256,396
11925	Ellensburg	$69,309	207,927	$62,407	$67,314	$78,206
11427	Elma	$49,121	147,362	$44,224	$47,705	$55,433
11631	Fairmount	$141,583	424,750	$127,491	$137,495	$159,764
20632	Fairview	$282,739	848,216	$254,566	$274,588	$319,062
12931	Fidalgo	$42,377	127,131	$38,156	$41,159	$47,816
23531	Fossil	$17,779	53,336	$16,011	$17,266	$20,059
10916	Foster Creek	$31,375	94,125	$28,249	$30,474	$35,402
20831	Gold Beach	$639	1,916	$576	$620	$720
12034	Goldendale	$66,744	200,233	$60,092	$64,821	$75,320
12433	Goose Lake	$20,106	60,319	$18,103	$19,528	$22,688
30631	Goshen	$57,492	172,475	$51,763	$55,834	$64,878
10331	Hanford	$146,153	438,459	$131,583	$141,944	$164,932
10520	Happy Valley	$29,013	87,040	$26,120	$28,178	$32,742
21330	Harney	$46,140	138,420	$41,549	$44,805	$52,066
23031	Hat Rock	$141,663	424,988	$127,540	$137,581	$159,867
33530	Hatwai	$169,288	507,864	$152,410	$164,413	$191,041
13230	Hayford	$13,165	39,496	$11,853	$12,786	$14,857
33432	Heyburn	$34,325	102,976	$30,206	$33,660	$39,110
10332	Highlands	$56,087	168,260	$50,499	$54,474	$63,287
12531	Holcomb	$4,294	12,882	$3,867	$4,170	$4,845
10333	Horse Heaven	$62,169	186,506	$55,972	$60,378	$70,156
44531	Hot Springs	$227,252	681,757	$204,597	$220,706	$256,454
23435	Keeler	$699,788	2,099,365	$630,064	$679,618	$789,683
10335	Kennewick	$54,217	162,652	$48,815	$52,659	$61,178
42435	Kerr	$2,761	8,283	$2,487	$2,681	$3,115
11835	Kitsap	$331,585	994,755	$298,564	$322,009	$374,182
23141	La Grande	$57,048	171,145	$51,362	$55,405	$64,378
22043	Lane	$407,298	1,221,895	$366,722	$395,548	$459,625
20941	Lapine	$104,604	313,812	$94,178	$101,589	$118,045
22241	Lebanon	$25,296	75,887	$22,776	$24,566	$28,545
10341	Ledbeder	$33,924	101,772	$30,544	$32,948	$38,280
11140	Levey	$9,464	28,392	$8,521	$9,191	$10,680
10835	Lexington	$110,765	332,294	$99,726	$107,572	$124,996
12441	Lone Pine	$6,795	20,385	$6,118	$6,601	$7,666
21041	Lookingglass	$4,796	14,388	$4,568	$3,589	$6,231
31240	Lost River	$22,202	66,605	$19,988	$21,562	$25,055
11746	Maple Valley	$668,857	2,006,571	$615,078	$643,621	$747,872
22445	Marion	$142,553	427,659	$128,342	$138,449	$160,868
22044	Martin Creek	$60,592	181,777	$54,551	$58,847	$68,379
12346	Mason	$47,119	141,356	$42,422	$45,763	$53,171
23345	Maupin	$23,486	70,457	$21,147	$22,808	$26,502
20361	McLoughlin	$111,771	335,314	$100,625	$108,552	$126,137
12645	Metaline Falls	$40,957	122,870	$36,875	$39,780	$46,215
12141	Morton	$27,625	82,876	$24,872	$26,832	$31,172
13945	Moxee	$50,461	151,384	$45,432	$49,007	$56,945
13146	Murray	$457,732	1,373,195	$412,100	$444,541	$516,554
12451	Nespelem	$32,952	98,857	$29,668	$32,004	$37,185
12036	No. John Day Caps.	$9,429	28,287	$8,499	$9,138	$10,650
13455	Olympia	$864,972	2,594,916	$778,799	$840,016	$976,101
23455	Oregon City	$120,588	361,763	$108,575	$117,112	$136,076

Table 5.1
SINGLE SEGMENT SUBSTATION O and M by SEGMENT

ID	NAME SUBS	AVG O&M COSTS	Total Cost	1998 O&M	1997 O&M	1996 O&M
20356	Ostrander	$298,994	896,983	$269,302	$290,317	$337,364
43960	Ovando	$58,134	174,401	$52,338	$56,458	$65,605
22062	Parker	$13,325	39,975	$11,997	$12,941	$15,037
12160	Paul C.W.	$125,546	376,639	$113,032	$121,931	$141,676
12161	Pe Eell	$19,947	59,840	$17,959	$19,373	$22,508
20355	Pearl 500 kV	$285,131	855,393	$256,751	$276,891	$321,751
20760	Ponderosa	$194,998	584,995	$175,552	$189,385	$220,058
10561	Port Angeles	$446,866	1,340,598	$402,338	$433,979	$504,281
11363	Potholes	$187,499	562,496	$168,807	$182,099	$211,590
11766	Raver	$520,036	1,560,108	$468,347	$504,970	$586,791
10367	Reata	$16,473	49,420	$14,369	$16,310	$18,741
20965	Redmond	$188,117	564,351	$169,370	$182,694	$212,287
21066	Reston	$2,539	7,617	$2,286	$2,466	$2,865
10365	Richland	$52,620	157,861	$47,388	$51,098	$59,375
10967	Rocky Reach	$317,666	952,999	$285,993	$308,513	$358,493
20865	Rogue	$86,027	258,082	$77,457	$83,545	$97,080
10651	Ross	$1,218,205	3,654,615	$1,096,805	$1,183,079	$1,374,731
31965	Round Valley	$19,719	59,156	$17,754	$19,150	$22,252
23065	Roundup	$139,078	417,235	$125,216	$135,070	$156,949
22771	Salem	$130,335	391,005	$117,346	$126,578	$147,081
10570	Sappho	$187,911	563,734	$169,177	$182,497	$212,060
11470	Satsop	$187,232	561,695	$168,563	$181,839	$211,293
11965	Schultz	$30,361	91,083	$27,348	$29,479	$34,256
12371	Shelton	$124,977	374,932	$112,531	$121,369	$141,032
10970	Sickler	$150,431	451,294	$135,432	$146,098	$169,764
10670	Sifton	$178,147	534,440	$160,392	$173,011	$201,037
12170	Silver Creek	$57,950	173,850	$52,175	$56,279	$65,396
21120	Slatt	$99,323	297,968	$89,423	$96,466	$112,079
13171	Snohomish	$1,334,255	4,002,766	$1,195,226	$1,298,595	$1,508,945
13173	Snoking	$319,131	957,392	$287,376	$309,903	$360,113
12772	South Tacoma	$639	1,916	$576	$620	$720
31973	Spar Canyon	$12,744	38,231	$11,475	$12,376	$14,380
12071	Spearfish	$21,801	65,403	$19,627	$21,174	$24,602
10371	Stevens Drive	$162,880	488,640	$146,642	$158,189	$183,809
41572	Stillwater	$19,787	59,361	$17,815	$19,218	$22,328
43175	Taft	$226,850	680,549	$204,223	$220,321	$256,005
21075	Tahkenitch	$95,269	285,807	$85,784	$92,519	$107,504
34175	Targhee	$43,981	131,944	$39,601	$42,712	$49,631
62075	Teton	$19,048	57,144	$17,402	$18,382	$21,360
10375	Thayer Drive	$151,443	454,328	$136,345	$147,081	$170,902
61230	Tincup-Lower Valley	$7,683	23,049	$6,924	$7,458	$8,667
22175	Toledo	$178,897	536,692	$161,078	$173,733	$201,881
12698	USK	$18,424	55,272	$16,588	$17,894	$20,790
11385	Vantage	$382,677	1,148,031	$344,527	$371,653	$431,851
52590	Warner	$52,622	157,865	$47,376	$51,105	$59,384
20494	Wauna	$90,869	272,607	$81,809	$88,257	$102,541
22090	Wendson	$104,016	312,047	$93,648	$101,018	$117,381
31692	West Burley	$47,055	141,165	$42,364	$45,699	$53,102
31090	Westside	$30,099	90,298	$27,100	$29,232	$33,966
10390	White Bluffs	$110,966	332,898	$99,906	$107,767	$125,225
20292	Wren	$19,654	58,962	$17,696	$19,087	$22,179
Network Segment with 34.5 kV equipment						

