

BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

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EXHIBIT NO._____(JDM-2)

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NATURAL GAS COST OF SERVICE STUDY

1
2 A cost of service study is an engineering-economic study, which apportions the
3 revenue, expenses, and rate base associated with providing natural gas service to designated
4 groups of customers. It indicates whether the revenue provided by the customer group
5 recovers the cost to serve those customers. The study results are used as a guide in
6 determining the appropriate rate spread among the groups of customers.

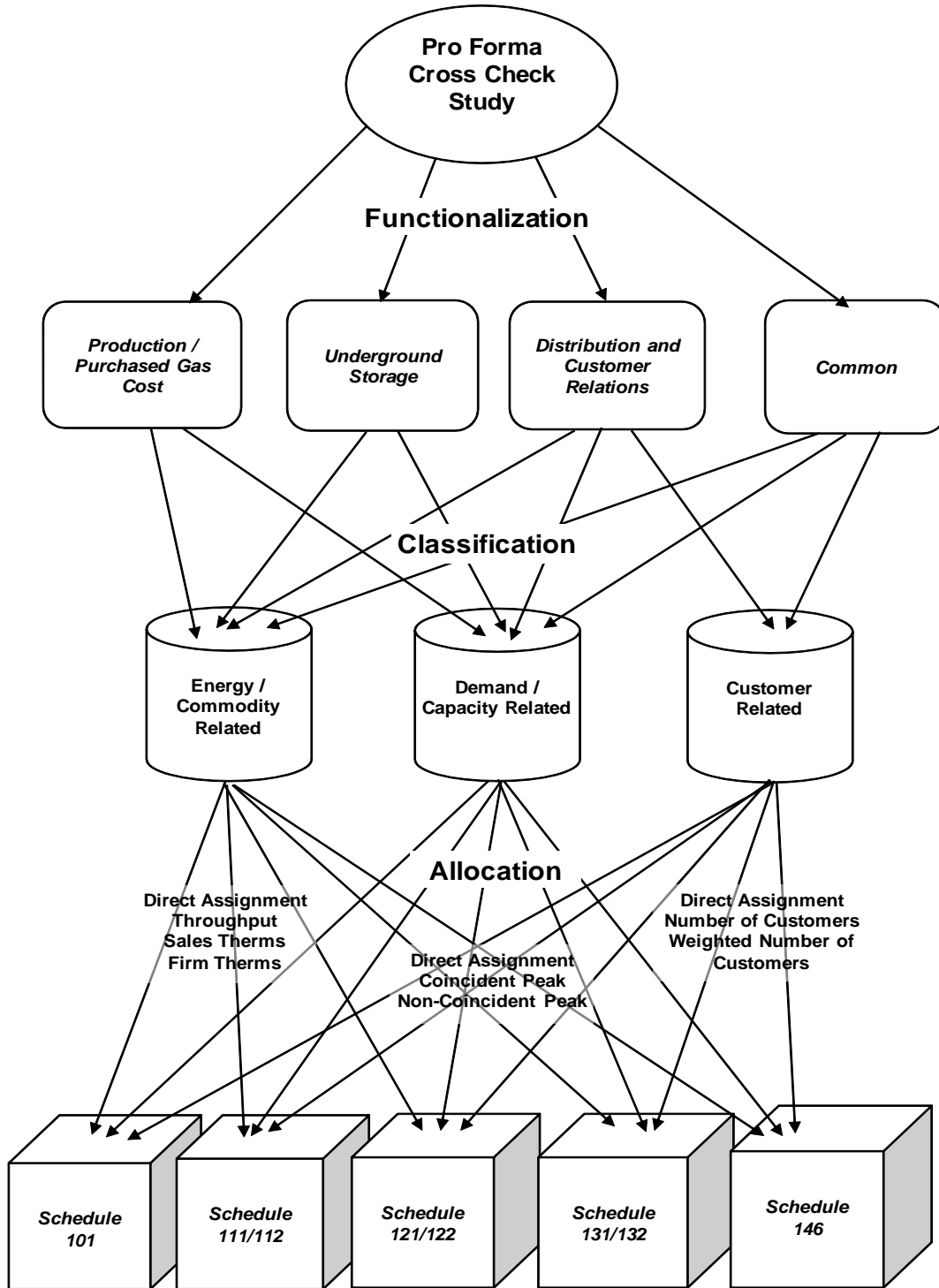
7 There are three basic steps involved in a cost of service study: functionalization,
8 classification, and allocation. See the flow chart below.

