EXH. CDP-1T
DOCKETS UE-240004/UG-240005
2024 PSE GENERAL RATE CASE
WITNESS: CURT D. PUCKETT

BEFORE THE
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION, **Complainant,** **v.** **PUGET SOUND ENERGY,** **Respondent.**	**Docket UE-240004** **Docket UG-240005**

PREFILED DIRECT TESTIMONY (NONCONFIDENTIAL) OF

CURT D. PUCKETT

ON BEHALF OF PUGET SOUND ENERGY

FEBRUARY 15, 2024

PUGET SOUND ENERGY

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I. INTRODUCTION

Q. Please state your name, business address, and relationship with Puget Sound Energy.

A. My name is Curt D. Puckett, and my business address is 179 Pinehill Lake Dr, Horton, MI 49246. I am employed by Det Norske Veritas ("DNV") as Vice President, Energy Systems, North America, Energy Insights, U.S.A., Analytics & Digitalization. DNV was hired by Puget Sound Energy ("PSE") to support the gas load research analysis filed as Exhibit CDP-3.

Q. Have you prepared an exhibit describing your education, relevant employment experience, and other professional qualifications?

A. Yes, I have. Exhibit CDP-2 presents my education, relevant employment experience, and other professional qualifications.

Q. What are your duties as Vice President, Energy Systems, North America, Energy Insights, U.S.A., Analytics & Digitalization as it relates to this testimony?

A. On this project I was the Project Sponsor, responsible for overseeing and approving the analytics conducted in support of the Gas Load Research Analysis project.

Q. What topics are you covering in your testimony?

A. The purpose of my prefiled direct testimony is to present the results of the gas load study conducted for the 12-month test year ending on June 30, 2023, in support of PSE's 2024 general rate case. This analysis was conducted to comply with the Electric and Natural Gas Cost of Service Rules recently codified in Chapter 480-85 of the Washington Administration Code. These rules were developed through an Electric and Natural Gas rulemaking process in Dockets UE-170002 and UG-170003 (consolidated). The gas load study is submitted herewith as the Second Exhibit to my Prefiled Direct Testimony, Exh. CDP-3.

II. GAS LOAD RESEARCH

A. Definition of Gas Load Research

Q. What is gas load research and how does PSE perform its gas load research?

A. Gas load research provides information and insight on how the demand for gas varies across different classes of customers. PSE conducts its gas load research to develop daily gas usage profiles by rate class and to provide estimates of coincident and non-coincident peaks, average gas usage for a test year period to support its gas cost of service and rate design. To conduct this analysis, DNV used daily gas consumption data provided by PSE. The analysis includes validating data quality, adjusting for gaps when the full population data are not available or cannot be used, developing load profiles and calculating summary statistics.

Q. Did PSE use the same load research methodology in this case as in its last general rate case?

A. This is the second case that DNV has assisted PSE in preparing a gas load research analysis. The analysis was conducted in accordance with WAC 480-85. The analysis follows standard load research practices as outlined in the Third Edition of the AEIC Load Research Manual, and DNV used the same methodology in PSE's 2022 general rate case.

B. Load Research Methodology

Q. What statistical methodology did DNV use in this analysis?

A. DNV used standard load research practices in its review and analysis of the gas load data as documented in the Association of Edison Illuminating Companies (AEIC) Load Research Manual. The analysis takes advantage of as much data as possible and in cases when full population data are not available, it uses standard statistical techniques, i.e., stratified ratio estimation, to expand the available daily data to the full populations of interest. Under stratified ratio estimation, the analysis leverages data available for the various rate schedule samples, i.e., the daily gas usage data, with information known for the full population of customers, e.g., the annual billed energy. In our analysis, the population of customers were stratified based on rate schedule, class, and annual use. Next, the available sample data are mapped back into the populations of interest. This allows us to create "case weights" that are used to weight the available sample data to the populations of interest. A case weight is

simply the number of customers in the population of interest represented by each available sample point. A final reconciliation adjusts the daily load over the study period to the known population billing totals for that same period by rate schedule and class.

Q. Please describe the historical daily load data, gas sales and customer data used for PSE's Daily Gas Load Research analysis.

A. Although PSE attempts to collect gas usage data for all its gas customers via AMR/AMI metering technology or any other data communication technology, there are exceptions. Data for all gas customers were not available for the entire test period due to absence of proper metering technology, equipment failures etc. Because of these reasons, it's possible for certain rate schedules and classes to not have daily data for all its customers for the entire test period.

Table 1 presents a summary of the daily data available for each rate schedule and class. The table presents the rate schedule, customer class, the number of accounts in the population, the number of accounts with available daily data, the percentage of accounts with daily data and the resultant case weight. As evidenced by the table, daily data were available for nearly 99 percent of the population.