Table 5.1
SINGLE SEGMENT SUBSTATION O and M by SEGMENT

ID	NAME SUBS	AVG O&M COSTS	Total Cost	1998 O&M	1997 O&M	1996 O&M
13905	Alfalfa	$25,540	76,620	$22,995	$24,806	$28,819
13816	Clarkston	$19,947	59,840	$17,959	$19,373	$22,508
12215	Creston	$23,774	71,321	$21,404	$23,091	$26,826
22022	Dorena	$20,647	61,940	$18,589	$20,053	$23,298
31640	Idahome	$19,787	59,361	$17,815	$19,218	$22,328
12235	Irby	$13,165	39,496	$11,853	$12,786	$14,857
22035	Junction City	$46,977	140,932	$42,295	$45,625	$53,012
11040	Keller	$14,312	42,937	$12,886	$13,900	$16,151
12255	Odessa	$59,256	177,767	$53,350	$57,548	$66,869
30910	Priest River	$20,647	61,940	$18,589	$20,053	$23,298
11065	Republic	$33,272	99,815	$29,956	$32,314	$37,545
23475	Timber	$19,787	59,361	$17,815	$19,218	$22,328
12290	Wagner Lake	$20,647	61,940	$18,589	$20,053	$23,298
20592	Warren	$22,053	66,160	$19,856	$21,419	$24,885
Utility Delivery Segment						
22672	Acton	$23,342	70,026	$21,016	$22,671	$26,339
22003	Alderwood	$14,645	43,936	$13,186	$14,224	$16,526
32805	Athol	$33,828	101,485	$30,456	$32,858	$38,171
11111	Baxter	$22,120	66,361	$19,915	$21,484	$24,962
12310	Bayshore	$19,787	59,361	$17,815	$19,218	$22,328
22911	Beaver	$48,611	145,832	$43,765	$47,211	$54,856
10316	Benton City	$39,239	117,717	$35,329	$38,111	$44,277
13210	Bigelow	$20,266	60,798	$18,247	$19,683	$22,868
10309	Black Rock	$3,753	11,259	$3,379	$3,645	$4,235
22010	Blue River	$20,791	62,374	$18,719	$20,194	$23,461
32918	Brinckens Corner	$13,804	41,412	$12,429	$13,406	$15,577
13611	Burbank	$27,268	81,805	$24,551	$26,485	$30,769
22113	Burnt Woods	$19,787	59,361	$17,815	$19,218	$22,328
10613	Camas	$41,242	123,726	$37,132	$40,055	$46,539
13072	Cape Horn	$22,849	68,548	$20,572	$22,192	$25,784
10621	Carborundum	$40,561	121,684	$36,519	$39,395	$45,770
13070	Carson	$20,615	61,844	$18,560	$20,022	$23,262
21415	Cascade Locks	$19,360	58,079	$16,198	$19,373	$22,508
13516	Cathlamet	$22,849	68,548	$20,572	$22,192	$25,784
13817	Chambers	$22,453	67,360	$20,215	$21,808	$25,337
10615	Chelatchie	$18,959	56,878	$17,070	$18,414	$21,394
10817	Chemical	$70,418	211,254	$63,396	$68,389	$79,469
13215	Cheney	$60,981	182,943	$54,903	$59,224	$68,816
22063	Cheshire	$16,100	48,299	$14,496	$15,636	$18,167
20516	Clatskanie	$15,138	45,414	$13,630	$14,703	$17,081
43220	Clinton	$13,165	39,496	$11,853	$12,786	$14,857
11115	Connell	$23,684	71,052	$21,328	$23,001	$26,723
44115	Corvallis	$10,987	32,961	$9,892	$10,671	$12,398
80210	Curlew	$14,486	43,457	$13,042	$14,069	$16,346
52530	Davis Creek	$13,166	39,499	$11,853	$12,789	$14,857
10720	Dayton	$10,987	32,961	$9,892	$10,671	$12,398
10111	Delight	$13,165	39,496	$11,853	$12,786	$14,857
22021	Dexter	$22,102	66,305	$19,899	$21,466	$24,940
32021	Dixie	$18,959	56,878	$17,070	$18,414	$21,394
11620	Duckabush	$20,806	62,419	$18,733	$20,208	$23,478
32529	East Grangeville	$14,486	43,457	$13,042	$14,069	$16,346
42425	Elmo	$21,961	65,882	$19,771	$21,329	$24,782

Table 5.1
SINGLE SEGMENT SUBSTATION O and M by SEGMENT

ID	NAME SUBS	AVG O&M COSTS	Total Cost	1998 O&M	1997 O&M	1996 O&M
11127	Eltopia	$14,486	43,457	$13,042	$14,069	$16,346
22034	Fern Ridge	$19,947	59,840	$17,959	$19,373	$22,508
23430	Filbert	$14,486	43,457	$13,042	$14,069	$16,346
12730	Fircrest	$23,790	71,370	$21,419	$23,105	$26,846
10630	Fishers Road	$39,604	118,813	$35,658	$38,465	$44,690
13231	Four Lakes	$49,157	147,470	$44,264	$47,741	$55,465
43230	Frenchtown	$17,103	51,310	$15,398	$16,612	$19,300
22234	Froman	$13,165	39,496	$11,853	$12,786	$14,857
12243	Gaffney	$13,165	39,496	$11,853	$12,786	$14,857
21030	Gardiner	$65,299	195,897	$58,791	$63,420	$73,686
22931	Garibaldi	$22,647	67,942	$20,389	$21,996	$25,557
20815	Geisel Monument	$13,165	39,496	$11,853	$12,786	$14,857
11133	Glade	$25,581	76,743	$23,032	$24,846	$28,865
44131	Grantsdale	$9,667	29,000	$8,703	$9,388	$10,909
13520	Grays River	$16,178	48,535	$14,566	$15,713	$18,256
13232	Green Bluff	$22,134	66,402	$19,927	$21,498	$24,977
21432	Guthrie	$18,411	55,232	$16,576	$17,881	$20,775
20931	Hampton	$19,947	59,840	$17,959	$19,373	$22,508
13234	Hangman	$20,474	61,421	$18,433	$19,885	$23,103
22231	Harrisburg	$20,633	61,900	$18,577	$20,040	$23,283
41533	Haskill	$14,285	42,855	$12,861	$13,874	$16,120
10130	Hatton	$14,312	42,937	$12,886	$13,900	$16,151
20631	Hauser	$146,282	438,847	$131,698	$142,069	$165,080
33434	Hay Mill	$29,609	88,827	$26,656	$28,758	$33,413
22930	Hebo	$36,265	108,795	$32,653	$35,219	$40,923
22029	Hideaway	$19,196	57,588	$16,042	$19,218	$22,328
43248	Huson	$13,165	39,496	$11,853	$12,786	$14,857
22535	Ione	$25,419	76,256	$22,885	$24,686	$28,685
13840	Jerita	$29,000	87,000	$26,109	$28,164	$32,727
12335	Kamilche	$20,106	60,319	$18,103	$19,528	$22,688
31151	Laclede	$13,165	39,496	$11,853	$12,786	$14,857
20841	Langlois	$26,281	78,843	$23,662	$25,526	$29,655
12242	Larene	$13,165	39,496	$11,853	$12,786	$14,857
12735	Lynch Creek	$25,421	76,264	$22,888	$24,691	$28,685
13933	Mabton	$14,463	43,390	$13,022	$14,047	$16,321
41650	Madison	$21,270	63,810	$19,153	$20,655	$24,002
11245	Mayview	$9,667	29,000	$8,703	$9,388	$10,909
11145	Mesa	$20,106	60,319	$18,103	$19,528	$22,688
13246	Mica	$13,165	39,496	$11,853	$12,786	$14,857
10645	Mill Plain	$22,905	68,714	$20,622	$22,245	$25,847
23045	Milton	$28,314	84,941	$25,492	$27,500	$31,949
33440	Minico	$14,645	43,936	$13,186	$14,224	$16,526
33445	Minidoka	$22,138	66,413	$19,930	$21,501	$24,982
22945	Mohler	$20,106	60,319	$18,103	$19,528	$22,688
22746	Monmouth	$46,489	139,467	$41,858	$45,152	$52,457
21550	Mountain Avenue	$29,679	89,037	$26,720	$28,824	$33,493
31145	Moyie	$13,165	39,496	$11,853	$12,786	$14,857
12748	Narrows.	$17,436	52,307	$15,698	$16,934	$19,675
20495	Necanium	$13,165	39,496	$11,853	$12,786	$14,857
31650	Newcomb	$16,966	50,897	$15,274	$16,478	$19,145
30952	Newport	$27,706	83,118	$24,944	$26,910	$31,264
20650	No. Brooking	$1,186	3,558	$1,068	$1,152	$1,338

