

**BEFORE THE WASHINGTON  
UTILITIES AND TRANSPORTATION COMMISSION**

WASHINGTON UTILITIES AND  
TRANSPORTATION COMMISSION,  
Complainant,  
v.  
PUGET SOUND PILOTS,  
Respondent.

Docket TP-

**TESTIMONY OF  
ERIC C. KLAPPERICH  
ON BEHALF OF PUGET SOUND PILOTS  
JUNE 29, 2022**

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1 **I. IDENTIFICATION OF WITNESS**

2 **Q: What is your name, business address, and current occupation?**

3 A: My name is Captain Eric Klapperich. My business address is 2003 Western Ave, Suite  
4 200, Seattle, Washington 98121. I am a member and current Vice President of the Puget Sound  
5 Pilots. I hold a 1,600 Gross Ton (“GT”) Master license and First Class Pilot endorsement from  
6 the U.S. Coast Guard, as well as a Washington State pilot’s license that is specific to the Puget  
7 Sound Pilotage District.  
8

9  
10 **Q: How long have you been a Puget Sound Pilot?**

11 A: I have been a pilot operating independently under my own license as a member of the  
12 Puget Sound Pilots for approximately 14 years.  
13

14 **Q: How did you become a Puget Sound Pilot?**

15 A: Becoming a Puget Sound Pilot is a very rigorous process that takes many years to  
16 complete. I describe the application process and training program in detail in my testimony  
17 below. At the outset, however, it is important to understand that the path to becoming a pilot  
18 begins long before a prospective pilot is even qualified to apply to sit for the training program  
19 entrance exam. Obtaining the multiple licenses and certifications necessary to become a pilot (for  
20 example, STCW Training, firefighting, radar, ECDIS, BRM, Security on Board, HAZMAT, and  
21 many others) takes approximately 20 years to accumulate.  
22

23  
24 I began my maritime career as a deckhand on small coastal freighters at Western Pioneer  
25 in 1986. Between 1986 and 1990, I earned an A.B. Ticket (Able Bodied Seaman) and a 500 GT  
26 Mates License. In 1990, as a newly licensed mate, I joined Western Towboat Co. in Seattle,

1 where I was promoted to tugboat captain in 1993. Being a tugboat captain is itself a highly  
2 skilled position that requires instinctual ship handling abilities and sound judgment. Many of our  
3 association's members served as tugboat captains before becoming pilots precisely because that  
4 job develops the ship handling skills that are so critical to piloting on Puget Sound.

5 Over the next 12 years working as a tug Captain all over Puget Sound, Canada and  
6 Alaska, I obtained a 1600 GT Masters license and successfully completed all of the federal  
7 requirements to obtain a First Class Pilot endorsement on my license. These requirements  
8 included approximately 327 round trips on specified routes throughout Puget Sound from the  
9 Canadian border to Olympia. These trips include the main ship channel, harbors, ferry routes and  
10 waterways throughout the District. I was able to complete all the required pilotage trips, while  
11 working as a tug captain. The pilotage district is divided into 25 chart sections, known as  
12 chartlets, that must be drawn by memory and require a 90% passing grade. Once a specific route  
13 was completed and I was able to draw the corresponding chartlet for approval, it was endorsed  
14 on my license.  
15

16 In addition to chart exams, I was required to prepare written route descriptions for each  
17 drawn chart, which are extensive exam summaries describing in detail, pertinent aspects of Puget  
18 Sound such as wind and weather, and local tides and currents. After successfully drawing all  
19 charts and preparing all written route descriptions, I earned my First Class Pilot endorsement for  
20 all of Puget Sound and the adjacent areas including Lake Washington, Haro Strait, Boundary  
21 Pass, and the Straits of Georgia. Completing the federal requirements was an incredibly daunting  
22 commitment that required me to take a lot of time away from my wife and two young kids.  
23 However, obtaining my first-class pilot endorsement was both a personal goal and a necessary  
24 prerequisite that allowed me to qualify for the pilot's exam.  
25  
26

1 In early 2005, the Board of Pilotage Commissioners (“BPC”) announced the exam date  
2 for November 2005. In August of 2005, I took a three month leave of absence from Western  
3 Towboat Co to study and prepare for the exam. After months of studying for hours each day, I  
4 sat and successfully passed the written exam and was invited to the simulator portion. My  
5 simulator score was added to my written score, and I was placed on the trainee list with the other  
6 successful applicants. That testing process was the most stressful situation I had experienced to  
7 that point in life. It was a very demanding process that tested my knowledge, situational  
8 awareness, judgment, and ship handling.

9  
10 In August 2007, I began the Puget Sound Pilot training program. The seven-month  
11 training program that I participated in before becoming a pilot was also incredibly rigorous and  
12 stressful, and required my full attention while observing, training, and being evaluated. I was  
13 ultimately able to successfully complete the training program, become a pilot and member of our  
14 association, and obtain my state license in February 2008.

15  
16 **Q: Has the training program changed since you became a pilot?**

17 **A:** Yes. The 2005 exam was the last year for which applicants were required to obtain their  
18 federal First Class Pilot endorsement as a prerequisite to sit for the exam. The successful  
19 applicants from the 2005 exam were the last group of trainees whose training program was  
20 shorter than it is today because applicants were required to have all trips, routes and charts  
21 completed and endorsed before applying. Today, an applicant may sit for the exam before  
22 obtaining his or her First Class Pilot endorsement and may complete the federal requirements  
23 during the training program if the applicant is admitted. This change has extended the training  
24 program from seven months to up to three years.  
25  
26

1 **Q: What was the purpose of this change?**

2  
3 A: Under the old system, a prospective applicant was required to spend years attaining local  
4 knowledge before becoming eligible to sit for the exam. As a practical matter, this limited our  
5 applicant pool primarily to captains from within our region. This change was part of a deliberate  
6 strategy to attract a national applicant pool with a diverse range of maritime experience.

7  
8 **II. PURPOSE OF TESTIMONY**

9 **Q: What is the purpose of your testimony?**

10  
11 A: I have been asked to testify regarding several topics based on my training and experience  
12 as a Puget Sound Pilot.

13 First, I have been asked to discuss PSP's mission, which is to ensure maritime safety on  
14 our district's waterways. It is a common misconception that maritime pilots work for the  
15 shipping industry, or that our primary responsibility is to the ships and shipowners that are  
16 subject to compulsory pilotage. In fact, however, our duty is to act on behalf of Washington State  
17 in service of the public interest and to maintain professional judgment that is independent of any  
18 commercial considerations that do not comport with the needs of maritime safety.

19  
20 Second, I have been asked to describe the training and license requirements that an  
21 aspiring pilot must complete in order to become a Puget Sound Pilot. The process to become a  
22 Puget Sound Pilot is arduous. Qualified applicants to the training program are already licensed  
23 masters with significant sea time and experience. From that elite applicant pool, only the most  
24 well-qualified candidates are admitted into the training program, where they go on to spend years  
25 honing their bridge presence, shiphandling abilities, local knowledge, and judgment under the  
26

1 supervision of licensed pilots. The result of this process is that only the most highly qualified and  
2 skilled candidates become Puget Sound Pilots.

3 Third, I will address the levels of licensure and continued training and education that  
4 Puget Sound Pilots accrue after successfully completing the training program and receiving a  
5 state pilot's license from the Board of Pilotage Commissioners. A licensee does not become an  
6 "unlimited" pilot authorized to pilot a ship of any size on any route until his or her sixth year of  
7 active service. Even after a Puget Sound Pilot achieves unlimited status, that pilot continues his  
8 or her training and education through simulator and manned model exercises. This ongoing  
9 education is critical to ensure that we continue to maintain and improve safe operations as ship  
10 technology changes and ships become larger and more difficult to maneuver.  
11

12 Fourth, I have been asked to address the challenges and risks that Puget Sound Pilots  
13 encounter in the line of duty. Piloting is a very difficult job, and Puget Sound is an exceptionally  
14 large and complex pilotage district. The challenges our pilots encounter are diverse and  
15 significant. I describe in detail below three examples of particularly difficult jobs that our pilots  
16 perform on a regular basis. I also describe the ways in which the challenges pilots face have  
17 evolved as the size of the largest ships calling at Puget Sound has increased dramatically in  
18 recent years.  
19

20 Lastly, I have also been asked to opine on PSP's use of international gross tonnage or  
21 "GT ITC" as a measure of calculating pilotage rates. Fair and reasonable pilotage rates should  
22 (and do) take into account the relative difficulty of piloting a particular ship which, in turn,  
23 correlates closely to the ship's size. Because GT ITC more accurately captures the size of a  
24 ship's structures, it is a better proxy for the difficulty and risk of piloting a ship than other  
25 measurements such as domestic gross registered tonnage or "GRT" and, therefore, is the more  
26



appropriate metric to calculate pilotage rates for all ships irrespective of whether they are engaged in international or domestic commerce.

**A. Puget Sound Pilots' Mission is to Ensure Maritime Safety.**

**Q: When was the Puget Sound Pilots association formed?**

A: The Puget Sound Pilots have existed as an unincorporated association in its current form since 1935. We have been protecting Puget Sound and the public trust for more than 85 years.

**Q: What is PSP's mission?**

A: Our mission statement, which is available on our website, states: "The mission of the Pilots is to ensure against the loss of lives, loss of or damage to property and vessels, and to protect the marine environment by maintaining efficient and competent pilotage service on our State's inland waters within the Puget Sound Pilotage District."

**Q: Does PSP's mission statement accurately reflect your understanding of your responsibility as an individual pilot?**

A. Absolutely. Speaking for myself and, I am confident, every one of my fellow pilots, safety is our unequivocal number one priority, to the exclusion, whenever necessary, of any other concern. Protecting against the loss of human life is, of course, our most important responsibility. In addition, pilots are committed to the protection of property and the environment, which includes Puget Sound's diverse ecology and natural resources that belong to the citizens of the State of Washington. Pilots are acutely aware of the ecological sensitivity of Puget Sound and the massive catastrophe that could result from an oil spill or other serious maritime accident.

1 Simply put, our job – 24 hours a day, 365 days a year – is to prevent that type of devastating  
2 event from happening. As I describe in detail below, every member of our association has  
3 undergone extensive training and education to provide the best achievable protection of our  
4 state’s waterways.

5  
6 **Q: Are there any misconceptions that you have encountered regarding the nature of**  
7 **pilots’ role and their mission?**

8 A: Within the piloting community, and specifically within PSP, our mission of safety above  
9 all else is clearly and universally understood. I do think, however, that outside the piloting  
10 community there is a common misconception that pilots’ role is primarily to provide a service to  
11 shippers and to support their commercial interests. That is simply not the case. While pilots  
12 certainly do our best to serve our shipping customers in an efficient and timely manner, we do so  
13 impartially and do not allow economic considerations to interfere with the exercise of our  
14 independent judgment or cause us to lose focus on our mission of ensuring safety.

15  
16  
17 **Q: How is a pilot’s role different from that of a ship’s master or other members**  
18 **of the bridge team?**

19 A: A pilot’s role is very different from a ship’s master and other deck officers. My  
20 understanding based on decades of experience in the maritime industry is that ship captains are  
21 subject to an incredible amount of economic pressure to save money from their owner, charterer,  
22 agents, or business operations. In the maritime industry, and especially in international shipping,  
23 time is extremely valuable, and even a short delay can be very costly. As a result, economic  
24 priorities can, and sometimes do, influence captains to take unsafe routes, sail in unsafe weather  
25  
26

1 conditions, or otherwise cut corners to save time and maximize profit. A lack of appropriate  
2 regard for safety among international shippers is, unfortunately, a fairly common problem that is  
3 widely known within the maritime community. For an in-depth discussion of this important topic  
4 I encourage the UTC to review *The Outlaw Sea – A World of Freedom, Chaos, and Crime* by  
5 William Langewiesche, and *Voyages of Abuse – Seafarers, Human Rights and International*  
6 *Shipping* by A.D. Cooper.

7 In addition to pilots' intimate local knowledge of their pilotage ground, compulsory  
8 pilotage exists, in part, to prevent economic considerations or the bridge team's other external  
9 concerns from interfering with a ship's safe navigation while sailing on Washington State's  
10 coastal or inland waterways. Pilots are not members of the ship's bridge team, are not servants of  
11 the vessel or its owner, and are therefore not influenced by economic pressures that can distort  
12 the exercise of sound judgment and safe navigation. The pilot's independence is intentional, as  
13 reflected in the official statement on the piloting profession that was adopted in 1997 by the  
14 Board of Trustees of the American Pilots Association and is widely known and taught  
15 throughout our industry. That statement requires pilots to "exercise independent judgment  
16 without regard to any desires that do not comport with the needs of maritime safety."

