MEETING MINUTES

STATE OF WASHINGTON BOARD OF PILOTAGE COMMISSIONERS

May 12, 2005

Present:
Chairman Dudley, Commissioners C. Davis, Mackey, Niederhauser, Hannigan, Addington, Lee, Palmer, and N. Davis
Assistant Attorney General, Susan Cruise
Administrator, Peggy Larson and Administrative Assistant, Judy Bell

Captains Bill Bock, Mel Flavel and Mr. Walt Tabler: Puget Sound Pilots
Mary Nelson: Port of Grays Harbor
Captain Mike Moore, Luis Kohls: Pacific Merchant Shipping Association
Steve Cooke: Himself
Douglas Coburn: Quay Cruise Agencies, USA

PUBLIC HEARING
A public hearing of the Board of Pilotage Commissioners was convened at 9:35 a.m. by Chairman Harry Dudley at 2911 Second Avenue, Seattle, Washington.

WAC 363-116-300: Pilotage Rates for the Puget Sound Pilotage District. RCW 88.16.035(4) requires the Board of Pilotage Commissioners to annually fix tariffs for pilotage services performed aboard vessels. The filed rule as proposed jointly by the Puget Sound Pilots, Polar Tankers, Inc. N.W. and Pacific Merchant Shipping Association reflects a 4.0% increase in all tariff categories except transportation to be charged for pilotage services in the Puget Sound Pilotage District. In addition, increased transportation charges have been proposed which reflect new taxi rates of $2.50 per drop and $2.00 per mile. The written presentation dated April 14, 2005, considered by the Board today, reflects a modified request for a 5.0% increase in all categories except transportation and a rounded $2.50 taxi drop charge of $3.00 in addition to the $2.00 per mile taxi charge. The process for developing this joint proposal follows the guidelines of a 5-year tariff agreement established on April 10, 2001 between PSP, PTI and PSSOA. The PSP 5-year Capital Spending Plan and 2004 year-end audited Financial Statement, previously submitted to the Board, were also considered in today's tariff determination. Captain Bill Bock stated that the PSP would not be presenting oral testimony. Captain Mike Moore for PMSA stated that the rate committees would start early to begin the process this fall of reviewing traffic trends and begin next year's tariff negotiations. There was no other testimony presented. The public hearing was closed by Chairman Dudley at 9:37 a.m.. This hearing was recorded on audiotape.

REGULAR MEETING
The regular meeting of the Board of Pilotage Commissioners was convened immediately following the public hearing.

Consideration of Preceding Hearing: WAC 363-116-300. Following the Board's review and consideration of all written and oral testimony, it was moved by Commissioner Addington and seconded by Commissioner Niederhauser that the Board adopt the revised joint proposal for the 2005-06 Puget Sound Pilotage District tariff as outlined in the letter dated April 14, 2005 from Polar Tankers, Inc. N.W., Puget Sound Pilots and the Pacific Merchant Shipping Association, including tariff considerations necessary for the continued administration of Grays Harbor pensions.

Specifically:
- A **5% increase** in all tariff categories, except transportation, effective July 1, 2005 through June 30, 2006.
- A change in transportation fees as indicated in the joint proposal reflecting an increase in Seattle **taxi fares to $2.50 per drop and $2.00 per mile**, also effective July 1, 2005.

In addition, the Board acknowledges:

- Total projected vessel assignments for 2005 = **7,768**
- Number of tariff-funded pilots, including one non-watch-standing president and any compensation for accrued Comp Days = **53** (Based on a Maximum Safe Assignment Level = **149**)
- Target Net Income per pilot = **$214,665**
- Individual Business Expense Allowance per pilot = **$23,943**

Speaking to the motion, Commissioner C. Davis stated that the Board recognizes the formula set forth in the 5-year tariff agreement and as a result of the Board's acceptance of the tariff proposal, it should be made clear that the Board is not rubber-stamping the agreement.

Also speaking to the motion, Commissioner Lee asked for an explanation behind the request for a 5% increase. Captain Moore explained that the rate committees have agreed to try the use of a Dampening Adjustment Factor when calculating the 2005 tariff adjustment. The concept of this adjustment is to dampen an anticipated significant swing in the tariff adjustment for the following year. 2005 is the third consecutive year that the self-adjusting formula has calculated a decrease in the tariff. For a variety of reasons, if the MOU were to be extended beyond its current term, which ends this year, the 2006 tariff adjustment will swing positive and could be quite significant depending on this year's vessel traffic. Therefore the swing will be dampened by artificially raising the tariff adjustment by a factor of 6.79% above the adjustment called for by the formula (-1.79%). The result is a 5% increase in the tariff. The effect of this adjustment is to increase 2005 revenue, which will then cause the formula (should it be extended) to ask for less of the anticipated increase in 2006. In addition, Walt Tabler stated that PSP's request for a significant increase in the Target Net Income also contributed to the decision to use the dampening adjustment factor. Commissioner Addington added that this isn't the first time the formula has been tweaked.

The motion carried. (9:45 a.m.)

Minutes. There being no corrections or additions, the April 21, 2005 Minutes stand approved as written.

OLD BUSINESS

Consideration of Proposed Rule-Making. The Board continued its review of the proposed WACs and made a few additional changes. Susan Cruise is in the midst of her legal review and will be prepared to offer her comments at the next Board meeting. Upon finalizing a document for rule making, the next deadline for filing it with the Code Reviser is June 22, which would allow for a public hearing date on or after July 26. The deadline after that is July 6, which would allow for a public hearing date on or after August 9.

NEW BUSINESS

2005 Annual Tariff Hearings Preparation. GHPD - A 2005-2006 tariff proposal from the Port of Grays Harbor has been submitted to the Board in addition to the 2004 Preliminary Financial Statement in accordance with the timetable established for tariff document submission. The written proposal submitted today contains a request for an increase in the Vessel Draft Charge of $9.01 per meter or $2.79 per foot; a $200 increase in the Boarding Fee per each boarding/deboarding from a boat or helicopter; and a $10 decrease in the Pension Charge per pilotage assignment, including cancellations. A public hearing has been filed for June 9, 2005 at 9:30 a.m.

Committee Report: Policy Statement Development Regarding "In Ballast" Definition. Before the Board for review was the committee's draft policy statement regarding an "in ballast" definition for liquid petroleum gas carriers. It was moved by Commissioner Lee and seconded by Commissioner Addington to adopt a policy statement, which reads as follows:

Statement of Policy Regarding the Interpretation of the Term "In Ballast" as used in RCW 88.16.190 and WAC 363-116-500.

It is the policy of the Board that an LPG carrier is deemed to be in a ballast condition if the vessel has retained on board only the minimum cargo necessary plus a safety factor to arrive at its next load port in a cold condition. This quantity is not to exceed 1.5 percent of the cargo carrying capacity.

The motion carried. Chairman Dudley stated that until language is worked out for LNG carriers, if one should call in our state waters it will be required to take a tug escort.

Committee Report: Pilot Examination Development. The committee members met for the first time on May 2nd. The Board was given an overview of what topics were discussed and what options are being considered with respect to the next pilot examination. There will be another meeting following today's Board meeting.

Pilots' Activity Reports. Captain Bill Bock, President, Puget Sound Pilots, reported that assignments for April were roughly 10% below tariff projections; Captain Niederhauser will soon be on medical leave due to an injury; the American Pilots Association and PSP, has just become aware of and will be responding to a piece of federal legislation that the USCG is proposing to Congress that would completely revise mariner licensing provisions and basically eliminate all references in the federal statutes to pilot, master, mate or engineer licenses and instead, all mariners would receive a merchant marine credential; the Washington state legislature has created the "Oil Spill Advisory Council" through Senate Bill 5432 on which PSP would like to be considered for one of the sixteen positions appointed by the governor; and PSP is still awaiting a written response from BP regarding their security procedures.

Mary Nelson, Director of Finance and Administration of the Port of Grays Harbor, reported that assignments through April are about 20% above tariff projections and May looks good as well; activity at the Weyerhaeuser facility is down, however the AGP Terminal activity is up 65%; the first quarter of 2005 was good overall; and Gary Nelson and Captain Steve Cooke are progressing toward an employment agreement.

Commissioner Comments. Commissioner Addington asked the Board for a determination on whether or not a "crew boat" meets the definition of a small passenger vessel for purposes of acquiring a vessel exemption under RCW 88.16.070. No Board member objected to the Chairman's response that if all other criteria were met, he would recommend that an exemption be granted.

Commissioner Niederhauser reported that he and Commissioner Hannigan met with the USCG licensing division personnel to assure that what the Board intends to codify in the WAC dovetails with federal licensing laws. Also, the state legislature passed the mandatory boater education law, Senate Bill 5145, which will phase in a boater testing requirement over the next ten years. The new Sector Seattle Command was announced in a press release yesterday regarding the reorganization of the US Coast Guard bases.

Commissioner Lee stated he would like to modify (non-substantive) the Policy Statement adopted at the March 15 Board meeting regarding the "in ballast" definition for crude oil and refined petroleum products. He will bring his suggested revision to the next meeting.

Commissioner Hannigan reported that a larger class vessel (8100 TEU) operated by Evergreen Lines will soon be calling at the Pierce County Terminal in Tacoma and will require dredging and a 100 foot lengthening of the dock in order to allow two vessels to be properly docked at the same time. This facility is only about a year old and already in need of modification to accommodate this larger size vessel.

Confirmation of Next Regular Meeting Date. The next regular meeting date is June 9, 2005, in the B Level Conference Room at 2911 Second Avenue, Seattle. The Grays Harbor Pilotage District tariff hearing will precede the meeting at 9:30 a.m..

Review of Pilot Physical Examination Reports. After reviewing the physicians' reports it was moved by Commissioner Lee and seconded by Commissioner Niederhauser that the annual physical examination reports for Captains M.R. Flavel, P.M. Hannigan, C.C. Hunziker, G.D. Hurt, B.S. Knowles, G.N. Larson, E.C. Lichty, R.F. McCurdy and M.J. Shuler be accepted for license renewal. The motion carried.

The Chairman adjourned the regular session Board meeting at 11:40 a.m.

