

BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

DOCKET NO. UE-16_____

EXHIBIT NO. ____ (TLK-2)

TARA L. KNOX

REPRESENTING AVISTA CORPORATION

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ELECTRIC COST OF SERVICE

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A cost of service study is an engineering-economic study, which apportions the revenue, expenses, and rate base associated with providing electric service to designated groups of customers. It indicates whether the revenue provided by the customers recovers the cost to serve those customers. The study results are used as a guide in determining the appropriate rate spread among the groups of customers.

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There are three basic steps involved in a cost of service study: functionalization, classification, and allocation. See the flow chart below.

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First, the expenses and rate base associated with the electric system under study are assigned to functional categories. The uniform system of accounts provides the basic segregation into production, transmission, and distribution. Traditionally, customer accounting, customer information, and sales expenses are included in the distribution function and administrative and general expenses and general plant rate base are allocated to all functions. In this study I have created a separate functional category for common costs. Administrative and general costs that cannot be directly assigned to the other functions have been placed in this category.

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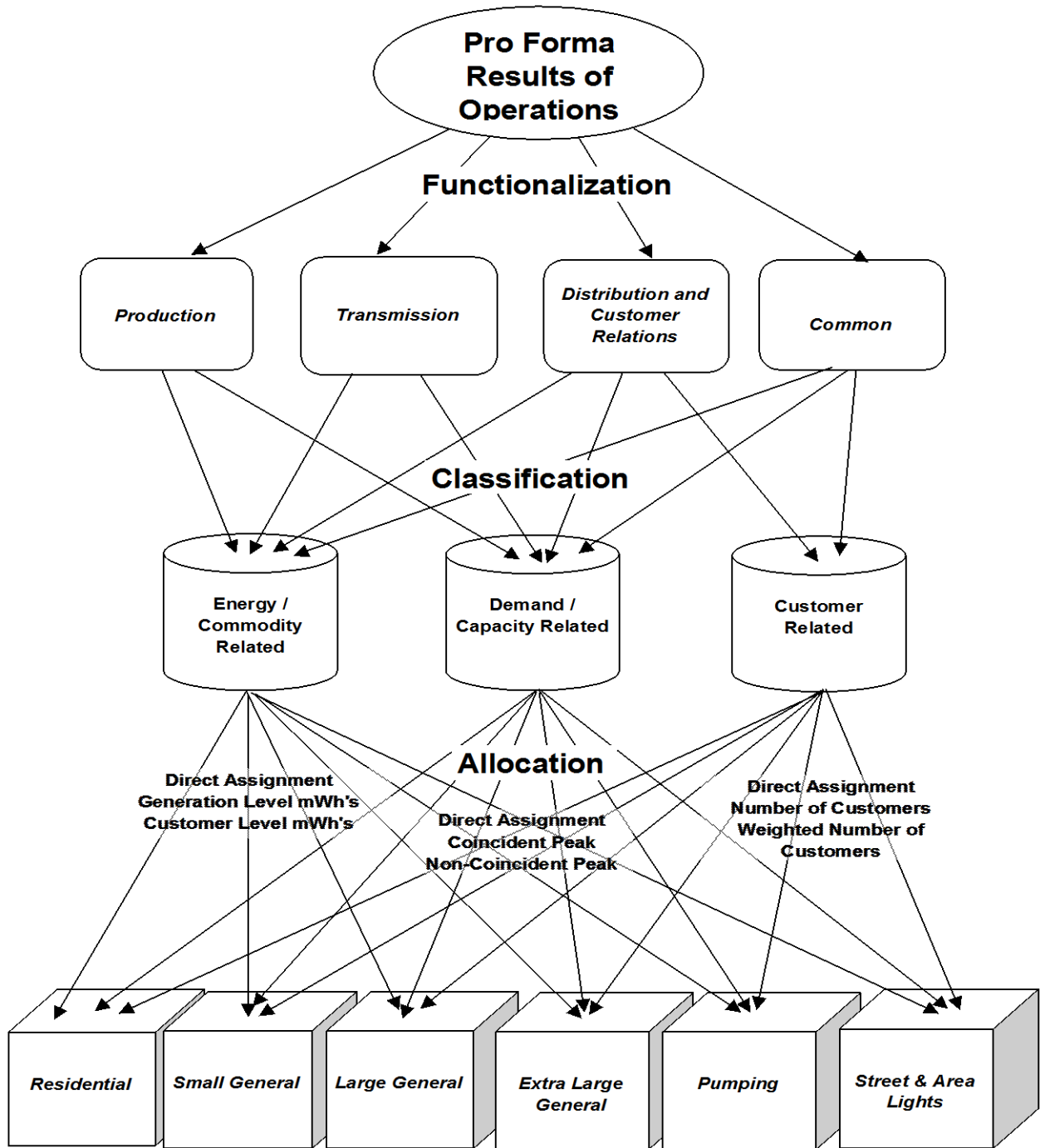
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Second, the expenses and rate base items which cannot be directly assigned to customer groups are classified into three primary cost components: energy, demand and customer related. Energy related costs are allocated based on each rate schedule's share of commodity consumption. Demand (capacity) related costs are allocated to rate schedules on the basis of each schedule's contribution to peak demand. Customer related items are allocated to rate schedules based on the number of customers within each schedule. The number of customers may be weighted by appropriate factors such as relative cost of