17  
18  
19 **B. Only Highly Skilled and Experienced Mariners are Eligible to Apply for the**  
20 **Pilot Training Program.**

21 **Q: What qualities or character traits must a mariner possess to become a Puget Sound**  
22 **Pilot?**

23 A. There are several. First, a pilot must be physically fit. Both the Coast Guard and the  
24 Board of Pilotage Commissioners require pilots to pass regular physical examinations, and for  
25 good reason. Most significantly, pilots must be capable of safely executing a pilot transfer, which  
26 requires the pilot to embark and disembark a ship while in transit using a pilot boat and pilot

1 ladder. The transfer process can be very physically strenuous, particularly when wind or sea  
2 conditions cause the ship to pitch or roll, which may require the pilot to ascend the pilot ladder in  
3 challenging conditions while in motion. Puget Sound Pilot Captain Sandy Bendixen, describes  
4 the pilot transfer process and the safety risks it presents (especially when, as happens too often,  
5 ships and their crew fail to provide a transfer arrangement that complies with international  
6 standards) in detail in her testimony.

7         Second, a pilot must be highly intelligent and an effective communicator. The amount of  
8 critical information that a pilot must internalize, commit to memory, and apply in real time is  
9 staggering. Pilots must possess a deep understanding of relevant scientific principles. Pilots must  
10 calculate and understand how multiple factors (*e.g.*, tide, current, underkeel clearance and  
11 hydrodynamics) may impact the safe maneuvering of a vessel and its ship handling  
12 characteristics. Pilots must also have complete mastery of the local geography and marine  
13 environment, including the ability to accurately draw from memory the entire Puget Sound  
14 Pilotage District navigation chart (which comprises no less than 25 discrete chartlets), including  
15 correctly placing navigation aids, shipping lanes, water depths, underwater hazards, and other  
16 markers.  
17

18         Third, and perhaps most importantly, a pilot must possess sound judgment and  
19 confidence in his or her decision-making in critical situations. This is developed through training  
20 and honed by experience. As I discuss below, our training and preparation is what enables pilots  
21 to safely handle virtually every class of ship along multiple routes in the everchanging conditions  
22 of the Puget Sound environment.  
23

24  
25  
26 **Q:     Who may apply to become a Puget Sound Pilot?**

1 A: Section 363-116-0751 of the Washington Administrative Code sets out minimum  
2 licensure and sea time requirements to apply to the training program and sit for the written  
3 portion of the entrance exam. Pilots come from a variety of maritime backgrounds (*e.g.*, open  
4 water, ferry, tug) and this background typically determines the license that the prospective  
5 applicant holds at the time he or she applies. While there is some variation regarding minimum  
6 sea time requirements depending on the applicant's maritime background, generally the applicant  
7 must have accumulated a minimum of two years sailing on his or her master's license. Reaching  
8 the level of experience that is necessary to meet this requirement, however, takes much more  
9 than two years.  
10

11  
12 **Q: Could you please describe an example of one of the career paths to becoming a**  
13 **pilot?**

14 A: Yes. A candidate who comes from a towing background (like I did), typically would  
15 begin their career as a deckhand. The first licensing step for such a candidate is to obtain an A.B.  
16 Ticket or Able Body Seaman license. This requires the licensing candidate to pass an exam that  
17 addresses topics including the safe launching and operation of a lifeboat, deck safety, rules of the  
18 road, knot tying, and other fundamental maritime skills.  
19

20 Next, the candidate must apply for and sit for a 1,600 GT Mate's license. Assuming the  
21 candidate passes the mate's exam – a difficult process that requires several weeks of preparation  
22 and study, typically at a maritime learning center – he or she would need to accumulate at least  
23 two years of sea time (a process that typically takes four years) before becoming eligible to apply  
24 for a 1,600 GT Master's license. Assuming a mariner passes the master's exam – which is itself a  
25 very significant accomplishment – the aspiring pilot must then accumulate two more years of sea  
26

1 time (which, again, takes four years) sailing on that upgraded license just to meet the minimum  
2 requirements to apply for the pilot training program.

3  
4 **Q: Are some career paths to becoming a pilot considered more difficult than others?**

5 A. While there are several different maritime career paths to become a pilot, I would not  
6 describe any particular path as being more difficult or less difficult. Rather, each career path  
7 develops different (and, of course, some overlapping) strengths. For this reason, it is extremely  
8 important for PSP to maintain a pilot corps that includes pilots from diverse professional  
9 backgrounds. However, the minimum eligibility thresholds contained in WAC 363-116-0751  
10 ensure that every applicant to the training program regardless of their background is already an  
11 accomplished, seasoned mariner. This skilled applicant pool is then further narrowed through a  
12 highly selective examination and training program designed to identify and select only the most  
13 highly skilled candidates.

14  
15 **C. The Application and Training Process to Become a Puget Sound Pilot is**  
16 **Selective and Difficult.**

17 **Q: Once a candidate meets the minimum eligibility requirements, what is the process to**  
18 **become a pilot trainee?**

19 A: To be clear, simply meeting the minimum qualifications to apply to the pilot training  
20 program in no way guarantees the applicant a spot as a trainee. Once a candidate submits a  
21 qualified application, he or she may register to take the written examination at the next test date  
22 offered by the Washington Board of Pilotage Commissioners. The subject matter of the written  
23 exam is extensive and covers topics that range from seamanship and ship handling, to federal  
24 laws affecting mariners and pilots including environmental laws, to the operation of marine  
25  
26

1 radar, VHF radio, and navigational equipment. The written exam is very challenging and  
2 requires intensive study. As I mentioned above, I personally took a three-month leave of absence  
3 from Western Tugboat Co. to prepare for the exam, during which I studied full time. A list of  
4 topics that are fair game for the written exam is contained at WAC 363-116-076(3).

5  
6 **Q: How is success or failure on the written exam assessed?**

7 A: The written exam is developed by the BPC and a “cut score” is set by a psychometric  
8 expert and subject matter experts. Each applicant’s exam is then individually graded. Applicants  
9 who do not meet or exceed the cut score are dismissed. Those who score higher than the cut  
10 score on the 200-question written exam may participate in the simulator evaluation.  
11

12  
13 **Q: Please describe the simulator evaluation?**

14 A: Like the written exam, the simulator evaluation is very stressful and challenging.  
15 Applicants are evaluated by a panel of evaluators that includes BPC board members who hold or  
16 have held at minimum a 1600 GT Master’s license as well as two non-board members who hold  
17 or have held a state pilot’s license within the last 10 years. The simulator evaluation tests critical  
18 skills including the applicant’s ship handling ability, communication skills, and ability to respond  
19 appropriately to both routine and emergency situations. A description of the factors considered in  
20 the evaluation is contained at WAC 363-116-077.  
21

22 As with the written examination, a cut score is set by a psychometric expert and subject  
23 matter experts for the simulator evaluation, and applicants who score below the cut are  
24 dismissed. Candidates who pass the simulator are placed on a ranked list based on their  
25 combined simulator and written examination scores. Applicants are then selected from this list  
26

1 and invited to join the training program in ranked order as open positions become available. If an  
2 applicant does not begin the training program within four years of the written examination, the  
3 applicant is removed from the list.  
4

5 **Q: Once an applicant is admitted to the training program, what is required to**  
6 **successfully complete the program and obtain a Washington State pilot's license?**

7 A: First, the prospective trainee will be offered a Training Program Agreement by BPC that  
8 sets forth the trainee's rights and responsibilities. An example of the Training Program  
9 Agreement is Exhibit ECK-02. Once the trainee executes the Training Program Agreement, he or  
10 she is officially in the training program and will be assigned a Training Program that assigns the  
11 trainee an initial route and details other training program requirements that the trainee must  
12 complete to obtain his or her state license. An example of the Training Program Requirements  
13 document issued to a trainee upon admission to the program is Exhibit ECK-03. While my  
14 testimony describes in general terms the training program's contents, I encourage the UTC to  
15 consult Exhibits ECK-02 and ECK-03 for greater detail on this topic.  
16  
17  
18

19 **Q: Who administers the training program?**

20 A: The training program is administered by the Training Evaluation Committee as a  
21 subcommittee of the BPC. The chair of the committee is an active state-licensed pilot and pilot  
22 commissioner. The State also maintains an employed position of Training Program  
23 Administrator who handles the administrative tasks associated with operating the training  
24 program. The training program is very rigorous and typically takes between 20 and 24 months to  
25 complete.  
26



1 **Q: Please describe the program's basic elements?**

2  
3 A: The basic elements of the training program requirements are described at WAC 363-116-  
4 078. Each trainee's progress is overseen and regularly evaluated by a trainee evaluation  
5 committee or "TEC" that includes a minimum of three state-licensed pilots.

6 At the beginning of the training program, the TEC assigns the trainee an initial route  
7 between a commonly navigated port or terminal and the district's seaward boundary. Within the  
8 first eight months of training, the trainee must take and pass multiple conning quizzes (these are  
9 very specific tests that include local knowledge questions such as how close the shallows are to a  
10 particular point of land, how close particular berths are in feet, the depth of water at a particular  
11 berth in feet and tenths of feet, etc.) for the assigned route with scores of at least 80%, must take  
12 and pass a local knowledge exam for the assigned route with a score of at least 85%, and must  
13 obtain a First Class Pilot endorsement on the trainee's federal license for the assigned, initial  
14 route. As I discuss in more detail below, obtaining the federal endorsement requires the trainee to  
15 accurately describe the routes in detail and draw the required chartlets for that route from  
16 memory. If the trainee fails to timely complete these requirements or obtain an extension, he or  
17 she is dismissed from the training program. To complete the training program, the trainee must  
18 successfully pass the conning quiz and local knowledge exam for all routes.

19  
20  
21 Trainees typically complete well over 250 trips (typically around 300) with licensed  
22 pilots during the training program. These trips are completed in three phases: observation trips,  
23 training trips, and the evaluation trips. Each phase involves dozens of trips aboard different  
24 classes of ships on a wide range of routes, in order to expose the trainee to as many diverse  
25  
26

scenarios as possible. All trips must be successfully completed and logged before a candidate is eligible for his or her state license.

**Q: Please describe the trainee's job during observation trips?**

A: During observation trips, the trainee's job is to observe and ask questions. At this stage, the trainee is not permitted to control the ship, but may work on bridge presence and familiarize his or herself with bridge equipment. Once a trainee has completed observation trips and successfully passed the conning quiz and local knowledge exam for a particular route, the trainee is eligible to begin the training phase for that route.

**Q: Please describe the trainee's responsibilities during training trips?**

A: During the training phase, the trainee takes control of the vessel, but engages with the licensed pilot throughout the job, with the pilot answering questions and providing input. Lastly, once the trainee has completed the required training trips, he or she begins the evaluation phase.

**Q: Please describe the evaluation phase?**

A: On evaluation trips, the trainee controls the ship independently without advice from the licensed pilot. The licensed pilot's role on these trips is limited to intervening when safety requires. If a trainee receives three interventions at any point during the evaluation phase, the trainee can continue training. However, if a trainee receives a fourth intervention, the trainee is dismissed from the training program.

1 **Q: Have you ever had to intervene during an evaluation trip and, if so, could you please**  
2 **describe an example?**

3 A: Yes. I would like to give two examples. On one occasion, I was supervising a trainee on  
4 an evaluation trip in route to Everett near Scatchet Head, when the trainee gave an order to cross  
5 traffic lanes ahead of an oncoming vessel rather than continue south and allow the oncoming  
6 ship to pass. It was an inappropriate order that would have resulted in an unsafe maneuver, and I  
7 intervened. It is important to note that this trainee was an experienced captain at the time of this  
8 incident. On the second occasion, I was transiting on a loaded oil tanker approaching the south  
9 berth at Cherry Point from the north. The trainee being evaluated needed to transit past the north  
10 berth which was occupied by a tanker being loaded and surrounded by an oil boom. The trainee  
11 failed to recognize that the current was pushing us at an extreme rate onto this loading tanker and  
12 was not making sufficient corrections to the ship's set and drift. Due to the extraordinary risk  
13 presented I intervened and made the required maneuvers to prevent potential catastrophe.

