Exh. RL-1T
TP-190976
Witness: Robert Leachman

BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION, Complainant, v. PUGET SOUND PILOTS, Respondent.	DOCKET NO. TP-190976

REBUTTAL TESTIMONY OF

ROBERT LEACHMAN, PhD.

ON BEHALF OF PUGET SOUND PILOTS

JULY 13, 2020

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I. IDENTIFICATION OF WITNESS

Q: Please state your name and provide your business address for the record.

A: Dr. Robert C. Leachman, Leachman & Associates LLC, 245 Estates Drive, Piedmont, CA 94611.

Q: Can you please provide a brief summary of your professional background and academic training, including highlights of you experience in analyses related to international container volumes through ports?

A: I received the AB degree in Mathematics and Physics in 1973, the MS degree in Operations Research in 1975, and the PhD degree in Industrial Engineering and Operations Research in 1979, all from the University of California at Berkeley. During semester breaks and summers in 1970, 1971, 1972 and 1975, I worked various positions in the Operating Department of the Oregon Division of the Union Pacific Railroad. During the years 1973 and 1974 I worked as a Service Planning Analyst in the Marketing Department of Union Pacific Railroad. During the period 1977 – 1982 I worked as a Planning Engineer, Senior Engineer and an Associate Engineer for Alan M. Voorhees & Associates, later PRC Planning & Economics, a nationally-recognized transportation planning firm. Beginning in 1979 I joined the faculty of the Dept. of Industrial Engineering and Operations Research at the University of California at Berkeley, rising to the rank of Full Professor in 1992, a position I now hold. In 1983 I founded Leachman & Associates, and I continue to serve as Principal for this limited liability company (LLC). Leachman & Associates provides consulting and software for

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the management and design of supply chains and for economic and capacity analysis of freight transportation.

II. PURPOSE OF YOUR TESTIMONY

Q: Can you please describe the purpose of your testimony here?

A: The purpose of my testimony is to discuss the impact of new tariffs proposed by the Puget Sound Pilots in this rate proceeding on international container volumes through the Ports of Seattle and Tacoma and responds to the testimony of PMSA filed in this matter to the extent it seeks to implicate increased pilotage charges in Puget Sound as a material factor in the relative decline of Puget Sound port competitiveness.

Q: In developing that analysis what tools have you employed to perform an economic analysis of the impact of container volumes through ports for various policy makers?

A: Since 2003 I have directed the ongoing development and application in policy analysis of a large-scale economic model embracing all waterborne containerized imports from Far Eastern countries to the continental United States. The model computes optimal supply chain strategies for each of the 90 largest importers of Far Eastern goods to the USA, plus optimal supply chain strategies for each of 16 generic importers serving as proxies for all other small and regional importers. The import volumes for these generic importers are calibrated such that there is a match between the total commodity volumes and the distribution of declared values in U S Customs data on such imports and those in the model. For this purpose, Port Import-Export Reporting Services – Trade Intelligencer (PIERS-TI) and Global Trade Atlas (GTA)[1] summaries of US

[1] PIERS-TI and GTA are commercial data service products of IHS Markit.

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Customs transactions on waterborne, containerized imports from the Far East to the United States for calendar 2005, 2015 and 2019 were also secured by the author.

Q: When you talk about optimization of supply chains, what do you mean?

A: The supply chains are optimized by the model in the sense of providing the lowest total logistics costs including all costs for transportation and handling plus holding costs for pipeline inventories and destination safety-stock inventories of the imported goods.

Q: Are there other factors involved in developing this model?

A: Yes. The model is calibrated with:

- PIERS-TI and GTA data concerning declared values for Far Eastern imports stratified into 99 commodity types and import volumes for the 106 importers;
- US Census data on purchasing power by State and County;
- rate quotations and confidential contract rates from ocean carriers, intermodal marketing companies, and third party logistics providers for large and small importers;
- statistics concerning container flow times by port and landside transportation channels.

Q: What destinations are involved in this analysis?

A: Destinations included in the model are 22 popular sites for regional distribution centers across the Continental USA. The import volume to each site is assumed to be proportional to the fraction of total Continental USA purchasing power within the region served by the site. Supply-chain volumes from all importers calculated by the model are aggregated to predict import volumes by port and landside transportation channel for each of 13 potential North American ports of entry, including the Ports of Seattle and Tacoma, and the 22 destination regions (e.g., the region local to the Puget Sound ports includes Washington, Oregon, Idaho and Montana).

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Q: We understand your model is recognized and known as the "Elasticity Model." Can you explain?