Respectfully submitted,

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Peggy Larson, Administrator

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Harry H. Dudley, Chairman

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Charles M. Davis, Vice Chairman

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Commissioner Oliver E. Mackey

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Commissioner John S. Niederhauser

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Commissioner Patrick M. Hannigan

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Commissioner Vincent Addington

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Commissioner Craig W. Lee

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Commissioner Andrew C. Palmer

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Commissioner Norman W. Davis

PUGET SOUND PILOTS

Protecting your waterways since 1935

Puget Sound Pilots'

Request For Rate Increase

Before the Washington State

Board of Pilotage Commissioners

April 13, 2006

Puget Sound Pilots (PSP) requests that the Board adopt a 25.94% general tariff increase for 2006 along with increases for certain itemized charges. The pilots recognize that this is a large increase but the timing has never been better or more urgent. Much has changed in the last 5 years. While times have been very good for the steam ship industry and pilots in other ports, pilot earnings in Puget Sound have fallen behind. For the first time, our area has become less attractive to – and actually lost - pilot applicants for economic reasons. While industry has made unprecedented profits and shipping volumes are at an all time high, we have failed to make the changes necessary to insure that Puget Sound will continue to get an adequate supply of the very best pilots our merchant marine has to offer.

PSP recommends to the Board that it take increase pilot earnings to the level that they need to be to attract the best pilots now and for the future. Given recent decreases in pilotage rates – a $1,012 charge under our tariff table 3 years ago is now $869 - the proposed increase would restore rates to their level of three years ago and help return Puget Sound to the top ranks of attractive places to pilot ships. On the other hand, a failure to act now may well reduce the quality of our pilot corps and perhaps make it impossible for the Board to attract enough qualified applicants to safely service the ships that are being built and will be coming.

The PSP request is based on the following facts:

- The current $214,665 Target Net Income for Puget Sound pilots is far below the $350,000 to $400,00 average earnings of pilots in other ports across the nation;
- Over the past 20 years, TNI has been essentially flat, increasing only 10% in real dollars;
- The pilotage tariff is lower than at any time since 1984 in real dollars;

- While pilot income has remained flat and pilotage tariffs have gone down, the shipping industry has changed dramatically:
  - Ship sizes in Puget Sound have more than doubled since 1984 and increased 24% since 2000;
  - Larger ships bring increased risks to pilots. They are more difficult to navigate and the consequences of an accident are more severe;
  - Simple negligence has become a criminal offense if oil is spilled in the water;
  - Pilot productivity has increased 39% since 2000 and is at an all time high;
  - Pilotage costs on a per ship ton basis are 20% less than they were just 3 years ago;
  - Pilotage costs on a dollar basis are 19% lower than they were just 3 years ago;
  - Pilotage rates have plummeted in Puget Sound over the last 3 years while increasing at other West Coast ports;
  - Shipping industry profits have been at record highs over the past few years and the largest shippers calling in Puget Sound have enjoyed billions of dollars of profits.
- Use of a formula to set tariffs in Puget Sound has driven rates and pilot earnings down – the direct opposite of what has occurred at other similar ports;
- For the first time, pilots who have passed our exam have declined to enter the training program for financial reasons;
- Pilots from other districts who have ridden for pilotage in Puget Sound elected not to take the 2005 Puget Sound examination;
- In November, 2005, our first pilot exam in nine years drew only 21 applicants for nearly as many positions. As a result, another exam will likely be needed next year;
- As industry builds large numbers of foreign ships and our US merchant marine continues to shrink, competing pilotage commissions are chasing a dwindling supply of qualified applicants;
- In 2005, 49 healthy pilots – with an average age of 56 - did the work of 57. Our pilots substantially exceeded the Board's long established Safe Assignment Level.

These facts, amplified and supported in this submission, are offered in support of Puget Sound Pilots' request for a rate increase for the 2006-2007 tariff year.

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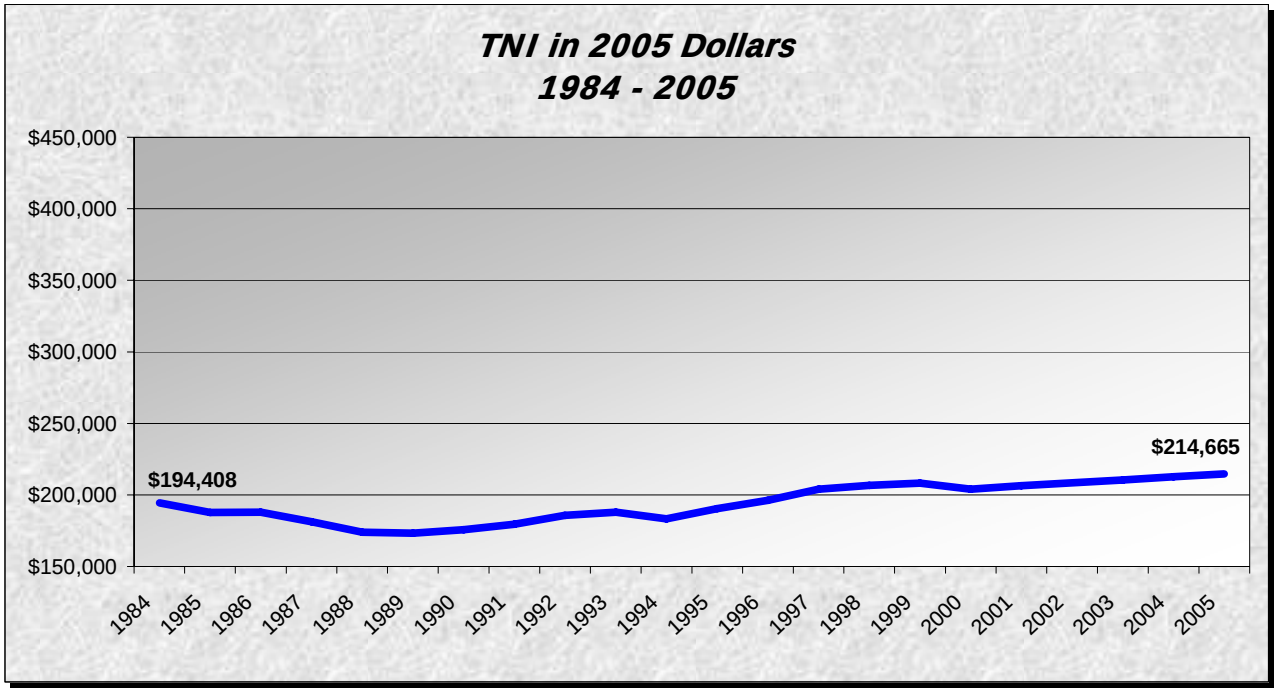
1. TARGET NET INCOME

The Target Net Income in Puget Sound Has Not Kept Pace– Especially in the Last Three Years

Target Net Income in Puget Sound has not kept pace with earnings of pilots in other ports or with the realities of modern shipping. Adjusted to current dollars, TNI was $194,408 in 1984 and $214,665 in 2005.[1] This is only a 10.4% increase over 21 years – less than ½ of 1% per year:



During these same years, there has been a dramatic change in the shipping industry. The trends have been in place over the last twenty years, but they have been especially sharp during the last five. It is during these last five years that Puget Sound has fallen out of sync. In those ports not constrained by draft or other factors, there has been a striking increase in the number and size of ships. This has increased earnings of pilots in private associations like ours in Alaska, Hawaii, and San Francisco. For the first time ever, state licensed pilot earnings in these West Coast ports have become competitive with the Gulf and East Coast Ports and are now at or above the national average of $350,000 to $400,000.[2]

[1] The TNI since 1984 in then current dollars is found at **Appendix B-1**
[2] See Testimony of George Quick attached in **Appendix A – 7.** .

In Puget Sound the tariff formula in the Memorandum of Understanding (MOU) negotiated between the pilots and industry in 1996 and 2001 tied pilot income to the CPI index rather than letting it float with the economics of the industry as it did at most other ports. In other districts, pilot earnings went sharply up with increased productivity, increased shipping industry profits, increased traffic and larger ships. Regulators in those ports recognized that the larger ships present a host of difficulties and risks to pilots and allowed pilot earnings to increase commensurately.

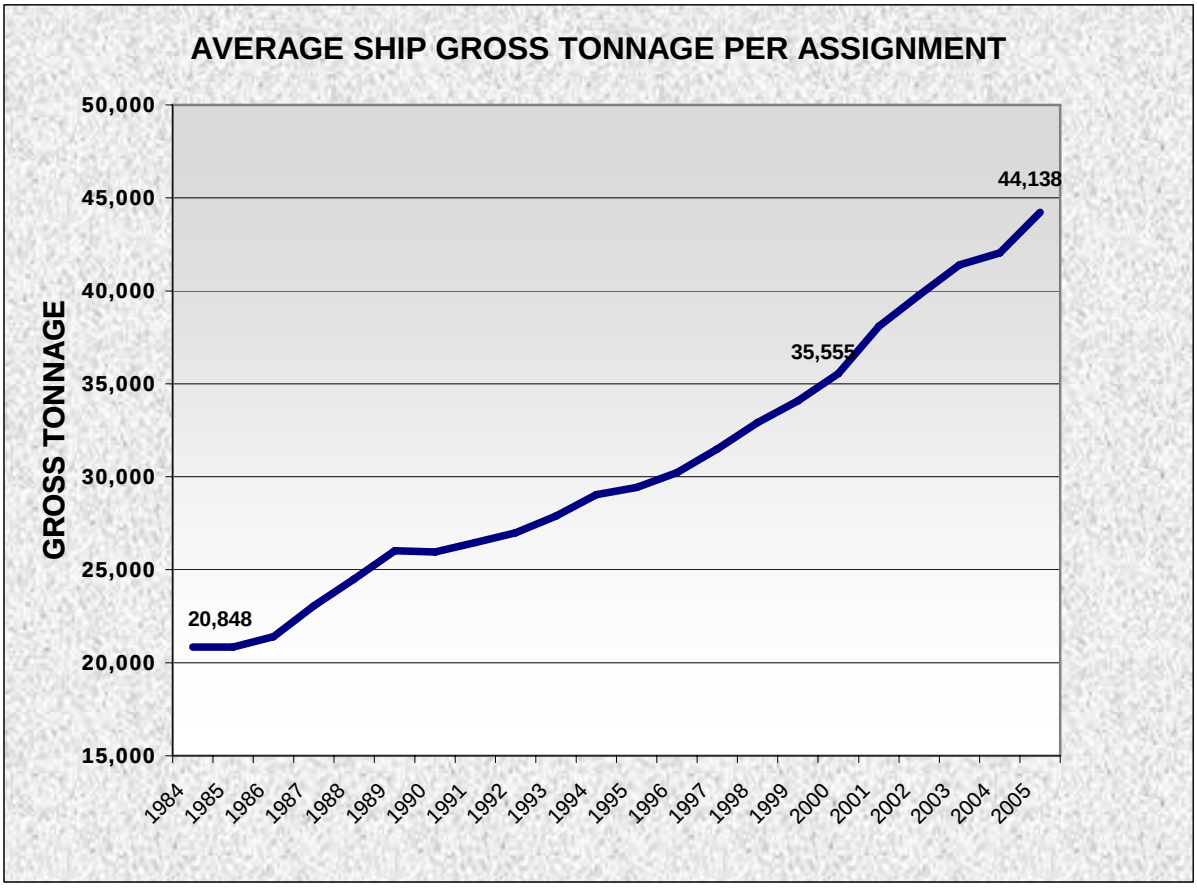
In Puget Sound, pilot earnings were held flat by the MOU.[3] Thus, the primary affect of the increases in productivity was to drive down pilotage rates. During this unparalleled time of increases in economies of scale, productivity and prosperity, normal economic forces have been artificially restrained and Puget Sound has been passed by. It is time to catch up.