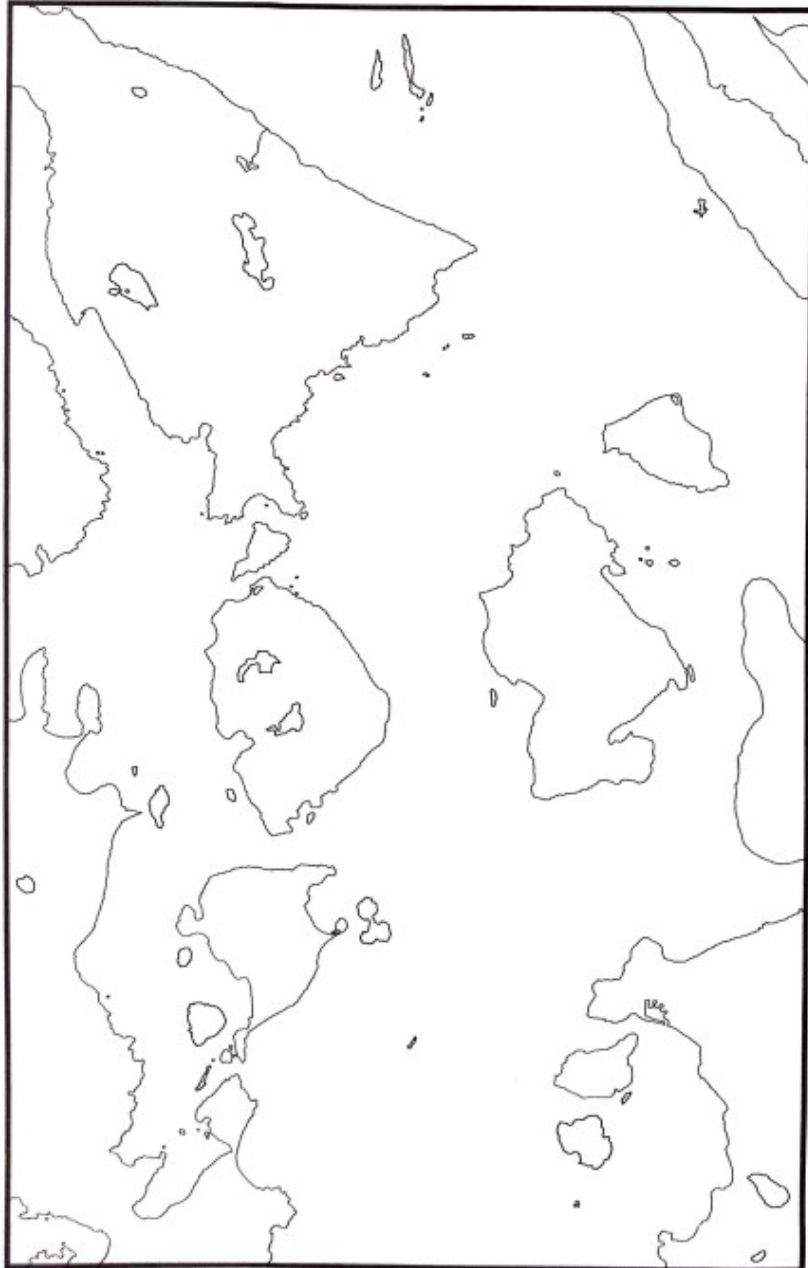
14  
15 Today both of these former trainees are members of PSP and are highly competent pilots.  
16 I give these examples to demonstrate that even seasoned mariners require extensive training  
17 before they are ready to become pilots. The State's training program is critical to ensuring that  
18 every pilot charged with protecting Puget Sound on behalf of the citizens of Washington has the  
19 tools, knowledge and experience that need to operate at the highest level of professional  
20 expertise and provide the greatest possible degree of safety.

21  
22 **Q: Is passing all of the BPC-required conning quizzes and local knowledge exams, and**  
23 **completing all required observation, training, and evaluation trips, sufficient for a trainee**  
24 **to receive a state license?**

1 A: No. In addition to the training program requirements administered by the BPC and  
2 overseen by the TEC, the trainee must also obtain a First Class Pilot endorsement on his or her  
3 federal license for every route within the pilotage district. In addition to logging trips, the trainee  
4 must write from memory a detailed description of each route for which endorsement is sought.  
5 Exhibit ECK-04 to my testimony is a copy of a route description prepared by Puget Sound Pilot  
6 Captain Trevor Bozina for Chart 18421, which is Rosario Strait. Exhibit ECK-04 is just one  
7 example of the many required route descriptions that trainees must commit to memory to receive  
8 their federal endorsement. As Exhibit ECK-04 demonstrates, these route descriptions are very  
9 detailed and include information regarding prevailing tides and currents, the type and direction of  
10 vessel traffic and cross traffic, the applicable vessel traffic system, special areas and operating  
11 requirements, special harbor rules, anchorages, geography, and man-made features.  
12

13 To obtain the required federal endorsement, the trainee must also draw from memory  
14 each of the 25 chart sections that comprise the charted area of the Puget Sound Pilotage District  
15 with near perfect accuracy. Like the route description exams, these chart tests are administered at  
16 the local Coast Guard Regional Exam Center. Trainees are provided with a blank chart section or  
17 “chartlet” for a particular area that includes instructions to identify and draw a long list of items  
18 including prudent courses, water depths every two inches (some drawn chartlets are as much as  
19 three feet by four feet in size), shoaling, land cover, traffic lanes, cable areas, and, most  
20 importantly, navigation aids. An example of a blank chartlet for Rosario Strait is reproduced  
21 below:  
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# ROSARIO STRAIT

## CHART # 18421

### CHARTLET #12

FLEET SOUND PERSONAL EXAMINATION CENTER  
PLEASANT EXAMINATION  
INSTRUCTIONS FOR CHARTLET #12

CHARTLET #12 MUST BE COMPLETED IN ONE SITTING. MAXIMUM ALLOWABLE TIME IS 45 MINUTES. (TIME SHOULD BE SUBTRACTED FROM 45 TO 15 MINUTES DURING THE 45 MINUTE FROM 100 TO 100). COMPLETE THE BLANK CHARTLET IN THE FOLLOWING MANNER:

- A. PRINT THE DATE, DISTANCE, AND YOUR NAME IN 4 EMPTY SPACES NEAR THE CHARTLET LEGS.
- B. INDICATE THE MAGNETIC VARIATION, THE YEAR COMPLETED, AND THE ANNUAL CHANGE, ALIVE, VINE, AND MAGNETIC NORTH.
- C. INDICATE WHETHER SOUNDINGS ARE IN FEET OR METERS.
- D. CHARTLET #12 SHALL SHOW THE NAMES OF GEOGRAPHIC FEATURES INCLUDING ISLANDS OF WATER.
- E. MARK EACH ISLAND WITH A NUMBER BY ITS PRESENT CHARTLET LOCATION USING STANDARD CHART SYMBOLS. PRINT AND WRITE WITH NORTHING RANGES OF 1000 FEET WITH THE CHARTLET ALONGSIDE EACH AND SHOW ITS NAME. (LEFT CHARACTERISTICS AND SOUND RANGES EXCEPT 4 APPROXIMATE. MARK ANY CHANNEL OR SANDBAR (NAME) WITH SOUTH RANGES. (LEFT) SHOW THE APPEARANCE OF SANDBAR. THE DEPTH OF SANDBAR IS TO BE INDICATED IN COLORED SECTORS, DEPTH OF WATER AND OTHER PAYMENT INFORMATION.
- F. INDICATE SHIPWRECK, PREVIOUS COURSES AND TRACKS BY DASHES. THESE ARE ALSO INDICATE DISTANCES AND BEARINGS TO NEAREST LANDMARKS OF COURSE CHANGE POINTS.
- G. MARK WATER DEPTHS ALONG YOUR TRACKS AND AT APPROXIMATELY TWO-MILE INTERVALS OVER THE ENTIRE AREA OF THE CHARTLET.
- H. THE CHARTLET #12 SHALL SHOW SIGNAL, PROMINENT LIGHTS, RED FLUKE, AND OTHER NAVIGATIONAL MARKERS AS WELL AS POSSIBLE. INDICATE CHANNELS AND SANDBAR MARKERS ALONG WITH BOTTOM CHARACTERISTICS.
- I. INDICATE ALL CHART AREAS AND VESSEL TRAFFIC LINES IN WORKING PORTS. LINES AND SHOW GENERAL APPROXIMATE RESTRICTED SPEED, HAZARDOUS AREA, AND OTHER RESTRICTED CLEARANCE. INDICATE ALL RESTRICTED CLEARANCE.
- J. COLOR THE COASTLINE OF THE ISLANDS IN YELLOW. MARK PROMINENT BLUFFS OF COASTS WITH BLACK WAVE MARKS. INDICATE ALL HAZARDOUS AREA WITH DASHES IN LIGHT BROWN OR GRAY.
- K. INDICATE ALL ESTABLISHED TERRY CHANNELS BY DASHED LINES.

SCALE: 1:80,000

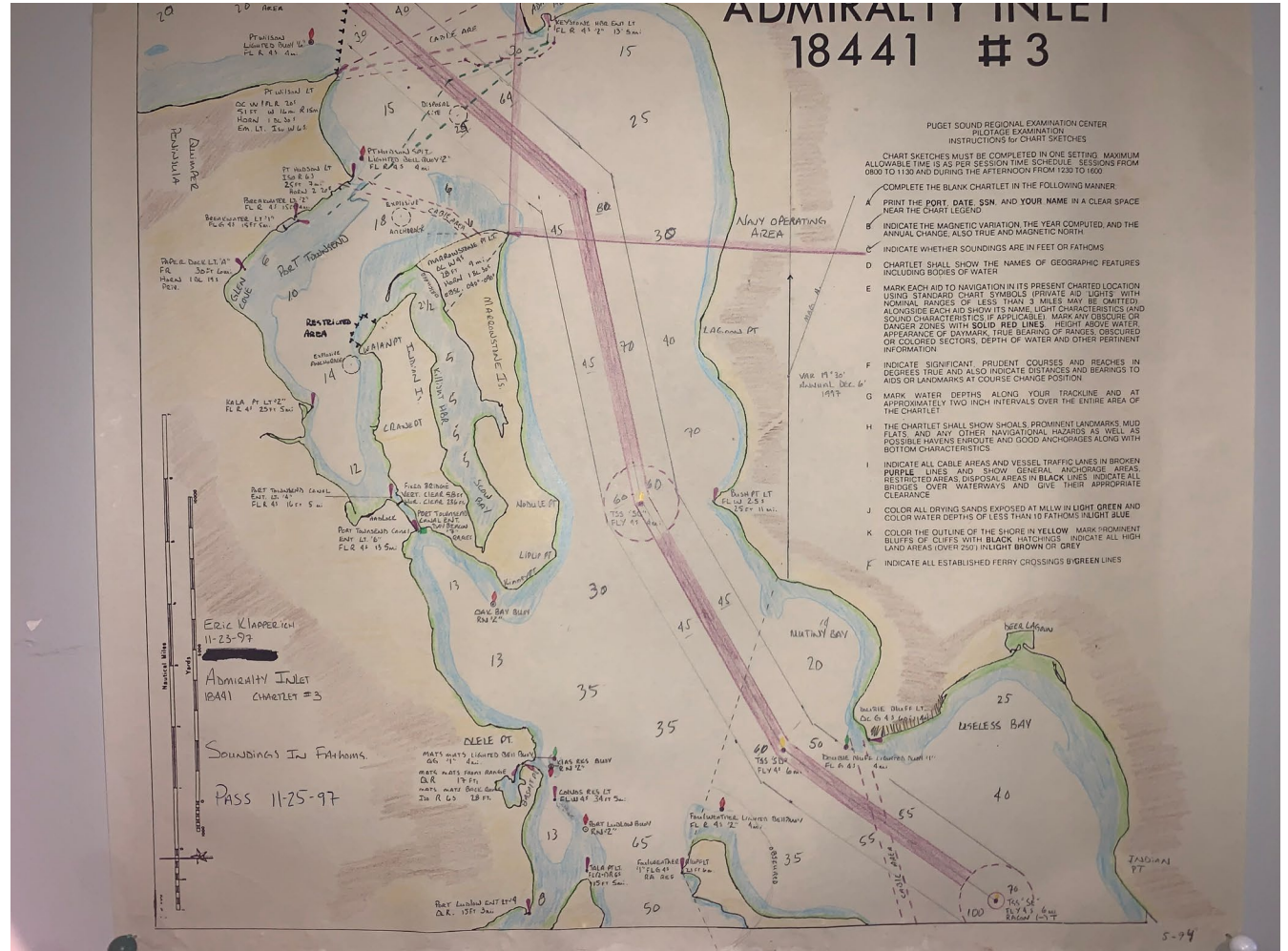


PRODUCED BY:  
REMOTE REPLICATION SERVICES (RRS) - WEST COAST  
NATIONAL GEOGRAPHIC INTELLIGENCE AGENCY (NGA)  
788-728-5882 / DSN: 366-5882 812018