A: The model is known as the Elasticity Model because repeated calculations of the model may be used to assess the impact of potential changes in transportation rates or port fees in terms of shifts in import volumes by port or channel. I wish to emphasize that the model works entirely from the point of view of importers. Changes in transportation or port costs to ocean carriers are assumed to be passed through from ocean carriers to their importing customers.

Q: Where has the model been employed?

A: The Elasticity Model has been applied in policy analysis for the San Pedro Bay, Oakland and Puget Sound ports to assess the impact of potential or existing container fees and of potential infrastructure improvements at those ports and in landside transportation channels serving those ports. It also has been applied to assess and re-engineer the supply chains of some of the largest American importers of Far Eastern goods. The Southern California Association of Governments has made publicly available the consulting reports describing the Elasticity Model and results of its application in policy analysis for the San Pedro Bay ports[2]. The methodology underlying the Model also has been published in the academic journal Transportation Research.[3] In recognition of this research, I serve as an Associate Editor of the journal.

[2] See Leachman, Robert C. *Final Report, Port and Modal Elasticity Study*, prepared for the Southern California Association of Governments, Sept. 2005. Report may be downloaded from the SCAG web site, http://www.scag.ca.gov/goodsmove/pdf/FinalElasticityReport0905rev1105.pdf, and Leachman, Robert C., *Final Report, Port and Modal Elasticity Study – Phase II*, prepared for the Southern California Association of Governments, Sept. 2010. Report may be downloaded from the SCAG web site, http://www.scag.ca.gov/goodsmove/elasticitystudyphase2.htm

[3] See Leachman, Robert C., 2008. "Port and Modal Allocation of Waterborne Containerized Imports from Asia to the United States," *Transportation Research Part E*, **44** (2), p. 313 – 331 (March, 2008).

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My Elasticity Model has been used in multiple studies of containerized imports at the Puget Sound ports. During the second half of 2007 I applied the Elasticity Model to analyze the port and modal elasticity of imports routed through the Puget Sound ports with respect to potential container fees. In January, 2008 I submitted a report to the Washington State Department of Transportation in support of their Freight Mobility Study entitled "Port and Modal Elasticity of Containerized Asian Imports via the Seattle-Tacoma Ports." In the same month, I testified at a legislative committee hearing on the matter. In October, 2011 I applied the Elasticity Model to assess the impact of proposed changes in fees charged by the Puget Sound Pilots. In December, 2011, I applied the Elasticity Model to assess the impact of the Harbor Maintenance Fee on the allocation of Far East – USA containerized imports to North American ports of entry, sponsored by the Port of Tacoma. In 2016, I applied the model to assess Far East – USA containerized supply chains under the sponsorship of the Intermodal Transportation Institute at the University of Denver.

Q: What is the current catalyst for the most recent update to your Elasticity Model?

A: This year, the Puget Sound Pilots asked me to assess the impact of proposed changes to their tariffs before the Washington Utilities and Transportation Commission on containerized imports through the Ports of Seattle and Tacoma (hereafter collectively referred to as the Northwest Seaport Alliance, or NWSA for short).

Q: Can you explain the analytical process used in the above referenced update?

A: The input data for this application of the Elasticity Model reflects 2019 overall Far East – Continental USA import volume, 2019 import mix by commodity, declared value and importer, 2018 transportation and handling rate quotations, 2018 purchasing power

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statistics, and 2015 container flow-time statistics. In this report, I refer to this data set as the Base Case data**.**

Q: In order to prepare the present study what were you provided?

A. The Puget Sound Pilots or ("PSP") supplied me with a spreadsheet computation of their actual total charges applied to international container vessels during the period November, 2018, through October, 2019 which was the most updated data available prior to the filing of their case in November, 2019. They also supplied me with spreadsheet computations of what the total charges to such vessels would have been during this period if their proposed tariffs in Year 1, Year 2, and Year 3 and thereafter had been in effect. Table 1 below shows NWSA international container volumes during this period, as well as the increment in charges under the proposed tariffs.

Q: And what were the assumptions you used in this analysis?

A: For the purposes of this analysis, I assumed that the proposed incremental charges from the Puget Sound Pilots would be passed through by the ocean carriers to their customers. I assumed a uniform charge per loaded TEU, import or export, priced so as to only recover the increment in pilotage fees.

Q: Can you explain the correlations and conclusions made from your analysis?

A: Yes. As may be seen in **Table 1**, dividing the total loaded TEUs imported and exported via the NWSA ports by the calculated increment in charges, the proposed Year 3 Tariff would have resulted in an increase in fees applied to shipments on such vessels amounting to about $1.36 per loaded TEU. The increments in Year 1 and Year 2 are smaller. As vessel size is increased, the increase per TEU would decline. The 2018-

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2019 increase analyzed in this report may therefore be viewed as a conservative, worst-case-scenario analysis.