[3] PSP is not blaming anyone for this state of affairs. Obviously, PSP signed the MOU in 2001. Our current situation results from an unanticipated surge in traffic and ship size that has swept aside the economic environment that existed 5 years ago.

2. BIGGER SHIIPS ARE HARDER TO PILOT

The Ships In Puget Sound Are Much Bigger Than They Have Ever Been. The Smaller Ships Are Largely A Thing Of The Past.

Ships calling here have been getting larger for the past 20 years. What follows is a chart of ship gross tonnage per assignment in Puget Sound from 1984 through 2005. The gross tonnage of the ships calling here has more than doubled over that time – it has actually increased by 112%[4]. This trend has been especially pronounced during the last five years with ships growing 16% from 38,099 to 44,138 GT. 2005 alone saw a 5.2% increase:



[4] Gross tonnage is essentially a measure of ship volume and is generally taken as the most reliable indicator of overall ship size. A table showing the average vessel size per assignment for each year since 1984 in shown on page **Appendix B-2**.

Over these years, the shipping companies have replaced their older ships with newer bigger ones. The trend is pronounced. Here are some representative ships that were the regular callers for some of our major lines in 1996 along with the ships that have replaced them[5]:

1996 VESSEL	CURRENT VESSEL REPLACING 1996 VESSEL	DATE PUT IN SERVICE	1996 GROSS TONS	CURRENT GROSS TONS	% IN-CREASE
PRESIDENT HARRISON	APL BELGIUM	2004	30,836	65,792	**113%**
OVERSEAS ALASKA	ALASKAN FRONTIER	2004	32,418	110,693	**241%**
EVER GENIUS	HATSU SIGMA	2000	37,033	75,246	**103%**
NUOVA LLOYDIANA	EVER UNITED	2005	35,629	69,218	**94%**
HANJIN KEELUNG	HANJIN YANTIAN	2005	36,266	83,133	**129%**
GOLDEN GATE BRIDGE (K-Line)	VANCOUVER BRIDGE	2005	34,846	54,519	**56%**
MAERSK VANCOUVER	KNUD MAERSK	2006	34,382	81,488	**137%**
MANUKAI (Matson)	MANOA	2003	23,785	37,811	**59%**
ALLIGATOR PRIDE	MOL EFFICIENCY	2001	41,126	53,822	**31%**
OOCL FRONTIER	OOCL JAPAN	2003	57,393	66,046	**15%**
ARCO TEXAS	POLAR ENDEAVOUR	2002	47,766	85,387	**79%**
GREAT LAND (Tote)	MIDNIGHT SUN	2002	31,515	65,314	**107%**
	AVERAGE		36,916	70,706	**97%**

All indications are that the trend toward larger ships will continue:

- Evergreen has recently introduced 7,024 TEU ships to the new Pierce County Terminal at the upper end of the Blair Waterway and plans larger ships in the future;
- Tacoma Port officials are actively designing berths for 12,000 and even 15,000 TEU ships at a greatly expanded Pierce County Terminal. PSP members participated with the Port and Evergreen at simulator trials last year to help in the design of this facility;
- These new Evergreen ships may approach 1300 feet in length with more than 180 feet of beam;
- OOCL and Hanjin are now bringing 8,000 TEU ships to Seattle;
- The OPA 90, single hulled tankers are being phased out, and much larger re-measured tankers are visiting the northern refineries;
- These tankers are given a load line that keeps them below the statutory 125,000 DWT limit, but they are really 180,000 to 190,000 DWT ships;

[5] **Appendix B-3** contains the detail comparison of these ships showing increases in LOA, beam and other information.

In 1984, a Puget Sound pilot could count on a steady diet of 525 foot log ships and other bulkers, 720 foot container ships and smaller tankers[6]. These smaller ships are largely gone from the maritime scene in Puget Sound. The bulker visiting Schnitzer Steel well up the Hylebos Waterway is now likely to have a 103 foot beam. Weyerhaeuser now has plans to vacate its facility in the Hylebos so that they can bring even larger ships into Olympia. The loaded cement ship going stern first through the bridges two and one-half miles up the Duwamish now may have a 93 foot beam. Container ships going to the end of the Blair Waterway, often with prevailing winds on the beam, are already 142 feet wide and 986 feet LOA with a draft of 46 feet. The Maersk ships visiting the Sitcum Waterway are 1,044 feet LOA. The tanker transiting Guemes Channel is often 166 feet wide and nearly 1,000 feet long. The congestion, shoals, winds and currents in Guemes Channel, Rosario Strait and the Saddlebag Passage are well known. The ships get bigger but the channels remain the same.

More importantly for the future of Puget Sound, it looks like this trend is continuing. Appendix D – 5 contains a copy of a recent *Puget Sound Business Journal* article on the Pierce County Terminal expansion:

> *The Port now plans to widen the entire waterway to 850 feet to accommodate huge container vessels capable of carrying up to 15,000 containers. Such ships would be about 50 percent larger than the largest vessels now calling at Northwest ports.*

Bigger Ships Are More Difficult To Pilot and Present Increased Stress and Risk to the Pilot

There are not very many professions in which the standard business insurance package includes $250,000 of insurance to pay criminal defense attorneys fees and where having $20 million of liability coverage leaves one underinsured for foreseeable events. While our legal and financial environment has been completely transformed in the last 20 years and the ships have doubled in size, many factors controlling what a pilot does have stayed the same. With some exceptions, ship propulsion and steering is the same as it has been for decades and the waterways have not grown wider or longer with the ships. Indeed, with the enormous cranes now being acquired by our port districts, the waterways are even shrinking.

Today's modern ships are harder to navigate and control than the smaller ships of yesteryear. Captain Mackenzie's testimony found at Appendix A-3 gives a detailed description of many of the difficulties faced by today's pilots as a result of these large ships. The ships take longer to stop, longer to alter course, are more susceptible to the wind because of their increased sail area and often are

[6] See the Testimony of Capt Delmar Mackenzie, a Puget Sound pilot since 1987. **Appendix A - 3**.

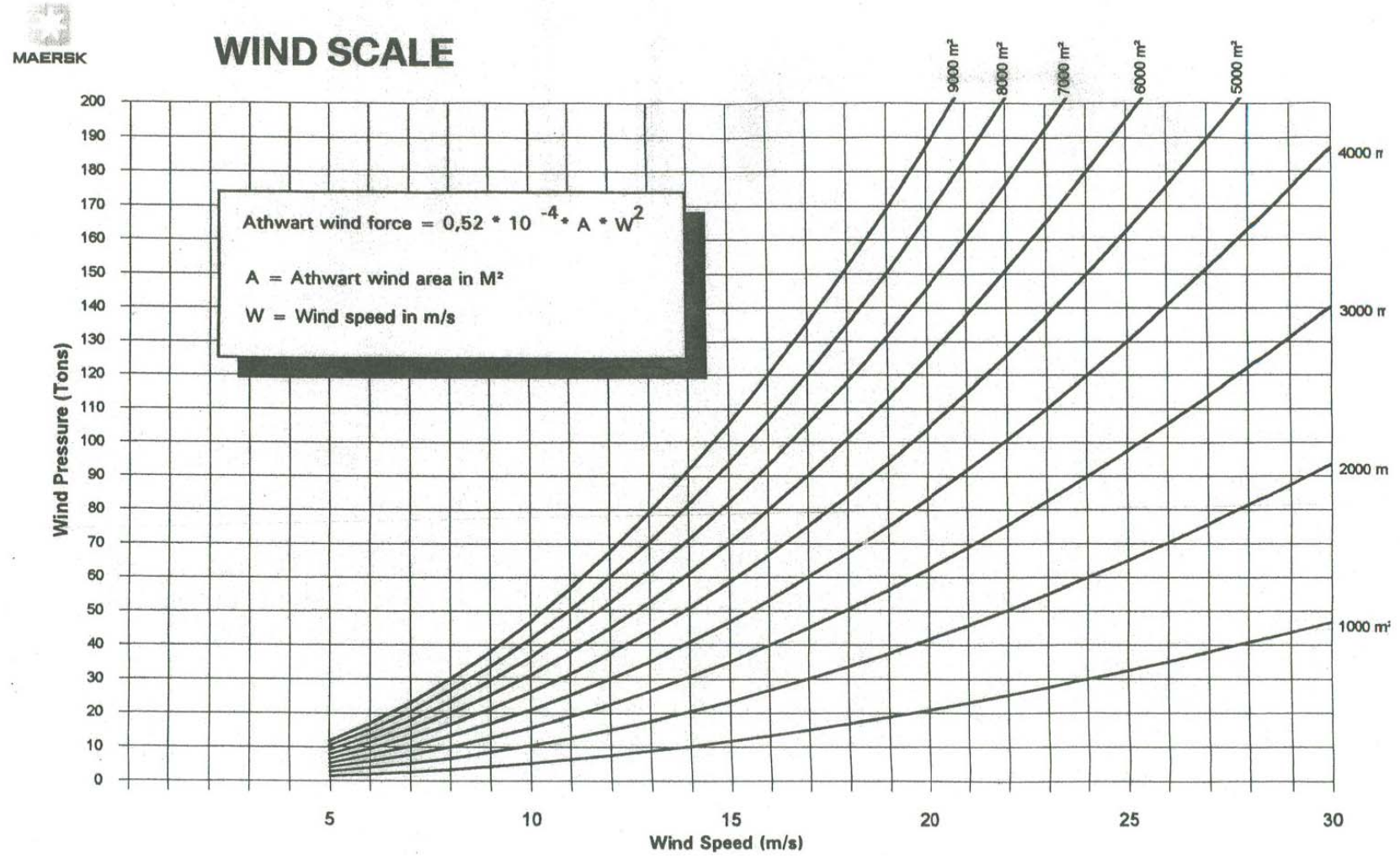
more difficult to maneuver due to limited under keel clearance. And of course, if they hit something, they cause more damage. This is not to say that as the ships have grown, the horsepower of the engines, thrusters and tugs have not increased – they have. However, these improvements always lag behind the size and weight of the ships. Even with these improvements, today's ships are less responsive and more difficult to manage than those of the past. They make the pilot's job much more difficult.[7]