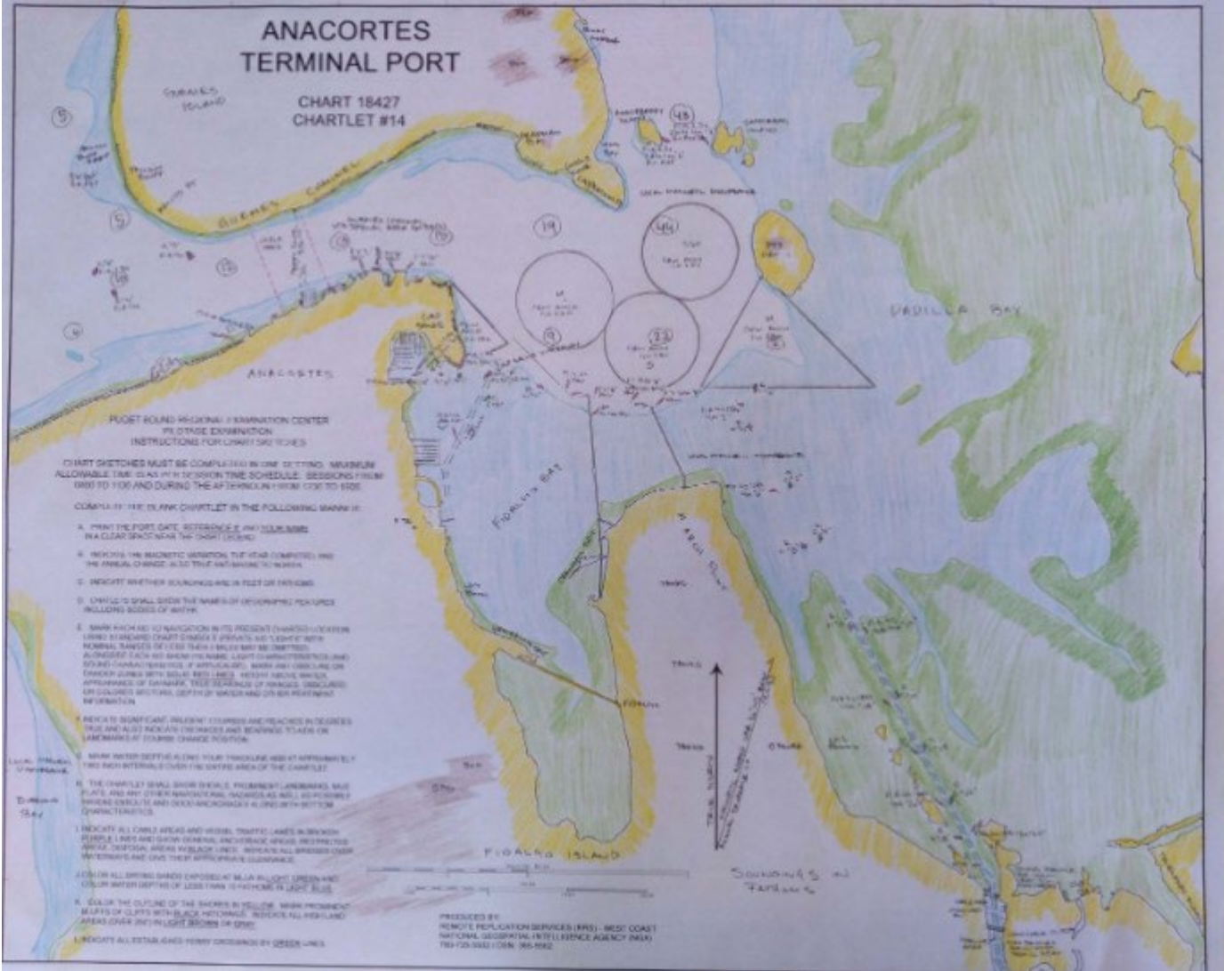
The trainee is then given a limited amount of time to draw the chart by correctly identifying and placing on the blank chart all of the required information. Once the applicant completes the chart, the examiner compares the drawn chart on a lighted table to an actual NOAA chart of the same area. Each drawn marker must touch the marker on the actual chart, with a minimum score of 90% required to pass.

The chartlets for Admiralty Inlet, Anacortes, and Rosario Strait are considered

intermediate, difficult, and very difficult, respectively. Each of these chartlets as drawn by me or one of my fellow pilots from memory is reproduced below:

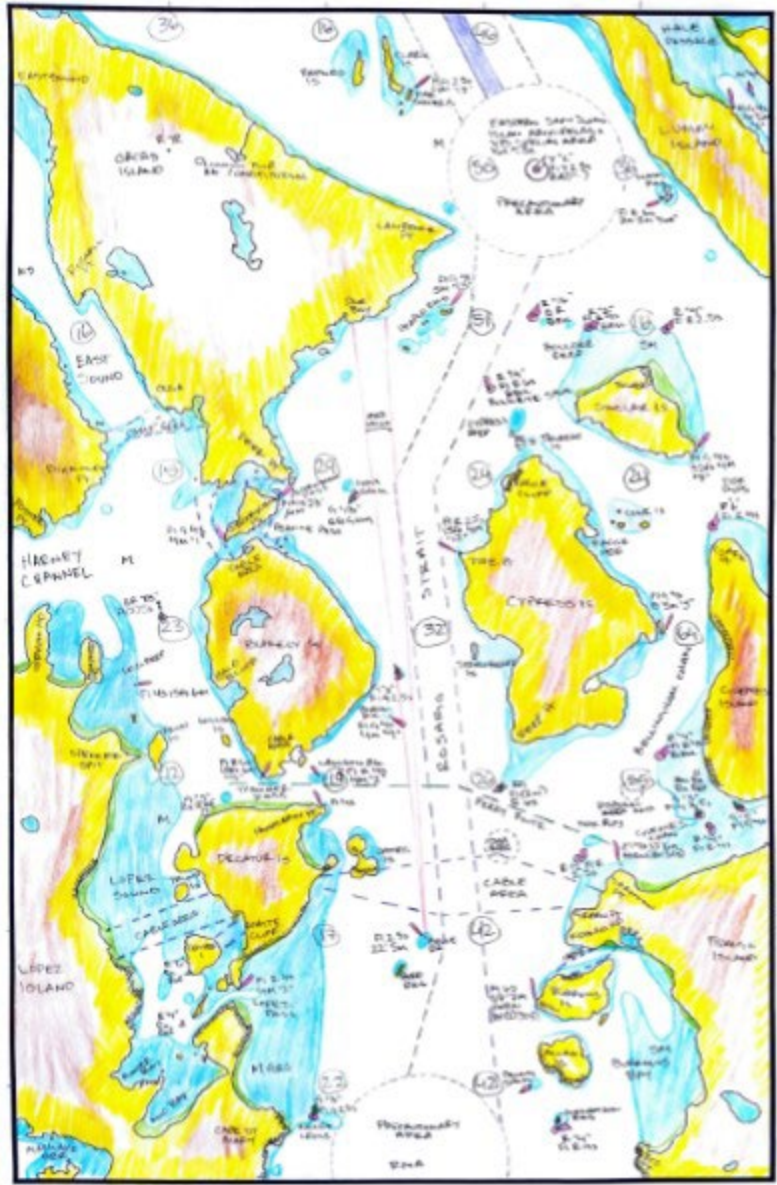


Intermediate: Admiralty Strait



Difficult: Anacortes

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# ROSARIO STRAIT

## CHART # 18421

### CHARTLET #12

YOUR PRESENTING COMMANDER/CAPTAIN  
POLICE COMMANDER  
RECEIVED THIS CHART ON 10/10/2018

CHART AND CHARTLET ARE COMPILED FROM THE BEST AVAILABLE INFORMATION AND THE CHARTERER ASSUMES RESPONSIBILITY FOR THE ACCURACY OF THE INFORMATION SHOWN ON THIS CHART. THE CHARTERER SHALL BE RESPONSIBLE FOR THE FOLLOWING:

1. THAT THE CHART IS USED IN ACCORDANCE WITH THE INSTRUCTIONS AND NOTES ON THE CHART.
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740-726-6862 / 6031-340-6862 010218

Very difficult: Rosario Strait

A nearly complete set of chartlets drawn from memory by Captain Bozina is attached as Exhibit ECK-05.

Once the trainee successfully completes all 25 charts and corresponding route descriptions, the trainee is eligible to receive the First Class Pilot endorsement on his or her federal license. Only after the trainee receives the First Class Pilot endorsement and completes



1 all other requirements of the training program, does he or she become eligible for issuance of a  
2 state pilot's license by vote of the Board of Pilotage Commissioners.

3  
4 **Q: What is your opinion of the process to become a Puget Sound Pilot?**

5 A: In my opinion, the process to become a Puget Sound Pilot is absolutely necessary to  
6 ensure that every one of our members possesses the elite skill, knowledge, and judgment that are  
7 required to ensure the best possible protection of our district's waterways. Of course, it is also  
8 imperative that our association offer competitive compensation, working conditions, and  
9 benefits, in order to recruit and retain an elite, diverse pilot corps from among a very small pool  
10 of candidates throughout the country. I believe there is a clear relationship between the  
11 competitiveness of the compensation we offer and the quality of trainee that we are able to  
12 recruit and retain.

13  
14 **D. Puget Sound Pilots' Education and Professional Development Continues**  
15 **Throughout Our Careers.**

16 **Q: Once a trainee completes the training program and receives his or her federal First**  
17 **Class Pilot endorsement and state license, is that person qualified to pilot any ship on any**  
18 **route in Puget Sound?**

19 A: No. New pilots begin at what we refer to within our association as "level zero," which is  
20 the lowest level of licensure and carries significant restrictions. In the first year of active service,  
21 a licensed limited pilot is prohibited from piloting a loaded oil tanker of any size, may not pilot  
22 any vessel (regardless of class) above 38,000 GT ITC, and is barred from piloting any ship  
23 greater than 3,000 GT ITC on the Duwamish Waterway. These restrictions are lifted gradually  
24 with the new pilot's limited license being upgraded on an annual basis.

1 A limited pilot's annual license upgrades do not, however, happen automatically. Rather,  
2 during each of his or her first five years, a limited pilot must take a minimum of eight "upgrade  
3 trips" on ships of the next step up in size for the applicable class of ship, and specified routes,  
4 under the supervision and evaluation of a more senior pilot. A pilot finally attains an "unlimited"  
5 license no earlier than his or her sixth year of active service. A table listing the license  
6 restrictions applicable to each of a pilot's first five years of service is contained at WAC 363-  
7 116-082. Please note that what PSP refers to internally as "level zero" corresponds to license  
8 year one in the WAC, "level one" corresponds to license year two, and so on.  
9

10  
11 **Q: Other than upgrade trips, once a Puget Sound Pilot trainee completes the training**  
12 **program, is that pilot's training and education complete?**

13 A: No. A Puget Sound Pilot's training and education continues throughout his or her career.  
14 For example, every five years each Puget Sound Pilot – regardless of seniority – must participate  
15 in manned model training. These weeklong trainings are held at special facilities (typically in  
16 France, Poland, England or Australia), where pilots practice ship handling skills and maneuvers  
17 on scaled model ships. Exercises include all types of scenarios and events. Information regarding  
18 manned model training and its application is available at <https://www.portrevel.com/>. These  
19 programs are extremely valuable and help ensure that pilots are regularly upgrading their training  
20 and skill sets.  
21

22  
23 **Q: Do Puget Sound Pilots also participate in simulator-based training exercises?**  
24  
25  
26

1 A: Yes. Pilots participate in simulator training, typically through the Marine Institute of  
2 Technology and Graduate Studies. These full day or multiday simulator courses include multiple  
3 exercises.  
4

5 **Q: Please describe the simulator training courses that Puget Sound Pilots participate**  
6 **in?**

7 A: Pilots participate in simulator training courses that address a number of subjects. For  
8 example, tethered escort training simulates emergency ship handling with loaded oil tankers in  
9 Puget Sound's most environmentally sensitive areas, with tug simulation being provided  
10 simultaneously in another simulation room with the tugboat companies that provide escort  
11 services. Other training subjects include Azipod training (Azipod is a 360' thrusting propellor  
12 system that is commonly deployed on large cruise ships) and Ultra Large Container Vessel  
13 training that provides pilots simulation training for taking large ships into our restricted and  
14 congested waterways, both of which are mandatory courses for license upgrades that authorize  
15 pilots to control the massive cruise ships and container vessels that are increasingly common  
16 callers at our local ports. Pilots also participate in bridge resource management training that is  
17 focused on responding to all situations that can occur while piloting on the bridge and using the  
18 bridge team effectively.  
19  
20  
21

22 **Q: Have Puget Sound Pilots also participated in live training exercises?**

23 A: Yes. Several of our pilots have had the opportunity to participate in live drills at sea  
24 aboard a loaded oil tanker and share that data and experience. This exercise, which was  
25 administered by Polar Tankers in coordination with PSP, Foss Maritime and the U.S. Coast  
26

Guard, involved multiple types of emergency situations in open water on the Strait of Juan De Fuca. While the extraordinary cost of live drills makes them impractical to hold on a regular basis, this unique opportunity provides an excellent example of pilots' ongoing commitment to continued education at every level, including the ship crew and tug operators.