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Table 1: NWSA International Container Volumes and Increments in PSP Charges

Northwest Seaport Alliance International Container Volumes (TEUs)

Month	Import			Export			Import + Export		
	Loaded	Empty	Total	Loaded	Empty	Total	Loaded	Empty	Total
Nov 2018	116607	18302	134909	83677	46825	130502	200284	65127	265411
Dec 2018	138873	20677	159550	85350	55399	140749	224223	76076	300299
Jan 2019	128615	15978	144593	72859	60043	132902	201474	76021	277495
Feb 2019	99669	12207	111876	65610	44157	109767	165279	56364	221643
Mar 2019	117007	20084	137091	86856	52437	139293	203863	72521	276384
Apr 2019	112652	15221	127873	81305	56604	137909	193957	71825	265782
May 2019	111730	13121	124851	70541	51252	121793	182271	64373	246644
Jun 2019	122645	13320	135965	76559	59432	135991	199204	72752	271956
Jul 2019	122946	8965	131911	73828	52580	126408	196774	61545	258319
Aug 2019	112267	9929	122196	74852	58749	133601	187119	68678	255797
Sep 2019	131451	9619	141070	82148	56313	138461	213599	65932	279531
Oct 2019	109469	13072	122541	79321	49468	128789	188790	62540	251330
Total	1423931	170495	1594426	932906	643259	1576165	2356837	813754	3170591

Source: NWSA Web Site

Impact of Proposed Changes to the PSP Tariff for Pilotage Services:

Year 3 Tariff Delta	**Per Loaded TEU**
$3,205,312.25	$1.3600059
Year 2 Tariff Delta	**Per Loaded TEU**
$2,809,299.25	$1.1919786
Year 1 Tariff Delta	**Per Loaded TEU**
$1,529,328.21	$0.6488901

Source: Tariff deltas are private communications from the Puget Sound Pilots.

Q: Can you elaborate on the import containerized cargo supply-chain as it relates to the NWSA ports of Seattle and Tacoma?

A: Yes, but before addressing the specifics of the Puget Sound situation, it may be helpful to understand the transportation services provided by ocean carriers, the composition of containerized imports from the Far East to the Continental United States, the various

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supply-chain strategies for Far East – USA importers, and the competitive position of the NWSA ports.

In that regard, **Table 2** below displays a list of the top trading partners for the NWSA ports ranked by dollar value of trade in 2016. As can be seen, the list is dominated by countries in the Far East. Indeed, the Far East countries account for more than 90% of imports at USA West Coast ports.[4]

Table 2

NWSA's Top Trading Partners in 2016

China	$32.5 billion
Japan	$17.4 billion
Republic of Korea	$6.0 billion
Taiwan	$3.9 billion
Vietnam	$2.3 billion
Thailand	$1.3 billion
Australia	$1.0 billion
Malaysia	$1.0 billion
Singapore	$0.8 billion
India	$0.8 billion

Source: NWSA Web site

Table 3 displays port shares of Far East – Continental USA waterborne, containerized imports for the calendar years 2005, 2015 and 2019. As may be seen, the share for the NWSA ports dropped from 14.2% in 2005 to 7.9% in 2015 and to 7.3% in 2019.

[4] Source: PIERS-TI and GTA.

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Table 3
Port Shares of Far East – Continental USA Containerized Imports (TEU basis)

Port of Entry	2005	2015	2019
Northeast	12.8%	16.7%	17.4%
Southeast	9.2%	13.8%	15.3%
Gulf Coast	1.2%	2.2%	5.1%
Subtotal, all-water	23.2%	32.7%	37.8%
San Pedro Bay	56.9%	50.7%	45.3%
Oakland	5.3%	4.3%	4.2%
Seattle-Tacoma	14.2%	7.9%	7.3%
British Columbia	0.5%	4.4%	5.3%

Sources: PIERS-TI, Port of Vancouver, Prince Rupert Port Authority

Q: Generally, what are the transportation service arrangements offered by the ocean carriers to their Far Eastern customers?

A. The ocean carriers offer several alternative transportation service products to importers of goods from the Far East, primarily:

- Container Yard (CY) service whereby, the ocean carrier only provides transportation to the marine terminal at port of entry; the importer must arrange for landside transportation from another vendor or utilize in-house trucking resources.
- Store-Door (SD) service whereby, the ocean carrier provides the dray from the marine terminal to a customer dock in the hinterland of the port of entry.
- •Inland-Point Intermodal (IPI) service whereby, the importer contracts with the ocean carrier for both cross-ocean and landside movement of the container to the importer's destination dock. The ocean carrier contracts with a railroad for long-haul landside movement of the container from the marine terminal at port of entry to a rail intermodal terminal, and the ocean carrier provides the dray from the rail intermodal terminal to the importer's destination dock.

