Technical Memorandum

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From: **Shawn Koorn, HDR**

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Subject: **SPU Retail Water Cost Allocation Review**

Introduction

HDR Engineering, Inc. (HDR) was retained by Seattle Public Utilities (SPU) to assist in a high level review of its retail water cost allocation and rate structure as well as the wastewater rate structure. This technical memorandum will discuss HDR's review of SPU's retail water cost allocation approach. Additional analysis was not requested or completed by HDR based on the resulting conclusions or recommendations for this high level review of the retail water cost allocation.

SPU Document Review

The starting point of the retail water cost allocation review was to meet with SPU staff and discuss the approach used by SPU in the past to develop their retail water cost allocation and also discuss the information and documentation available for HDR's review. SPU staff provided information to HDR for their review and consideration in the development of this technical memorandum. These documents included the following:

- Historical SPU presentations on the approach to setting retail water rates.
- Historical written information on SPU's approach to setting retail water rates.
- Historical review of SPU's retail water rates.
- SPU 2016 – 2017 Water Rate Study.
- SPU cost of service excel spreadsheets.

The above documents, along with discussion with SPU staff, were the basis for HDR's review, findings and conclusions. HDR reviewed the historical documentation and information on the approach and development of SPU's retail water rates. The primary focus for the water retail customer cost allocation was the 2016 – 2017 Water Rate Study and the accompanying excel spreadsheet used to develop the cost allocation between the retail customers.

Overview of the Retail Water Cost Allocation Review

The starting point of the review was to compare the approach (i.e., the methodology) used by SPU in the development of the retail water cost allocation to generally accepted industry approaches. For the water industry, the most widely recognized rate setting manual is the American Water Works Association (AWWA) M1 Manual. This manual contains the generally accepted approaches to setting cost-based water rates, and specifically includes a chapter on the methodologies used to equitably allocate costs between a utility's various customer classes

of service. The approach used by SPU in the development of the retail water cost allocation was compared to the generally accepted methodologies outlined and discussed within the AWWA M1 Manual

AWWA M1 Manual Approach to Cost Allocation

The AWWA M1 Manual discusses various approaches which may be utilized to equitably allocate costs between the various customer classes of service (e.g. residential, commercial, etc.). As discussed in the AWWA M1 Manual, the following steps are used to develop an equitable allocation of costs:

1. Determine the method to accumulate costs (e.g., cash basis, utility basis).
2. Determine the methodology to allocate costs (e.g., base extra-capacity, commodity demand).
3. Determination of the customer classes of service.
4. Allocation of costs to the various cost components (i.e., average day, peak day, customer).
5. Distribution of costs to the customer classes of service.

The AWWA M1 Manual discusses the various and different approaches which may be used to complete each of the steps noted above. Generally accepted approaches, as discussed above, were utilized by SPU in the development of their retail water cost allocation.

Review of the SPU Retail Water Cost Allocation

SPU's retail water cost allocation was reviewed and compared to the approach and methodologies outlined in the AWWA M1 Manual. As previously noted, SPU's 2016 – 2017 Water Rate Study and the accompanying Microsoft excel spreadsheets were the primary components reviewed.

Method of Accumulating Costs

There are two methods identified in the AWWA M1 Manual that are used to establish the total costs to provide service. These are the "Cash" Basis and the "Utility" or "Accrual" Basis. Both methods are widely used by utilities in developing the costs associated with providing service.

Under the Cash Basis the utility takes the following approach:

1. Totals its total operation and maintenance (O&M) expenses for the year. Operation and maintenance expenses include the materials, electricity, labor, supplies, etc. needed to keep the utility functioning.
2. Adds any applicable taxes or transfer payments to determine total operating expenses. Taxes may be any local, State, or Federal taxes paid by the Utility or any transfers to other funds (i.e., rate stabilization, capital, emergency).
3. Determine capital costs by adding debt service payments (principal and interest) to capital improvements financed with rate revenues.

The sum of these components determines the total costs to provide service under the Cash Basis approach (i.e., total revenue requirement). In contrast to the cash basis methodology, the

utility/accrual basis is similar, but different from the cash basis methodology. Provided below is a comparison of the Cash and Utility Basis approach.