1 metering equipment. In addition to these three cost components, any revenue related
 2 expense is allocated based on the proportion of revenues by rate schedule.

3 **ELECTRIC COST OF SERVICE STUDY FLOWCHART**



22 **Pro Forma Results of Operations by Customer Group**

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1 The final step is allocation of the costs to the various rate schedules utilizing the
2 allocation factors selected for each specific cost item. These factors are derived from usage
3 and customer information associated with the test period results of operations.

4 **BASE CASE COST OF SERVICE STUDY**

5 **Production and Transmission Classification (Peak Credit)**

6 This study utilizes a Peak Credit methodology to classify production and
7 transmission costs into demand and energy classifications. The Peak Credit method
8 acknowledges that all energy production costs contain both capacity and energy components
9 as they provide energy throughout the year as well as capacity during system peaks.
10 Likewise, the transmission system is built not only for peak use, but also for everyday
11 delivery of energy. The peak credit ratio (the proportion of total production cost that is
12 capacity related) is determined using the electric system load factor inherent in the test year.
13 The share of production costs attributable to demand is one minus the load factor (average
14 MW divided by peak MW) which is 37.93% for the twelve months ended September 2015
15 test year. The same classification ratio is applied to all production and transmission costs.

16 **Production and Transmission Allocation**

17 Production and transmission demand related costs are allocated to the customer
18 classes by class contribution to the average of the twelve monthly system coincident peak
19 loads. Although the Company is usually a winter peaking utility, it experiences high
20 summer peaks and careful management of capacity requirements is required throughout the
21 year. The use of the average of twelve monthly peaks recognizes that customer capacity
22 needs are not limited to the heating season.

1 Energy related costs are allocated to class by pro forma annual kilowatt-hour sales
2 adjusted for losses to reflect generation level consumption.

3 **Distribution Facilities Classification (Basic Customer)**

4 The Basic Customer method considers only services and meters and directly assigned
5 Street Lighting apparatus (FERC Accounts 369, 370, and 373 respectively) to be customer
6 related distribution plant. All other distribution plant is then considered demand related.
7 This division delineates plant which benefits an individual customer from plant which is part
8 of the system. The basic customer method provides a reasonable, clearly definable division
9 between plant that provides service only to individual customers from plant that is part of
10 the interconnected distribution network. Additionally, the basic customer method has been
11 explicitly accepted for both electric and natural gas cost of service in the State of
12 Washington.

13 **Customer Relations Distribution Cost Classification**

14 Customer service, customer information and sales expenses are the core of the
15 customer relations functional unit which is included with the distribution cost category. For
16 the most part they are classified as customer related. Exceptions are sales expenses which
17 are classified as energy related and uncollectible accounts expense which is considered
18 separately as a revenue conversion item.