Table 1 – Summary of Available Daily Data

Schedule/Domain	Number of Accounts (N)	Available Daily Data (n)	Percentage of Data Available	Case Weight (N/n)
23-Residential	819,584	816,836		1.00
Schedule 23 Total	819,584	816,836	99.7%	
31-Commercial	58,272	57,740		1.01
31-Industrial	2,342	2,322		1.01
Schedule 31 Total	60,614	60,062	99.1%	
41-Commercial	1,356	1,184		1.15
41-Industrial	76	62		1.23
41T-Commercial	77	77		1.00
41T-Industrial	18	18		1.00
Schedule 41 Total	1,527	1,341	87.8%	
85-Commercial	35	13		2.69
85-Industrial	7	Deemed		
85T-Commercial	25	23		1.09
85T-Industrial	61	61		1.00
Schedule 85 Total	128	97	75.8%	
86-Commercial	119	112		1.06
86-Industrial	7	5		1.40
86T-Commercial	2	2		1.00
86T-Industrial	5	5		1.00
Schedule 86 Total	133	124	93.2%	
87-Commercial	4	Deemed		
87T-Commercial	3	3		1.00
87T-Industrial	8	7		1.14
Schedule 87 Total	15	10	66.7%	
Special Contracts	9	9		1.00
Special Contracts Total	9	9	100.0%	
Schedule Totals	882,010	878,479	99.6%	

Q. Please describe the historical gas sales and customer data used for PSE's Daily Gas Load Research analysis

A. For this analysis DNV was provided energy usage data for the full population of PSE Sales and Transportation customers. The data were provided by schedule and customer class. Table 2 provides a summary of the data provided. The table lists a variety of information including schedule, customer class, the number of accounts, and the total annual use in Therms.

Table 2 – Summary of Population Billing Data Used in Analysis

Schedule/Domain	Number of Accounts	% of Schedule Accounts	% of Total Accounts	Annual Use (Therms)	% of Schedule Use	% of Total Use	Average Annual Use (Therms)
23-Residential	812,902	100.00%		615,458,748	100.00%		757
Schedule 23 Total	812,902	100.00%	93.18%	615,458,748	100.00%	51.72%	757
31-Commercial	55,712	96.21%		232,925,969	94.43%		4,181
31-Industrial	2,192	3.79%		13,743,592	5.57%		6,270
Schedule 31 Total	57,904	100.00%	6.64%	246,669,561	100.00%	20.73%	4,260
41-Commercial	1,167	87.74%		60,190,531	66.38%		51,577
41-Industrial	69	5.19%		9,417,004	10.39%		136,478
41T-Commercial	77	5.79%		14,711,698	16.22%		191,061
41T-Industrial	17	1.28%		6,357,019	7.01%		373,942
Schedule 41 Total	1,330	100.00%	0.15%	90,676,252	100.00%	7.62%	68,178
85-Commercial	28	24.35%		19,904,154	23.56%		710,863
85-Industrial	5	4.35%		4,702,369	5.57%		940,474
85T-Commercial	23	20.00%		16,510,606	19.54%		717,852
85T-Industrial	59	51.30%		43,368,168	51.33%		735,054
Schedule 85 Total	115	100.00%	0.01%	84,485,298	100.00%	7.10%	734,655
86-Commercial	101	89.38%		5,654,559	69.23%		55,986
86-Industrial	6	5.31%		384,580	4.71%		64,097
86T-Commercial	2	1.77%		1,512,056	18.51%		756,028
86T-Industrial	4	3.54%		616,915	7.55%		154,229
Schedule 86 Total	113	100.00%	0.01%	8,168,111	100.00%	0.69%	72,284
87-Commercial	4	28.57%		20,026,822	17.98%		5,006,705
87T-Ccommercial	3	21.43%		17,775,915	15.95%		5,925,305
87T-Industrial	7	50.00%		73,610,467	66.07%		10,515,781
Schedule 87 Total	14	100.00%	0.00%	111,413,204	100.00%	9.36%	7,958,086
Special Contracts	9	100.00%		33,066,238	100.00%		3,674,026
Special Contracts Total	9	100.00%	0.00%	33,066,238	100.00%	2.78%	3,674,026
Schedule Totals	872,387		100.00%	1,189,937,413		100.00%	1,364

The residential class accounts for 93 percent of the total accounts and 52 percent of the total annual gas sales. Schedule 31 Sales accounts for 6.6 percent of the total number of accounts and an additional 20.7 percent of total annual gas sales.