Cash versus Utility Basis Comparison			
Cash Basis		**Utility Basis (Accrual)**	
+	O&M Expense	+	O&M Expense
+	Taxes or Transfer Payments	+	Taxes or Transfer Payments
+	Capital Improvements Financed with Rate Revenues (≥ Depreciation Expense)	+	Depreciation Expense
+	Debt service (Principal + Interest)	+	Return on Investment
=	Total Revenue Requirement	=	Total Revenue Requirement

Under the Utility, or Accrual, basis the utility takes the following approach:

1. Totals its total operation and maintenance (O&M) expenses for the year. Operation and maintenance expenses include the materials, electricity, labor, supplies, etc. needed to keep the utility functioning.
2. Adds any applicable taxes or transfer payments to determine total operating expenses. Taxes may be any local, State, or Federal taxes paid by the Utility or any transfers to other funds (i.e., rate stabilization, capital, emergency).
3. Determine capital costs by including annual depreciation expense and a fair rate of return on its net plant investment.

The sum of these components determines the total costs (i.e., total revenue requirement) to provide service under the Utility Basis approach.

In reviewing the method of accumulating costs, SPU uses a Cash Basis approach to develop the revenue requirement. For purposes of developing the cost of service analysis, a utility basis approach is applied. The application of the Utility Basis approach for cost allocation purposes is a commonly used, and generally accepted, approach used by utilities when there are owners and non-owners served. Non-owners are outside City retail and wholesale customers. Under the Utility Basis approach, a different rate of return may be used to reflect the additional costs or risks associated with serving the non-owners of the system. For SPU, the return component is determined for the wholesale customers, and the return needed to balance to the total Cash Basis revenue requirement is used for all retail customers. Again, this is a generally accepted approach as discussed in the AWWA M1 Manual.

Given the above review and comparison to generally accepted methodologies, HDR reached a number of conclusions in this area. These are summarized below.

Key Conclusions of the Method to Accumulate Costs
• SPU has utilized a generally accepted methodology, the Cash Basis method, to establish the revenue requirement analysis. • SPU has utilized a generally accepted methodology, the Utility Basis, to develop the cost of service analysis and reflect the cost and risk related to serving non-owner customers.

Cost Allocation Methodology

As noted previously, the AWWA M1 Manual provides two primary methodologies to equitably allocate costs. These are the Base-Extra Capacity and Commodity-Demand methodologies. Each methodology allocates costs to the following components:

- Flow (average consumption)
- Demand (peak consumption)
- Customer
- Fire protection (public and private fire service)

While the two approaches may seem very similar, in actuality, each methodology has a slightly different approach to the development of the cost allocation. A primary difference between these two methodologies is the perspective each takes in equitably allocating costs. The two differing perspectives are a design perspective or an operational perspective.

Under the design perspective, costs are assigned and equitably allocated based upon how or why a facility was designed or sized to meet average consumption or peak consumption requirements. In contrast, an operating perspective considers how the facility is operated on a daily, monthly or annual basis and assigns average consumption and peak consumption requirement related costs to reflect the actual operation of the facility. Another key difference between the two methodologies is the way in which peak consumption requirements are viewed and allocated. Under the base-extra capacity methodology the peak consumption requirements are based on the incremental difference between system, or customer class, average day and the peak day requirements. Under the commodity demand methodology, the peak requirement is based on the total system, or customer class, consumption requirements. In some cases a modified, or combined, approach is used to reflect specific cost components. For example, the treatment related expenses may be allocated on an operational basis while the distribution related expenses are allocated on a design basis to reflect the constraints and costs of the system.

A simple numerical example of these two peak consumption allocation methods may best illustrate the differences. Assume a utility with an average day demand of 6 million gallons per day (MGD) and a peak demand of 10 MGD. Under the base-extra capacity method the peak consumption costs would be equitably allocated on the basis of the contribution of each class of service to the 4 MGD difference between the system average day and peak day use. In contrast, under the commodity demand method, the peak consumption costs would be

allocated on the contribution of each customer class of service to the 10 MGD system peak demand. This can result in a different allocation of costs depending on each customer class's average consumption needs compared to their peak consumption needs.

As noted, both generally accepted cost allocation approaches recognize and include the use of a demand component within the cost allocation. In reviewing SPU's cost allocation, it appears that SPU has generally followed typical industry approaches to allocating costs. However, SPU has purposefully excluded a separate peak consumption component and has essentially allocated all flow and peak costs on the flow allocation component. In the 2016 – 2017 Rate Study SPU has provided an explanation why a capacity cost component has been excluded from the cost allocation methodology. In summary, SPU staff and the Rate Study provides the following reasons for SPU's cost allocation approach.