19 **Distribution Cost Allocation**

20 Distribution demand related costs which cannot be directly assigned are allocated to
21 customer class by the average of the twelve monthly non-coincident peaks for each class.
22 Distribution facilities that serve only secondary voltage customers are allocated by non-
23 coincident peak excluding all primary and transmission voltage customers. This includes

1 line transformers, services, and secondary voltage overhead or underground conductors and
2 devices. The costs of specific substations and related primary voltage distribution facilities
3 are directly assigned to Extra Large General Service customers based on their load ratio
4 share of the substation capacity from which they receive service. The remaining primary
5 voltage overhead or underground conductors and devices are allocated by non-coincident
6 peak for all customers except those that received direct assignment (Schedule 25).

7 Most customer costs are allocated by average number of customers. Weighted
8 customer allocators have been developed using typical current cost of meters, estimated
9 meter reading time, and direct assignment of billing costs for hand-billed customers. Street
10 and area light customers are excluded from metering and meter reading expenses as their
11 service is not metered.

12 **Administrative and General Costs**

13 Administrative and general costs which are directly associated with production,
14 transmission, distribution, or customer relations functions are directly assigned to those
15 functions and allocated to customer class by the relevant plant or number of customers. The
16 remaining administrative and general costs are considered common costs, and have been left
17 in their own functional category. These common costs are allocated to rate class by factors
18 equivalent to those approved for Puget Sound Power and Light (now Puget Sound Energy)
19 in Docket No. UE-920499 and indirectly classified by the implicit relationship of energy,
20 demand and customer that make up the various allocation factors applied to the costs.

21 Common plant items are allocated to rate class by either relative: production,
22 transmission, distribution plant; production, transmission, distribution labor subtotal; or
23 operating and maintenance labor total. Most common administrative and general expenses

1 are allocated to rate class by relative operating and maintenance expenses before
2 administrative and general expenses excluding purchased power, fuel, wheeling, and
3 revenue items. Property insurance expense is allocated by plant totals. Injuries & damages
4 and pensions & benefits expenses are allocated by operating and maintenance labor expense
5 totals. Working capital is allocated by tangible plant in service (production, transmission,
6 distribution, general plant).

7 **Revenue Conversion Items**

8 In this study, state excise tax, uncollectible accounts and commission fees have been
9 classified as revenue related and are allocated by pro forma revenue. These items vary with
10 revenue and are included in the calculation of the revenue conversion factor. Income tax
11 expense items are allocated to schedules by net income before income tax adjusted by
12 interest expense.

13 For the functional summaries on pages 2 and 3 of the cost of service study, these
14 items are then assigned to component cost categories. The revenue related expense items
15 have been reduced to a percent of all other costs and loaded onto each cost category by that
16 ratio. Similarly, income tax items have been reduced to a percent of net income before tax
17 then assigned to cost categories by relative rate base (as is net income).