Table 5.1
SINGLE SEGMENT SUBSTATION O and M by SEGMENT

ID	NAME SUBS	AVG O&M COSTS	Total Cost	1998 O&M	1997 O&M	1996 O&M
31150	North Bench	$13,165	39,496	$11,853	$12,786	$14,857
22216	North Butte	$12,746	38,239	$10,596	$12,786	$14,857
20652	Norway	$20,120	60,360	$18,115	$19,542	$22,703
21461	Parkdale	$18,953	56,860	$17,065	$18,407	$21,388
23360	Pine Hollow	$18,635	55,906	$16,777	$18,100	$21,029
20861	Port Orford	$25,098	75,294	$22,596	$24,376	$28,322
10361	Prosser	$46,034	138,102	$41,447	$44,712	$51,943
31668	Raft	$14,979	44,937	$13,488	$14,548	$16,901
22065	Rainbow Valley	$19,787	59,361	$17,815	$19,218	$22,328
10164	Ralston	$14,486	43,457	$13,042	$14,069	$16,346
13968	Rattlesnake	$13,165	39,496	$11,853	$12,786	$14,857
11166	Ringold	$25,581	76,743	$23,032	$24,846	$28,865
13865	Riparia	$18,635	55,906	$16,777	$18,100	$21,029
33431	Riverton	$27,651	82,953	$24,895	$26,855	$31,203
11165	Riverview	$39,891	119,674	$35,917	$38,745	$45,012
33467	Roes Corner	$1,166	3,497	$1,050	$1,132	$1,315
11134	Sagehill	$19,787	59,361	$17,815	$19,218	$22,328
30970	Samuels	$3,293	9,880	$2,416	$3,453	$4,011
32870	Scarcello	$19,787	59,361	$17,815	$19,218	$22,328
10170	Schrag	$14,312	42,937	$12,886	$13,900	$16,151
30975	Selle	$17,548	52,644	$15,799	$17,043	$19,802
10372	Snipes	$17,548	52,644	$15,799	$17,043	$19,802
11472	South Elma	$2,990	8,969	$2,863	$2,981	$3,125
13274	Springhill	$22,931	68,794	$20,645	$22,272	$25,877
23071	Stateline	$9,667	29,000	$8,703	$9,388	$10,909
12761	Steilacoom	$23,790	71,370	$21,419	$23,105	$26,846
13073	Stevenson	$19,947	59,840	$17,959	$19,373	$22,508
44171	Stevensville	$20,649	61,948	$18,589	$20,056	$23,303
13670	Sun Harbor	$140,835	422,506	$126,794	$136,778	$158,934
12765	Surprise Lake	$19,787	59,361	$17,815	$19,218	$22,328
43275	Tarkio	$19,787	59,361	$17,815	$19,218	$22,328
11175	Taylor Flats	$22,690	68,069	$20,428	$22,037	$25,604
23476	Thatcher Junction	$19,787	59,361	$17,815	$19,218	$22,328
42775	Troy	$34,309	102,927	$30,889	$33,323	$38,715
22475	Tumble Creek	$13,444	40,331	$12,104	$13,056	$15,171
20680	Two Mile Road	$19,189	57,566	$17,239	$18,653	$21,674
12746	Tyee/Lakeview	$22,150	66,451	$19,942	$21,512	$24,997
23376	Tygh Valley	$18,635	55,906	$16,777	$18,100	$21,029
13081	Underwood	$20,647	61,940	$18,589	$20,053	$23,298
31680	Unity	$21,349	64,046	$19,223	$20,733	$24,090
10685	Vancouver Shipyard	$40,966	122,899	$36,884	$39,789	$46,226
44185	Victor	$9,667	29,000	$8,703	$9,388	$10,909
22091	Walton	$20,633	61,900	$18,577	$20,040	$23,283
13990	White Swan	$19,079	57,236	$17,177	$18,530	$21,529
23691	Windishar	$13,644	40,933	$12,285	$13,251	$15,397
12490	Winthrop	$20,283	60,849	$18,262	$19,699	$22,888
10391	WPPSS WNP #2	$7,192	21,576	$6,782	$7,230	$7,564
42795	Yaak	$21,912	65,736	$19,727	$21,282	$24,727

Table 5.2
MULTISEGMENT SUBSTATION O and M by SEGMENT

ID	NAME SUBS	AVG O&M COSTS	TOTAL COSTS	1998 O&M	1997 O&M	1996 O&M
13305	Addy	$176,517	529,550	$158,869	$171,561	$199,120
22205	Albany	$171,553	514,658	$154,471	$166,600	$193,587
30905	Albeni Falls	$12,758	38,273	$11,490	$12,389	$14,394
10605	Alcoa	$559,877	1,679,631	$501,990	$548,475	$629,166
22005	Alvey	$795,430	2,386,291	$716,311	$772,402	$897,578
10311	Ashe	$186,563	559,689	$167,966	$181,198	$210,525
20612	Bandon	$92,660	277,979	$83,434	$89,989	$104,556
13271	Bell	$1,138,521	3,415,563	$1,025,112	$1,105,693	$1,284,758
23311	Big Eddy	$934,712	2,804,135	$841,549	$907,804	$1,054,782
31111	Bonners Ferry	$45,570	136,709	$41,034	$44,257	$51,418
12611	Boundary	$82,852	248,557	$74,597	$80,465	$93,495
31611	Bridge	$36,676	110,027	$33,025	$35,618	$41,384
22810	Buckley	$76,771	230,312	$69,113	$74,562	$86,637
10917	Chief Joseph	$994,811	2,984,432	$895,626	$966,153	$1,122,653
10915	Columbia	$428,343	1,285,029	$385,663	$415,990	$483,376
41516	Columbia Falls	$96,031	288,094	$86,472	$93,261	$108,361
41517	Conkelley	$737,054	2,211,161	$663,606	$715,799	$831,756
10815	Cowlitz	$131,556	394,669	$118,446	$127,769	$148,454
13715	Custer	$431,886	1,295,658	$388,825	$419,450	$487,383
13221	Deer Park	$54,072	162,217	$48,683	$52,517	$61,017
21025	Drain	$72,960	218,881	$65,693	$70,860	$82,328
31820	Dworshak	$87,452	262,356	$78,803	$84,900	$98,653
22025	Eugene	$92,859	278,577	$83,609	$90,183	$104,785
41530	Flathead	$79,950	239,851	$71,982	$77,652	$90,217
22032	Florence	$52,391	157,172	$47,170	$50,883	$59,119
23432	Forest Grove	$49,351	148,052	$44,436	$47,931	$55,685
11131	Franklin	$319,886	959,659	$288,004	$310,669	$360,986
23030	Freewater	$32,486	97,458	$29,254	$31,548	$36,656
43925	Garrison	$526,552	1,579,656	$474,086	$511,362	$594,208
13931	Grandview	$75,037	225,110	$67,561	$72,876	$84,673
21431	Hood River	$38,715	116,145	$34,857	$37,600	$43,688
13735	Intalco	$291,165	873,495	$262,133	$282,776	$328,586
22836	John Day	$219,673	659,019	$197,778	$213,347	$247,894
41535	Kalispell	$72,373	217,120	$65,169	$70,289	$81,662
42742	Libby	$123,671	371,012	$111,344	$120,108	$139,560
13841	Little Goose	$63,215	189,645	$56,914	$61,395	$71,336
10841	Longview	$790,524	2,371,572	$711,780	$767,717	$892,075
22041	Lookout Point	$26,572	79,717	$23,927	$25,805	$29,985
12840	Lopez Island	$103,319	309,958	$93,018	$100,343	$116,597
11240	Lower Granite	$40,010	120,030	$36,022	$38,858	$45,150
13641	Lower Monumental	$101,477	304,432	$91,363	$98,554	$114,515
21845	Malin	$349,300	1,047,901	$314,579	$339,178	$394,144
23646	McMinnville	$85,741	257,224	$77,203	$83,271	$96,750
23046	McNary	$902,679	2,708,037	$812,688	$876,676	$1,018,673
10345	Midway	$411,052	1,233,155	$370,076	$399,213	$463,866
13145	Monroe	$318,293	954,879	$286,637	$309,084	$359,158
12552	Naselle	$66,531	199,592	$59,909	$64,611	$75,072
13051	No. Bonneville	$89,677	269,032	$80,741	$87,093	$101,198
22055	Oakridge	$35,281	105,843	$31,765	$34,266	$39,812
23061	Pendleton	$12,256	36,768	$11,035	$11,905	$13,828

Table 5.2
MULTISEGMENT SUBSTATION O and M by SEGMENT

ID	NAME SUBS	AVG O&M COSTS	TOTAL COSTS	1998 O&M	1997 O&M	1996 O&M
11262	Pomeroy	$44,408	133,225	$39,982	$43,131	$50,112
12565	Raymond	$86,782	260,347	$78,134	$84,281	$97,932
21065	Reedsport	$52,601	157,802	$47,361	$51,088	$59,353
10165	Ritzville	$19,787	59,361	$17,815	$19,218	$22,328
13690	Sacajawea	$59,832	179,497	$53,867	$58,109	$67,521
12690	Sacheen	$82,064	246,191	$73,884	$79,701	$92,606
30971	Sandpoint	$26,336	79,007	$23,714	$25,576	$29,717
22271	Santiam	$282,720	848,159	$254,568	$274,556	$319,035
44771	Silver Bow	$113,452	340,357	$102,143	$110,185	$128,029
22671	St. Johns	$355,502	1,066,505	$320,073	$345,274	$401,158
21960	Summer Lake	$19,998	59,993	$18,004	$19,423	$22,566
31071	Swan Valley	$86,246	258,739	$77,649	$83,761	$97,329
12775	Tacoma	$290,894	872,681	$261,934	$282,495	$328,252
23375	The Dalles	$71,735	215,204	$64,588	$69,671	$80,945
22976	Tillamook	$121,504	364,511	$109,666	$118,277	$136,568
42776	Trego	$40,808	122,425	$36,745	$39,633	$46,047
13275	Trentwood	$189,720	569,159	$170,820	$184,249	$214,090
22675	Troutdale	$497,789	1,493,368	$448,200	$483,429	$561,739
10485	Valhalla	$238,894	716,683	$215,113	$232,008	$269,562
13691	Walla Walla	$151,962	455,885	$136,821	$147,580	$171,484
Multisegmented stations with a 34.5 kV componet						
31626	East Hills	$61,754	185,261	$55,598	$59,977	$69,686
22045	Mapleton	$42,636	127,909	$38,387	$41,410	$48,112
12361	Potlatch	$38,777	116,332	$34,913	$37,661	$43,758
11171	Scooteney	$99,234	297,701	$89,346	$96,376	$111,979

CHAPTER 6

DELIVERY FACILITIES FORECASTED TO BE SOLD THROUGH FY2003

In 1996 TBL adopted a policy for the sale of Delivery segment facilities to customers served by those facilities, including both the Utility Delivery and DSI Delivery segments. The policy is expected to be extended through the rate period. The facilities that are forecast to be sold will affect the Delivery segment revenue requirement through the investment base and O&M allocation. A forecast of facilities to be sold during the period FY1999 through FY2003 was made and is shown in Table 6.1. The forecast was made by TBL staff familiar with sales in progress and with customer interest in potential purchases.