CY and SD services to Gulf Coast or East Coast ports of entry are commonly referred to as "all-water" services, reflecting their movement through the Panama Canal in lieu

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of transcontinental rail movement. All-water service is less expensive than IPI service but takes longer. The choice of service type is in the hands of the importer.

Table 4 displays a ranking of the top imported commodities from Far Eastern countries to the Continental United States transiting in waterborne containers. As may be seen, imports are nearly all retail goods rather than raw materials or inputs to manufacturing. As such, the imports need to be distributed across the Continental USA. Even the auto parts commodity includes very little in the way of parts for vehicle assembly; instead, the lion's share of imports in this category are replacement parts moving into dealer networks and third-party auto parts retailers.

Table 4
Top Commodities in Far East – Continental USA Waterborne Containerized Imports in 2019

Commodity	Share
Furniture, Bedding, Lamps	16.8%
Machinery and computers	8.8%
Electronics, electrical equipment and electric appliances	8.2%
Toys, games and sports equipment	6.7%
Plastic products	6.7%
Apparel	5.2%
Auto parts and motorcycles	5.2%
Rubber products	4.3%
Steel products	3.8%
Footwear	3.2%
Linen, blankets, curtains	2.1%
Leather goods	2.0%
Paper products	1.9%
Wood products	1.9%
All other	23.2%

Source: PIERS-TI and GTA

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Q: Can you characterize the importers of goods coming from the Far East?

A: Yes. Importers may be classified into four broad groups:

1. small and regional importers, i.e., importers bringing in goods consumed solely within one region of the Continental USA, and/or small-scale importers, bringing in less than 200 TEUs per week;
2. large nation-wide importers of inexpensive goods, bringing in more than 200 TEUs per week of goods with average declared value less than $15,000 per TEU that are distributed across the Continental USA;
3. large nation-wide importers of inexpensive and moderate-value goods, bringing in more than 200 TEUs per week of goods with average declared valued values up to $40,000 per TEU that are distributed across the Continental USA; and
4. large nation-wide importers of expensive goods, bringing in more than 200 TEUs per week of goods with average declared value higher than $40,000 per TEU.

Q: Can you describe the categories of importers by type in more detail please?

A: Category (4) importers develop supply chains to manage inventories as tightly as possible. This category predominantly consists of original equipment manufacturers (OEMs) who bring Asian-manufactured goods to the USA and then re-sell them to USA retailers, re-shipping the goods to regional distribution centers or retail outlets operated by the retail customers. This category includes electronics companies, footwear companies, tire companies, and the like. Onward landside shipment from a cross-dock or import warehouse in the vicinity of the port of entry is made in domestic trailers or containers; the ocean carriers are not involved in this transportation. The great majority of imports from Asia in this category enter the USA through the San

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Pedro Bay ports of Los Angeles and Long Beach; a lesser amount enters through Puget Sound ports.

Category (3) importers develop supply chains involving 2-5 ports of entry for the Continental USA, whereby marine containers are routed to cross-docks in the vicinity of the port of entry, the imported goods are sorted and re-stuffed into domestic containers and trailers that are dispatched to regional distribution centers or to an import warehouse (for goods not yet in demand). By de-vanning imports from marine containers and re-allocating them among regional distribution centers, Category (3) importers achieve a better match-up of supply with demand than otherwise. To a much lesser extent, Category (3) importers utilize IPI service, principally for one-time-sales items or for very low-value items. Large "Big-Box" retailers such as Walmart, Target, Home Depot, Family Dollar, Ikea and others populate this category.

In contrast, Category (2) importers develop supply chains to manage transportation costs as tightly as possible. Prominent members of this category are furniture retailers such as Ashley Furniture and Lowe's. In these supply chains, marine boxes are routed directly from the source factories in the Far East to regional distribution centers across the Continental USA. Category (2) importers are major users of IPI services offered by the ocean carriers. Category (1) importers are too small in scope or scale to achieve any economies from the trans-loading practices of the Category (3) and (4) importers, and so they develop supply chains similar to those of Category (2) importers. Category (1) and (2) importers thus account for most of IPI traffic.

Table 5 displays a ranking of the top importers of waterborne, containerized imports from Far Eastern countries to the Continental United States in 2019. As may be seen, Big-Box retailers (Category 3), furniture and home improvement retailers (Category 2)

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and original equipment manufacturers of electronics and electrical appliances (Category 4) dominate the list.