18 The following matrix outlines the methodology applied in the Company Base Case
19 cost of service study.

Line Account	Functional Category	Classification	Allocation
Production Plant			
1 Thermal Production	P = Production	Demand/Energy by Peak Credit (37.93% Demand)	D01/E02 Coincident Peak Demand/Annual Generation Level Consumption
2 Nuclear Production (Settlement Exchange)	P = Production	Demand/Energy by Peak Credit (37.93% Demand)	D01/E02 Coincident Peak Demand/Annual Generation Level Consumption
3 Hydro Production	P = Production	Demand/Energy by Peak Credit (37.93% Demand)	D01/E02 Coincident Peak Demand/Annual Generation Level Consumption
4 Other Production (Coyote Springs)	P = Production	Demand/Energy by Peak Credit (37.93% Demand)	D01/E02 Coincident Peak Demand/Annual Generation Level Consumption
5 Other Production	P = Production	Demand/Energy by Peak Credit (37.93% Demand)	D01/E02 Coincident Peak Demand/Annual Generation Level Consumption
Transmission Plant			
6 All Transmission	T = Transmission	Demand/Energy by Peak Credit (37.93% Demand)	D01/E02 Coincident Peak Demand/Annual Generation Level Consumption
Distribution Plant			
7 360 Land	D = Distribution	Demand	D08 Non-coincident Peak Demand Primary
8 361 Structures	D = Distribution	Demand	D03/D04/D05 Direct Assign Large / Non-coincident Peak Demand Excl DA
9 362 Station Equipment	D = Distribution	Demand	D03/D04/D05 Direct Assign Large / Non-coincident Peak Demand Excl DA
10 364 Poles Towers & Fixtures	D = Distribution	Demand	D03/D04/D06/D07 Primary NCP Excl DA / Secondary NCP / Direct Assign Lights / Direct Assign Large
11 365 Overhead Conductors & Devices	D = Distribution	Demand	D03/D04/D06 Primary NCP Excl DA / Secondary NCP / Direct Assign Large
12 366 Underground Conduit	D = Distribution	Demand	D03/D04/D06 Primary NCP Excl DA / Secondary NCP / Direct Assign Large
13 367 Underground Conductors & Devices	D = Distribution	Demand	D03/D04/D06 Primary NCP Excl DA / Secondary NCP / Direct Assign Large
14 368 Line Transformers	D = Distribution	Demand	D06 Non-coincident Peak Demand Secondary only
15 369 Services	D = Distribution	Customer	C02 Secondary Customers unweighted Excl Lighting
16 370 Meters	D = Distribution	Customer	C04 Customers weighted by Current Typical Meter Cost
17 373 Street and Area Lighting Systems	D = Distribution	Customer	C05 Direct Assignment to Street and Area Lights
General Plant			
389 - 392, 397, 398 Land, Structures, Furniture,			
18 Transportation, Communication, Miscellaneous Equipment	P/T/D	Demand/Energy/Customer as in related Labor	S22 Labor O&M Total
393 Stores Equipment	P/T/D	Demand/Energy/Customer as in related Plant	S05 P/T/D Plant Total
394 - 396 Tools Shop/Garage, Laboratory, Power Op Equip	P/T/D	Demand/Energy/Customer as in related Labor	S21 Labor P/T/D O&M Subtotal
Intangible Plant			
19 301 Organization	P/T/D/G	Demand/Energy/Customer as in related Plant	S06 Sum of Production, Transmission, Distribution, and General Plant
20 302 Franchises & Consents - Hydro Relicensing	P = Production	Demand/Energy by Peak Credit (37.93% Demand)	D01/E02 Coincident Peak Demand/Annual Generation Level Consumption
21 303 Misc Intangible Plant - Transmission Agreements	T = Transmission	Demand/Energy from Transmission Plant	S02 Sum of Transmission Plant
22 303 Misc Intangible Plant - Distribution Agreements	D = Distribution	Demand/Customer from Distribution Plant	S03 Sum of Distribution Plant
23 303 Misc Intangible Plant - Software and Other Common	P/T/D/G	Demand/Energy/Customer as in related Plant	S06 Sum of Production, Transmission, Distribution, and General Plant
Reserve for Depreciation/Amortization			
24 Intangible	P/T/D/G	Follows Related Plant	S01/S02/S03/S06 Sum of Production / Transmission / Distribution Plant / P/T/D/G Total
25 Production	P = Production	Follows Related Plant	D01/E02 Coincident Peak Demand/Annual Generation Level Consumption
26 Transmission	T = Transmission	Follows Related Plant	D01/E02 Coincident Peak Demand/Annual Generation Level Consumption
27 Distribution	D = Distribution	Follows Related Plant	D02/D03/D04/D05/D06/D07/D08/C02/C04/C05 - See Related Plant
28 General	P/T/D	Demand/Energy/Customer as in related Labor or Plant	S22/S05/S21 Labor O&M Total, P/T/D Plant Total, Labor P/T/D O&M Subtotal
Other Rate Base			
29 252 Customer Advances for Construction	D = Distribution	Customer	S13 Sum of Account 369 Services Plant
30 282/190 Accumulated Deferred Income Tax	P/T/D/G	Follows Related Plant	S01/S02/S03/S04 Sums of Production / Transmission / Distribution / General Plant
31 Other Attrition Adjustment to Rate Base	P/T/D	Demand/Energy/Customer from Plant	S04 Sum of General Plant
32 Hydro Relicensing Related Settlements	P = Production	Demand/Energy by Peak Credit (37.93% Demand)	D01/E02 Coincident Peak Demand/Annual Generation Level Consumption
33 Lancaster Deferred Balance	P = Production	Demand/Energy by Peak Credit (37.93% Demand)	D01/E02 Coincident Peak Demand/Annual Generation Level Consumption
34 Deferred Meter Retirements Balance	D = Distribution	Customer	C04 Customers weighted by Current Typical Meter Cost
35 Working Capital	P/T/D/G	Demand/Energy/Customer as in related Plant	S06 Sum of Production, Transmission, Distribution, and General Plant