Table 6.1 shows the forecast of substations to be sold for both Utility and DSI Delivery segments. The investment shown is for 9/30/98. The investment for the stations forecast to be sold will be subtracted from the total segment investment by year. The average O&M cost will also be subtracted from the total segment O&M cost (3 year average), which is used in allocating budgeted O&M cost for the test years. The forecast of sold stations includes those stations to be retired or removed from service for reasons other than being sold. An example is Hanna substation, where the DSI customer has ceased operation and the substation is no longer used. In a few cases the Utility customer has developed another way to serve its load and the equipment at the station has been retired or moved to another station.

TABLE 6.1
DELIVERY SUBSTATIONS FORECAST TO BE SOLD

DSI Delivery Stations

ID	NAME	INVEST 9/30/98	AVG O&M COSTS
Sold in FY1999			
10605	Alcoa	6,338,949	377,748
Sold in FY2001			
13271	Bell	14,545,296	420,350
41517	Conkelley	5,539,872	384,612
21031	Hanna	2,360,198	79,946
12775	Tacoma	3,890,334	79,124
13275	Trentwood	3,738,726	105,742
	Total in FY2001	**30,074,427**	**1,069,774**
Total for all Years		**36,413,376**	**1,447,522**

Utility Delivery Stations

Sold/Retired in FY1999			
10817	Chemical	938,422	70,418
22032	Florence	355,439	21,763
20631	Hauser	534,246	146,282
12690	Sacheen	202,565	7,109
23691	Windishar	117,079	13,644
	Total in 1999	**2,147,751**	**259,216**
Sold/Retired in FY2001			
22003	Alderwood	653,125	14,645
32805	Athol	780,463	33,828
12310	Bayshore	315,689	19,787
10316	Benton City	386,960	39,239
13210	Bigelow	396,982	20,266
22010	Blue River	296,601	20,791
22063	Cheshire	1,541,496	16,100
11115	Connell	611,356	23,684
80210	Curlew	582,237	14,486
10720	Dayton	387,531	10,987
22021	Dexter	357,290	22,102
31626	East Hills	210,901	18,435
22034	Fern Ridge	153,787	19,947
12730	Fircrest	1,080,988	23,790
11131	Franklin	1,150,298	42,432
23030	Freewater	693,317	19,986
20815	Geisel Monument	77,887	13,165
13232	Green Bluff	138,873	22,134
22231	Harrisburg	224,002	20,633
33434	Hay Mill	1,153,328	29,609
12335	Kamilche	543,988	20,106
12840	Lopez Island	1,835,841	46,975
23646	McMinnville	537,242	27,798
13246	Mica	73,573	13,165
23045	Milton	2,562,506	28,314
33440	Minico	776,451	14,645
31650	Newcomb	561,618	16,966

TABLE 6.1
DELIVERY SUBSTATIONS FORECAST TO BE SOLD

ID	NAME	INVEST 9/30/98	AVG O&M COSTS
22055	Oakridge	623,665	28,149
10361	Prosser	893,919	46,034
31668	Raft	553,034	14,979
22065	Rainbow Valley	265,682	19,787
33431	Riverton	544,450	27,651
11165	Riverview	566,169	39,891
33467	Roes Corner	1,887,120	1,166
11134	Sagehill	475,304	19,787
32870	Scarcello	935,764	19,787
10372	Snipes	442,817	17,548
11175	Taylor Flats	477,206	22,690
31680	Unity	1,245,501	21,349
12490	Winthrop	1,407,436	20,283
Total in FY2001		**28,402,398**	**913,114**
Total for all years		**30,550,149**	**1,172,330**

CHAPTER 7

SEGMENTATION OF PROPOSED SYSTEM ADDITIONS

Plant-in-service additions for FYs 1999 through 2003 are shown in the following tables. These forecasts are provided by TBL program offices, consistent with the capital obligations in TBL's FY2001 budget submittal to OMB and congress. The program offices indicate the estimated energization dates and segmentation of proposed plant additions. The forecasted additions include indirect costs, such as corporate overhead and AFUDC. The projected plant-in-service by budget item is shown in Table 7.1 and are summarized by segment in Table 7.2.

Table 7.1 shows the segmentation by budget item. The first columns list the budget item number and name. The "SUB-LIN-GEN PLT" set of columns show the percent of each item projected to be capitalized as lines, substations, or general plant. The next set of columns labeled "SEGMENT DISTRIBUTION" shows the segment the transmission plant is assigned to. For example, the first line has a 1 in the NW column that means 100% of this item is assigned to the Network segment. The plant in service by year is shown in the later columns.

Table 7.2 is a summary of plant is service by segment by year for lines and substations in the top two sections. The bottom section is the general plant summary and shows the investment by account by year. The account tittle, BPA account number (BA), and FERC account number (FA) are shown under the account heading. The control equipment and communications equipment accounts are partly allocated to ancillary services as shown in Chapter 10. The assignment to each account is based on the historical treatment of the budget items.

TABLE 7.1
FY1999 - FY2003 CAPITAL ADDITIONS PROJECTIONS
(Dollars in Thousands)

"Plant-in-Service Projections" - Inflation Included - $(000)																	
		SUB - LIN - GEN PLNT			SEGMENT DISRTIBUTION								FY 99	FY 00	FY 01	FY 02	FY 03	TOTAL
RPA	RPA NAME	%LIN	%SUB	%GP	DS	GI	ITM	NW	PU	IND	IAC	IDC						
CR1147	E. Seattle Reinf	0.65	0.35					1						500.0	13,000.0	4,229.0		**17,729.0**
CR1452	N. Seattle Transformer Reinf	0.01	0.99					1							8,000.0	4,200.0	428.2	**12,628.2**
CR1492	Schutz 500 KV series caps		1					1								8,500.0	14,000.0	**22,500.0**
	Olympia 230/115KV Bank #4		1					1										**0.0**
	Raver-Paul outage relief	0.88	0.12					1						200.0	2,500.0	1,462.5		**4,162.5**
	Pearl 500/230 KV bank		1					1										**0.0**
	Troutdale 230 KV Shunt Cap		1					1					1,218.0					**1,218.0**
	Shelton 230 KV Shunt Cap		1					1						840.9				**840.9**
	Redmond 230 KV Shunt Cap		1					1						900.0	257.1			**1,157.1**
	Cross Cascades SC 500 KV	0.9	0.1					1										**0.0**
	McNary-Slatt 500KV line	0.7	0.3					1										**0.0**
	Hanford-Ost. tap to Big Eddy	0.85	0.15					1										**0.0**
	McNary-Slatt 500KV line	0.7	0.3					1							500.0	1,200.0	8,800.0	**10,500.0**
	McNary-Coyote 500KV Line	0.8	0.2					1										**0.0**
	Olympia-White River Relocation	1						1							450.0	71.5		**521.5**
	West of Hatwai (Coulee-Bell fixes)	0.85	0.15					1							1,400.0	8,500.0	41,000.0	**50,900.0**
	PNW-Idaho fixes	0.5	0.5					1							350.0	2,500.0	364.0	**3,214.0**
	N-2 Criteria Compliance	0.5	0.5					1						3,000.0	4,200.0	4,400.0	4,500.0	**16,100.0**
	Northern Intertie Fixes	0.85	0.15					1					3,000.0	5,500.0	3,600.0	22,000.0	14,000.0	**48,100.0**
	Fire Suppression			1											1,043.0	1,077.0	1,104.0	**3,224.0**
CR1500	System Reactive Facilities		1					0.9			0.05	0.05	2,500.0	8,200.0	6,625.0	5,000.0	5,000.0	**27,325.0**
CR1990	Various Additions	0.75	0.25					1						4,500.0	9,500.0	10,000.0	10,000.0	**34,000.0**
CR2000	System Controls		0.34	0.66				0.3			0.02	0.02	8,200.0	8,000.0	8,200.0	8,500.0	8,600.0	**41,500.0**
	Transmission Sched Development			1									1,000.0	9,000.0	6,500.0	5,500.0	4,500.0	**26,500.0**
CR2500	Fiber Optics (Incls Terminations)			1									3,600.0	23,015.7	26,838.9	22,200.0	18,200.0	**93,854.6**
CR3000	Misc Line & Sub Additions	0.5	0.5					0.92			0.04	0.04	5,200.0	5,200.0	4,400.0	4,000.0	4,500.0	**23,300.0**
CR7488	Hood River Reinforcement	1						1						3,048.0				**3,048.0**
CR7XX9	Kitsap Penin Reinf	0.8	0.2					1							1,000.0	11,000.0	1,315.5	**13,315.5**
CR7XX0	Custer-Intalco Rebuild	0.6	0.4					1										**0.0**
CR7XX9	San Juan Cable Replcmt	0.9	0.1					1							10,200.0	875.8		**11,075.8**
CR7478	Albany-Eugene Rebuild	0.6	0.4					1							4,100.0	257.8		**4,357.8**
CR7XX8	Trentwood Area	0.5	0.5					1							973.3			**973.3**
	SW Oregon Coast (Bandon-Rogue)	0.8	0.2					1								4,500.0	14,500.0	**19,000.0**
	Fairview SVC		1					1									5,000.0	**5,000.0**
	Franklin Area Reinf.	1						1						2,800.0	374.4			**3,174.4**
CR7490	Tanner	0.8	0.2					1						2,568.0				**2,568.0**
	Santiam-Chemawa 230 Line #2	0.9	0.1					1										**0.0**
	Trentwood 230/115kv bk/line		1					1										**0.0**
	Libby-Bonners Ferry 115 recond.	1						1										**0.0**
	Salem-Grand Rd Recond	1						1								2,600.0	408.8	**3,008.8**
	Midway-Grandview Recond	1						1							3,800.0	468.7		**4,268.7**
	Goshen-Drummond Upgrade&Tx	1						1								2,000.0	416.5	**2,416.5**
	Longview 230/115-kV Bank #2		1					1										**0.0**
	Port Angeles (SVC)		1					1										**0.0**
	Seattle City Light	0.25	0.75					1					1,800.0	200.0				**2,000.0**