**Q: Do Puget Sound Pilots also participate in less formal education through information sharing?**

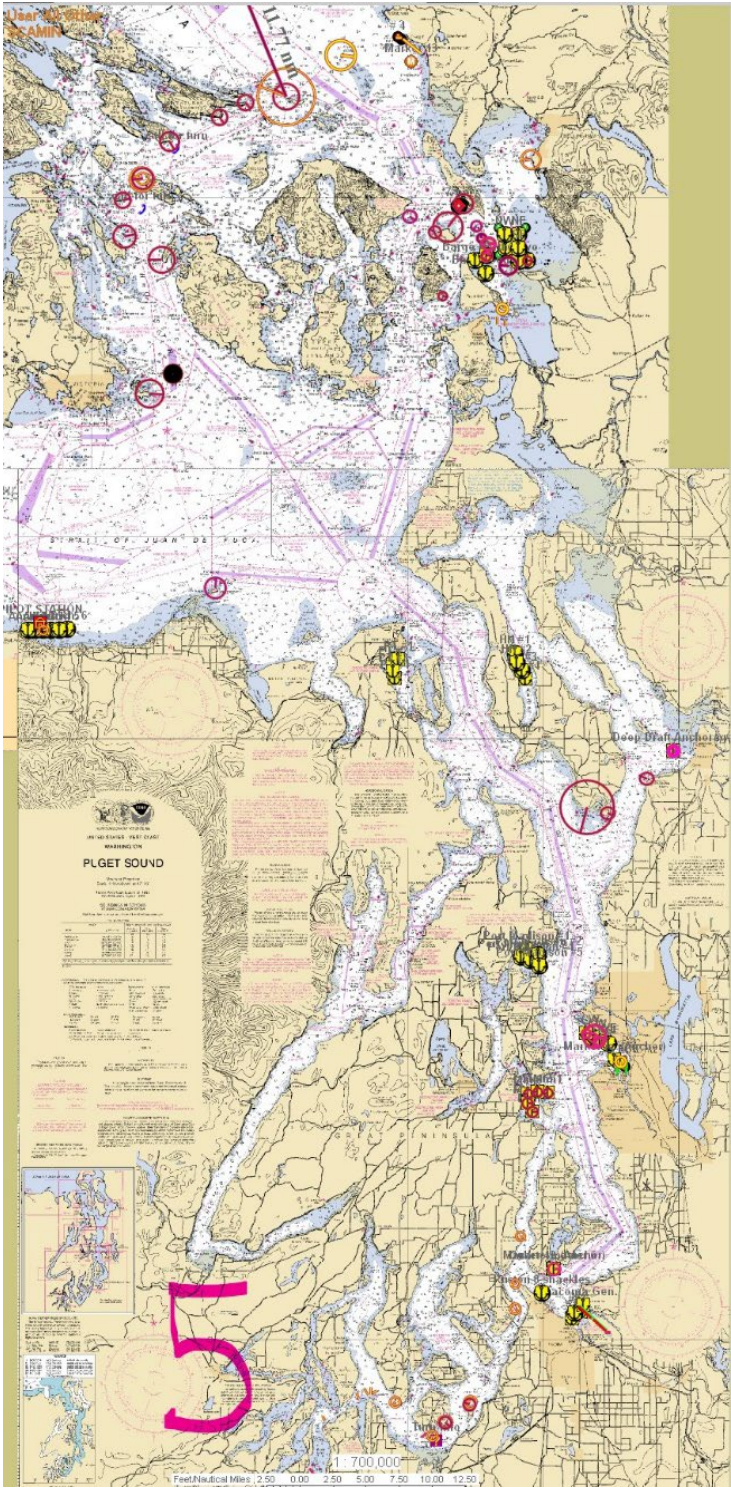
A: Absolutely. Pilots participate in constant educational dialogue among ourselves. If an adverse event or incident generates a lesson to be learned, it will be brought to a board meeting and, where appropriate, shared with the pilot group at large. PSP has an established safe practices committee, and educational advice and experiences are regularly shared by email. As a general matter, the Port Angeles pilot station is a hub for communicating relevant experience, best practices, and shared learning.

**E. Puget Sound is an Exceptionally Large, Diverse, and Challenging Pilotage Ground.**

**Q: What makes navigating the Puget Sound Pilotage District challenging?**

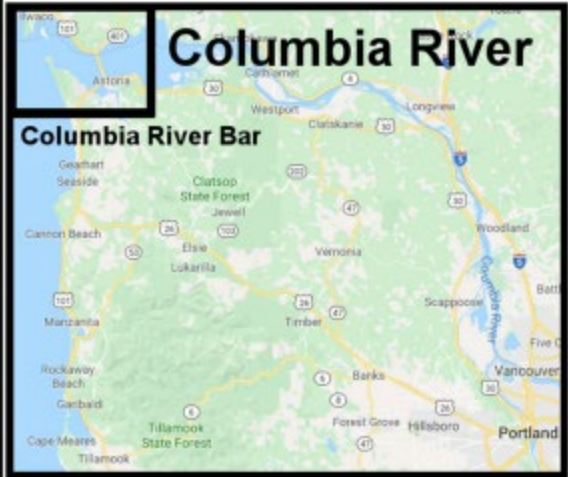
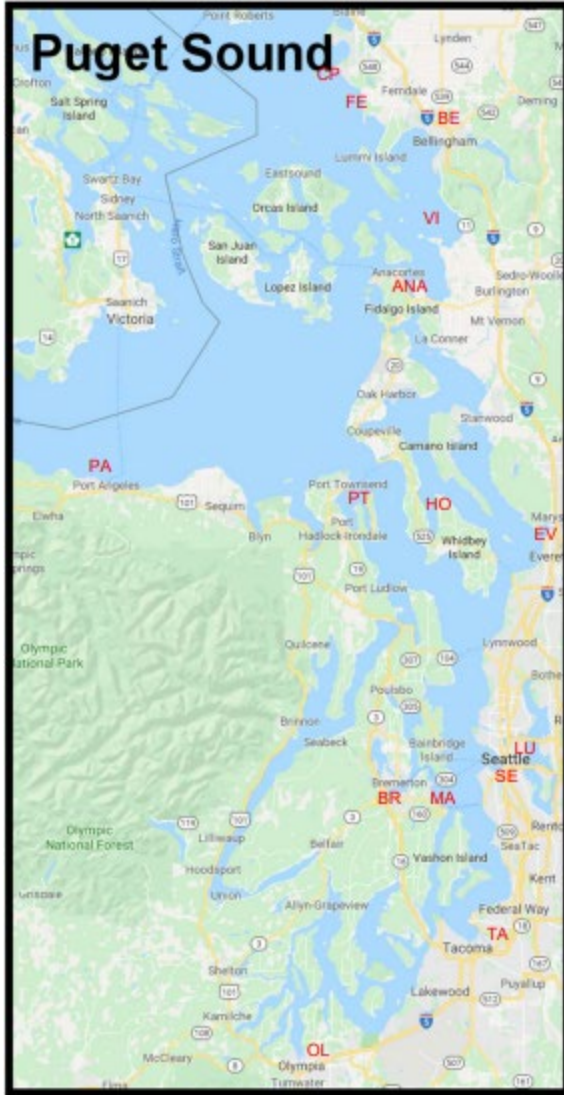
A. The Puget Sound Pilotage District is one of the largest pilotage districts in the United States. The District extends from the Canadian border in the North to Olympia in the South. To put the District's size in perspective, it is larger than the San Francisco Bay, Columbia River, Columbia River Bar and Grays Harbor pilotage districts combined. For the Commission's reference, a map of the District is reproduced below:

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In addition, the below image shows a representation of the total square mileage of our district alongside other pilotage districts to help illustrate the relative difference in size:

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PA TO CP=58 NM  
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PA TO VI ANC=46 NM  
PA TO ANA=42 NM  
PA TO PT=32 NM  
PA TO HO ANC=72 NM  
PA TO EV=60 NM  
PA TO LU=58 NM  
PA TO MA ANC=69 NM  
PA TO SE=67 NM  
PA TO TA=80 NM  
SE TO OL=50 NM  
CP TO SE=87 NM  
CP TO MA=88 NM  
CP TO VI ANC=20 NM  
ANA TO SE=69 NM  
ANA TO VI ANCH=7 NM  
EV TO TA=49 NM  
EV TO SE=29 NM  
HO ANC TO SE=40 NM  
HO ANC TO TA=60 NM

**Q: How does Puget Sound's sheer size affect the difficulty of piloting in this District?**

1 A: The sheer size of our District and its location within the dynamic Pacific Northwest  
2 marine environment creates an almost infinite range of challenges to which every Puget Sound  
3 Pilot must be prepared to respond. The geography of our District is diverse and maritime  
4 conditions are unpredictable and highly variable. Wind speed and direction, currents, local  
5 swells, swell size, and a daily average ten-foot, semi-diurnal tidal range, along with minus tides  
6 and king tides, are among the environmental factors that regularly test a pilot's skill, experience,  
7 instincts and judgment in extremely consequential situations.

8  
9 **Q: Does Puget Sound also experience a diverse range of vessel traffic?**

10 A: Absolutely. Our District welcomes a diverse range of ships, each of which has key  
11 differences in size, operation, cargo and maneuvering characteristics. The diversity of ships  
12 subject to pilotage, combined with our District's complex environment (both natural and  
13 manmade), means that no two transits or maneuvers are ever alike.

14  
15 In any given two-week watch cycle, a Puget Sound Pilot may be dispatched any time day  
16 or night to navigate a 1,200-foot container ship through a congested waterway, successfully  
17 dock a nearly 1,000-foot loaded oil tanker carrying approximately 37.8 million gallons or  
18 900,000 barrels of crude oil in sustained high winds with current (the force of just one knot of  
19 current is roughly equal to approximately 30 knots of wind), pilot a 560-foot loaded cement ship  
20 backwards (*i.e.*, stern first) up the winding, two mile stretch of constricted Duwamish River with  
21 minimal underkeel clearance and passing through a bridge with as little as 27 feet of clearnence  
22 on either side, or perform any combination of these extraordinarily difficult assignments. To  
23 successfully meet these and countless other challenges, each Puget Sound Pilot must draw  
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1 constantly on his or her deep local knowledge and experience-guided instincts to pilot safely on  
2 our District's varied waterways.

3 **F. The Challenges that Puget Sound Pilots Encounter are Constantly Evolving**  
4 **and Increasing.**

5 **Q: Have the challenges you face as a Puget Sound Pilot changed during your tenure?**

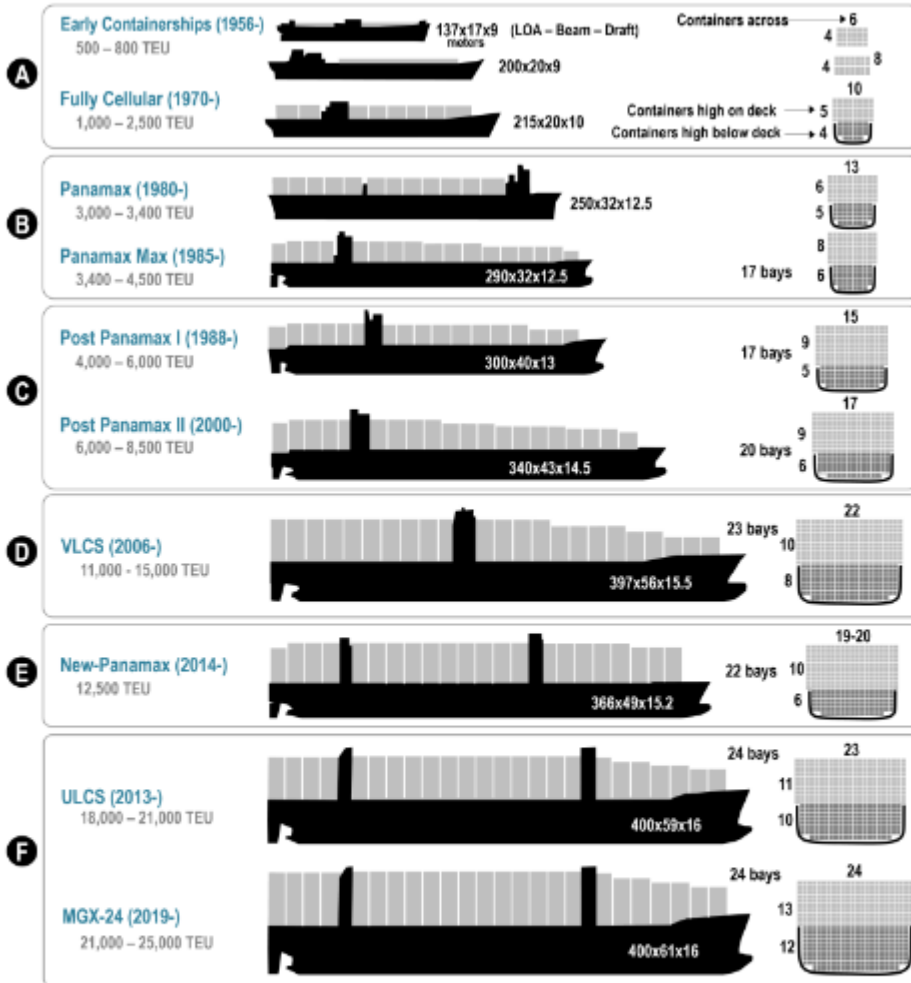
6 A: There is no question that the challenges that my fellow pilots and I face on a day-to-day  
7 basis have grown progressively more difficult and intense in recent years. Most significantly,  
8 ships – especially the container ships that call at the Ports of Seattle and Tacoma – have become  
9 much larger and less maneuverable both with respect to their engine and rudder configuration  
10 and due to reduced available waterway space.

11  
12  
13 **Q: Please describe the increase in container ship size that you have experienced during**  
14 **your tenure as a pilot?**

15 A: When I began piloting in 2008, the largest container ships that called Puget Sound were  
16 just under 1000 feet and about 140 feet wide. Those ships were around 76,000 GT ITC, with a  
17 draft around 40 feet, and carried approximately 7,000 twenty-foot equivalent units or TEUs.  
18 Today's ULCVs (Ultra Large Container Vessels) that call Seattle and Tacoma are much larger.  
19 The image reproduced below shows the growth of container ships over time:  
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# Evolution of Containerships



Evolution of Containerships

Source: All dimensions are in meters. LOA: Length overall. The loads displayed on deck represent maximal possible loads, which would involve a large share of empty containers. The loads are usually 1 to 3 containers less in height. Containerships usually carry fewer containers because of weight restrictions and lack of demand on certain routes.