The Wind Has More Impact On Today's Ships Than It Ever Has In The Past.

Due to the arrival of the large ships, much attention has been given recently to the issue of wind. Because wind impact increases dramatically with the size of the ship, a modest increase in the size of the ship can cause wind to have a much larger real effect on the vessel. Wind impact has been the subject of intense investigation in connection with the Blair Waterway berths where the prevailing wind is directly on the beam of vessels. The Blair Waterway also has car ships with a huge sail areas and large container ships with massive sail areas made up of both vessel sideshell and stacks of containers. Of course, wind is an issue with all large ships, and the larger tankers now visiting the northern refineries present wind issues of their own. Not only are the new tankers higher DWT tonnage ships, but the new tankers are also double hulled which makes them even larger and higher in the water.

[7] See Testimony of Capt Andy Coe, **Appendix A**- 1 and the testimony of Capt Delmar Mackenzie in **Appendix A-**3.

One of the most detailed analyses of wind was put together by Maersk in connection with its large ships. The wind chart shows how much force different wind speeds exert on vessels with varying sail areas. In this chart, the top and right axes are the sail area of the ship, the bottom is wind speed and the left side shows the tons of force exerted by the wind:



This chart on the previous page – which is posted on the bridge of Maersk ships - shows the affect of wind on the vessel in metric measurements. A "m/s" (meter per second) is about 2 knots of wind. As explained by Capt Mackenzie in Appendix A-3, these large ships have a very large sail area – the more sail area, the more wind effect. A 7,400 TEU container ship loaded on the westbound voyage exposes approximately 8,000 sq. meters of sail area to the wind. A smaller container ship such as Evergreen's Zeus II s (2,728 TEU's) and would present about 5,000 sq meters of area to the wind. On the larger ship, 12 knots of wind would require 15 tons bollard pull from a tug to offset it. On the smaller ship, this figure would be 9 tons. A doubling of the wind speed quadruples the force of the wind on a ship. Thus, a 24 knot wind would apply 60 tons to the larger ship and 36 to the smaller. The larger ship is much more impacted by the same increase in wind.

The margin of error is smaller on these larger ships. The impact of an unexpected gust or increase in wind speed is much greater. Because of the ship size, some of the techniques normally available to the pilot to lessen the impact of wind, e.g. aiming the bow toward the wind and crabbing down the waterway at a slight angle, are not available[8]. Bank cushion and suction are more of an issue because the ship must favor the windward side of the channel. The job is simply more difficult and more stressful. The more powerful tugs and modern equipment have helped, but they cannot counterbalance the inherent difficulties presented by the physical forces that take over a large ship in a narrow waterway.

Wind was also one of the primary topics of analysis in the recent simulator trials at Star Center in Dania, Florida, in which Capts. Hunziker and Mackenzie participated in various scenarios involving various ships. The report prepared for the Port of Tacoma after completion of these simulator trials is instructive as to the kind of issues that Puget Sound pilots must deal with now and increasingly in the future. A copy of the draft report is in Appendix C. A quote from the report illustrates the position of the pilot on the top of the risk bubble as industry pushes for larger ships:

> *While nearly all of the runs were conducted without incident, shiphandlers (Pilots) often experienced high levels of stress, possibly reflecting the task difficulty involved in many of these exercises.*

Star Center draft report, page 1. This was stress in the simulator – far away from the bridge of an actual ship in the Blair Waterway.

[8] See Mackenzie Testimony at Appendix A-3.

The Larger Ships Take Longer To Stop, are Harder to Turn and Present a Much Smaller Margin of Error

Ninety percent of a Puget Sound pilot's assignments are on cargo vessels using the same type of propulsion and control systems that have been in use for decades. Cruise ships have newer propulsion systems and some of the Polar tankers have complex control mechanisms for steering, e.g. Kamewa. Out of 8,260 assignments in 2005, 238 were on Polar tankers with Kamewa, 347 were on cruise ships and another 250 were on Tote and ATC ships with twin screws. On the other 7,425 transits, the pilot had the same tools that have been here for decades:

- Direct drive diesel propulsion;
- Rudder controlled steering;
- Bow thruster assistance at slower speeds. Bow thrusters are helpful on some ships, but are not reliable and are normally not available to the pilot at full strength;
- Tugs;
- Navigation by visibility, radar and gyro-compass.

Today's pilot is facing a much bigger ship with essentially the same tools he has used for decades. There is more of everything – to be sure the information from GPS systems, AIS, VTS, *etc*. is all helpful, but it is just that - information. None of it affects the handling characteristics of the vessel in close quarters. In fact, this equipment and the crew's frequent blind reliance on it introduce a whole host of new issues and problems for the pilot to manage. See Statement of Capt. Andy Coe, Appendix A -1.

The big ships have more inertia - they are harder to move and take longer to stop. Increased engine and tug size has not varied this. The ships must be handled more carefully, accurately and more slowly. Thus, the most dangerous part of the job – docking, undocking and the transit of waterways, takes longer. It used to take 30 minutes to sail up the Blair Waterway to the dock. Now it might be 1½ hours to get up the waterway, turn in the basin and tie up the ship. It can take even longer if there are complications or another ship is at the berth. See Captain Mackenzie's testimony at Appendix A – 3.

Visibility is more limited on the larger ships. Not only is the ship wider and higher, but on most of the new ships the bridge is further aft. This creates an even larger forward blind distance. This is true on the tankers as well.

The ships are going into tighter waterways and berths with less clearance fore and aft. These ships are so large in comparison with the docks that they must be squeezed into berths originally designed to accommodate smaller vessels.

Terminal space is at a premium. Head and stern clearances are much less than they used to be.
Most importantly – especially to the stress level of the job - larger ships afford less ability to recover from mistakes or changed circumstances and less margin for error. A pilot will alter the course of a ship dozens of times during a transit. On a larger ship, every one of these course alterations takes longer to initiate, longer to take effect and, most importantly, longer to undo if it is wrong or if circumstances change while it is being implemented. This increased lag time between orders and desired effect and the difficulty of reversing orders – all of which is due solely to the increased size of the ship - dramatically increases the stress on the pilot and the stakes of every decision. Every decision must be anticipated correctly and made at the earliest possible time. Even the smallest miscalculation or change in circumstances can have an enormous impact. All of this is much more difficult today than it was 20 years ago.

Bank cushion and suction are also more of an issue today than they were with smaller ships. Cushion and suction are related hydrodynamic forces that complicate the movement of large or deep vessels in confined channels. Large, deep vessels displace significantly more water than smaller ones. The combination of these two forces can cause a ship to sheer uncontrollably if it gets too close to the edge of the channel. Suction can also pull a moored ship right off its berth, parting the lines and setting it adrift. The only way to mitigate the effects of cushion and suction in a narrow channel is to proceed at a very slow speed and to try to keep the vessel in the middle of the channel and as far away from the ships that are tied up in the waterway as possible----a challenging task at best---- that has been compounded by the increasing size and draft of the modern ships. Indeed if the wind is blowing on the beam, the center of the waterway may not be an option.

The Strength of the Tugs Always Lags Behind The Size of The Ships

It has been suggested that the newer, larger tugs in use today - and sometimes available to the pilot - make the piloting of the larger ships safer and easier than before. This simply is not the case. The one hard and fast rule of shipping industry behavior is that at any given time, tug capacity will lag behind what is needed for the ships. See Capt. Coe testimony at Appendix A-1. Big ships are built because they are profitable to the shippers using them. Big tugs are built because they have to be. They are needed – not wanted - by industry. As pointed out above, it is normally the pilots who determine when more powerful tugs need to be more powerful. When the pilots start requiring more horsepower or bollard pull, industry slowly responds by providing bigger and more powerful tugs.

The effectiveness of the tugs is also limited by the thrusters at the other end of the ship. The tug normally can't pull any harder than the thruster can push, or the ship gets out of balance. Very often, the pilot only has a portion of the rated thruster power available to him. The thrusters often share power with other ship equipment and if there is a power drain, the full rated horsepower of the thruster is not

available. This is true more times than not and the pilot is frequently misled by the master as to available thruster power.

Another limiting factor on the use of the tugs is the stress bearing capacity of the bits on the ships. The ships are so heavy, and the forces so great that the tugs have to be careful not to fracture deck plates and pull the bits out of the deck of the ship. Most of the time, the ship's crew doesn't even know the safe working load rating on the bits. It is left to the pilot and the tug crew to try to determine how much of the tug's power is available.