TABLE 7.1
FY1999 - FY2003 CAPITAL ADDITIONS PROJECTIONS
(Dollars in Thousands)

"Plant-in-Service Projections" - Inflation Included - $(000)																	
		SUB - LIN - GEN PLNT			SEGMENT DISRTIBUTION							FY 99	FY 00	FY 01	FY 02	FY 03	TOTAL
RPA	RPA NAME	%LIN	%SUB	%GP	DS	GI	ITM	NW	PU	IND	IAC	IDC						
CR7700	Customer Service Items	0.46	0.51	0.03	0.04			0.89	0.04				1,100.0	2,048.0	2,086.0	4,308.0	4,416.0	**13,958.0**
MR2C	Nonelectric Plant Replcmts			1									5,800.0	2,000.0	1,400.0	10,500.0	6,000.0	**25,700.0**
MR3C	Transmission Line Replcmts	1						0.92			0.08		3,000.0	3,200.0	3,900.0	4,200.0	4,400.0	**18,700.0**
MR4C	Substation Replcmts		1		0.05	0.02		0.84	0.05		0.02	0.02	12,000.0	12,800.0	15,800.0	16,800.0	17,300.0	**74,700.0**
MR5C	System Protection Replcmts		1					0.88			0.06	0.06	2,500.0	2,700.0	3,300.0	3,500.0	3,700.0	**15,700.0**
MR6C	Pwr Sys Cntrl Replcmts			1									4,200.0	4,200.0	4,800.0	5,300.0	5,500.0	**24,000.0**
MR8C	Tools and Equipment			1									2,400.0	2,560.0	4,172.0	4,308.0	4,416.0	**17,856.0**
	Emergency Funds	0.5	0.5		0.05	0.02	0.05	0.68	0.05		0.1	0.05		10,000.0	10,000.0	10,000.0	10,000.0	**40,000.0**
VR2C	PP&A--Fire Prot/Sec Contain			1									528.0	334.8	334.8	331.7	340.0	**1,869.3**
VR4C	PP&A--PCB Capacitor Replac		1					1					7,000.0	7,000.0	7,100.0	7,100.0	7,250.0	**35,450.0**
VR7C	PP&A--Restoration		0.33	0.67				0.33					1,028.0	753.2	753.2	746.4	765.1	**4,045.9**
VR5C	Cap ADP Equip--Environment			1									154.0	716.8	730.1	753.9	772.8	**3,127.6**
CR5400	Capital ADP Equipment			1									1,500.0	665.6	730.1	753.9	772.8	**4,422.4**
CR9100	Completion of Prior Yr Items			1									100.0	0.0	0.0	0.0	0.0	**100.0**
CR9130	Cap-to-Exp Adjustments	0.25	0.25	0.5				0.5					(3,000.0)	(3,000.0)	(3,000.0)	(3,000.0)	(3,000.0)	**(15,000.0)**
	Undistributed Reduction	*0.3*	*0.5*	*0.2*						*0.8*				*(4,075.8)*	*4,078.8*			
CR9600	*TSD Program Indirect*	*0.3*	*0.5*	*0.2*						*0.8*			8,400.0	8,192.0	8,344.0	8,616.0	8,832.0	**42,384.0**
CR999	*TSD MS&A*	*0.3*	*0.5*	*0.2*						*0.8*			8,500.0	7,168.0	7,301.0	7,539.0	7,728.0	**38,236.0**
CR9600	*Support Services Cap Distribution*	*0.3*	*0.5*	*0.2*						*0.8*			5,000.0	5,120.0	5,215.0	5,385.0	5,520.0	**26,240.0**
CRAF	*TSD AFUDC*	*0.3*	*0.5*	*0.2*						*0.8*			5,000.0	4,096.0	7,301.0	8,616.0	7,728.0	**32,741.0**
CR9600	*TSD Share - Corp OH*	*0.3*	*0.5*	*0.2*						*0.8*			12,000.0	11,575.3	10,880.8	7,754.4	7,728.0	**49,938.5**
TOTAL TBL CAPITAL													**103,728.0**	**155,526.5**	**213,038.5**	**238,554.6**	**256,805.7**	**967,650.3**
Segment Legend:																		
DS=DSI Delivery; GI=Generation Integration; ITM=Montana Intertie; NW=Network; PU=Utility Delivery; IND=Indirects; IAC=AC Intertie; IDC=DC Intertie																		

TABLE 7.2
TRANSMISSION BUSINESS LINE - CAPITAL PROGRAM
(Dollars in Thousands)

Plant-In-Service Projection Summary

Substations Summary By Segment - w/ Indirects Rolled Into The Segments

Segment	FY 99	FY 00	FY 01	FY 02	FY 03	TOTAL
DSI Segment	936.4	1,191.7	1,376.0	1,430.5	1,426.3	**6,360.8**
Generation Integration Segment	361.1	455.3	528.8	529.5	527.9	**2,402.5**
Montana Intertie Segment (Eastern)	0.0	319.7	317.8	303.6	295.9	**1,237.0**
Network Segment	42,142.9	52,188.0	73,818.0	79,000.5	89,958.7	**337,108.1**
Public Utility Segment	936.4	1,191.7	1,376.0	1,430.5	1,426.3	**6,360.8**
AC Intertie Segment	1,015.1	1,901.0	1,892.6	1,741.3	1,735.7	**8,285.7**
DC Intertie Segment	1,015.1	1,581.3	1,574.8	1,437.7	1,439.8	**7,048.7**
Sub's Grand Total	**46,407.0**	**58,828.7**	**80,883.9**	**85,873.6**	**96,810.5**	**368,803.6**

Lines Summary By Segment - w/ Indirects Rolled Into The Segments

Segment	FY 99	FY 00	FY 01	FY 02	FY 03	TOTAL
DSI Segment	41.9	363.2	343.7	370.3	364.6	**1,483.7**
Generation Integration Segment	0.0	126.2	119.2	112.5	110.1	**467.9**
Montana Intertie Segment (Eastern)	0.0	315.6	298.0	281.1	275.1	**1,169.9**
Network Segment	17,040.1	34,339.7	61,705.6	79,586.2	96,052.8	**288,724.4**
Public Utility Segment	41.9	363.2	343.7	370.3	364.6	**1,483.7**
AC Intertie Segment	712.5	1,085.6	1,072.7	1,030.1	1,036.7	**4,937.7**
DC Intertie Segment	215.4	446.9	402.9	371.1	374.2	**1,810.4**
Lines Grand Total	**18,051.8**	**37,040.3**	**64,285.8**	**82,121.7**	**98,578.0**	**300,077.6**

General Plant Summary By Account

Account	FY 99	FY 00	FY 01	FY 02	FY 03	TOTAL
Metering Stations (BA=414; FA=353)	45.8	71.3	76.8	141.4	144.5	**479.8**
Cntl. Equip (BA=424; FA=353)	12,876.9	20,224.9	19,241.1	18,569.1	17,808.6	**88,720.5**
Comm. Equip. (BA= 664/673/684/694; FA=397)	5,954.2	24,829.4	30,783.6	24,444.3	20,416.7	**106,428.2**
Structures & Imp. (BA=511; FA=390)	7,980.1	3,581.6	4,358.2	13,327.2	8,863.7	**38,110.8**
ADP Equip. & Software (BA=530/535; FA=391.2/39	1,870.9	1,549.5	1,702.4	1,714.6	1,749.8	**8,587.3**
Tools, Shop & Garage Equip. (BA=590; FA=394)	297.4	300.2	481.3	485.5	495.7	**2,060.2**
Stores Equip. (BA=570; FA=393)	442.9	447.9	718.4	725.3	740.5	**3,075.0**
Helicopter (BA=550 FA=392.2)	297.4	300.2	481.3	485.5	495.7	**2,060.2**
Lab Equip. (BA=614 FA=395)	594.8	600.5	962.6	971.1	991.3	**4,120.4**
Test Facilities (BA=615 FA=395.1)	0.0	0.0	0.0	0.0	0.0	**0.0**
Land & Land Rights (BA=504 FA=389)	0.0	0.0	0.0	0.0	0.0	**0.0**
Fixed Wing (BA=560 FA=392.3)	297.4	300.2	481.3	485.5	495.7	**2,060.2**
Office Furn. & Fixtures (BA=520; FA=391.1)	0.0	0.0	0.0	0.0	0.0	**0.0**
Rolling Stocks (BA=540 FA=392.1)	442.9	447.9	718.4	725.3	740.5	**3,075.0**
Power Operated Equip. (BA=630; FA=396)	594.8	600.5	962.6	971.1	991.3	**4,120.4**
General Plant Grand Total	**31,695.8**	**53,254.1**	**60,968.2**	**63,045.9**	**53,933.9**	**262,897.8**

Note: FA is FERC Account; BA is BPA Account

DOCUMENTATION OF

SEGMENTATION FOR ANCILLARY SERVICES

INTRODUCTION

Ancillary services are necessary to support the transmission of capacity and energy from resources to load while maintaining reliable operation of TBL's transmission system in accordance with good utility practice. The services are defined in the rate schedules. Ancillary Services include:

Scheduling, System Control, and Dispatch

Reactive Supply and Voltage Control from Generation Sources
Regulation and Frequency Response
Energy Imbalance
Operational Reserves – Spinning
Operational Reserves – Supplemental

The determination of the revenue requirement for these services requires that the investment in the equipment used to provide the service and the associated O&M be identified. The primary costs for providing these services are associated with the control equipment located primarily at the control center, and the communications system and SCADA connecting to the facilities being controlled.