**Q: Please provide an example of some of the larger ships that call Puget Sound?**

**A:** Some MSC container ships calling Seattle are about 1200 feet long and 168 feet wide with an average draft approaching 50 feet. The GT ITC of these ships is around 142,000, and they carry up to 14,000 TEUs. These larger ships are much more difficult to pilot, especially in

1 the narrow, restricted and shallow waterways that are defining features of our District's largest  
2 and most congested ports.

3  
4 **Q: Were Puget Sound's constricted waterways such as the East Waterway and West**  
5 **Waterway at the Port of Seattle designed to accommodate vessels as large as the**  
6 **containerships that you see calling today?**

7 A: Our waterways were originally built to accommodate much smaller ships than the  
8 massive container ships that now routinely call at the Ports of Seattle and Tacoma. Aside from  
9 limited dredging (which is offset by these ships' deeper drafts and does not increase available  
10 space for maneuvering), the physical size of the District's constricted waterways has not  
11 changed. This, coupled with the much larger shoreside facilities that have been built to receive  
12 and offload these ships' massive cargo loads has reduced the margin for error and added  
13 tremendous risk not only to the pilot and crew, but also to the marine environment and  
14 Washington's economy.

15  
16  
17 **Q: Do the newer, larger ships also have deeper drafts?**

18 A: The increased weight of the new much larger container ships has deepened these ships'  
19 drafts and reduced the available under-keel clearance or "UKC" to at or near the 10% of draft  
20 minimum that our guidelines require. For example, the greatest available depths at West  
21 Waterway Seattle are located in an extraordinarily narrow channel or "gate" that is only about  
22 400 feet wide with a maximum dredged depth of 46 feet. This gate provides a deep-water  
23 channel for entering the West Waterway, with shallower depths on both sides, outside of this  
24 channel. This means that large container ships with drafts of up to 50 feet must be brought in on  
25  
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1 an approximately 10-foot high tide in order to leave five feet, or 10% of draft for UKC safety. If  
2 the pilot fails to keep the ship within this gate or miscalculates the timing and position of the  
3 tide, the ship could touch the bottom and potentially cause significant damage to the ship.

4 The lack of UKC also significantly changes the ship's handling characteristics related to  
5 the ever-changing pressures under and around the ship, making it less responsive and sluggish to  
6 rudder and engine commands. When piloting a ship with a small UKC, a pilot needs to give  
7 larger rudder orders for longer periods of time, and occasionally more, or longer engine starts for  
8 rudder effectiveness, while managing the ship's speed. Some bowthrusters are also less  
9 responsive when operating with a small UKC, which requires increased use of tug assist. Add in  
10 typical conditions such as 15 knots of wind applying force to 12,000 square meters (2.97 acres)  
11 of sail area and current from the Duwamish River applying forces against the ship's hull, and  
12 piloting these massive ships, at all hours of the day and night, becomes very demanding and  
13 stressful.  
14

15  
16 **Q: Do any other factors limit maneuverability of large container ships within Puget**  
17 **Sound's constricted waterways?**

18  
19 A: Additional factors further limit the waterway in which pilots must maneuver the  
20 increasingly large ships calling Puget Sound. For example, 10-15 knots of wind may require  
21 three degrees of "leeway," which means that instead of steering the vessel at a 180-degree true  
22 course, the pilot must steer at 183 degrees to make a 180-degree course over the ground. When  
23 you apply the added leeway, a ship that is nominally 168-foot wide creates an actual swept path  
24 of as much as 230 feet, which further reduces or limits the available dredged channel width, or  
25 clearance for any permanent underwater obstructions.  
26

1 Another challenge for pilots when piloting larger ships in restricted waterways, is the  
2 outreach of cranes, which have become much larger to accommodate the ULCVs' enormous  
3 payloads. A good example of this is in the East Waterway between pier 18 on the west side and  
4 pier 30 on the east. The waterway is 740 feet wide. With the increased outreach of the container  
5 cranes to load/offload these larger ships, the width of the waterway between crane tips reaching  
6 across the waterway is reduced from 740 feet to 281 feet. When one subtracts room for the  
7 necessary placement of 100-foot tugboats, tug line to maneuver and perform at a high level, and  
8 the ship's actual swept path, the waterway quickly becomes very narrow with almost no space  
9 for maneuvering.  
10

11  
12 **Q: Does the work of shoreside personnel present maneuvering challenges in constricted**  
13 **waterways?**

14 A: Sometimes, yes. Shoreside personnel do not always position these massive cranes  
15 properly, which can interfere with a pilot's carefully planned approach and create additional  
16 safety hazards. One of our pilots recently encountered this issue, as documented in a Pilot's  
17 Report of Marine Safety Occurrence dated March 21, 2022, that was recently submitted to the  
18 Board of Pilotage Commissioners. The reported incident involved a near miss at Pier 4 on the  
19 Blair Waterway. As that pilot explains in his report, "[d]ue to the size of the ships, it is not  
20 always possible to determine the exact crane location in relation to the bow until after the ship is  
21 alongside," and "an error of only 1 or 2 degrees can be enough for the bow to make contact with  
22 the cranes."  
23

24 In that case, the cranes were out of position and the required shoreside support was not  
25 present. As the pilot approached, he determined that "[g]iven the difficult weather and the size of  
26

1 the ship, stopping the maneuver could have proven to be hazardous.” Remarkably, the pilot was  
2 able to safely maneuver the ship alongside while avoiding contact with the shoreside facility. A  
3 copy of the pilot’s report is Exhibit ECK-06 to my testimony. The report provides insight into  
4 the complex real-time adjustments and decision-making that pilots must exercise in order to  
5 safely execute our duties. Unfortunately, this example of a shoreside operational mistake is an  
6 unacceptably frequent occurrence.

7  
8 **Q: Could you briefly summarize the increased challenges of piloting in recent years**  
9 **that you have experienced?**

10  
11 A: In short, while the ships entering our District and the shoreside equipment at our local  
12 ports have grown steadily larger, the restricted waterways on which Puget Sound Pilots must  
13 safely navigate these ships have for the most part stayed the same size. The result is that piloting  
14 has become increasingly difficult and more challenging with less room for error and a reduced  
15 safety margin with a substantial increase risk. Puget Sound Pilots are constantly adapting and  
16 upgrading our training, technology, and best practices to meet these new challenges.

17  
18  
19 **Q: Are the challenges presented by environmental factors changing as well?**

20 A: Yes. As I explained above, the multiple environmental variables that affect piloting  
21 within our District can – and often do – present extraordinary challenges. It is not unusual, for  
22 example, to encounter sustained southwest winds of 30 knots or more during the winter months  
23 at exposed berths such as the oil refinery terminals located at Cherry Point and Anacortes. Due to  
24 the open nature of the Cherry Point Terminal, high winds are often joined by localized swells  
25 and strong currents. These elements, especially when encountered in combination, can decrease  
26

1 the effectiveness of tug assist and make docking and undocking large ships extremely difficult  
2 and dangerous.

3 There is broad consensus in the scientific community that human-caused climate change  
4 will result in increased frequency and intensity of adverse weather events. This consensus is  
5 articulated in the Ruggiero, et al. and University of Washington reports that are Exhibits ECK-07  
6 and ECK-08 to my testimony. Specifically, the University of Washington report explains that the  
7 Pacific Northwest and Puget Sound are highly likely to experience increasingly intense weather  
8 events as climate change progresses.

9 Assuming that the scientific forecast regarding the effects of climate change on the Puget  
10 Sound area is accurate, there is no question that increased frequency and intensity of severe  
11 weather events will make piloting on the District's exposed waterways even more challenging.  
12 Simply put, extreme maritime conditions increase the risk of a serious incident. For this reason,  
13 climate change presents a potentially significant and evolving challenge and risk factor for  
14 pilotage on Puget Sound and the environment and citizens of Washington State.

15  
16 **G. Specific Examples Illustrate the Challenges that Puget Sound Pilots**  
17 **Encounter in Our Mission to Provide Best Achievable Protection of Puget**  
18 **Sound's Coastal and Inland Waterways.**

19 **Q: Could you please describe specific examples of jobs that are representative of the**  
20 **types of challenges that Puget Sound Pilots face in the course of their duties?**

21 A: Yes. I would like to give three examples.

22  
23 **1. Transiting a container ship through the West Waterway.**

24 Q: What is the first example?

25 A: The first example I would like to address is piloting a container ship on a transit through  
26 the Port of Seattle's West Waterway. [Exhibit ECK-09](#) to my testimony shows drone footage of

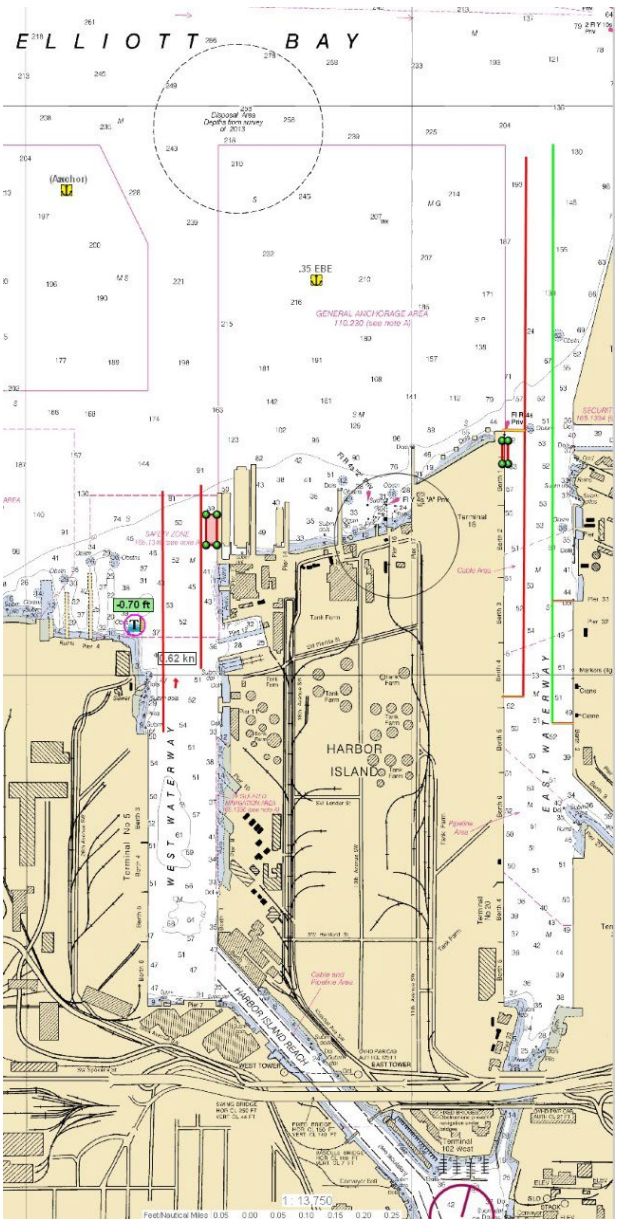
1 me performing this job alongside a view of the dashboard of my Personal Piloting Unit or “PPU”  
2 computer system. Specifically, the video shows me piloting the approximately 1,200-foot MSC  
3 Camille on June 19, 2022. [I have narrated the video in order to provide the UTC with a first-hand](#)  
4 [perspective of the execution of this very difficult assignment.](#)



15 There are multiple restricted waterways within the District including Seattle’s West  
16 Waterway and East Waterway, and the Blair Waterway in Tacoma. Each presents its own unique  
17 maneuvering challenges. Seattle’s East Waterway, for example, is often highly congested due to  
18 its multiple container terminals. Navigating Seattle’s West Waterway is especially challenging  
19 because it requires pilots to maneuver large container ships stern first in an unmarked narrow  
20 channel of water that has not been dredged to an appropriate depth. Like the above-described  
21 maneuvers at Cherry Point, pilots often perform these difficult maneuvers in adverse weather  
22 conditions.  
23

24 A chart showing the Port of Seattle’s West Waterway and East Waterway is reproduced  
25 below:  
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As can be seen from ECK-09 and the image above, Seattle's West Waterway is very narrow. Within the waterway, an even narrower channel or "gate" further limits the pilot's safe zone of navigation. The West Waterway's gate is shown by the red vertical lines at the waterway's entrance. In the adjacent East Waterway the green line denotes the dredged channel, while the red line denotes the crane outreach.