Some IPI customers (typically very large importers) insist on a particular port of entry, but most leave it up to the carrier. IPI traffic not specifying a port of entry is termed "discretionary cargo" by the ocean carriers.

Table 5

Top Importers of Far East – Continental USA Waterborne, Containerized Imports in 2019

Importer	Volume (TEUs)	Type of Company
Walmart	893.390	Big-box retailer
Target	600,040	Big-box retailer
Home Depot	400,100	Big-box, home improvement
Lowe's	292,244	Home improvement
Ashley Furniture	270,000	Furniture
Samsung	181,328	OEM of electronics, appliances
Family Dollar Stores/Dollar Tree	171,936	Big-box retailer
LG Group	156,348	OEM of electronics, appliances
IKEA	131,684	Home improvement
Nike	118,219	OEM of footwear
Williams-Sonoma	88,800	Appliances
Rooms to Go	69,680	Furniture

Source: PIERS-TI

Q: And exactly how do the import containerized cargo supply-chain factors detailed above impact the competitive position of Puget Sound ports and more specifically, the NWSA ports of Seattle and Tacoma?

A: In 2005 the Ports of Seattle and Tacoma enjoyed strong IPI traffic, but subsequently, IPI traffic at the NWSA ports declined sharply. **Table 6** portrays trends in IPI traffic to USA points east of the Rockies during the period 2013-2019. As may be seen, total IPI traffic during this period declined by about 287,000 TEUs or 6.9%. IPI traffic via California ports declined about 465,000 TEUs or 15.6%, while IPI traffic via the Ports

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of Seattle and Tacoma declined about 240,000 TEUs or 34.9%. During the same period, IPI traffic to USA points east of the Rockies routed via British Columbia ports jumped by about 418,000 TEUs or 82.9%.

Table 6
IPI Traffic to USA Points East of the Rockies, 2013 - 2019 (TEUs)

Year	British Columbia Ports	NWSA Ports	California Ports	Total IPI
2013	504,035	688,112	2,972,921	4,165,068
2014	580,531	589,796	2,817,592	3,987,919
2015	694,273	564,274	2,855,520	4,114,067
2016	698,567	578,793	2,655,807	3,933,167
2017	799,440	485,920	2,747,909	4,033,269
2018	869,725	491,975	2,773,467	4,135,167
2019	921,796	448,188	2,507,927	3,877,911

Source: Intermodal Association of North America

Q: Please explain some of these patterns since 2005?

A: Overall IPI traffic has declined steadily since 2005 for two major reasons. First, there has been increased and lower-priced all-water service offered to importers. Second, large Big-Box and E-commerce firms have taken retail market share away from small and regional retailers. As noted above, small and regional retailers rely on IPI service for their imports from the Far East, while large Big-Box and E-commerce retailers make only modest use of it.

Q: And why in your view did this pronounced shift in traffic occur?

A: The most significant reason for the marked shift of IPI traffic destined to USA points to utilize routings via the British Columbia ports is that imports destined to the USA routed via Canadian ports avoid the Harbor Maintenance Fee assessed at all USA ports. This fee is set at 0.125% of declared value, paid by the importer. In 2019, the average

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declared value of imports from Far East countries via the NWSA ports was about $38,400 per TEU.[5] The HMF on a commodity with this declared value would be about $48 per TEU. If instead shipments of this commodity were routed via a British Columbia port, the importer would save $48 per TEU. It is important to note that the majority of IPI containers are forty-foot containers (counting as two TEUs) and some are 45-foot containers (counting as 2.25 TEUs). A forty-foot container counts as one forty-foot equivalent unit, or FEU for short. Thus, on average, importers are saving about $96 per FEU routed through the Canadian ports.

Q: Are there other factors affecting the loss of traffic in the Ports of Seattle and Tacoma in your view?

A: Yes. A second reason for the growth of USA imports via the British Columbia ports is that the Canadian railroads charge the ocean carriers less than do the US railroads to certain inland US points. Terms between ocean carriers and railroads are confidential contracts with complicated terms, but it is believed that the Canadian roads are charging the ocean carriers about $50 - $100 less per TEU ($100 - $200 per FEU) to the Upper Midwest and the greater Chicago area than are the US railroads.[6] Contract IPI rates via Prince Rupert and Vancouver to the Twin Cities and Chicago from the ocean carriers for at least one large Category (3) importer are lower than the IPI rates it can obtain via USA ports.[7]

[5] Source: PIERS-TI.
[6] Private communications from BNSF and Union Pacific railroads.
[7] Private communications from a Big-Box retailer

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Q: Have you done calculations that demonstrate the affect of a hypothetical surcharge on rates paid by importers involving the Ports of Seattle and Tacoma?