The Added Size Of The Ship Increases The Likelihood Of A Collision In A Near Miss Situation And Increases the Amount of the Damage If There Is Contact

If something does go wrong with one of these larger ships, the stakes are much higher. They carry more cargo in the case of container ships and more people in the case of cruise ships. All ships today carry more oil than in the past. The ships they are planning for the Blair may have up to 3,000,000 gallons of fuel oil capacity.[9] As statistics show, the overwhelming majority of oil release incidents from ships are not from tankers. They are more frequently from cargo ships carrying oil for fuel, *e.g*. the *Selendang Ayu*.

The sheer bulk of the ships makes the impact of any accident more severe, whether it be a hard landing on a dock or a collision with another ship. A near miss between a log ship and a ferry is one thing. An incident with a 1,000 ft. by 142 ft. container ship is something else again. The Board is familiar with the recent near miss of the *Knud Maersk* and the Ferry *Wenatchee*. All aspects of that scenario would have been much easier to manage had the Knud Maersk been smaller. There would have been more time to react and communicate as the situation unfolded and there would have been less damage at impact if the ships had collided.

It takes years of experience and specialized training for pilots to develop the skills necessary to handle these large ships. These ships bring enormous economies of scale and profitability to industry and are an important part of the economy of our region. However, these ships present their own challenges to the pilots who have to move them. They have transformed the pilot's job and elevated the challenges faced and skills required to a whole new level.

[9] See the specifications for the 8,100 TEU Samsung ship in **Appendix B-4.**

3. THE PILOT AS RISK MANAGER

The Pilot's Risk Management Role Is Of Crucial Importance To The People Of Washington but it Exposes the Pilot to Continual Risk

In some ways, one of the most important roles of the pilot is as the risk manager for the ship moving industry. Captain Coe describes this in detail in his testimony found in Appendix A-1. It is the pilot – free of the commercial pressures of the shipping industry – who determines how good a thruster is or how big the tugs need to be. For example, had there been a pilot aboard the *Selendang Ayu* in December of 2004, the engine would not have been shut down to try to save money in making engine repairs and the rescue tugs would have been called much sooner once the ship lost power. The commercially driven decision of the master in that case resulted in massive environmental damage as well as loss of life. It is up to the pilot to draw the line and require more assistance – free from commercial pressures and often over the objections of industry.

This is recognized even by INTERTANKO – one of the most effective and persistent shipping industry voices.

> *There is a further aspect of responsibility which INTERTANKO would like to see addressed within this sub-committee, and that is that a pilot should never be put under commercial pressure to make any decision which may be counter to the safe judgment of the pilot. In the past, a number of accidents can be attributed to such influence upon a pilot. The pilot must have support from the pilotage system to ensure that the pilot's assessment overrides any commercial requirements and the pilot is not under any pressure to bend to commercial requirements.*
> IMO Paper, STW 29/7/5, submitted by INTERTANKO, 10 November, 1997

More locally, the PSP Guidelines were recently amended to add more tugs on many of the waterway transits in Puget Sound. By the time of the Commission's March 2006 meeting to discuss the CR 102 filing for this rate case, industry had already quantified the cost of these new tug assistance guidelines and used this figure in resisting the pilots' requested rate increase. Within months of putting these guidelines in place, Captain Delmar Mackenzie had a near miss with the *MOL Confidence* (reported to the Board in February, 2006) in which all power was lost as the ship approached Terminal 5 during a strong ebb tide after a heavy rain. Captain Mackenzie was able to dock the vessel, but only by use of full power on both tugs – one of which was newly required under the amended PSP guidelines. But for the extra tug provided by the pilots' new Guidelines, the situation would have been an accident rather than a near miss.

As pointed out in Capt Coe's testimony in Appendix A-1, pilots are continually asked to do more with bigger ships and larger challenges. They are continually

on the leading edge of the risk bubble. As soon as they learn how to handle one situation within acceptable risk standards, a larger ship arrives. Pilots are the ones who require the larger tugs, the larger thrusters or whatever other safety measures are available. The shipping companies typically do not ask or even tell the pilots what ships they intend to bring to Puget Sound.[10] They just appear and the pilots move them. It is the pilots' risk tolerance that determines exactly how, when and whether these behemoths will be moved. The only thing that is for sure is that the pilots will remain on the leading edge of this risk bubble until the ships stop getting larger – an event that will likely never occur.

This risk analysis role is perhaps the most important public service performed by pilots. In telling industry that a job needs three tugs instead of two, pilots are protecting the citizens of Washington who could be the ones most affected by a mishap. The pilots are the only non-industry source of expertise on many of these crucial safety issues. To be sure, the IMO and the Coast Guard are involved, but in this day and age when almost all ships fly flags of convenience for economic reasons and have stripped down crews of multiple nationalities; it is the pilots who are on the front line of protecting the public by insuring the safe navigation of ships. The experience and training of the pilots allows them to be leaders in this area and proactive on these safety issues.

The Prospect Of Criminal Liability Has Added To The Risk Factors Presented By The Larger Ships.

Today's larger ships present risks to the pilots that are far greater than those of the past. This is especially true given the scrutiny under which the maritime community now operates. In the event of an incident, pilots will no longer face only a Coast Guard and Pilotage Commission license proceeding. They will also be questioned by the FBI, EPA and the state Department of Ecology. While there are no reports of pilots being found guilty of crimes in this area, this is more likely because pilots are very good at avoiding oil spills. Avoiding oil spills is a big part of what they do. Ships without pilots put a lot more oil in the water than ships with pilots. It can't seriously be suggested that if there were a major incident with oil in the water, that officials would not be aggressively looking at pilot criminal liability under one of the fifteen major statutes that Commissioner Davis's paper indicates can be used to make mariners criminally liable.[11]

The weight of opinion in the marine journals and legal sources indicates that if a petroleum spill is involved, pilots will almost certainly face criminal prosecution. Instead of hiring admiralty lawyers, pilots will be hiring criminal lawyers. See the article on the criminalization of simple mariner negligence from the August, 2005 issue of the *Professional Mariner* in Appendix D -1.

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[10] There are some exceptions such as Evergreen and the Port of Tacoma's recent collaboration with PSP to determine just how large a ship they can take up the Blair Waterway.

[11] See Commissioner Davis's paper on the criminalization of negligence for mariners at www.davismarine.com .

As pointed out above, the standard license/defense insurance package which is specifically designed for pilots in the Pacific Northwest has coverage of $250,000 just to pay criminal attorney's fees. Any criminal fines ultimately levied are uninsured. The insurance companies evaluating this risk see a substantial risk of criminal prosecution of pilots. Nor is it just the tankers that present this danger. Every ship calling in Puget Sound carries enough oil to become a major environmental threat if there is a mishap.

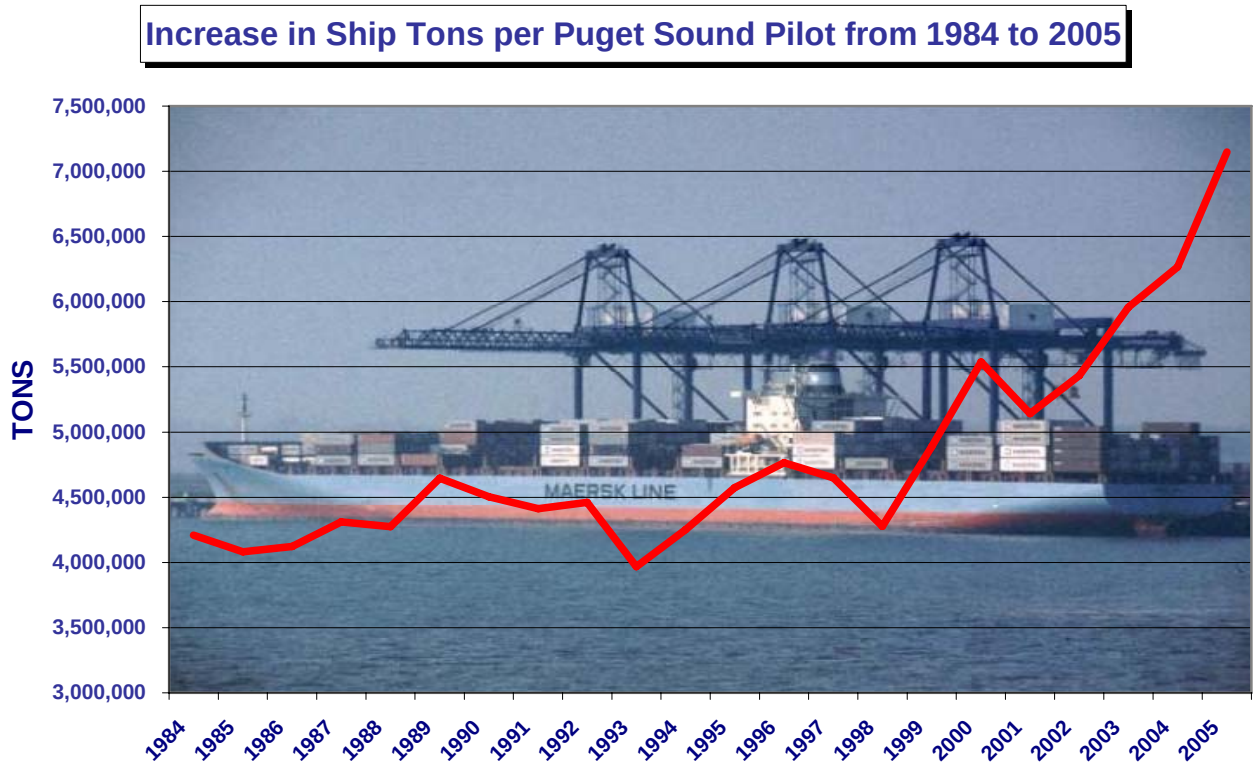
Our society's obsession with finding culprits and putting them on display or in jail has become insatiable. The possibility of complete personal and financial ruin exists every time a pilot takes the con of a vessel. These risks today are many multiples of what they have been in the past. The legal and financial risk environment for today's pilot does not even remotely resemble what it was 20 years ago.