Line Account	Functional Category	Classification	Allocation
Production O&M			
1 Thermal	P = Production	Demand/Energy by Peak Credit (37.93% Demand)	D01/E02 Coincident Peak Demand/Annual Generation Level Consumption
2 Thermal Fuel (501)	P = Production	Demand/Energy by Peak Credit (37.93% Demand)	D01/E02 Coincident Peak Demand/Annual Generation Level Consumption
3 Hydro	P = Production	Demand/Energy by Peak Credit (37.93% Demand)	D01/E02 Coincident Peak Demand/Annual Generation Level Consumption
4 Water for Power (536)	P = Production	Demand/Energy by Peak Credit (37.93% Demand)	D01/E02 Coincident Peak Demand/Annual Generation Level Consumption
5 Other (Coyote Springs)	P = Production	Demand/Energy by Peak Credit (37.93% Demand)	D01/E02 Coincident Peak Demand/Annual Generation Level Consumption
6 Other Fuel (547)	P = Production	Demand/Energy by Peak Credit (37.93% Demand)	D01/E02 Coincident Peak Demand/Annual Generation Level Consumption
7 Other	P = Production	Demand/Energy by Peak Credit (37.93% Demand)	D01/E02 Coincident Peak Demand/Annual Generation Level Consumption
8 Purchased Power and Other Expenses (555 and 557)	P = Production	Demand/Energy from Production Plant	S01 Sum of Production Plant
9 System Control & Misc (556)	P = Production	Demand/Energy by Peak Credit (37.93% Demand)	D01/E02 Coincident Peak Demand/Annual Generation Level Consumption
Transmission O&M			
10 All Transmission	T = Transmission	Demand/Energy by Peak Credit (37.93% Demand)	D01/E02 Coincident Peak Demand/Annual Generation Level Consumption
Distribution O&M			
11 580 OP Super & Engineering	D = Distribution	Demand/Customer from Other Dist Op Exp	S16 Sum of Other Distribution Operating Expenses
12 581 Load Dispatching	D = Distribution	Demand	D02 Non-coincident Peak Demand
13 582 Station Expenses	D = Distribution	Demand	S09 Sum of Account 362 Station Equipment
14 583 Overhead Lines	D = Distribution	Demand	S10 Sum of Accounts 364 and 365 Poles, Towers, Fixtures & Overhead Conductors
15 584 Underground Lines	D = Distribution	Demand	S11 Sum of Accounts 366 and 367 Underground Conduit & Underground Conductors
16 585 Street Lights	D = Distribution	Customer	S15 Sum of Account 373 Street Light and Signal Systems
17 586 Meters	D = Distribution	Customer	S14 Sum of Account 370 Meters
18 587 Customer Installations	D = Distribution	Customer	S13 Sum of Account 369 Services
19 588 Misc Operating Expense	D = Distribution	Demand/Customer from Other Dist Op Exp	S16 Sum of Other Distribution Operating Expenses
20 589 Rents	D = Distribution	Demand	D02 Non-coincident Peak Demand
21 590 MT Super & Engineering	D = Distribution	Demand/Customer from Other Dist Mt Exp	S17 Sum of Other Distribution Maintenance Expenses
22 591 MT of Structures	D = Distribution	Demand	S08 Sum of Account 361 Structures & Improvements
23 592 MT of Station Equipment	D = Distribution	Demand	S09 Sum of Account 362 Station Equipment
24 593 MT of Overhead Lines	D = Distribution	Demand	S10 Sum of Accounts 364 and 365 Poles, Towers, Fixtures & Overhead Conductors
25 594 MT of Underground Lines	D = Distribution	Demand	S11 Sum of Accounts 366 and 367 Underground Conduit & Underground Conductors
26 595 MT of Line Transformers	D = Distribution	Demand	S12 Sum of Account 368 Line Transformers
27 596 MT of Street Lights	D = Distribution	Customer	S15 Sum of Account 373 Street Light and Signal Systems
28 597 MT of Meters	D = Distribution	Customer	S14 Sum of Account 370 Meters
29 598 Misc Maintenance Expense	D = Distribution	Demand/Customer from Other Dist Mt Exp	S17 Sum of Other Distribution Maintenance Expenses
Customer Accounts Expenses			
30 901 Supervision	C = Customer Relations	Customer	S18 Sum of Other Customer Accounts Expenses Excluding Uncollectibles
31 902 Meter Reading	C = Customer Relations	Customer	C03 Customers Weighted by Estimated Meter Reading Time
32 903 Customer Records & Collections	C = Customer Relations	Customer	C01 All Customers unweighted
33 904 Uncollectible Accounts	R = Revenue Conversion	Revenue	R01 Retail Sales Revenue
34 905 Misc Cust Accounts	C = Customer Relations	Customer	C01 All Customers unweighted
Customer Service & Info Expenses			
35 907 Supervision	C = Customer Relations	Customer	C01 All Customers unweighted
36 908 Customer Assistance	C = Customer Relations	Customer	C01 All Customers unweighted
37 909 Advertising	C = Customer Relations	Customer	C01 All Customers unweighted
38 910 Misc Cust Service & Info	C = Customer Relations	Customer	C01 All Customers unweighted
Sales Expenses			
39 911 - 916	C = Customer Relations	Energy	E02 Annual Generation Level Consumption