A: Yes. I computed import flows using the Elasticity Model once with the base-case data and then a second time assuming a $1.36 per TEU surcharge on rates paid by the importers for their imports routed through the Ports of Seattle and Tacoma. For comparison purposes, I also made a run of the Model assuming the HMF was eliminated and another run assuming the IPI charges through USA West Coast ports were reduced to be competitive with the IPI rates the British Columbia ports. The particular changes assumed in the last scenario are reductions in IPI rates via NWSA ports to rail intermodal terminals in the Twin Cities and Chicago of $50 per TEU and $100 per TEU, respectively.

Table 7 compares the port shares of Far East – Continental USA containerized imports to the actual shares reported in the PIERS-TI extract of US Customs data for 2019. The match is not perfect, but it is reasonably close in view of the Model's purpose to predict changes in port and channel shares as a result of changes in port and channel economics.

Table 7

Comparison of 2019 Actual Port Shares of Far East - USA Containerized Imports to Elasticity Model Calculations

Port of Entry	2019 Actual	Elasticity Model
All-water (Gulf Coast and East Coast)	37.8%	35.9%
San Pedro Bay	45.3%	44.7%
Oakland	4.2%	3.5%
NWSA Ports	7.3%	9.6%
British Columbia Ports	5.3%	6.3%

Sources: PIERS-TI for actual shares and author's Elasticity Model calculations

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Q: What additional comparisons were tested and what conclusions arrived at for the NWSA ports?

A: **Table 8** displays the port shares for Elasticity Model calculations on the Base Case, the PSP Increase case, the case of No HMF, and the case of more competitive IPI charges by US railroads. The Base Case calculation of the Elasticity Model predicts a 2019 Far East import volume at the NWSA ports of approximately 1,446,000 TEUs for a 9.6% share of Far East – Continental USA containerized imports. A re-run of the calculations of the Elasticity Model with the added $1.36 per TEU fee applied at Seattle and Tacoma resulted in the same annual import volume at the NWSA ports, i.e., 1,446,000 TEUs. That is, the fee value is not large enough to induce importers whose least costly supply chain utilizes the Ports of Seattle and Tacoma before the new fee is applied to reduce their import volumes routed via Puget Sound in the case the fee is applied.

Table 8
Calculated Port Shares of Far East - USA Containerized Imports (TEU basis)

Port of Entry	Base Case	PSP Increase	No HMF
All-water	35.9%	35.9%	35.9%
San Pedro Bay	44.7%	44.7%	47.9%
Oakland	3.5%	3.5%	3.5%
NWSA Ports	9.6%	9.6%	9.8%
British Columbia Ports	6.3%	6.3%	2.9%

Source: Author's Elasticity Model calculations

Q: What conclusions can be drawn from the above model and table?

A: The Elasticity Model predicts elimination of the HMF would displace or divert about 520,000 USA-destined TEUs per year from the British Columbia ports to USA West Coast ports. However, the model predicts only about 18,000 TEUs in increased import volume at the NWSA ports, with the rest of the displacement benefitting the San Pedro

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Bay ports. Because much of this import volume is discretionary, the ocean carriers and US railroads could contract to allocate this shifted volume among US West Coast ports differently, with more shifting to the NWSA ports. The predictions of the Elasticity Model simply reflect prevailing IPI rates to importers and the rail service frequency, transit time and service quality via the various West Coast ports.

Q: What would the effect of differing or lower IPI charges be?

A: In the case of more competitive IPI charges by the US railroads serving the NWSA ports, the Elasticity Model predicts a displacement of about 444,000 USA-destined TEUs per year from the British Columbia ports, with all of this import volume shifting to the NWSA ports.

Q: What would the effect of such a change be?

A: Such a shift would be a dramatic change for the NWSA ports, raising the NWSA ports' share of Far East imports by almost three points to 12.5%. Again, because much of this import volume is discretionary, the ocean carriers and US railroads could contract to allocate this shifted volume among US West Coast ports differently.

Q: Are there additional perspectives you can share regarding the result of modeling the impact of the increase in pilotage fees?

A: To put the proposed surcharge in perspective, a Category (1) or (2) importer bringing goods from a port city in China to a distribution center located in the greater Chicago area will spend about $3,800 per high-cube 40-foot container on IPI transportation (including destination dray), or about $1,900 per TEU. If the declared value of the imported goods is $38,400 per TEU (the 2019 average for Far East imports at the NWSA ports), the importer pays an additional $48 for the Harbor Maintenance Fee, making for a total cost of $1,948. A surcharge of $1.36 per TEU to cover the proposed

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PSP increase amounts to a 0.07% increase in import shipping costs. I would say "infinitesimal" is a fair description of this increase.