What sets the independent pilot apart from the rest of the marine community is that he or she not only faces enormous risks, but the pilot faces them alone. Unlike ship masters and pilots employed by municipalities or organizations, there is no employer or other deep pocket to act as a shield from this potentially ruinous liability. The pilot alone is responsible for his or her actions.

4. PRODUCTIVITY AND PROFIT

The Productivity of Today's Puget Sound Pilot Has Increased Dramatically, Especially Over The Past 5 Years

Today's pilot moves more than twice as much cargo as his counterpart 20 years ago.[12] The growth in productivity in the last five years alone has been phenomenal – a whopping 39%. In 2001, 54 pilots moved ships totaling 278 million tons (5,148,148 tons per pilot). Last year 51 pilots moved ships totaling over 360 million tons (7,148,571 tons per pilot).



For the reasons pointed out above, this increase in productivity brought about by larger ships has dramatically contributed to the profits made by industry during this time – but it has come at a price to the pilots – more difficult piloting and increased risks. The pilots bear the burdens imposed by these larger ships every day and should be properly compensated.

[12] A complete record of ship tonnage per pilot and on an overall basis from 1984 to 2005 is found at **Appendix B-3.**

Productivity can be measured by various criteria – size of ships, amount of cargo carried – TEUs, cars, people and oil - and the dollar value of the cargo being carried. In its CR 102 filing, industry suggests that the best measure of productivity is number of ships calling in Puget Sound. This ignores two things. First, it ignores the dramatic increase in the volume of cargo carried on the ships that are now twice as large as before. When measuring the productivity of an employee, companies don't measure how often he comes to the office – they measure how much the person gets done when there. Second, industry ignores the fact that, like the office worker's available days of work, the pilot's available number of ship movements is regulated and finite. For safety reasons, the Commission has established a maximum desirable number of assignments.[13]

By any measure, pilot productivity has increased dramatically during the last 22 years, but in particular during the last five years. Growth in Seattle and Tacoma has been large. A recent Seattle P-I article noted that: "*The Port of Seattle was North America's fastest-growing container port in 2005, with a record 2.1 million TEUs, up 18 percent from 2004.*"[14] The Port of Tacoma is also coming off a record year. See the Port's newsletter Article on the Port shattering records in Appendix D- 2. An insert box from that article shows the following 2005 statistics:

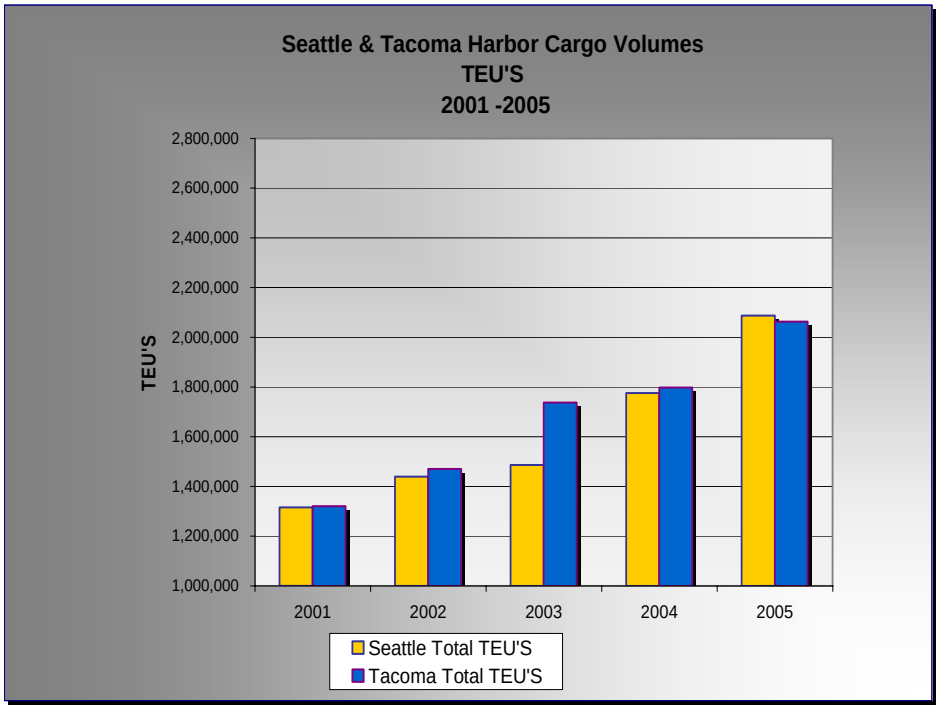
The Port's 2005 volumes include:

- Record 20.4 million short tons in overall tonnage – up 8.3%
- Record 2.07 million TEUs (Twenty-Foot Equivalent "Container" Units) – up 15% (of this total, international volume was up 20.3% and domestic was up 1.3%)
- Record 633,620 intermodal lifts (a measurement of container rail activity) – up 29.4%
- Record 6.97 million short tons of grain – up 4.2%
- Breakbulk cargo maintained a strong volume – 116,680 short tons – down slightly from 2004
- Auto volumes came in at 135,900 units – down 13.6%

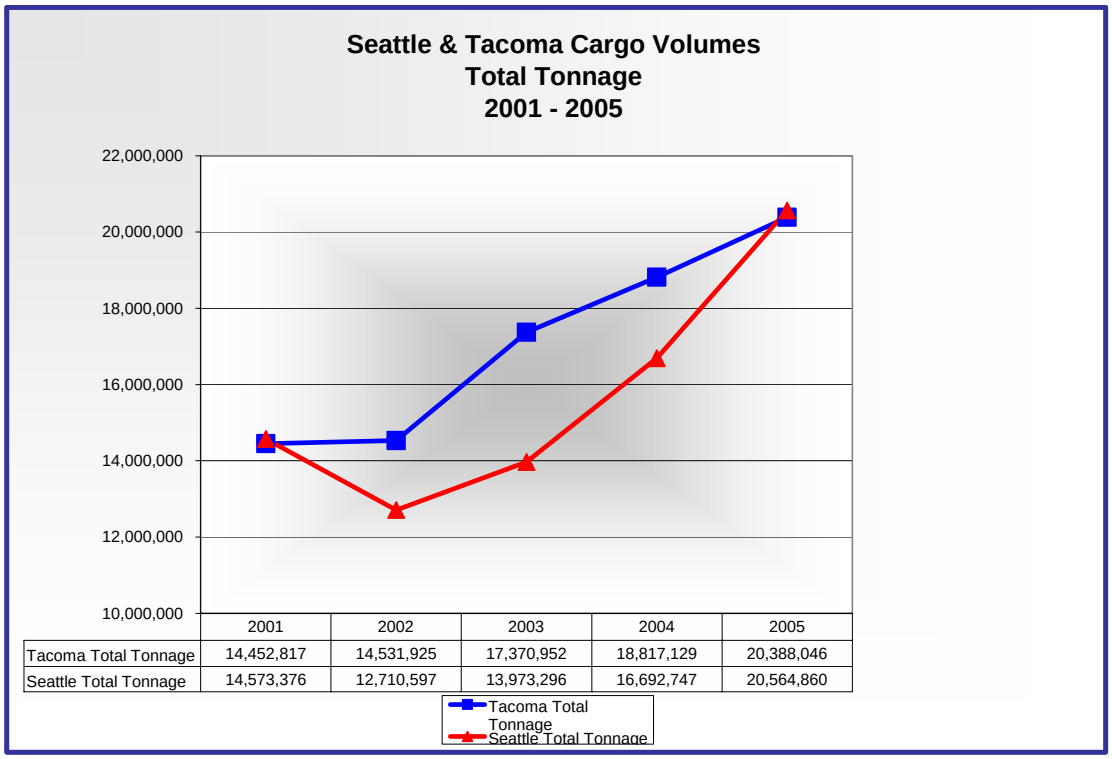
Puget Sound's two major ports have enjoyed unprecedented growth. In the last five years, both ports have grown from 14,000,000 to 20,000,000 TEU ports. The detailed tonnages, TEU's, cars etc are set forth in Appendix B-6 (Tacoma) and B-7 (Seattle). During these years of growth, the number of Puget Sound pilots has actually gone down from 54 in 2001, to 53 in 2002 and 51 in each year since.

[13] The impact of last year's forced violation of these safety standards is discussed in detail below in **Section 7.**.
[14] Seattle, P-I, Saturday April 1, 2006.

The following chart shows the 55%+ growth in the number of TEU's moved through the two ports:



Here is the same race between the ports showing a 40% increase in tons:



	2001	2002	2003	2004	2005
Tacoma Total Tonnage	14,452,817	14,531,925	17,370,952	18,817,129	20,388,046
Seattle Total Tonnage	14,573,376	12,710,597	13,973,296	16,692,747	20,564,860

There are other signs of growth as well. One of the best indications of the ever increasing productivity and economies of scale can be found in the crane purchases in both ports. The Board is aware of the large cranes brought into Tacoma in early 2005 for the new Pierce County Terminal. As this submission is being written, the Port of Seattle is unloading its latest cranes at Terminal 18. These new cranes, pictured below are designed to stretch across 23 containers. They have a full 85 feet more reach than the cranes they are replacing. A fact sheet on the cranes from the Port of Seattle's web page is found at Appendix B-8.

Picture shows new cranes being unloaded in April 2006 at T – 18 in Seattle. Smaller blue crane in the foreground is being delivered to the Port of Portland.