Q. Please summarize the results of PSE's 2023 load research results.

A. Figure 1 presents vertical EnergyPrints that display the total daily use of each Sales schedule. The EnergyPrint displays day of year on the y-axis and the daily use as a color gradient with low levels of load in the black to blue spectrum and high levels of load in the yellow to white spectrum. The EnergyPrints present a "helicopter" view of the data providing a perspective on the average weekday, average weekend,

and seasonality of the load. The EnergyPrints start on July 1, 2022, and present the daily use throughout the study period ending on June 30, 2023. In this figure, we present the average daily temperature, followed by the PSE system load and each of the rate Sales class schedule loads beginning with Schedule 23 Residential. Schedules 23- Residential and 31- General Service loads mimic the system load characteristics. The remaining classes are slightly different with Schedule 85 and Schedule 86 being the most different from the system load. Schedule 85 and Schedule 86 show much higher more consistent use during the summer months. In addition, the dark lines throughout show the lower loads experienced by this class on weekends.

Figure 1 – Sales Schedule Loads

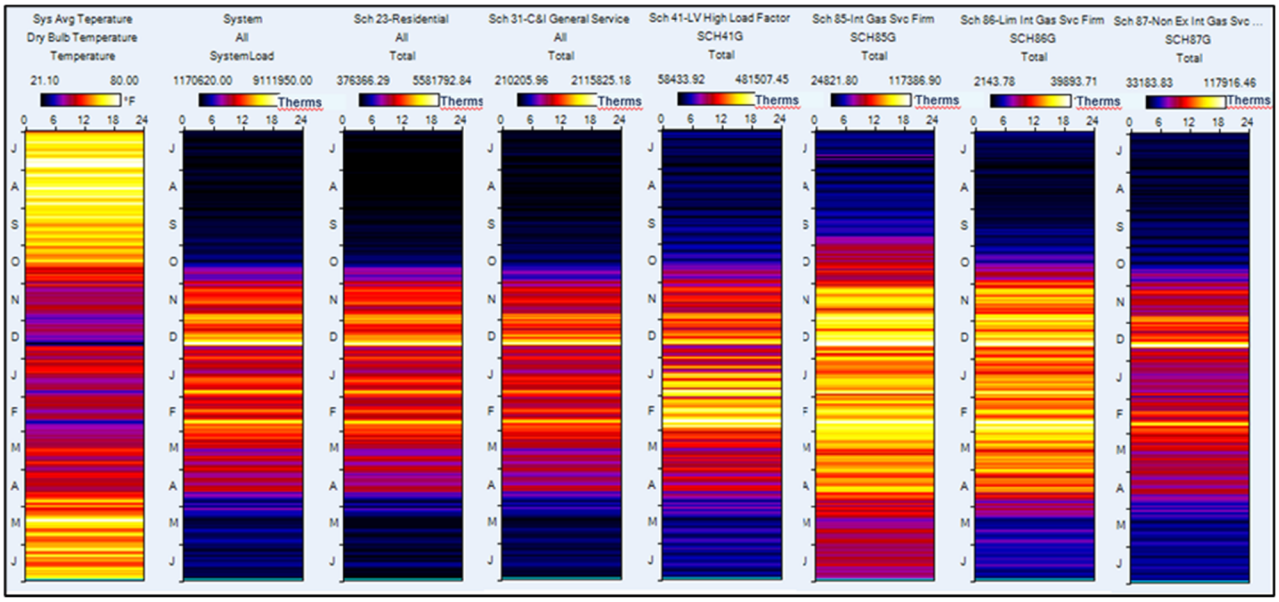

Figure 2 presents the vertical EnergyPrints for the Transportation schedules. Once again, we present the average daily temperature, the PSE system load, followed by the various transportation schedules. Here, most of the schedules show a

substantial difference when compared to the System load. Schedules 41Transportation, 85 Transportation, and 87 Transportation show consistently higher weekday load throughout the year when compared to the system load. In general, the transportation loads have higher and more consistent load when compared to their Sales counterparts.