Q: Do you have additional thoughts about the results of the model calculations?

A: Yes. Reviewing the Model calculations in more detail, in both the Base-Case and the PSP Increase scenarios, 48.8% of the import volume at the Puget Sound ports consists of goods imported by Category (1), Category (2) and Category (3) importers to be consumed in the region local to the NWSA ports. This region includes the states of Washington, Oregon, Idaho and Montana. The remaining 51.2% of imports at the NWSA ports are accounted for by goods to be consumed in regions east of the Rockies, mostly imported by Category (3) importers de-vanning marine boxes in the hinterland of the ports are re-shipping in domestic containers and trailers.

In the Competitive IPI scenario, IPI imports of Category (1) and Category (2) importers destined to Upper Midwest and Chicagoland distribution centers shift from the British Columbia ports to the NWSA ports, adding 444,000 TEUs per year to the NWSA ports. In the No HMF scenario, only about 38,000 TEUs per year shift from the British Columbia ports to the NWSA ports, while 406,000 TEUs per year shift to the San Pedro Bay ports.

Category (3) importers bringing imports through the NWSA ports to be ultimately consumed east of the Rockies trans-load their goods to domestic containers hauled in domestic stack trains by the railroads. Inventory economies are achieved by the large retailers in this category through the pooling of demands in the Pacific Northwest, Upper Midwest and Chicago regions, re-allocating imports after arrival at Puget Sound so as to better match up supply and demand in the several regions, reacting to

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fluctuations in demands transpiring subsequent to booking vessel passage from the Far East.

Rates for domestic containers reflect the east-west balance of demand for the domestic containers. At present, westbound is the head-haul to the Puget Sound area for domestic containers, but eastbound is the head-haul from California and from Vancouver. Because of a complete lack of westbound domestic-stack business, eastbound domestic-stack train service is not available from Prince Rupert. Domestic-box rail rates from Seattle and Tacoma to selected inland points such as the Twin Cities and Chicago are attractive to Category (3) importers. Shifting these imports to use Vancouver or California ports as the North American port of entry would entail a substantial increase in costs for such importers. Their imports are quite inelastic to IPI discounts at British Columbia ports and completely insensitive to the proposed increment in PSP fees.

Q: Can you summarize your elasticity model findings for import containerized cargo through the NWSA ports?

A: Yes, let's first consider imports to be consumed in the Pacific Northwest that are routed through the NWSA ports. In 2010, the long-distance trucking rates paid by several large American importers of Asian goods averaged $2.19 per mile, including fuel recovery surcharges. Thus a $2.72 surcharge on a 40-foot container (i.e., two TEUs) is roughly equivalent to the cost of trucking the forty-foot container an additional 1.24 miles.

Q: Can you please characterize the importation of Far East merchandise in the context of the transportation logistics in the northwest?

A: The vast majority of imports from the Far East are retail goods, or goods that will become retail goods after minor value-added operations and/or re-sale. Marine containers containing such imports destined to the region local to Puget Sound by and

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large are not routed directly to retail outlets. Instead, they are mostly routed to regional distribution centers operated by or on behalf of large retailers. The Pacific Northwest regional distribution centers for most large American retailers are located in the south end of the Kent Valley or in new warehouse parks around Tacoma (e.g., Frederickson) and Olympia (e.g., Lacey). That is, the destinations for import marine containers imported through Puget Sound containing goods to be consumed in the region local to Puget Sound are fairly concentrated. Trucking a forty-foot marine container down from the Port of Vancouver to a warehouse located in the Kent Valley costs on the order of $400-$500, compared to $75-$150 for a dray from the Ports of Tacoma and Seattle. Trucking a container from the California ports to these distribution centers would cost even more. The cost penalty for serving distribution centers in Spokane, Boise or Butte from Vancouver in lieu of Puget Sound is not as extreme as the foregoing, but still much more than $2.72 per box. Thus, an increase of $2.72 per forty-foot container routed via the Puget Sound Ports resulting from the proposed increase in PSP fees would not have a significant impact on imports to be consumed within the region local to Puget Sound.

Q: What is your conclusion regarding the impact of PSP's proposed tariff increase on import cargo?

A: In summary, the impact on imports from the proposed increase in PSP fees, if any, is too small to be measurable.

Q: Did you analyze the impact of PSP's proposed tariff increase on export cargo? If so, please explain.