- The differences in peak consumption use between the residential and general service classes has historically been driven by summer irrigation. Given the decline in residential irrigation, the customer classes, both residential and general service, peak consumption patterns have become very similar. SPU expects the consumption patterns to continue in this manner.
- The availability of data, given a bi-monthly billing period, is limited and does not provide accurate information on peak day or peak hour consumption figures. This type of data can be costly to collect.
- Reductions in demand on the system have reduced the issue of capacity constraints on SPU's system and peak demands are not driving the current costs on the system. Further, impacting the reduced peak consumption are changes in the customer demographics, end uses of the water, and continued reduction in outdoor watering needs.

SPU is in a unique situation regarding the customer demands and system requirements, however, it is HDR's opinion that the use of a capacity component may still be relevant and SPU may want to reconsider including a peak component and cost allocation in the analysis. This opinion is based on the following observations:

- Will the current peak consumption conditions, by customer class, remain stable or will they change in the future as SPU's customers base changes?
- In HDR's experience utilities, regardless of the magnitude of peak consumption needs, similarity of class demand patterns, or excess capacity within the system, do not exclude or ignore the demand component with the cost of service analysis
- The peak consumption related component can be a key aspect when establishing the pricing for the rates.
- It is important to understand the cost of peak consumption prior to developing rate designs.

It is also important to consider that while it may appear that the peak consumption component may not vary significantly between the various customer classes of service, depending on the approach and results of the allocation of specific cost components, it may provide a different overall allocation of costs. In HDR's opinion, it is important to understand the cost to serve the

various customer classes of service. Then rates can be designed that take the results of the cost of service into consideration, yet are driven by other rate design goals and objectives and policy decisions. Cost of service results are just one of the "tools" that are used to establish rates. Once costs are understood, the trade-offs between various rate structures can be determined and a decision made between alternatives.

Key Conclusions of the Cost Allocation
• In general, it appears SPU has used an industry standard approach in developing the cost allocations. • HDR would recommend that SPU consider including a demand cost component for purposes of cost allocation.

Determination of Customer Classes of Service

The purpose of developing customer classes of service is to group customers with similar usage (consumption) characteristics and facility requirements together for purposes of allocating costs and developing equitable rates. The AWWA M1 Manual notes that while there is not an industry standard set of customer classes, the typical customer classes of service are residential, commercial, and industrial. The key point being, the purpose is to determine the cost to provide service for customer with like/similar customer characteristics and facility requirements. The customer characteristics refer to how a customer, or groups of customers, utilizes the system. For example, most residential customers consume water in a similar manner and during similar time periods (e.g., mornings and evenings, summer lawn watering, average volumes of use, etc.), while non-residential customers may, or may not, consume water in a similar manner. Therefore it is important to review the overall utility rate setting goals and objectives when establishing customer classes of service to reflect those goals and objectives for an equitable allocation of costs.

The current retail rate customer classes of service for SPU include residential, general service, private fire, and public fire. These customer classes of service are further defined and documented in the 2016 – 2017 Water Rate Study. For purposes of setting retail water rates the identified classes of service are reasonable and reflect typical industry approaches as described in the AWWA M1 Manual.

While SPU's customer classes of service reflect typical customer classes of service, the AWWA M1 Manual does discuss the further refinement of customer classes if the customer characteristics vary within a customer class for cost allocation purposes. For example, utilities may separate the multi-family customers as a class of service or further separate non-residential into additional classes such as industrial or small and large water users who may have different daily or seasonal consumption patterns.

In some cases, a utility may have a single rate structure for all customer classes of service. A utility may chose this approach when there are not significant cost differences associated with

serving the different types of customers on the system. This may also be appropriate if the utility can accurately assess the costs imposed on the system and the resulting single rate structure equitably reflects the costs incurred on the system for the various types of customer classes of service. Other utilities may select this approach for administrative ease and customer understanding.

What is important is that the costs are understood, and then decisions reflect an understanding of the tradeoffs between alternative rate structures. The perceived equity in customer classes and rate schedules may not be clear to customers or those making policy decisions. In some cases, there is the mistaken perception, absent clear cost justification, that a specific rate structure is the most equitable, when in fact it may not be given the costs of providing service to different customer types.

Finally, when considering the customer classes of service for cost allocation purposes, it is important to revisit the overall rate study goals and objectives. Typically, the over-arching goal of the cost of service should be the equitable allocation of costs and the development of cost-based rates. Absent an understanding of the cost associated with serving a particular customer group it is difficult to make pricing decisions. Once the cost to serve each customer class is known and understood, a policy decision can be made during the rate design phase of the study as to whether it is appropriate to establish a separate rate for a particular class of service or merge that customer class of service into another class of service.