We are also seeing unequalled times of prosperity in the shipping industry. Combined profits of 10 of the largest users of Puget Sound ports have increased sharply during the last four years. From 2002 to 2004, the years for which data is available for all of these companies, profits grew from $2.249 billion in 2002 to $4.516 billion in 2003 and 7.992 billion in 2004. A chart follows showing the profit of some of the shipping and oil companies using our ports. 2005 data is not available for all companies. All figures are in millions:[15]

Profit of Major Shipping Companies and Oil Companies Calling on Puget Sound Ports*

(All figures in $Millions)

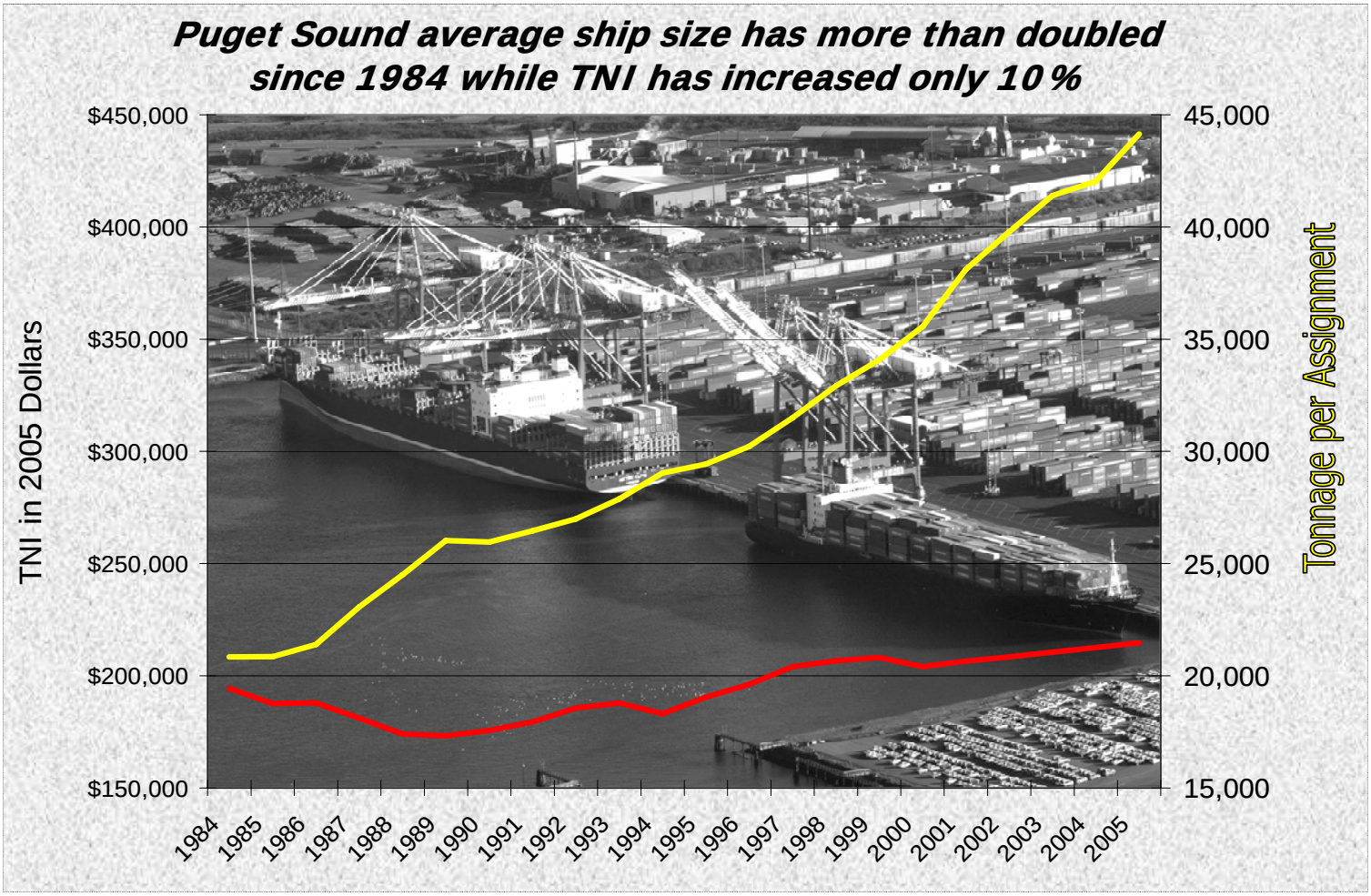
	2001	2002	2003	2004	2005
Maersk	$1,003	$1,701	$2,912	$4,463	
Evergreen	$48	$31	$106	$378	
Hanjin	-$59	$15	$247	$616	
Hapag-Lloyd	$203	$149	$384	$386	
Horizon		$22	$15	$6	-$18
NYK	$281	$132	$119	$329	$663
OOCL		$52	$329	$670	
Yang Ming	-$19	$32	$195	$306	
"K"-Line	$15	$36	$86	$314	
MOL	$59	$79	$123	$524	$913
Total for 10 Shipping Companies:		**$2,249**	**$4,516**	**$7,992**	
OIL COMPANIES					
BP Oil	$8,010	$6,845	$10,267	$15,731	$26,785
Conoco Phillips	$1,661	-$295	$4,735	$8,129	$13,617
Tesoro	$88	-$117	$76	$327	$507
Shell	$10,852	$9,419	$12,496	$18,183	
Total for 4 Oil Companies	**$20,611**	**$15,852**	**$27,574**	**$42,370**	

*Data not available for years left blank. Data not found for APL, COSCO, China Shipping and Tote. Hyundai too diversified to derive shipping profits.

[15] Data is from Hoovers Online financial Services.

Despite Productivity Increases, There Have Been No Substantial Increases in Target Net Income Over the Past Twenty Years

Target Net Income has not kept pace with the realities of the modern environment over the last 21 years. Adjusted to current 2006 dollars, TNI was $194,408 in 1984 and $214,665 in 2005. This is only a 10.4% increase over 21 years – ½ of 1% per year. A chart showing this trend comparing it to the dramatic increase in ship size demonstrates the current imbalance:



5. THE WASHINGTON PILOTAGE COMMISSION IS NO LONGER COMPETITIVE IN ATTRACTING THE BEST APPLICANTS TO PUGET SOUND

The Different State Pilotage Commissions Are Competing For Candidates From an Ever Shrinking American Merchant Marine In the Face of Increasing Demand for Qualified Mariners

Traditionally, pilot applicants have come to Seattle from the deep sea industry, tug boats, the ferry system and other pilot groups. The balance of candidates from those industries is important and is one of the reasons that Puget Sound has traditionally had such a strong pilot corps with an excellent safety record. Each of these groups brings a different perspective to the job and the sharing of ideas and techniques among the groups is very important.

For economic reasons largely relating to the Jones Act, the US merchant marine corps of officers is shrinking. According to MARAD statistics, there are now only 209 US flag vessels in the deep sea trade. See the description of this part of the industry in the Testimony of Captain George Quick in Appendix A-7.

Our Demand for Pilots Will Remain High

In Puget Sound we have an aging pilot corps and the promise of continued long term growth in the amount of ship traffic. This combines for the prospect of a long term demand for qualified applicants. The Board has not yet set the number of licenses that it will issue pursuant to new WAC 363-116-065. By any measure, we are woefully short at this time. There are 6 in the training program now. This will leave another 10 from the 2005 exam. Those applicants will likely be taken in soon. It appears that the Board may have to try to give another examination in 2007 - right on the heels of its 2005 exam and the May 2006 exam in San Francisco.

It is impossible to predict how many pilots will be lost to retirement and health. The average age of the PSP members is 56. Historically, the average retirement age is 64. This includes those retiring at a normal age and those retiring early for health reasons. We have surveyed our members and expect the following schedule of retirements over the next 15 years:

	Date of Birth	Start Date	Age Now	Year's Piloting Now	Expected Retire-ment			Date of Birth	Start Date	Age Now	Year's Piloting Now	Expected Retire-ment
1	1937	1991	69	14.9	2006		**19**	1946	1990	60	16.2	2012
2	1950	1990	56	16.0	2006		**20**	1942	1977	64	28.7	2012
3	1945	1991	60	15.2	2006		**21**	1948	1992	58	13.9	2012
4	1944	1984	62	22.1	2007		**22**	1949	1990	57	16.1	2013
6	1942	1984	64	21.4	2007		**23**	1949	1982	57	23.9	2013
5	1939	1988	67	17.4	2007		**24**	1950	1987	56	18.3	2013
7	1938	1995	68	10.3	2007		**25**	1952	1989	54	17.1	2014
8	1942	1986	64	19.8	2008		**26**	1949	1997	57	8.6	2014
9	1943	1980	63	26.0	2009		**27**	1952	1992	54	13.9	2015
10	1941	1990	65	15.5	2010		**28**	1954	2000	52	5.4	2015
11	1949	1982	57	23.8	2010		**29**	1951	1985	55	20.8	2015
12	1952	1990	53	16.2	2010		**30**	1951	1988	55	18.3	2015
13	1946	1985	59	21.0	2010		**31**	1952	1992	54	13.5	2015
14	1949	1990	57	16.2	2011		**32**	1953	1990	53	15.8	2015
15	1946	1985	60	20.6	2011		**33**	1951	1998	54	8.1	2015
16	1942	1985	64	20.5	2011		**34**	1952	2001	54	4.9	2016
17	1944	1992	62	13.9	2011		**35**	1953	2003	53	2.5	2016
18	1955	1995	51	10.7	2012							

It is also difficult to predict how many pilots the Board will need to serve the ships that will be coming here. If the Board sets the number of pilots above 55, which is likely, there will be even more demand. It is impossible to predict traffic, especially in the short term, but we do know that industry is building many ships. We don't know exactly when or where these ships will go into trade, but we do know that generally, Seattle and Tacoma are well situated and aggressively going after increased trade. Currently, the liner companies serving the United States have 885 ships. They are building hundreds more and expect to roll them out on the following schedule:[16]

2006	139
2007	122
2008	126
2009	24

[16] The complete table of vessels under construction is attached in **Appendix B-11.**

The Washington Pilotage Commission Has Started To Lose Qualified Puget Sound Applicants

The Washington Pilotage Commission is competing with other commissions and pilot employers to attract the candidates it will need to meet the upcoming demand. Recent history is not encouraging. The Board's first pilotage exam in 9 years only attracted 21 applicants. Because only 16 of these passed the examinations, the Board will probably have to go back out into the applicant pool next year for another exam.

Removal of the requirement for full federal pilotage at the time of the application would have to be done by legislative amendment for an exam next year. Even if this can be done, it goes without saying that many of the qualified mariners who are interested in becoming Puget Sound pilots have already applied and taken the test. It is crucial that the Board cast a wider net and that it be attractive to the entire marine community.