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

17 Second, the expenses and rate base items are classified into three primary cost
18 components: demand, commodity or customer related. Demand (capacity) related costs are
19 allocated to rate schedules on the basis of each schedule's contribution to system peak
20 demand. Commodity (energy) related costs are allocated based on each rate schedule's
21 share of commodity consumption. Customer related items are allocated to rate schedules
22 based on the number of customers within each schedule. The number of customers may be
23 weighted by appropriate factors such as relative cost of metering equipment. In addition to

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

3 **NATURAL GAS COST OF SERVICE STUDY FLOWCHART**



Pro Forma Cross Check Study by Customer Group

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 - Purchased Natural Gas Costs**

6 The Company owns no natural gas production facilities serving the Washington
7 jurisdiction. In addition, the revenue and expenses associated with the natural gas
8 purchased to serve sales customers and pipeline transportation to get it to our system have
9 been removed from the Company's filing. The natural gas costs included in the
10 production function include the expenses of the gas supply department.

11 The expenses of the gas supply department recorded in account 813 are classified as
12 commodity related costs. The gas scheduling process includes transportation customers, so
13 estimated scheduling dispatch labor expenses are allocated by throughput. The remaining
14 gas supply department expenses are allocated 95% by sales volumes and 5% on total
15 throughput.

16 **Underground Storage**

17 Underground storage rate base, operating and maintenance expenses are classified as
18 commodity related. Thirteen percent of underground storage costs are allocated to customer
19 groups by annual throughput, the remaining eighty-seven percent are allocated by sales
20 therms.

21 **Distribution Facilities Classification (Peak and Average)**

22 Distribution mains and regulator station equipment (both general use and city gate
23 stations) are classified as demand and commodity related using the peak and average ratio
24 for the distribution system. Peak demand is defined as the average of the five-day sustained

1 peaks from the most recent three years. Average daily load is calculated by dividing annual
2 throughput by 365 (days in the year). The average daily load is divided by peak load to
3 arrive at the system load factor of 39.78%. This proportion is classified as commodity
4 related. The remaining 60.22% is classified as demand related. Meters, services and
5 industrial measuring & regulating equipment are classified as customer related distribution
6 plant. Distribution operating and maintenance expenses are classified (and allocated) in
7 relation to the plant accounts they are associated with.

8 **Customer Relations Distribution Cost Classification**

9 Customer service, customer information and sales expenses are the core of the
10 customer relations functional unit which is included with the distribution cost category. For
11 the most part these costs are classified as customer related. Exceptions include uncollectible
12 accounts expense, which is considered separately as a revenue conversion item, and
13 Demand Side Management amortization expense recorded in Account 908. The demand
14 side management investment costs and amortization expense are included with the
15 distribution function and classified to demand and commodity by the peak and average ratio.

16 **Distribution Cost Allocation**

17 Demand related distribution costs are allocated to customer groups (rate schedules)
18 by each group's contribution to the three year average five-day sustained peak. Commodity
19 related distribution costs are allocated to customer groups by annual throughput. The
20 throughput allocation for distribution main investment has been segregated into small,
21 medium and large mains. Small mains are defined as less than two inches, medium mains
22 are 2 and 3 inches, and large mains being four inches or greater. Large usage customers
23 (Schedules 131/132 and 146) receive zero allocation of small main and a 33.3% of medium
24 main.

1 Most customer related costs are allocated by the annualized number of customers
2 billed during the test period. Meter investment costs are allocated using the number of
3 customers weighted by the relative current cost of meters in service at September 30, 2015.
4 Services investment costs are allocated using the number of customers weighted by the
5 relative current cost of typical service installations. Industrial measuring and regulating
6 equipment investment costs are allocated by number of customers weighted by industrial
7 meters at current cost.