Chapter 8 document's segmentation of the ancillary service investment, chapter 9 provides the segmented O&M, and chapter 10 identifies the proposed plant additions for FY1999 through FY2003.

Chapter 8

Segmentation of Ancillary Service Investment

The investment in plant for ancillary services as of 9/30/98 is shown in table 8.1.The equipment that is assigned to ancillary services is from general plant accounts. This primarily includes control and communications equipment. Other types of equipment from general plant accounts that support this equipment, as structures and improvements, are allocated to all segments as part of the overall general plant. The control equipment is included in the FERC account 353 and the communications equipment is in the FERC account 397. The BPA accounts system uses a number of accounts for specific types of equipment that feed into each of the general FERC accounts. Allocation factors for each BPA account have been developed for allocating the investment costs to each subsegment (service) and are explained below.

Table 8.1 shows the segmentation of plant associated with ancillary services by BPA and FERC account. Column A is a description of each account, column B is the associated BPA account, column C is the BPA Plant Retirement Unit (PRU) number, and column D is the FERC account. Columns E through K shows the proportion of the account investment allocated to transmission (column E) and each ancillary service. Column L is the total investment as of September 30, 1998. Columns M through S show the investment assigned to each service. The total investment assigned to each service is shown at the end of the table.

Substation Equipment – Control (FERC 353)

The substation control equipment account includes the portion of substation equipment used to control the system from the control center including RODS (Real time Operations, Dispatch, and Scheduling system). The FERC 353 account includes all substation equipment, but for

segmentation purposes only control equipment that is in BPA account 424 is classified to ancillary services. The percentage of investment assigned to each service is based on staff estimates of its use.

Communications (FERC 397)

The TBL communication system provides a range of functions. The primary is to communicate between the control centers, TBL substations, federal and non-federal generating plants, and other utilities to dispatch, schedule, control, and maintain the transmission system. The communications account includes microwave, fiber, and radio equipment as well as SCADA (Supervisory Control And Data Acquisition System) equipment.

Microwave and fiber system

This backbone of TBL's communication system is composed of microwave and fiber networks. The system consists of circuits connecting the control center to locations on the system. The total number of circuits in use is about 2800 at present. The amount of the communication system assigned to each service is based on the proportional number of circuits used for each service.

The Scheduling, System Control, and Dispatch service is estimated to use about 700 circuits, or 25% of the total. Approximately 1% of these circuits are used to control generator reactive, leaving 24% assigned to the Scheduling, System Control, and Dispatch use.

The use for Regulation and Frequency Response service, which is primarily automatic generation control (AGC), is about 180 circuits which is approximately 6% of the total.

The use for Energy Imbalance and Operating Reserves is relatively small. None of the communication system is allocated to those services. The remaining circuits, about 69% of the backbone system, are used primarily for transmission purposes as RAS and transfer trip.

TBL plans to continue to convert its microwave network to a fiber network in the future. Most of the uses of the microwave system are planned to be transferred to the fiber system in the future. In the long term use, TBL expects the use of the combined system to continue in the same proportion. The allocation percentages are for accounts for microwave and fiber equipment, and apply to both plant in service and capital additions.

SCADA Equipment

Supervisory Control And Data Acquisition System (SCADA) is primarily comprised of a set of computers at the control center and at each TBL substation that are used to monitor and control the TBL transmission system. A primary function of SCADA is to remotely operate switching devices at substations. It has been assigned almost entirely to the System Control service (98%), with minor amounts used for Generator Reactive Supply (1%) and Regulation and Frequency Control (1%).

Other Communications Equipment

The other portion of TBL's communication equipment is the UHF/VHF radio system. This system is largely for mobile voice communications, which is used primarily for maintenance communications. This investment for this system is assigned to transmission.