1 Through this narrow gate, a pilot must maneuver massive container ships including  
2 ULCVs that, as described earlier in my testimony, are increasingly common within our district.  
3 The enormous size of these ships is almost impossible to overstate. ULCVs may exceed 1,200  
4 feet length-over-all, with containers stacked as high as 90 feet or more above deck, and drafts of  
5 up to 50 feet. Notably, the West Waterway's gate has a lowest depth of just 46 feet, which means  
6 that the pilot must execute the transit and bring a deep-draft ship to berth during the window of  
7 high tide when there is sufficient water depth to accommodate a vessel with a draft in excess of  
8 46 feet. Any misjudged line up while entering or transiting the gate could result in a grounding,  
9 risking a serious marine incident and potentially damaging the bottom of the ship. If the transit is  
10 not precisely timed, the ship may be forced to go to anchor and wait for the next high tide,  
11 potentially costing the shipper hundreds of thousands of dollars in terminal costs.  
12

13 Container ships transiting the East and West Waterways forward or bow first, and the  
14 Blair Waterway-maintain a speed around three knots over the ground. However, to maintain the  
15 ship's maneuverability (which is crucial within the restricted waterway) and keep water flow  
16 over the rudder, the pilot will try to keep the ship's engines at "dead slow ahead," or minimum  
17 RPMs. On some ships, dead slow ahead implies an over-ground speed of about five to six knots,  
18 even up to eight knots, and possibly as much as 10 knots – nearly four times faster than the  
19 acceptable, safe speed. This requires a pilot to use a tug or combination of tugs to help manage a  
20 safe speed. A failure to recognize conditions and keep the ship's speed down can result in  
21 damage from hydrodynamics caused by the ship's displacement. Too much speed along with the  
22 ship's displacement can cause moored ship's lines to part, barges to break loose and marinas to  
23 sustain potential-damage. On top of this, prevailing summer winds from the north often act as tail  
24  
25  
26

1 winds that – especially when applied to a ULCV’s enormous sail area – can increase the ship’s  
2 ability to continue to “carry her way” along with ordinary speed under power.

3 To keep the ship’s speed down to a safe level when transiting a waterway, the pilot relies  
4 on tugs, tug design, and their unique abilities and available applications. The pilot strategically  
5 places the tugs on the bow and stern of the ship, or forward and aft along the side of the ship. A  
6 pilot may sometimes use up to four tugs when adverse weather conditions require them. In  
7 addition to controlling the ship, the pilot must give very precise, and constant adjustments to the  
8 position of and force applied by each tug, in order to maintain the correct speed and course over  
9 ground, or move the ship laterally while taking advantage of the ship’s pivot point and turning  
10 lever. Most containerships have bowthrusters, which are also a vital tool in these waterway  
11 transits that can be very effective for maintaining course over ground or assist with lateral  
12 movement while working against the rudder.

14 On some transits, the pilot must also adjust for wind force by heading the ship a few  
15 degrees to windward off azimuth. This technique allows the pilot to steer a few degrees to  
16 windward which results in a closer course over ground. This will also help relieve some of the  
17 stress on the tugs’ equipment and can at times help deflect the wind from an angle that decreases  
18 the amount of wind force applied to “the body” of the ship. The drawback of this technique is  
19 that it gives the ship a larger footprint known as a swept path. This swept path, while often  
20 necessary, increases the ship’s width profile and reduces the already minimal available space to  
21 keep the ship within the gate, off the bottom, and clear of the gantry cranes. The pilot’s active  
22 management and critical decision-making must persist throughout the entire transit with virtually  
23 zero margin for error.  
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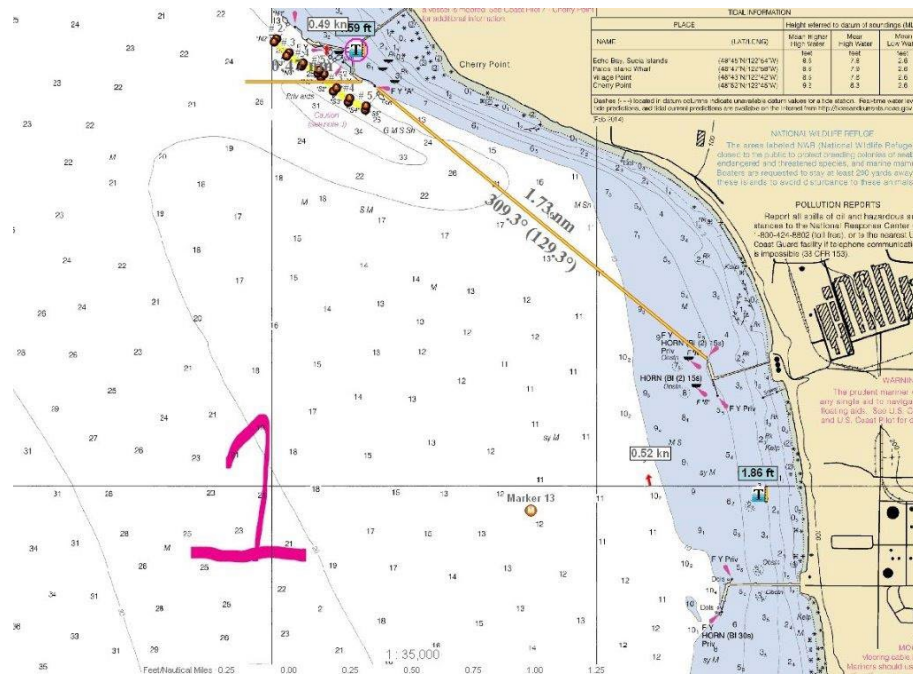
1 It is worth emphasizing that these ULCVs can carry as much as four million gallons of  
 2 diesel fuel. Seattle's East and West Waterways are situated at the mouth of the Duwamish River  
 3 which is an important and sensitive native fishing ground. A serious marine incident resulting in  
 4 an oil spill in this area would have potentially catastrophic consequences. It is the elite expertise  
 5 and consistently error-free performance of Puget Sound Pilots that enables commerce to function  
 6 at our District's economically vital container terminals while simultaneously protecting the  
 7 cultural heritage and natural resources that share the waterway.

8  
 9 **2. Undocking an oil tanker at Cherry Point.**

10 **Q: What is the second example?**

11 **A: The second example is undocking an oil tanker at Cherry Point in adverse weather.**

12 Cherry Point is located at the northern end of the District, north of Ferndale and just a few miles  
 13 south of the Canadian border. For the Commission's reference, a chart of Cherry Point is  
 14 reproduced below:



1 As shown above, Cherry Point is an exposed berth with open water to the south,  
2 southwest and northwest.

3 The BP Cherry Point Terminal has two berths that handle foreign and domestic tankers.  
4 The south berth handles crude oil and the north berth handles refined product. The long fetch of  
5 open sea room to the southwest often produces high prevailing winds. Occasionally, these winds  
6 reach over 40 knots, which produces an extremely challenging assignment for the pilot. Any  
7 mistake or unforeseen circumstance such as a tug line parting, has the potential to damage the  
8 ship and shore facility.

9 Our larger tankers, foreign and domestic, are typically about 900 feet in length-over-all,  
10 over 160 feet in width, and utilize a single propeller and rudder known as “single screw”  
11 configuration. Most tankers that call our refineries are configured with a single screw propeller  
12 configuration, with the exception of some domestic carriers that deploy twin screw and twin  
13 rudder (two propellers, two rudders) configurations. While the twin screw configuration offers a  
14 pilot some added maneuverability, all of these vessels have large super structures and side shells  
15 that compound the sail area and deep drafts that make them more vulnerable to current forces.  
16

17 Prevailing maritime conditions at Cherry Point change seasonally and can present  
18 extreme challenges. During the summer months, from June through September, prevailing winds  
19 from the north may increase the difficulty of bringing a ship alongside the piers. Because ships  
20 going to Cherry Point must approach against the current, any ship docking starboard side to the  
21 pier will have to anticipate north winds that can be compounded with the ebb current. This  
22 scenario requires patience and a lot of effort to perfect a balance with the tugs pushing against  
23 the wind and current.  
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1 From October to May, the prevailing winds are generally out of the south to southwest at  
2 sustained speeds of between 10 to 20 knots. However, it is not uncommon during the winter  
3 months to encounter sustained onshore winds of between 30 to 40 or even 50 knots. These winds  
4 push ships directly toward the dock, which makes both docking and undocking a ship very  
5 difficult and requires the pilot to execute a carefully planned strategy using gained knowledge  
6 and instincts to manage the available assets such as tugs to his or her advantage to combat the  
7 wind, while using the current to the pilot's advantage to safely put the ship alongside the dock.  
8 In addition, both berths at Cherry Point are not designed as a "dock" with a long dock face to lay  
9 against. Rather, both berths have multiple landing pads spaced out evenly so the ship's side  
10 shell, lays on the pads with the bow and stern overhanging. There is also enough space between  
11 the pads to allow the round part of the bow or stern to get in between and come unintentionally  
12 closer to the main pier or structures on the pier.

14 Sustained winds of 30 knots is a critical threshold because at 35 knots of sustained wind,  
15 the oil terminals will shut down operations. If a ship has not yet arrived in conditions where the  
16 sustained winds are in the 30 to 35 knot range, the terminal will not allow her to berth and it is  
17 left to the pilot to find a new destination, usually an anchorage. If the ship is already alongside  
18 performing cargo operations and the winds hit 30 to 35 knots, cargo operations will stop and the  
19 terminal will call for a pilot to be dispatched to move the ship off the berth to prevent damage to  
20 the pier. This happens a few times each winter and can be an emergency situation with winds  
21 increasing.

23 When sustained winds of 35 knots or more come up from the southwest, the local swell  
24 will also increase in size. This southwest wind and swell puts pressure on the side of the ship and  
25 it will start bouncing laterally into the pier structure, putting stress on the ship's lines and  
26

1 potentially causing damage to the pier. In these situations, the ship will need to be moved off the  
2 pier. These strong winds, which sometimes reach 50 knots, apply such force on the side of the  
3 ship that a tug will be asked by the pilot to provide full power. However, the increase in swell  
4 increases the force that the tug puts on her lines as the tug surges with the swell, which adds  
5 unintended tension and possibly a parting of the line. If a tug parts one or more lines, there is  
6 serious risk of significant shoreside damage including to a number of chiksan loading arms.  
7 There is also serious risk that a forceful allision with the dock could damage or even puncture the  
8 ship's hull. Either scenario could potentially trigger an oil spill.

9  
10 To perform the maneuver of moving a ship off the Cherry Point terminal berth in extreme  
11 onshore wind, the pilot will "make fast" the tugs based on the specific conditions he or she faces  
12 on that particular day. During this maneuver, the pilot is in constant communication with each of  
13 the tug captains giving specific commands that must be immediately repeated and then carried  
14 out. Throughout this process, the high winds, swell and current create strong and often  
15 unpredictable forces that work directly against the pilot's efforts and require the pilot to draw  
16 heavily on his or her knowledge and past experiences (such as moving the ship ahead or astern to  
17 take advantage of "the lever" that is created from the location of the pivot point) for a safe  
18 departure.  
19

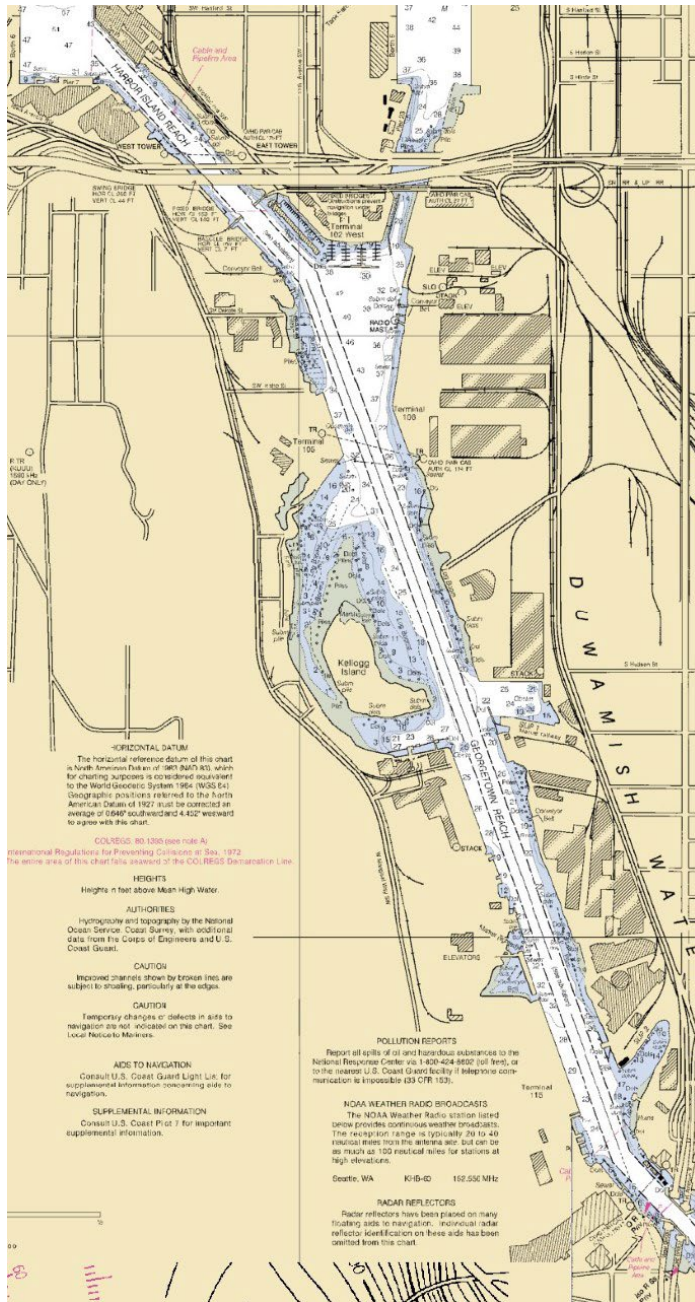
20 **3. Transiting a bulk carrier up the Duwamish River.**

21 **Q: What is the third example?**

22 A: The third example I would like to discuss is the transit of a bulk carrier through the Port  
23 of Seattle's West Waterway and up the Duwamish River. This job is often done stern first. I use  
24 these stern first examples because these ships are not designed to go backward. Ships are  
25 designed for efficiency going forward over long distance. They are streamlined on the bow, and  
26

1 more rounded on the stern for effective water flow, and even the propeller is pitched to move the  
2 ship forward by propelling water over the rudder. When the propeller runs astern, there is no  
3 water propelled over the rudder making the rudder less effective. Going astern becomes a real  
4 challenge because the ship's design is working against you and requires the use of other tools  
5 and techniques that must be applied.