Key Conclusions of the Determination of Customer Classes of Service
• SPU has used generally accepted approaches to establish the customer classes of service. • Analyzing costs on a class-by-class basis provides the cost-justification, if appropriate, for merging customer classes of service together into a single class of service.

Allocation of Costs to Cost of Service Components

Once the methodology and customer classes of service have been developed, the next step is to review the costs of providing retail water service and allocate them to the cost of service components. As noted, the primary cost components outlined in the AWWA M1 Manual are flow, demand, customer, and fire protection. Using the appropriate methodology, the costs of providing retail water service are then allocated to the cost component based on why the cost is incurred. For example, customer related expenses are allocated 100% to the customer cost component.

SPU's cost allocation begins with the total O&M costs for the retail water system. The O&M costs have been functionalized to reflect the type of costs. For example, costs are functionalized into commodity, reservoirs, mains, public fire, etc. Each functional O&M category is then allocated between commodity (flow), customer, or fire protection. As noted in the prior section, the exclusion of a demand cost component may change the current allocation

to the customer classes of service, or as demand patterns change in the future it may result in changing the overall cost allocations.

SPU's approach for allocating customer related costs is based on the average of the actual number of customers and the number of equivalent meters. SPU has chosen this averaging approach as the majority of the costs reflect a blend of both per customer/account related costs and equivalent meter related. Overall, this method does appear to equitably allocate the customer related costs. However, HDR has typically used, and seen other utility's use, a more refined approach to allocating customer related costs. For example, rather than combine all customer costs into a single category and using the average customer allocation component, the specific costs related to equivalent meters is allocated separately as is the customer costs related to a per customer allocation component.

In reviewing the allocation of O&M expenses it appears to be reasonable and, in general, reflect industry standard approaches with the exception of allocating costs to the demand component. As noted previously, the demand costs have been combined with the flow related costs and allocated as flow.

Key Conclusions of the Allocation to Cost Components
• In general SPU has used generally accepted principles in the allocation of costs to cost of service components. • HDR would recommend that SPU reconsider the use of a demand component for cost allocation.

Distribution of Costs to Customer Classes of Service

Once the costs are allocated to the various cost components the next step is to distribute them to the various customer classes of service. To equitably distribute costs, allocation factors are developed for each customer class of service. For example, the commodity allocation factor is developed based on each customer class's annual use. Then, this relationship, or percentage, is used to distribute the commodity-related costs to each customer class.

SPU has developed a distribution factor for each customer class of service based on generally accepted methodologies. For each customer class of service a distribution factor was developed for the flow and customer components. For SPU the fire protection costs are directly assigned to the public or private fire protection customer class. Using the distribution factor for each cost component the allocated costs were distributed to the customer classes of service following generally accepted rate setting approaches.

Key Conclusions of the Distribution of Costs
• SPU has used generally accepted principles in the distribution of costs to customer classes of service.

Conclusions and Recommendations

In general, SPU has followed generally accepted principles for the retail water cost allocation. The development of the method to accumulate costs for the revenue requirement is the Cash Basis approach, while the cost of service analysis uses the Utility Basis approach. This approach, of using both Cash Basis for the revenue requirement and the Utility Basis for the cost of service, is a typical approach for utilities that service inside retail, outside retail, and wholesale customers. SPU has also used generally accepted methodologies for developing the cost allocation and distribution for the retail water cost allocation process for purposes of setting rates.

As noted, a key component of the allocation of costs includes the peak consumption component when reviewing industry standard approaches. At the current time, SPU has excluded the use of the peak consumption component as customer characteristics have changed over time, and are currently similar between the residential and general service customers, system costs are no longer driven by customer demands on the system, and other reasons noted previously. However, the results of the cost allocation are used to determine the cost to serve the various customer classes of service. Once the cost is known, then rates can be developed to reflect rate design goals and objectives and policy direction. By developing the total cost, SPU would understand any trade-offs between various rate structure alternatives and impacts to customers. Cost of service is only one of the tools in SPU's tool box that is used to develop rates that prudently support the costs of the system. It is important to understand how changing peak consumption patterns may impact the cost of service results over time. Ultimately, rates can be designed that take the cost of service results into consideration while focusing on other rate structure goals and objectives.

Summary

HDR has provided a high level review of SPU's retail water cost allocation approach. No additional technical analysis was completed, or requested, during this review. The recommendations included within this technical memorandum reflect generally accepted industry standard approaches to water cost allocations.