Figure 2 – Transportation Schedule Loads

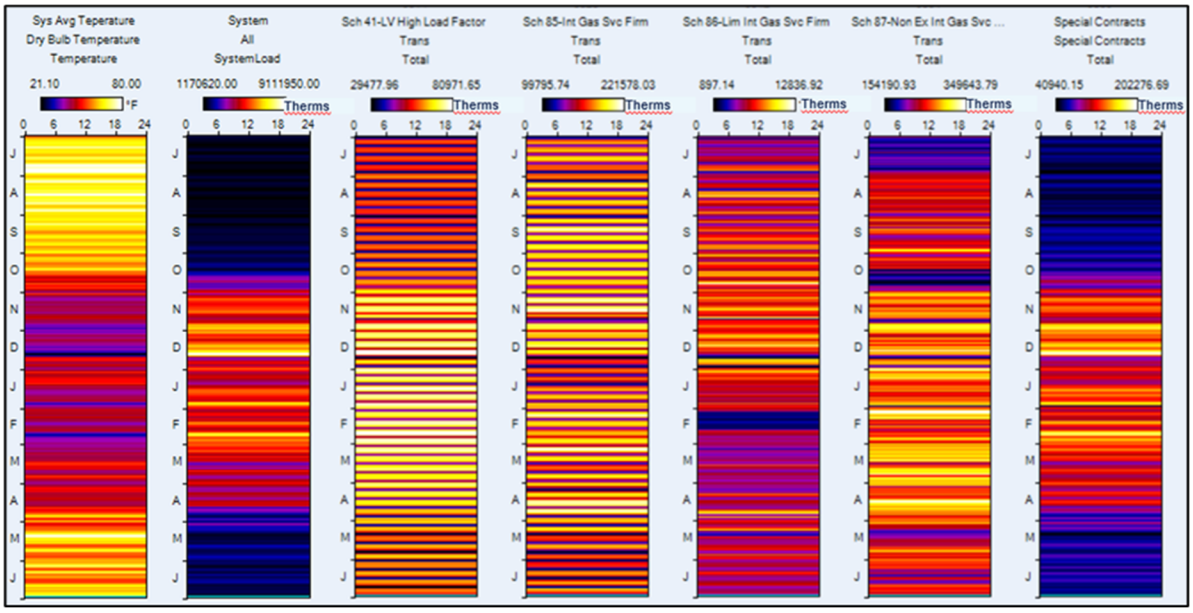

Table 3 summarizes the annual use, average daily use, annual class peak date, annual class peak demand, load factor, class demand at the time of the system peak, system peak load factor and coincidence factor. Schedule 23-Residential dominates, accounting for 51 percent of the total annual therm use and an even higher portion (61 percent) of the system peak demand. Schedules 3, and 87 are coincident with the system peak. For this fiscal year period, all but Schedule 41 was coincident with the extremely cold system peak day of Thursday, December 22, 2022, where the temperature averaged 21.1°F. None of the Transportation schedules were coincident

with the December system peak. Schedule 86T has the lowest coincidence with the system load calculated at 34 percent.

Table 3 – Summary of Results

Schedule	Annual Use (Therms)	Average Daily Use (Therms)	Non-Coincident (Class Peak) Date	Non-Coincident (Class Peak) Demand (Therms)	Non-Coincident Load Factor (%)	Coincident (System Peak), Thursday December 22, 2022		Coincidence Factor (%)
						Class Demand (Therms)	Load Factor (%)	
Sales								
23	615,458,748	1,686,188	Thursday, December 22, 2022	5,581,793	30.2%	5,581,793	30.2%	100.0%
31	246,669,561	675,807	Thursday, December 22, 2022	2,115,825	31.9%	2,115,825	31.9%	100.0%
41	69,607,535	190,706	Thursday, February 23, 2023	481,507	39.6%	419,957	45.4%	87.2%
85	24,606,524	67,415	Thursday, December 22, 2022	117,387	57.4%	117,387	57.4%	100.0%
86	6,039,139	16,546	Thursday, December 22, 2022	39,894	41.5%	39,894	41.5%	100.0%
87	20,026,822	54,868	Thursday, December 22, 2022	117,916	46.5%	117,916	46.5%	100.0%
Sales Totals	982,408,329	2,691,530	Thursday, December 22, 2022	8,392,772	32.1%	8,392,772	32.1%	100.0%
Transportation								
41T	21,068,717	57,723	Wednesday, December 21, 2022	80,972	71.3%	77,741	74.3%	96.0%
85T	59,878,774	164,051	Thursday, November 17, 2022	221,578	74.0%	171,749	95.5%	77.5%
86T	2,128,972	5,833	Thursday, October 27, 2022	12,837	45.4%	4,392	132.8%	34.2%
87T	91,386,383	250,374	Monday, February 6, 2023	349,644	71.6%	277,515	90.2%	79.4%
Special Contracts	33,066,238	90,592	Wednesday, December 21, 2022	202,277	44.8%	186,231	48.6%	92.1%
Transportation Totals	207,529,084	568,573	Monday, December 19, 2022	775,573	73.3%	717,628	79.2%	92.5%

More detail is provided using a series of figures and tables presented in Exh. CDP-3.

III. CONCLUSION

Q. Does that conclude your prefiled direct testimony?

A. Yes, it does.