Line Account	Functional Category	Classification	Allocation
Admin & General Expenses			
1 920 - 926 & 930 -935 Assigned to Production	P = Production	Demand/Energy from Production Plant	S01 Sum of Production Plant
2 920 - 926 & 930 -935 Assigned to Transmission	T = Transmission	Demand/Energy from Transmission Plant	S02 Sum of Transmission Plant
3 920 - 926 & 930 - 935 Assigned to Distribution	D = Distribution	Demand/Customer from Distribution Plant	S03 Sum of Distribution Plant
4 920 - 926 & 930 - 935 Assigned to Customer Relations	C = Customer Relations	Customer	C01 All Customers unweighted
5 Other 920-923, 928-931 Salaries, supplies, etc	P/T/D	Demand/Energy/Customer from O&M Expenses	S19 Sum of expenses excluding Purch Power, Fuel, Wheeling, Uncollectibles, Tariff Rider
6 924 Property Insurance	P/T/D	Demand/Energy/Customer from Plant	S06 Sum of Production, Transmission, Distribution, and General Plant
7 Other 925-926 Inj & Dam, Pensions & Benefits	P/T/D	Demand/Energy/Customer from Labor O&M Total	S22 Sum of Labor O&M Expenses
8 928 FERC Commission Fees	P = Production	Energy	E02 Annual Generation Level Consumption
9 927,928 Franchise Fees, WUTC Commission Fees	R = Revenue Conversion	Revenue	R01 Retail Sales Revenue
10 935 Maintenance of General Plant	P/T/D	Demand/Energy/Customer from Plant	S04 Sum of General Plant
Depreciation & Amortization Expense			
11 Intangible	P/T/D/G	Demand/Energy/Customer as in related Plant	S01/S02/S06 Sum of Production Plant / Sum of Transmission Plant / Sum of P/T/D/G Plant
12 Production	P = Production	Demand/Energy as in related Plant	D01/E02 Coincident Peak Demand/Annual Generation Level Consumption
13 Transmission	T = Transmission	Demand/Energy as in related Plant	D01/E02 Coincident Peak Demand/Annual Generation Level Consumption
14 Distribution	D = Distribution	Demand/Customer as in related Plant	D02/D03/D04/D05/D06/D07/D08/C02/C04/C05 - See Related Plant
15 General	P/T/D	Demand/Energy/Customer as in related Labor or Plant	S22/S05/S21 Labor O&M Total, P/T/D Plant Total, Labor P/T/D O&M Subtotal
Taxes			
16 Property Tax	P/T/D/O	Demand/Energy/Customer from Related Plant	S01/S02/S03/S04 Sums of Production / Transmission / Distribution / General Plant
17 State kWh Generation Taxes	P = Production	Demand/Energy by Peak Credit (37.93% Demand)	D01/E02 Coincident Peak Demand/Annual Generation Level Consumption
18 Misc Production Taxes	P = Production	Demand/Energy by Peak Credit (37.93% Demand)	D01/E02 Coincident Peak Demand/Annual Generation Level Consumption
19 Misc Distribution Taxes	D = Distribution	Demand/Customer from Distribution Plant	S03 Sum of Distribution Plant
20 Washington State Excise Tax	R = Revenue Conversion	Revenue	R01 Retail Sales Revenue