6           These bulk carriers are typically about 560 feet length-over-all with drafts of about 30  
7 feet. Like the container ships, these ships transit the West Waterway backwards or stern first.  
8 Unlike the container ships, however, these bulk carriers travel approximately two miles upriver  
9 to the Glacier Cement and Lafarge cement facilities. An image of the Duwamish River chart is  
10 reproduced below:  
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 21 To complete this transit, the pilot must maneuver the ship stern-first through river  
 22 currents that can be very powerful. At the same time, the pilot must negotiate manmade obstacles  
 23 including cranes, a railroad bridge that is only 150 feet wide, and set fishing nets. As I mentioned  
 24 previously, the Duwamish River is an important tribal fishing area. Native fishermen use set nets  
 25 that extend into the shipping channel and are positioned using a buoy and anchor system. During  
 26



1 peak fishing season in the late summer months, these nets create a navigational hazard that the  
2 pilot must safely negotiate to avoid entangling fishing gear in the ship's propellor. Worse yet, if  
3 one of the tugs snags a net, that tug is not available for the pilot's needs, leaving the ship  
4 possibly stranded in the restricted Duwamish River. Because the fishermen move their nets  
5 regularly, no two transits are ever alike, and each trip upriver presents a unique and stressful  
6 maneuvering challenge.

7 When it is tribal gillnet season and the nets are set, we will limit Duwamish River  
8 assignments to daylight only, because of the added challenges these nets present and the  
9 difficulty of seeing the nets at night. The East and West Waterways are also subject to tribal  
10 treaty gillnet rights, which present navigational challenges in those waterways. But while the  
11 Port of Seattle provides monetary incentives to tribal fishermen to move their nets to  
12 accommodate shipping traffic in the East and West Waterways, no such arrangement exists in  
13 the Duwamish River above Harbor Island.

14  
15  
16 **H. Pilots Perform Their Duties While Maintaining a Cooperative Relationship**  
17 **with the Public and Accommodating Competing Uses of Washington**  
18 **Waterways.**

19 **Q: Are the three examples you describe above the only significantly challenging**  
20 **situations faced by a Puget Sound Pilot?**

21 A: No, not at all. These examples are intended to illustrate the diverse range of difficult jobs  
22 that Puget Sound Pilots execute on a regular basis. They are by no means the only (or even the  
23 most difficult) challenges our pilots encounter. The Port of Tacoma's Blair Waterway, for  
24 example, is an extremely restricted and difficult two-mile waterway to navigate. Likewise,  
25 currents at Anacortes, in Guemes Channel, can be very strong and variable, making approaches  
26 to oil terminals with a loaded tanker very difficult. And moving oil tankers between Cherry Point

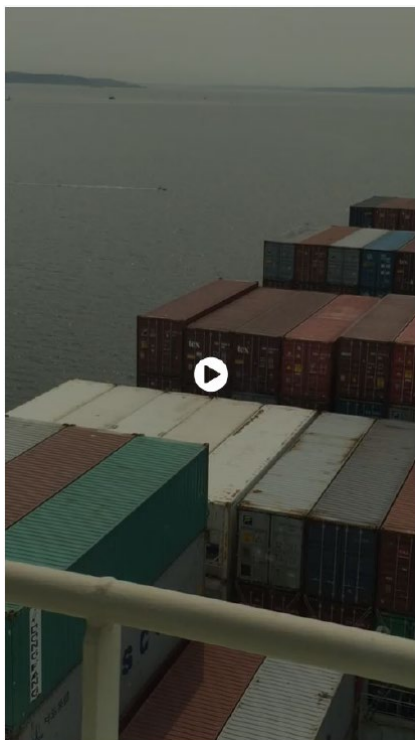
1 and Anacortes – as our pilots do regularly – is a precarious transit that requires the pilot to  
2 maneuver in narrow passages between small rocky islands, submerged obstacles, and  
3 recreational vessel congestion, sometimes in the fog. The fact is that piloting on our District’s  
4 waterways presents more unique challenges than are possible to address in this testimony. The  
5 nature of our profession is that each pilot must be constantly vigilant and prepared to respond to  
6 whatever situation he or she may encounter on the water, in any weather, night or day.

7  
8 **Q: Are pilots’ duties complicated by the general public’s use of the waterways?**

9  
10 **A:** At the outset, I want to be clear that pilots are partners of the public. Puget Sound Pilots  
11 are mindful that our role is to protect the public interest and public trust uses of the waterways.  
12 Our commitment to the public is reflected in our high level of engagement. For example, PSP  
13 participates in a voluntary program whereby we report whale sightings to help track and protect  
14 marine mammal populations. Nearly every year, pilots volunteer and speak at yacht clubs  
15 throughout the Puget Sound region to help educate recreational boaters on safe practices. PSP  
16 also serves as a founding partner of the Puget Sound Harbor Safety Committee, which is a  
17 marine safety forum involving federal, state, and industry officials.

18  
19 Still, there is no question that public use of the waterways can and often does make our  
20 job more difficult. Commercial and recreational fisherman often exercise poor seamanship and  
21 become obstacles to navigation. Communication with these vessels is often impossible and the  
22 pilot is instead required to maneuver around them. The same is true of small recreational craft or  
23 sail vessels, which often assume they have the right of way when, in fact, the opposite is true in  
24 shipping lanes. Most recreational boat operators are not proficient with the Rules of the Road,  
25 and boats often do not correctly gauge how fast piloted ships are traveling, which sometimes  
26

requires the pilot to change speed or course to avoid collision. [Exhibit ECK-10](#) to my testimony is a video that provides an example of the poor decision-making we commonly encounter from recreational boaters. [That video is available by clicking this link.](#)



**I. Calculating Pilotage Rates for All Vessels Based on GT ITC Ensures Pilotage Rates are Fair, Reasonable, and Non-Discriminatory.**

**Q: How is the cost of pilotage calculated?**

A: The rates in our pilotage tariff are calculated based on a combination of factors that includes a vessel's gross tonnage as determined in accordance with the International Tonnage Convention of 1969. This measurement is sometimes referred to as GT ITC, and it is distinguished from the domestic measure of gross registered tonnage, which is commonly referred to as GRT. Generally speaking, GT ITC is generally based on the molded volume of all enclosed spaces of the ship, whereas GRT or net tonnage is based on the molded volume of only cargo carrying spaces of the ship, but various rules allow for the exclusion of space that is

1 actually used for cargo. For a more precise definition and explanation of these two similar  
2 sounding but very different measurement systems, I would refer the Commission to the  
3 testimony of tonnage expert Phil Essex.<sup>1</sup>  
4

5 **Q: Why are pilotage rates calculated based on a ship's GT ITC rather than its GRT if**  
6 **both measure volume?**

7 A: Pilotage rates must be fair and reasonable. To accomplish this objective, one key  
8 principle is that a ship should be charged pilotage that is commensurate with the relative  
9 difficulty and risk of a marine casualty of piloting that vessel. The bottom line is that larger ships  
10 are more difficult to pilot and present greater risk, which is why GT ITC tonnage is used to  
11 calculate a fair, just and reasonable rate.  
12

13 A second key principle that follows logically is that ships' volumetric size should be  
14 measured in a manner that is consistent, so that ships of like size pay like rates. This is the reason  
15 why GT ITC is a superior metric compared to GRT. GT ITC provides a more accurate and  
16 standardized measure of a vessel's size by including and calculating the total volume of its  
17 external dimensions including superstructures, voids, fuel and water tanks and other volumetric  
18 structures. GRT, on the other hand, is subject to exclusions from the total volume calculation,  
19 only measuring those spaces which carry cargo, while also providing opportunities in ship design  
20 to exclude cargo spaces.  
21

22 Put simply, pilots are not piloting just the carrying capacity of cargo on board. Rather, we  
23 are piloting the measurements of the entire ship. For this reason, there is no question in my mind  
24 that GT ITC is the most fair, just, and reasonable measurement to use for all ships regardless of  
25

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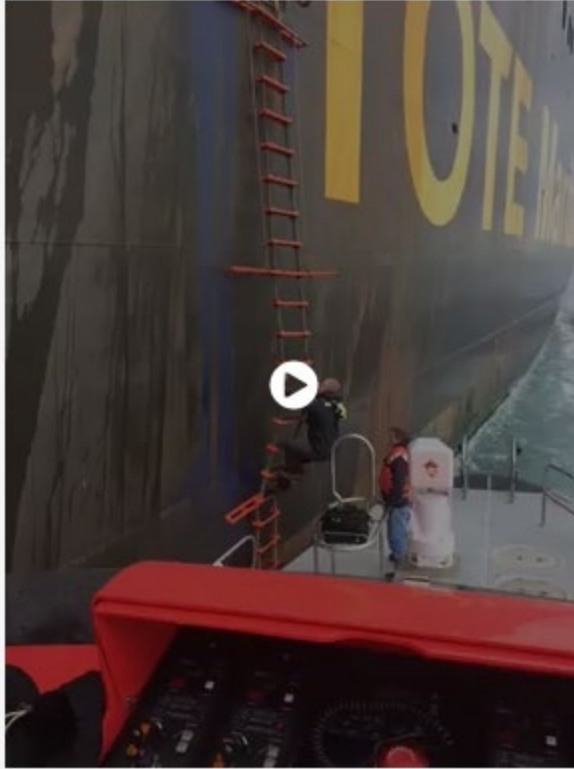
<sup>1</sup> Exh. PE-1T.

1 whether a particular ship is engaged in coastwise or foreign trade – a distinction that is  
2 completely irrelevant to the difficulty of pilotage. For a more detailed explanation of this topic, I  
3 would again invite the Commission to review Mr. Essex’s testimony.  
4

5 **Q: Is GT ITC used elsewhere in the governing regulations as a proxy for the difficulty**  
6 **of piloting a particular ship?**

7 A: Yes. As I discussed earlier, pilots achieve different levels of licensure based on years of  
8 experience and the completion of license upgrade trips completed annually during the pilot’s first  
9 five years of active service. Less experienced pilots are significantly restricted in the size of ship  
10 they may pilot. WAC 363-116-082 measures these restrictions in terms of GT ITC (not GRT)  
11 precisely because it is a more accurate measure of the ship’s size that better correlates to the  
12 difficulty and risk of a piloting assignment.  
13

14 TOTE’s vessels, the M/V MIDNIGHT SUN and M/V NORTH STAR illustrate this  
15 point. These are large ships of greater than 65,000 GT ITC. As a result, only level 3 pilots (*i.e.*,  
16 fourth year of licensure) and above may pilot these ships. Despite their large size, however, these  
17 ships are below 36,000 GRT. If GRT were used instead of GT ITC as a proxy for the relative  
18 difficulty of piloting a ship, even a pilot with less than one year of experience would be allowed  
19 to pilot TOTE’s vessels – a result that would be clearly inappropriate and potentially dangerous.  
20 [Exhibit ECK-11](#) to my testimony is a video of me boarding a TOTE ship that shows the size of  
21 the vessel’s large size. This video also is a good example of a pilot transfer as discussed in  
22 Captain Bendixon’s testimony.  
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**Q: Why have TOTE Maritime’s vessels historically been assessed pilotage based on GRT rather than GT ITC?**

A: The disparate treatment of TOTE Maritime’s vessels that prevailed until our association’s most recent rate case is the product of historical practice that was not justified and created a substantial undeserved windfall to TOTE. I have personally piloted TOTE’s vessels many times, and there is no question that these large, high sail area ships are just as challenging to pilot as similar vessels of comparable GT ITC. The fact that TOTE’s ships are engaged in coastwise rather than international commerce in no way changes that conclusion and is completely irrelevant to the pilotage rates that TOTE should be required to pay under a fair, just and reasonable tariff. There is no principled basis on which to grant TOTE a very substantial pilotage rate discount compared to the rates charged to every other ship of comparable size operating under pilotage on our District’s waterways.

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**III. CONCLUSION**

**Q: Does this conclude your testimony?**

**A: Yes.**

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