TABLE 8.1
Segmentation of Ancillary Services Plant - Investment As of 9/30/98

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
DESC	ACCOUNT	PRU	FERC	ASSIGNTX	SCH&DISP	GENREACT	REG&FREQ	ENERGYIMB	SPINNING	SUPPL	Amount	ASSIGNTX	SCH&DISP	GENREACT	REG&FREQ	ENERGYIMB	SPINNING	SUPPL
Cntrl. Equip.: Dispatcher's board.	424	101	35311	0	1.00	0.00	0.00	0.00	0.00	0.00	2,208,034	-	2,208,034	-	-	-	-	-
Cntrl. Equip.: Stream gauging Equip., telemark by loc	424	102	35300	1	0.00	0.00	0.00	0.00	0.00	0.00	638,339	638,339	-	-	-	-	-	-
Cntrl. Equip.: Automatic weather reporting, by locati	424	103	35311	1	0.00	0.00	0.00	0.00	0.00	0.00	75,539	75,539	-	-	-	-	-	-
Cntrl. Equip.: RODS (Real time operation-dispatch & sch	424	104	35311	0	0.86	0.05	0.05	0.00	0.02	0.02	35,360,889	-	30,410,365	1,768,044	1,768,044	-	707,218	707,218
Cntrl. Equip.: Pwr.house data acquisition systems.	424	105	35311	0	0.00	0.10	0.20	0.00	0.35	0.35	873,945	-	-	87,395	174,789	-	305,881	305,881
Cntrl. Equip.: HVDC (high voltage DC) (console/comput	424	106	35311	0	0.95	0.00	0.00	0.00	0.00	0.05	31,154	-	29,596	-	-	-	-	1,558
Cntrl. Equip.: TCDS (Trans. Cntrl. dispatch system)Di	424	107	35311	0	1.00	0.00	0.00	0.00	0.00	0.00	19,216,241	-	19,216,241	-	-	-	-	-
Cntrl. Equip.: RAS (remedial action scheme) /line los	424	108	35311	1	0.00	0.00	0.00	0.00	0.00	0.00	1,771,219	1,771,219	-	-	-	-	-	-
Cntrl. Equip.: Dispatcher's board.	424	114	35311	0	1.00	0.00	0.00	0.00	0.00	0.00	83,409	-	83,409	-	-	-	-	-
Subtotal FERC 353 sub equip (Control 424 only)											60,258,769	2,485,097	51,947,645	1,855,439	1,942,833	-	1,013,099	1,014,656
COMMUNICATION Equip.	650	000	397000	1	0.00	0.00	0.00	0.00	0.00	0.00	17,113,628	17,113,628	-	-	-	-	-	-
Communication Equip.; BPA Sub.; Yard Equip.	664	101	39709	1	0.00	0.00	0.00	0.00	0.00	0.00	9,867,640	9,867,640	-	-	-	-	-	-
Transfer trip and relaying	664	102	39709	1	0.00	0.00	0.00	0.00	0.00	0.00	32,916,579	32,916,579	-	-	-	-	-	-
Telemetering Equip.	664	103	39700	0	0.50	0.05	0.40	0.00	0.03	0.02	7,180,469	-	3,590,235	359,023	2,872,188	-	215,414	143,609
Supervisory Equip.	664	104	39700	0	0.90	0.05	0.05	0.00	0.00	0.00	1,889,872	-	1,700,885	94,494	94,494	-	-	-
Telephone Equip.	664	105	39720	0	0.80	0.05	0.10	0.00	0.03	0.02	5,222,489	-	4,177,991	261,124	522,249	-	156,675	104,450
Radio Transmitting and Receiving Sets (MW)	664	106	39713	0	0.80	0.05	0.10	0.00	0.03	0.02	-	-	-	-	-	-	-	-
Load frequency Cntrl. Equip.	664	107	39714	0	0.05	0.10	0.65	0.00	0.10	0.10	418,986	-	20,949	41,899	272,341	-	41,899	41,899
Computer, supervisory (SCADA)	664	114	39700	0	0.98	0.01	0.01	0.00	0.00	0.00	86,301,553	-	84,575,522	863,016	863,016	-	-	-
Cables	664	115	39703	0	1.00	0.00	0.00	0.00	0.00	0.00	322,911	-	322,911	-	-	-	-	-
MULTIPLEX, scada	664	122	39700	0	0.90	0.05	0.05	0.00	0.00	0.00	127,702	-	114,932	6,385	6,385	-	-	-
Intercommunicating Sets (VHF)	664	202	39709	1	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	-
RACK RECORDER CCTV	664	301	39700	1	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	-
Cables	664	303	39703	1	0.00	0.00	0.00	0.00	0.00	0.00	17,737	17,737	-	-	-	-	-	-
Radio Transmitting and Receiving Sets (VHF)	664	305	39713	1	0.00	0.00	0.00	0.00	0.00	0.00	25,239	25,239	-	-	-	-	-	-
Radio Transmitting and Receiving Sets (VHF)	664	306	39713	1	0.00	0.00	0.00	0.00	0.00	0.00	26,101	26,101	-	-	-	-	-	-
Radio Transmitting and Receiving Sets (VHF)	664	307	39713	1	0.00	0.00	0.00	0.00	0.00	0.00	7,541	7,541	-	-	-	-	-	-
Radio Transmitting and Receiving Sets (VHF)	664	308	39713	1	0.00	0.00	0.00	0.00	0.00	0.00	6,651	6,651	-	-	-	-	-	-
Pwr. Supply	664	316	39700	1	0.00	0.00	0.00	0.00	0.00	0.00	30,267	30,267	-	-	-	-	-	-
Telephone and telegraph circuits	664	501	39720	0	0.80	0.05	0.10	0.00	0.03	0.02	4,422	-	3,538	221	442	-	133	88
SWITCH, AUTOMATIC TRAN	664	506	39700	1	0.00	0.00	0.00	0.00	0.00	0.00	204,027	204,027	-	-	-	-	-	-
PEDESTAL CARRIER CUR 8FT	664	602	39700	1	0.00	0.00	0.00	0.00	0.00	0.00	514	514	-	-	-	-	-	-
Scada	664	614	39700	0	0.90	0.05	0.03	0.00	0.01	0.01	59,509	-	53,558	2,975	1,785	-	595	595
Radio Transmitting and Receiving Sets	664	664	39713	0	0.90	0.03	0.05	0.00	0.01	0.01	-	-	-	-	-	-	-	-
Storage Batteries	664	704	39716	1	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	-
Radio Transmitting and Receiving Sets	664	800	39713	1	0.00	0.00	0.00	0.00	0.00	0.00	302	302	-	-	-	-	-	-
CONTRIB IN AID OF CONSTR, CONTRIBUTED Pl. CREDIT	664	882	39713	1	0.00	0.00	0.00	0.00	0.00	0.00	(24,620)	(24,620)	-	-	-	-	-	-
BPA lines/fiber optic cable	673	100	39713	0.69	0.24	0.01	0.06	0.00	0.00	0.00	64,461,274	44,478,279	15,470,706	644,613	3,867,676	-	-	-
Radio Transmitting and Receiving Sets (MW)	684	101	39713	0	0.90	0.03	0.05	0.00	0.01	0.01	480,448	-	432,403	14,413	24,022	-	4,804	4,804
Potential Devices	684	103	39713	1	0.00	0.00	0.00	0.00	0.00	0.00	10,567	10,567	-	-	-	-	-	-
SUPERVIS CLOSE/RECLOSE	684	104	39700	0	1.00	0.00	0.00	0.00	0.00	0.00	10,912	-	10,912	-	-	-	-	-
Communication Equip.; Microwave and Radio:MICROWAVE:	694	100	39722	0.69	0.24	0.01	0.06	0.00	0.00	0.00	3,536	2,440	849	35	212	-	-	-
MICROWAVE: HOOPER GOES	694	101	39722	0.69	0.24	0.01	0.06	0.00	0.00	0.00	2,844,892	1,962,975	682,774	28,449	170,694	-	-	-
MICROWAVE: Radio Transmitting and Receiving Sets	694	102	39722	0.69	0.24	0.01	0.06	0.00	0.00	0.00	177,764	122,657	42,663	1,778	10,666	-	-	-
MICROWAVE: Intercommunicating Sets	694	103	39722	0.69	0.24	0.01	0.06	0.00	0.00	0.00	62,664	43,238	15,039	627	3,760	-	-	-
MICROWAVE: LAKE WENATCHEE HYDRO	694	104	39722	1	0.00	0.00	0.00	0.00	0.00	0.00	70,386	70,386	-	-	-	-	-	-
HYDROMET CENTRAL CONTRLR	694	106	39722	1	0.00	0.00	0.00	0.00	0.00	0.00	175,261	175,261	-	-	-	-	-	-
LAURIER HYDRO	694	110	39722	1	0.00	0.00	0.00	0.00	0.00	0.00	13,877	13,877	-	-	-	-	-	-
Station Struc. and Station Service Equip.: Site deve	694	111	39700	0.69	0.24	0.01	0.06	0.00	0.00	0.00	3,738,038	2,579,246	897,129	37,380	224,282	-	-	-
Building	694	112	39700	0.69	0.24	0.01	0.06	0.00	0.00	0.00	15,391,839	10,620,369	3,694,041	153,918	923,510	-	-	-
Tower-microwave	694	113	39722	0.69	0.24	0.01	0.06	0.00	0.00	0.00	5,656,894	3,903,257	1,357,655	56,569	339,414	-	-	-
Storage Batteries	694	114	39716	0.69	0.24	0.01	0.06	0.00	0.00	0.00	16,931,144	11,682,489	4,063,475	169,311	1,015,869	-	-	-
Tower-microwave	694	117	39722	0.69	0.24	0.01	0.06	0.00	0.00	0.00	48,396	33,393	11,615	484	2,904	-	-	-
Radio Transmitting and Receiving Sets	694	119	39712	0.68	0.24	0.01	0.07	0.00	0.00	0.00	-	-	-	-	-	-	-	-
Tower-microwave	694	120	39722	0.69	0.24	0.01	0.06	0.00	0.00	0.00	45,072	31,100	10,817	451	2,704	-	-	-
Microwave Electronic Equip.	694	121	39700	0.69	0.24	0.01	0.06	0.00	0.00	0.00	12,406,441	8,560,444	2,977,546	124,064	744,386	-	-	-
Radio Transmitting and Receiving Sets	694	122	39712	0.69	0.24	0.01	0.06	0.00	0.00	0.00	76,077,713	52,493,622	18,258,651	760,777	4,564,663	-	-	-
Telephone and telegraph circuits	694	123	39720	0	0.90	0.03	0.05	0.00	0.01	0.01	3,870,882	-	3,483,794	116,126	193,544	-	38,709	38,709
Tower-microwave	694	125	39722	0.69	0.24	0.01	0.06	0.00	0.00	0.00	16,259	11,219	3,902	163	976	-	-	-
Boundary Goes	694	126	39700	0.69	0.24	0.01	0.06	0.00	0.00	0.00	12,202	8,419	2,928	122	732	-	-	-
Tower-microwave	694	130	39722	0.69	0.24	0.01	0.06	0.00	0.00	0.00	37,213	25,677	8,931	372	2,233	-	-	-
HEYBROOK MTU	694	131	39700	0.69	0.24	0.01	0.06	0.00	0.00	0.00	19,240	13,276	4,618	192	1,154	-	-	-
MT SPOKANE MTU MUX	694	132	39700	0.69	0.24	0.01	0.06	0.00	0.00	0.00	16,043	11,070	3,850	160	963	-	-	-
FALLS GOE	694	133	39700	0.69	0.24	0.01	0.06	0.00	0.00	0.00	22,505	15,528	5,401	225	1,350	-	-	-
Tower-microwave	694	136	39722	0.69	0.24	0.01	0.06	0.00	0.00	0.00	10,171	7,018	2,441	102	610	-	-	-
TEKOA HYDRO	694	138	39722	1	0.00	0.00	0.00	0.00	0.00	0.00	37,377	37,377	-	-	-	-	-	-
Grounding System, roads, site dvlpmt., etc. (UHF)	694	201	39722	1	0.00	0.00	0.00	0.00	0.00	0.00	311,235	311,235	-	-	-	-	-	-
Radio Transmitting and Receiving Sets (UHF)	694	202	39713	1	0.00	0.00	0.00	0.00	0.00	0.00	281,715	281,715	-	-	-	-	-	-
Towers	694	203	39722	1	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	-
Towers	694	206	39722	1	0.00	0.00	0.00	0.00	0.00	0.00	26,982	26,982	-	-	-	-	-	-