8 **Administrative and General Costs**

9 General and intangible rate base items are allocated by the Company's blended 4-
10 part factor allocator (4-factor). Administrative and general expenses are segregated into
11 plant related, labor related, revenue related and other. The plant related items are allocated
12 based on total plant in service. Labor related items are allocated by operating and
13 maintenance labor expense. Revenue related items are allocated by pro forma revenue.
14 Other administrative and general expenses are allocated by the Company's 4-factor.
15 Whenever costs are allocated by sums of other items within the study, classifications are
16 imputed from the relationship embedded in the summed items.

17 **Special Contract Customer Revenue**

18 Several special contract customers receive transportation service from the Company.
19 Rates for these customers were individually negotiated to cover any incremental costs and
20 retain some contribution to margin. The rates for these customers are not being adjusted in
21 this case. The revenue from these special contract customers has been segregated from
22 general rate revenue and allocated back to all the other rate classes by relative rate base. In
23 treating these revenues like other operating revenues their system contribution reduces costs
24 for all rate schedules.

1 **Revenue Conversion Items**

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

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

12 The following matrix outlines the methodology applied in the Company's Base Case
13 natural gas cost of service study.

Line Account	Functional Category	Classification	Allocation
Underground Storage Plant			
1 350 - 357 Underground Storage	Underground Storage	Commodity to match PGA items	E01/E04 Annual Throughput / Annual Sales Therm
Distribution Plant			
2 374 Land	Distributor	Demand/Commodity/Customer from Other Dist Plan	S05 Sum of accounts 376-385
3 375 Structures	Distributor	Demand/Commodity/Customer from Other Dist Plan	S05 Sum of accounts 376-385
4 376(S) Small Mains	Distribution	Demand/Commodity by Peak & Average	D01/E06 Annual throughput excludes Sch 131/132&146 D01/E01/E06 1/3 annual throughput to all schedules & 2/3's annual throughput excluding Schs. 131/132&146
5 376(M) Medium Mains	Distribution	Demand/Commodity by Peak & Average	D01/E01/E06 Annual throughput to all schedules
6 376(L) Large Mains	Distribution	Demand/Commodity by Peak & Average	D01/E01 Coincident peak (all), annual throughput (all)
7 378 M&R General	Distributor	Demand/Commodity by Peak & Average	D01/E01 Coincident peak (all), annual throughput (all)
8 379 M&R City Gate	Distributor	Demand/Commodity by Peak & Average	C02, Customers weighted by current typical service cos
9 380 Services	Distributor	Customer	C03, Customers weighted by average current meter cos
10 381 Meters	Distributor	Customer	C06, Customers weighted by industrial meter cos
11 385 Industrial M&R	Distributor	Customer	S05 Sum of accounts 376-385
12 387 Other	Distributor	Demand/Commodity/Customer from Other Dist Plan	
General Plant			
13 389-399 All General Plant	Common	Demand/Commodity/Customer from UG & D Plant	4-Factor (O&M less resource & labor, O&M labor, net direct plant, & customers)
Intangible Plant			
14 303 Misc Intangible Plan	Distributor	Demand/Commodity/Customer from Dist Plan	S15 Sum of Distribution Plant in Servic
15 303 Computer Software	Common	Demand/Commodity/Customer from UG & D Plant	4-Factor (O&M less resource & labor, O&M labor, net direct plant, & customers)
Reserve for Depreciation			
16 Underground Storage	Underground Storage	Commodity same as related plan	Allocations linked to related plant account
17 Distributor	Distributor	Demand/Commodity/Customer same as related plan	Allocations linked to related plant account
18 General	Common	Demand/Commodity/Customer same as related plan	Allocations linked to related plant account
19 Intangible	Distribution/Commor	Demand/Commodity/Customer same as related plan	Allocations linked to related plant account
Other Rate Base			
20 Accumulated Deferred FIT	All	Demand/Commodity/Customer from Plant in Servic	S17 Sum of Total Plant in Service
21 Constuction Advance	Distributor	Customer	C10 Residential only
22 Gas Inventory	Underground Storage	Commodity from Underground Storage Plan	S14 Sum of Underground Storage Plant in Servic
23 DSM Investment	Distributor	Demand/Commodity by Peak & Average	D01/E01 Coincident peak (all), annual throughput (all)
24 Working Capital	Common	Demand/Commodity/Customer from UG & D Plan	S17 Sum of Total Plant in Service
25 Other Rate Base	Common	Demand/Commodity/Customer from UG & D Plan	S17 Sum of Total Plant in Service
Purchased Gas Expenses			
26 804 Purchased Gas Cost	Production	Demand/Commodity from PGA Tracker WACOC	Excluded from Study
27 807 Purchased Gas Expenses	Production	Commodity	Excluded from Study
28 813 Gas Research Contributions	Production	Commodity	E08 GTI Expense (Weighted Annual Sales Therms
29 813 Other Gas Expenses	Production	Commodity	E01/E04 Annual Throughput / Annual Sales Therm

