BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

Docket UG-230393
Puget Sound Energy
Tacoma LNG Tracker

PUBLIC COUNSEL DATA REQUEST NO. 029:
REQUESTED BY: Robert Earle

Re: Changes in Gas Quality. Dockets UE-220066 and UG-220067, Ronald J. Roberts, TR. 421:9–424:11.

a. Please provide support, including but not limited to engineering studies and industry standards, that (Roberts, TR 421:9-422:2) "…actually impacts all of PSE's customers. It's just not a liquefaction issue at the LNG site; that's something that's being worked on in Canada. It has to do with the elevated levels of ethane and methane in the gas coming from Canada."
b. Please provide support, including but not limited to engineering studies and industry standards, that (Roberts, TR 423:9-12) "…that does apply to all of our customers. High levels of ethane or propane in our natural gas supply are not good for our customers either, not just TOTE."
c. Please provide support, including but not limited to engineering studies and industry standards, that (Roberts, TR 424:11-12) "Some cases would be very harmful to other equipment that's in the system, end user's equipment."

Response:

Puget Sound Energy ("PSE") objects to Public Counsel Data Request No. 029 to the extent it is outside the scope of this proceeding, requests information not reasonably calculated to lead to the discovery of admissible evidence, and because it requests information regarding PSE's decision to build the facility, which was already addressed by the Commission. PSE further objects to the extent this request attempts to relitigate issues already addressed and resolved in PSE's General Rate Case where the Commission held:

> We are not persuaded, either, that PSE incurred unreasonable costs in redesigning the facility due to changing composition of imported natural gas. Roberts testified that high levels of ethane or propane in imported natural gas were a problem for core gas customers as well as non-regulated, Puget LNG customers. Roberts also testified that the redesign represented only a fraction of the facility's overall cost.

See Dockets UE-220066/UG-220067 and UG-210918 (consolidated), Final Order 24/10 ¶ 403 (Dec. 22, 2022).

Notwithstanding its objections and subject thereto, PSE responds as follows:

a. Puget Sound Energy ("PSE") and others have observed increasingly high BTU content and Wobbe Index, caused by declining methane content and increased ethane and propane content, from British Columbia sourced gas since mid-2014. See Attachment A to PSE's Response to Public Counsel Data Request No. 029 for an Excel document containing a Mole/Gas Composition graph. Initially understood to be a short-term anomaly, it became readily apparent there was an ongoing trend. When both Fortis BC Energy and PSE inquired, Westcoast Energy (the pipeline in British Columbia) was able to eventually verify the trend was a result of increasing percentages of gas production from the liquids-rich North Montney production region in NE British Columbia. Utilizing the monthly collaborative process meetings among shippers and Westcoast Energy, PSE and Fortis BC Energy have encouraged the British Columbia producers and Westcoast Energy to manage the blend of gas supplies to not exceed the industry standard of 1110 BTU and 1400 Wobbe Index. Producers are unwilling to incur the costs of processing the gas to remove the excessive ethane and propane and Westcoast Energy's tariff has no restrictions with regard to high BTU or Wobbe Index.

b. Attached as Attachments B and C to PSE's Response to Public Counsel Data Request No. 029 are PDFs with excerpts from industry documents that describe the Wobbe Index and its use. The NGC+ Interchangeability Work Group[1] was convened to consider implications of the expected large supplies of imported LNG in 2005. The imported LNG was known to be produced from very high ethane content feedstock, which is similar to the supplies now being received from British Columbia. See PSE's Response to Public Counsel Data Request No. 028.a.

c. Elevated levels of ethane and propane, along with other heavier hydrocarbons, increase the BTU content of the gas and, perhaps more significantly, increases its Wobbe Index. An appliance that uses gas with too-high a Wobbe Index will not be able to supply sufficient oxygen for optimal combustion. Effects can include yellow-tipping, sooting, and increased emissions of (primarily) carbon monoxide. In addition, the combustion chamber and associated components can be subject to higher temperatures, leading to faster wear and a shorter lifespan. Produced soot can coat internal surfaces, reducing heat transfer efficiency and increasing exhaust temperature. Continued sooting can obstruct exhaust passageways

[1] The work group was formed by the Natural Gas Council.

which will reduce air intake, leading to a further increase in the rate of soot production.

Appliances vary in their susceptibility to the negative effects of gas with elevated Wobbe Index because of the inherent differences between them and how they are tuned ('adjusted'). Equipment properly adjusted at time of installation, for example that uses gas with a heating value of 1019 Btu/scf and Wobbe Index of **1341 Btu/scf** (Sumas, November 14, 2013), is not likely to perform well when supplied by gas with a heating value of 1121 Btu/scf and Wobbe Index of **1415 Btu/scf** (Sumas, October 18, 2019). It is likely some such equipment will experience accelerated wear and/or component failure as a result of use when supplied with gas having the higher heating value and Wobbe Index. The following table uses information from Attachment A to PSE's Response to Public Counsel Data Request No. 029 to show the gas composition as measured at Sumas on the two days referenced above:

GasDay	WOBBE	HHV	RelDensity	N2	CO2	Total Inerts	Methane	Ethane	Propane	Ibutane	Nbutane	Ipentane	Npentane	Hexanes	C4 Plus	C5 Plus
11/14/2013	1341	1019	0.577	0.742	0.676	1.418	96.29	2.111	0.141	0.014	0.017	0.003	0.002	0.003	0.04	0.009
10/18/2019	1415	1121	0.628	0.197	0.236	0.433	88.25	8.845	1.904	0.225	0.258	0.04	0.029	0.016	0.568	0.085

Attached as Attachment D to PSE's Response to Public Counsel Data Request No. 029 is a PDF describing the effects of variability in consumer appliances and consequences when substituting gas with different quality indices: "Consumer Appliance Population Raises Issues In Gas Interchangeability Testing" Levinsky, Howard. Gasunie Engineering and Technology, Pipeline and Gas Journal, January 2008 pp. 66:70.

ATTACHMENTS A - D PSE's
Response to
Public Counsel Data Request No. 029