21 Federal Income Taxes - Current and/or Deferred	R = Revenue Conversion	Revenue	R03 Revenue less Expenses Before Income Tax less Interest Expense
Other Income Related Items			
22 Transmission Related Items	T = Transmission	Demand/Energy from Transmission Plant	S02 Sum of Transmission Plant
23 Amortization of Gain on Sale of Misc Property	D = Distribution	Demand/Customer from Distribution Plant	S03 Sum of Distribution Plant
24 Amortization of Deferred Meter Retirements	D = Distribution	Customer	C04 Customers weighted by Current Typical Meter Cost
25 Renewable Production Related Items	P = Production	Demand/Energy from Production Plant	S01 Sum of Production Plant
Operating Revenues			
26 Sales of Electricity- Retail	R = Revenue from Rates	Revenue	Input Pro Forma Revenue per Revenue Study
27 Sales for Resale (447)	P = Production	Demand/Energy from Production Plant	S01 Sum of Production Plant
28 Misc Service Revenue (451)	D = Distribution	Demand/Customer from Distribution Plant	S03 Sum of Distribution Plant
29 Sales of Water & Water Power (453)	P = Production	Demand/Energy from Production Plant	S01 Sum of Production Plant
30 Rent from Production Property (454)	P = Production	Demand/Energy from Production Plant	S01 Sum of Production Plant
31 Rent from Transmission Property (454)	T = Transmission	Demand/Energy from Transmission Plant	S02 Sum of Transmission Plant
32 Rent from Distribution Property (454)	D = Distribution	Demand/Customer from Distribution Plant	S03 Sum of Distribution Plant
33 Other Electric Revenues - Generation (456)	P = Production	Demand/Energy from Production Plant	S01 Sum of Production Plant
34 Other Electric Revenues - Wheeling (456)	T = Transmission	Demand/Energy from Transmission Plant	S02 Sum of Transmission Plant
35 Other Electric Revenues - Energy Delivery (456)	D = Distribution	Demand/Customer from Distribution Plant	S03 Sum of Distribution Plant
Salaries & Wages (allocators)			
Operation & Maintenance Expenses			
36 Production Total	P = Production	Demand/Energy from Production Plant	S01 Sum of Production Plant
37 Transmission Total	T = Transmission	Demand/Energy from Transmission Plant	S02 Sum of Transmission Plant
38 Distribution Total	D = Distribution	Demand/Customer from Distribution Plant	S03 Sum of Distribution Plant
39 Customer Accounts Total	C = Customer Relations	Customer	S18 Sum of Other Customer Accounts Expenses Excluding Uncollectibles
40 Customer Service Total	C = Customer Relations	Customer	C01 All Customers unweighted
41 Sales Total	C = Customer Relations	Energy	E02 Annual Generation Level Consumption
42 Admin & General Total	P/T/D	Demand/Energy/Customer from Related Plant	S05 Sum of Production, Transmission and Distribution Plant