Line Account	Functional Category	Classification	Allocation
Underground Storage O&M			
1 814 - 837 Underground Storage Exp	Underground Storage	Commodity	E01/E04 Annual Throughput / Annual Sales Therm
Distribution O&M			
2 870 OP Super & Engineering	Distributor	Demand/Commodity/Customer from Dist Plan	S15 Sum of Distribution Plant in Servic
3 871 Load Dispatching	Distributor	Commodity	E01 Annual throughpu
4 874 Mains & Services	Distributor	Demand/Commodity/Customer from related plan	S06 Sum of Mains and Services Plant in Servic
5 875 M&R Station - General	Distributor	Demand/Commodity from related plan	S08 Sum of Meas & Reg Station - General Plant in Servic
6 876 M&R Station - Industrial	Distributor	Customer from related plan	S19 Sum of Meas & Reg Station - Industrial Plant in Servic
7 877 M&R Station - City Gate	Distributor	Demand/Commodity from related plan	S09 Sum of Meas & Reg Station - City Gate Plant in Servic
8 878 Meter & House Regulator	Distributor	Customer from related plan	S07 Sum of Meter and Installation Plant in Servic
9 879 Customer Installation	Distributor	Customer	C05, Customers weighted by average current meter cos
10 880 Other OP Expenses	Distributor	Demand/Commodity/Customer from other dist expense	S04 Sum of Accounts 870 - 879 and 881 - 892
11 881 Rents	Distributor	Demand/Commodity/Customer from other dist expense	S04 Sum of Accounts 870 - 879 and 881 - 892
12 885 MT Super & Engineering	Distributor	Demand/Commodity/Customer from Dist Plan	S15 Sum of Distribution Plant in Servic
13 886 MT of Structures	Distributor	Demand/Commodity/Customer from Other Dist Plan	S05 Sum of accounts 376-385
14 887 MT of Mains	Distributor	Demand/Commodity from related plan	S21 Sum of Distribution Mains Plant in Servic
15 889 MT of M&R General	Distributor	Demand/Commodity from related plan	S08 Sum of Meas & Reg Station - General Plant in Servic
16 890 MT of M&R Industrial	Distributor	Customer from related plan	S19 Sum of Meas & Reg Station - Industrial Plant in Servic
17 891 MT of M&R City Gate	Distributor	Demand/Commodity from related plan	S09 Sum of Meas & Reg Station - City Gate Plant in Servic
18 892 MT of Services	Distributor	Customer from related plan	S20 Sum of Services Plant in Service
19 893 MT of Meters & Hs Reg	Distributor	Customer from related plan	S07 Sum of Meter and Installation Plant in Servic
20 894 MT of Other Equipment	Distributor	Demand/Commodity/Customer from Dist Plan	S15 Sum of Distribution Plant in Servic
Customer Accounting Expenses:			
21 901 Supervisor	Customer Relations	Customer	C01 All customers (unweighted)
22 902 Meter Reading	Customer Relations	Customer	C01 All customers (unweighted)
23 903 Customer Records & Collection	Customer Relations	Customer	C01 All customers (unweighted)
24 904 Uncollectible Account	Revenue Conversion	Revenue	R03 Retail Sales Revenue
25 905 Misc Cust Accounts	Customer Relations	Customer	C01 All customers (unweighted)
Customer Service & Info Expenses:			
26 907 Supervisor	Customer Relations	Customer	C01 All customers (unweighted)
27 908 Customer Assistance	Customer Relations	Customer	C01 All customers (unweighted)
28 908 DSM Amortization	Distributor	Demand/Commodity by Peak & Average	D01/E01 Coincident peak (all), annual throughput (all)
29 909 Advertising	Customer Relations	Customer	C01 All customers (unweighted)
30 910 Misc Cust Service & Info	Customer Relations	Customer	C01 All customers (unweighted)
Sales Expenses			
31 911 - 916 Sales Expenses	Customer Relations	Customer	C01 All customers (unweighted)