A: Yes. Let me summarize the impact of a proposed fee increase on exports routed via the Puget Sound Ports. **Table 9** displays 2016 export volumes (in dollars) at the NWSA

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ports for the top nine commodities. The top export commodity is grain and oil seeds; much of this is handled in bulk ships rather than containers. Considering just the containerized grain, some originates in the Pacific Northwest and some originates east of the Rockies. Sixth on the list is fish and seafood, which largely originates in the Pacific Northwest. Other agricultural exports include prepared vegetables, fruits and nuts (third), vegetables (eighth), fruits and nuts (seventh), cereals (fourth) and meat (fifth). These include some PNW production but also include considerable exports originating in the Intermountain region or regions east of the Rockies. Commodities such as machinery (second) and inorganic chemicals (ninth) are largely not PNW-produced. It is clear that the Puget Sound Ports attract some exports from inland regions. The exports moving via the NWSA ports are a mix of containers loaded in the local region and containers loaded in distant regions. I will discuss each in turn.

Table 9

Top Export Commodities at the NWSA Ports in 2016

1. Grain and oil seeds	$3 billion
2. Industrial machinery and computers	$1.5 billion
3. Prepared vegetables, fruits and nuts	$1.0 billion
4. Cereals	$0.8 billion
5. Meat and meat products	$0.8 billion
6. Fish and seafood	$0.6 billion
7. Fruit and nuts	$0.6 billion
8. Vegetables	$0.6 billion
9. Inorganic chemicals and rare-earth minerals	$0.6 billion

Source: NWSA web site

Q: Did you calculate the increase in costs to exporters represented by any proposed incremental tariff increase by PSP?

A: Yes. For exports originating in the Pacific Northwest, as was noted above, a $1.36 per TEU increase in costs to an exporter is equivalent to requiring that exporter to truck his

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goods about 1.24 miles further. In comparing the relative trucking costs of routing exports via the Ports of Vancouver vs. routing exports via Seattle and Tacoma, if transportation costs were the only concern, we might expect exporters in a band about 1.24 miles wide stretching across the States of Washington, Idaho and Montana from east to west to shift preference in ports from the NWSA ports to Vancouver. Assuming exporters are uniformly distributed south-to-north, this is a very small impact, less than 0.01% of total exports from the region. Similarly, we might expect exporters in a band about 1.24 miles wide stretching from east to west across the southern portion of the State of Oregon to shift preference in ports from the NWSA ports to Oakland. Again, this would be a very small impact, less than 0.01% of total exports from the region.

For exporters located in regions east of the Rockies utilizing IPI service, the important issue for the ocean carriers is maintaining balance of rail-borne container flows to and from the various West Coast ports. Imbalance penalties imposed by the railroads, on the order of hundreds of dollars per container, dwarf the $2.72 per forty-foot container increase proposed by the Puget Sound Pilots. Export flows via the Puget Sound ports need to be maintained by the carriers in order to avoid imbalance penalties.

Q: What is your conclusion regarding the impact of PSP's proposed tariff increase on export cargo?

A: The amount of total exports from both the PNW and elsewhere that we could expect to be diverted to other West Coast ports from the Puget Sound ports as a result of a $1.36 per TEU surcharge, if any, is too small to be measurable**.**

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Q: Can you summarize your final overall conclusions regarding the impact of PSP's proposed tariff increase on the NWSA competitive position with retaining containerized cargo in Puget Sound?

A: In summary, the proposed changes in PSP fees assessed on container vessels results in an equivalent cost of $1.36 per loaded TEU laded or discharged at the NWSA ports. If such costs were passed through as surcharges to beneficial cargo owners, the impact on volumes handled by the Puget Sound ports, if any, would be too small to be measurable. The lack of impact stems from several factors: Routing imports consumed in the local region through alternative ports would be much more costly, and about 49% of imports at the NWSA ports are consumed in the region for which either Tacoma or Seattle is the closest port. The other 51% of imports at the NWSA ports move via rail to points east of the Rockies, mostly in domestic containers and trailers. Cost increases associated with foregone inventory economies and higher domestic-box rail rates at other ports of entry far exceeds a $1.36 per TEU surcharge assessed at the NWSA ports. Similarly, exports currently handled through Seattle and Tacoma are resistant to shifting to other ports because the increment in truck or rail costs exceeds $1.36 per TEU for virtually all shipments.

Q: Finally, do you have any other thoughts about improving/increasing the NWSA port share of imports?

A: Yes. The foregoing analysis reflects that a significant increase in market share for the NWSA ports could result from eliminating their $50 - $100 per TEU disadvantages, such as the absence of a Harbor Maintenance Fee applied to imports routed via the Canadian ports or correcting the inequities in inland point intermodal rates. But it will certainly not come about from mitigating a $1.36 per TEU cost issue.

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Q: Does this conclude your testimony?

A: Yes, it does.

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