TABLE 8.1
Segmentation of Ancillary Services Plant - Investment As of 9/30/98

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
DESC	ACCOUNT	PRU	FERC	ASSIGNTX	SCH&DISP	GENREACT	REG&FREQ	ENERGYIMB	SPINNING	SUPPL	Amount	ASSIGNTX	SCH&DISP	GENREACT	REG&FREQ	ENERGYIMB	SPINNING	SUPPL
GRIZZLY MTU	694	207	39700	1	0.00	0.00	0.00	0.00	0.00	0.00	7,096	7,096	-	-	-	-	-	-
Misc.	694	211	39700	1	0.00	0.00	0.00	0.00	0.00	0.00	486,407	486,407	-	-	-	-	-	-
Misc.building	694	212	39700	1	0.00	0.00	0.00	0.00	0.00	0.00	442,718	442,718	-	-	-	-	-	-
Misc.	694	213	39700	1	0.00	0.00	0.00	0.00	0.00	0.00	868,945	868,945	-	-	-	-	-	-
Misc.	694	214	39700	1	0.00	0.00	0.00	0.00	0.00	0.00	1,681,909	1,681,909	-	-	-	-	-	-
Radio Transmitting and Receiving Sets (UHF)	694	221	39713	1	0.00	0.00	0.00	0.00	0.00	0.00	9,951,777	9,951,777	-	-	-	-	-	-
Radio Transmitting and Receiving Sets (UHF)	694	222	39713	1	0.00	0.00	0.00	0.00	0.00	0.00	1,917,127	1,917,127	-	-	-	-	-	-
Misc. (UHF)	694	223	39700	1	0.00	0.00	0.00	0.00	0.00	0.00	41,452	41,452	-	-	-	-	-	-
PROSPECT HILL MTU	694	224	39700	1	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	-
PORTLAND HYDRO CONTRLR, W PORTLAND MTU	694	226	39700	1	0.00	0.00	0.00	0.00	0.00	0.00	23,182	23,182	-	-	-	-	-	-
Towers: MOODY HYDROMET	694	228	39722	1	0.00	0.00	0.00	0.00	0.00	0.00	18,382	18,382	-	-	-	-	-	-
Towers: LEES CAMP HYDRO	694	229	39722	1	0.00	0.00	0.00	0.00	0.00	0.00	9,562	9,562	-	-	-	-	-	-
STRIKE	694	230	39722	1	0.00	0.00	0.00	0.00	0.00	0.00	77,261	77,261	-	-	-	-	-	-
Towers: SPOUT SPRINGS HYDROMET	694	231	39722	1	0.00	0.00	0.00	0.00	0.00	0.00	13,309	13,309	-	-	-	-	-	-
REPEATER, TH	694	233	39722	1	0.00	0.00	0.00	0.00	0.00	0.00	48,438	48,438	-	-	-	-	-	-
ROCKY FL	694	235	39722	1	0.00	0.00	0.00	0.00	0.00	0.00	26,789	26,789	-	-	-	-	-	-
Radio Transmitting and Receiving Sets (VHF)	694	301	39713	1	0.00	0.00	0.00	0.00	0.00	0.00	698,348	698,348	-	-	-	-	-	-
Towers: PRIEST RIVER HYDRO	694	309	39722	1	0.00	0.00	0.00	0.00	0.00	0.00	10,083	10,083	-	-	-	-	-	-
Towers: ELK RIVER HYDRO	694	318	39722	1	0.00	0.00	0.00	0.00	0.00	0.00	23,743	23,743	-	-	-	-	-	-
Towers: WHITEBIRD HYDRO	694	325	39722	1	0.00	0.00	0.00	0.00	0.00	0.00	24,957	24,957	-	-	-	-	-	-
Towers: SPAULDING HYDRO	694	335	39722	1	0.00	0.00	0.00	0.00	0.00	0.00	16,099	16,099	-	-	-	-	-	-
pwers: CALDER HYDRO	694	340	39722	1	0.00	0.00	0.00	0.00	0.00	0.00	26,045	26,045	-	-	-	-	-	-
Towers: W GLACIER HYDRO	694	415	39722	1	0.00	0.00	0.00	0.00	0.00	0.00	86,061	86,061	-	-	-	-	-	-
HYDROMET	694	424	39722	1	0.00	0.00	0.00	0.00	0.00	0.00	41,576	41,576	-	-	-	-	-	-
Towers: ST REGIS HYDRO	694	431	39722	1	0.00	0.00	0.00	0.00	0.00	0.00	14,576	14,576	-	-	-	-	-	-
MORRELL	694	432	39722	1	0.00	0.00	0.00	0.00	0.00	0.00	37,148	37,148	-	-	-	-	-	-
Towers: OVANDO HYDRO	694	439	39722	1	0.00	0.00	0.00	0.00	0.00	0.00	16,138	16,138	-	-	-	-	-	-
DARBY GOES	694	441	39722	1	0.00	0.00	0.00	0.00	0.00	0.00	12,202	12,202	-	-	-	-	-	-
PATRICKS KNOB MTU	694	445	39722	1	0.00	0.00	0.00	0.00	0.00	0.00	10,728	10,728	-	-	-	-	-	-
CONTRIB IN AID OF CONSTR	694	882	39700	1	0.00	0.00	0.00	0.00	0.00	0.00	(67,274)	(67,274)	-	-	-	-	-	-
Subtotal FERC 397 Communications											381,553,245	214,289,507	146,002,661	3,739,470	16,729,224	-	458,228	334,155
Total FERC 353 and 397										**Total**	441,812,014	216,774,604	197,950,306	5,594,909	18,672,057	-	1,471,327	1,348,811
Total of all Ancillary Service Investment												**225,037,410**						

Chapter 9

Segmentation of Ancillary Service O&M

The O&M costs associated with Ancillary Services are shown in Table 9.1. The O&M costs was determined by examining the budgets for control center operations, scheduling, and associated equipment maintenance. Staff familiar with the control center operation and system scheduling, and the maintenance of the equipment supporting these areas, reviewed staff duties to estimate staff time spent in providing these services. The FY2001 budgeted costs were then allocated to each service on this basis, and escalated by 3% per year to the 2002 and 2003 test years. No TBL O&M costs were assigned to the Energy Imbalance service.

TABLE 9.1

ANCILLARY SERVICES OPERATIONS & MAINTENANCE EXPENSES
FY2002-2003 ($millions)

	Scheduling, System control, and Dispatch Service	Reactive Supply and Voltage control from Generation Sources	Regulation and Frequency Response Service	Operating Reserve-Spinning Reserve Service	Operating Reserve - Supplemental reserve Service	Total
FY2002						
Operations	$12.97	$0.41	$0.83	$0.03	$0.03	$14.28
Maintenance	0.08	0.00	0.02	0.00	0.00	0.10
Scheduling	5.67	0.00	0.00	0.00	0.00	5.67
Total	**$18.72**	**$0.41**	**$0.85**	**$0.03**	**$0.03**	**$20.04**
FY2003						
Operations	$13.36	$0.42	$0.86	$0.03	$0.03	$14.70
Maintenance	0.08	0.00	0.02	0.00	0.00	0.11
Scheduling	5.83	0.00	0.00	0.00	0.00	5.83
Total	**$19.28**	**$0.42**	**$0.88**	**$0.03**	**$0.03**	**$20.65**

Note: The table above used FY2001 expense estimates inflated at 3% per year.

The following is estimated FY2001 Expenses:

Operations	$12.30	$0.40	$1.10	$0.03	$0.03	$13.86
Maintenance	0.08		0.02			0.10
Scheduling	5.50					5.50
Total	**$17.88**	**$0.40**	**$1.12**	**$0.03**	**$0.03**	**$19.46**

Chapter 10

Segmentation of Ancillary Service Plant Additions

The plant additions for ancillary services for FY1999 through FY2003 are shown in table 10.1. The plant additions are segmented to each ancillary service in a manner similar to that used for existing equipment as shown in Chapter 8. The plant assigned to ancillary services is the general plant in the accounts for system control or communications. In chapter 7, the plant additions by budget item were assigned to the general plant accounts based on the type of equipment. The budget items, or portions of budget items, that were identified as system control or communications equipment were assigned to the ancillary service segment. The percent of each account allocated to each ancillary service is shown in table 10.2.

Table 10.1 shows the plant in service for each year in the top portion of the sheet. The plant is shown by FERC account and total for each year. FERC account 397 is communications and account 353 includes system controls. The bottom of Table 10.1 shows the additions by year for each service.

Table 10.2 shows each budget item that adds or replaces communications or system control equipment, and the percent of the general plant portion of the account that is allocated to each ancillary service. In table 7.1 the plant in service is split into general plant and transmission, with the percents in table 10.2 applied to the general plant amounts to determine additions for each service. The allocation percentages are based on the same proportions used for allocating existing plant investment in chapter 8.

TABLE 10.1
ANCILLARY SERVICE PLANT ADDITIONS

ANCILLARY SERVICES
PLANT-IN-SERVICE (by FERC Account)
($THOUSANDS)

	1998			1999			2000			2001			2002			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	51,948	146,003	197,951	61,055	147,432	208,487	77,070	153,391	230,461	91,999	160,779	252,778	106,260	166,646	272,906	119,789	171,546	291,335
Reactive Supply and Volt Control	1,855	3,739	5,594	2,150	3,799	5,949	2,501	4,047	6,548	2,865	4,355	7,220	3,233	4,599	7,832	3,599	4,803	8,402
Regulation and Freq Response	1,855	16,729	18,584	2,859	17,086	19,945	4,192	18,576	22,768	5,530	20,423	25,953	6,860	21,890	28,750	8,167	23,115	31,282
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	1,132	458	1,590	1,413	458	1,871	1,659	458	2,117	1,885	458	2,343	2,092	458	2,550
Op Reserve - Supplem Reserve	1,015	334	1,349	1,134	334	1,468	1,415	334	1,749	1,661	334	1,995	1,887	334	2,221	2,094	334	2,428
Total Plant-in-Service	57,686	167,263	224,949	68,330	169,109	237,439	86,591	176,806	263,397	103,714	186,349	290,063	120,125	193,927	314,052	135,741	200,256	335,997

ANCILLARY SERVICES
PLANT ADDITIONS (by FERC Account)
($THOUSANDS)

	1999			2000			2001			2002			2003		
	353	**397**	**TOTAL**	**353**	**397**	**TOTAL**	**353**	**397**	**TOTAL**	**353**	**397**	**TOTAL**	**353**	**397**	**TOTAL**
Sched, Syst Control, and Disp Serv	9,107	1,429	10,536	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	295	60	355	351	248	599	364	308	672	368	244	612	366	204	570
Regulation and Freq Response	1,004	357	1,361	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	119		119	281		281	246		246	226		226	207		207
Op Reserve - Supplem Reserve	119		119	281		281	246		246	226		226	207		207
Total Additions	10,644	1,846	12,490	18,261	7,697	25,958	17,123	9,543	26,666	16,411	7,578	23,989	15,616	6,329	21,945

TABLE 10.2

ASSIGNMENT OF PROJECTED GENERAL PLANT ADDITIONS TO ANCILLARY SERVICE SUB-SEGMENTS

			Percent of General Plant Allocated to Each Service 1/						
RPA	RPA NAME	FERC ACCOUNT	Sched, Sys Control, Dispatch	Reactive Supply from Gen	Reg & Freq	Energy Imbalance	Spinning	Supplemental	Ancillary Service % 2/
CR2000	System controls	Sys Control/353	90.0%	3.0%	5.0%	0.0%	1.0%	1.0%	66.0%
	Txm Sched Develop	Sys Control/353	90.0%	1.0%	5.0%	0.0%	2.0%	2.0%	100.0%
CR2500	Fiber 3/	Communication/397	77.4%	3.2%	19.4%	0.0%	0.0%	0.0%	31.0%
MR6C	Power Sys Contrl Repl	Sys Control/353	90.0%	3.0%	5.0%	0.0%	1.0%	1.0%	100.0%

1/ Percent of General plant portion of each budget item allocated to each sub-segment.

2/ Ancillary Services percent of total budget item; remainder of budget item assigned to transmission segments.

3/ Percents based on same allocation used for exisitng communications equipment described in chapter 8.