Line Account	Functional Category	Classification	Allocation
Admin & General Expenses			
1 920 Salaries	Common	Demand/Commodity/Customer from Other O&M	4-Factor (O&M less resource & labor, O&M labor, net direct plant, & customers)
2 921 Office Supplies	Common	Demand/Commodity/Customer from Other O&M	4-Factor (O&M less resource & labor, O&M labor, net direct plant, & customers)
3 922 Admin Expenses Transferred	Common	Demand/Commodity/Customer from Other O&M	4-Factor (O&M less resource & labor, O&M labor, net direct plant, & customers)
4 923 Outside Services	Common	Demand/Commodity/Customer from Other O&M	4-Factor (O&M less resource & labor, O&M labor, net direct plant, & customers)
5 924 Property Insurance	Common	Demand/Commodity/Customer from Plant in Service	S17 Sum of Total Plant in Service
6 925 Injuries & Damages	Common	Demand/Commodity/Customer from Other O&M	4-Factor (O&M less resource & labor, O&M labor, net direct plant, & customers)
7 926 Pensions & Benefits	Common	Demand/Commodity/Customer from Labor O&M	S13 O&M Labor Expense
8 927 Franchise Requirements	Revenue Conversion	Revenue	R01 Retail Sales Revenue
9 928 Regulatory Commission	Common	Demand/Commodity/Customer from Other O&M	4-Factor (O&M less resource & labor, O&M labor, net direct plant, & customers)
10 928 Commission Fees	Revenue Conversion	Revenue	R01 Retail Sales Revenue
11 930 Miscellaneous General	Common	Demand/Commodity/Customer from Other O&M	4-Factor (O&M less resource & labor, O&M labor, net direct plant, & customers)
12 931 Rents	Common	Demand/Commodity/Customer from Other O&M	4-Factor (O&M less resource & labor, O&M labor, net direct plant, & customers)
13 931 CSS Rent	Customer Relations	Customer	C01 All customers (unweighted)
14 935 MT of General Plant	Common	Demand/Commodity/Customer from Plant in Service	S17 Sum of Total Plant in Service
Depreciation Expense			
15 Underground Storage	Underground Storage	Commodity same as related plan	Allocations linked to related plant account
16 Distributor	Distributor	Demand/Commodity/Customer same as related plan	Allocations linked to related plant account
17 General	Common	Demand/Commodity/Customer same as related plan	Allocations linked to related plant account
18 Intangible	Distribution/Commodity	Demand/Commodity/Customer same as related plan	Allocations linked to related plant account
Taxes			
19 Property Tax	All	Demand/Commodity/Customer from related plan	S14/S15/S16 Sum of UG Plant/Sum of Dist Plant/Sum of Gen Plant
20 Miscellaneous Dist Tax	Distributor	Demand/Commodity/Customer from Dist Plant	S15 Sum of Distribution Plant in Service
21 State Excise Tax	Revenue Conversion	Revenue	R01 Retail Sales Revenue
22 Federal Income Tax	Revenue Conversion	Revenue	R02 Net Income before Taxes Less Interest Expense
23 Deferred FIT	Revenue Conversion	Revenue	R02 Net Income before Taxes Less Interest Expense
24 ITC	Revenue Conversion	Revenue	R02 Net Income before Taxes Less Interest Expense
Operating Revenues			
25 Revenue from Rates	Revenue	Revenue	Pro Forma Revenue per Revenue Study
26 Special Contract Revenue	All	Demand/Commodity/Customer from Rate Base	S01 Sum of Rate Base
27 Off System Sales	Production	Commodity	E04 Sales Therms
28 Miscellaneous Service Revenue	Distributor	Demand/Commodity/Customer from Dist Plant	S15 Sum of Distribution Plant in Service
29 Rent From Gas Property	All	Demand/Commodity/Customer from Rate Base	S01 Sum of Rate Base