It has been suggested that removing the requirement for federal pilotage at the time of application will expand the candidate pool. This is true to a certain extent but it is not the whole story. Candidates still must commit the same amount of time – 3 years or so- to the training process. See the Testimony of Capt. Quick at Appendix A-7. Applicants can either train in the training program receiving a stipend or they can train in their off time while continuing their jobs. One way the sacrifice is financial, the other way it is lifestyle. Either way, the sacrifice is a substantial – but necessary – deterrent.

Without a significant increase in net income, many qualified candidates will continue to find it unattractive to apply to Puget Sound. We are already seeing this with Alaska pilot Captain Doug Johnson's decision last year to remain in Alaska rather than enter the training program here even though he successfully passed the 1996 exam, lives in the Puget Sound area and was only facing a 7 month training program. His message declining the Board's offer to enter the training program reads:[17]

> *This is to confirm that I will not be training with the Puget Sound Pilots' Assoc. Such a move would decrease my income, not provide time off in large blocks, or give me an option of a possible future reduced work schedule. Five years ago you would have had different answer.*
> *Best Regards*
>
> *Capt. Doug Johnson*

[17] Capt Johnson's email is attached in **Appendix B – 12.**

The Board's invitation to join the training program was also turned down by Capt Jay Dwyer, a Los Angeles municipal pilot employed by the City of Los Angeles who passed the 1996 exam.

The Board also lost two Alaska pilots, Capts Stephan Moreno and Mike Anthony to its 2005 exam. See the Testimony of Capt. Stephan Moreno, an Alaska pilot with full federal pilotage who declined to take the exam here last year. Appendix A-5. These pilots had completed the Puget Sound Pilots' ridership program, live here in the Puget Sound region and had full federal pilotage. It simply was not attractive for them to come to work here. The Board cannot expect applicants to take a significant pay cut to become Puget Sound pilots. See Capt. Moreno's Testimony in Appendix A-5.

This is not to say that Puget Sound will never get a pilot from another district. Some people are less motivated by money than others. Last year, there were two Alaska pilots who did take the exam and who may decide to become pilots here. There will always be some candidates who for personal reasons will be willing to take a hefty cut in pay to come here. However, there will always be more candidates who cannot or will not come here if it requires a cut in pay. It should also be pointed out that both of these Alaska pilots started riding here when Puget Sound still offered competitive earnings.

The Puget Sound trend toward below industry standard compensation – which only started a few years ago - must be reversed before it does more damage. Thus far, we have not lost any licensed Puget Sound pilots to San Francisco or the other pilotage grounds. Given the training time and financial sacrifices required for a pilot to move, this is not surprising. A Puget Sound pilot wanting to go to the Bay area would have to go train there for 2 to 3 years while being paid only a $5,000 per month stipend. This is not attractive, even for an extra $150,000 per year in pay. It is very hard for a veteran pilot to change districts - applicants are much more mobile.

If the Board waits until we actually start to lose pilots before it addresses this issue, the battle will have been lost. Puget Sound's reputation as a first rate place to pilot will have been permanently damaged in the marine community and the Board will be hard pressed to attract the quality of applicant that the people of the State of Washington deserve. The good will that has been developed over the years by this Board offering a fair wage will be a thing of the past.

Many of the same forces that make it unattractive for a veteran pilot to change districts also make it harder to attract the deep sea masters who, up until now, have been an important portion of our pilot corps. See the explanation of this issue in the Testimony of Captain Quick, Appendix A – 7. A side by side

economic comparison makes it clear why, at current net income levels, we have trouble attracting the deep sea master:[18]

Here is the breakdown of earnings from the current Horizon/ MM&P contract:

Total daily shipboard compensation	$1,503.41
Less pension contribution	183.64
Less misc. contributions for training, etc.	33.47
Net daily compensation	$1,286.30
Annual number of shipboard days	182
Net annual compensation	$ 234,106.60[19]

In addition the Master has a guaranteed pension of 2% per year for each year of service. The benefits provided by the union contract for these captains also provide medical insurance at a nominal cost which is similar to the PSP individual expense allowance for insurance. Also, less of the employee's salary goes for Social Security and other types of taxes than is the case with the independent pilot.

More importantly, the deep sea master has the security of being an employee, of a large employer and a member of a labor union. If there is an incident, the ship captain is protected by the company and the company's lawyer. He or she simply goes to work when assigned and does not bear the market risks and business challenges that a pilot in a private association does. But more importantly, as Capt Sweeney pointed out to the Board at the March, 2006 meeting, when the deep sea master gets to the difficult and risky part of the transit, she turns it over to the pilot.

There Are Not Enough Highly Qualified Applicants To Go Around

Competition for qualified applicants is warming up. San Francisco last had an exam 4 years ago and will have another this May. [20] The applicant process is

[18] This detail comes from the Testimony of George Quick, of the MM & P attached in Appendix A – 11-12.
[19] There is an increase effective June 1, 2006 of 3% on wage related items that will increase the net annual compensation to $241,129.80.
[20] Information about the current San Francisco Examination comes from a telephone interview with Capt. Patrick A. Maloney, Executive Director of the California Board of Pilot Comissioners.

now closed for the May, 2006 exam. They expect to rank the applicants from this exam by this summer and once ranked, the applicants stay on the eligible list for entry into the training program for three years. The California Commission is anticipating about 16 retirements to be filled by this pool of applicants.

Four years ago in the Bay area, there were 112 people who applied for the exam, 55 passed the screening, 43 applicants who took the written exam, 24 went on to the simulator and 18 were ranked for entry into the training program. Of these 18, 6 were from other pilot groups, 6 from deep sea or ferries and 6 from the tugs.

This year there are were 60 who applied and 36 who qualified to take the exam. The industry background those qualified is 24 from the tugs, 8 from deep sea and ferries and 4 from other pilot districts.

Geographically, the applicants break down as follows:

15	Bay Area
10	Other Parts of California
4	Oregon
2	Washington
2	Hawaii
2	Virgin Islands
1	Alaska

Puget Sound Earnings Have Fallen Significantly Below the National Average for Independent Pilots in Ports Such As Ours

Puget Sound earnings have fallen significantly below the national average, especially for the pilotage districts with which the Board competes for applicants. The national average for state licensed pilots is between $350,000 and $400,000.[21] This includes many different types of pilots in different areas. It includes both the unlimited ports such as ours and the constrained ports such as Grays Harbor, Coos Bay and the Columbia River where traffic is limited by geographical or market forces. It does not include Canadian districts with whom we do not compete for members – Canadians do not have the license or citizenship required for pilotage in Washington. The West Coast association pilots in the Bay are, Alaska and Hawaii are in this national average range.[22] In competing for pilots, the word on the street in the marine community is important. If the word is that groups are making a lot of money, the applicants will hear it.

[21] See Testimony of Capt George A. Quick, **Appendix A – 7.**
[22] Quick Testimony Appendix A – 7.

The most reliable nearby data comes from San Francisco where audited financial statements are filed with the Pilotage Commission. The 2005 statement has not yet been filed, but the 2004 statement showed earnings of $354,000. The 2005 statement should be available before our hearing in May.

The San Francisco earnings are net of association expenses but there is no individual expense allowance in the Bay area as we have here, so to compare apples to apples, $23,943 must be deducted from San Francisco earnings. Like here, this amount does not include any reference to retirement programs. In San Francisco, pilots get a retirement payment funded by a tariff surcharge. The San Francisco benefit is considerably more generous than ours. It gives 1.84% of the average of the highest three year's net audited income at the time of retirement for each year of service. Unlike our payments that remain flat once started, Bay area retirement payments are adjusted for inflation over the years.

There has been considerable discussion of cost of living comparisons between Seattle and the Bay Area. First, it should be noted that the national average range of pilot earnings of $350 - $400,000 includes all areas from Astoria to New York. While the cost of living might be high in the Bay area, it is not high in most of the Gulf Region, Maryland, Virginia, and many of the southern ports.

One of the primary sources for relative cost of living data is the ACCRA - Council for Community and Economic Research. This non profit research group publishes data for many cities around the country. All of these cost of living comparisons have one thing in common – they measure the cost of goods and services. They assess equivalent spending power. Use of the data for straight across earnings comparisons assumes that one spends all income where he or she lives. Of course, this is not the case for higher income professionals. They tell you that if you are spending X dollars on goods in one area, those same goods will cost you Y dollars someplace else. As ACCRA states[23]:

> *The ACCRA Cost of Living Index measures relative price levels for consumer goods and services in participating areas.*

Professionals earning what pilots earn do not spend all of their money where they live. Investments and savings cost the same wherever you are. College costs for someone living in the Bay Area have nothing to do with the local cost of living. Indeed, California has such an extensive, high quality university system, college might even cost less. It is true, that your house and food might cost more in one place over another, but only a portion of one's income goes to these items.

[23] Explanations of all of this are found at ACCRA's web site: **http://www.accra.org/index.asp**

The studies aimed at professional compensation are heavily weighted with housing costs. As the ACCRA study states:

> *The Index reflects cost differentials for the standard of living present in a professional and/or managerial household. Operationally, this standard of living is set by the weighting structure. Home ownership costs, for example, are more heavily weighted than they would be if the Index were structured to reflect a clerical worker standard of living or average costs for all urban consumers.*

Here are the latest comparisons between Oakland, San Francisco and Seattle from the ACCRA:

Location	Total (100%)*	Grocery (14%)*	Housing (29%)*	Utilities (10%)*	Trans. (10%)*	Health (4%)*	Misc. (33%)*	Avg Rent**	Avg Home Price***
From (Origin)									
Oakland, CA	147.5	139.3	219.1	81.4	110.8	117.3	122.9	$1,389.00	$669,083.00
To (Destination)									
Seattle, WA	115.3	106.7	134.2	98.6	109.3	118.3	108.7	$1,037.00	$410,540.00
Percent Difference	-21.80%	-23.40%	-38.70%	21.10%	-1.40%	0.90%	-11.60%	-25.30%	-38.60%
From (Origin)									
San Francisco, CA	171.4	142.1	286.8	94.6	107.8	118.2	130.9	$2,021.00	$870,567.00
To (Destination)									
Seattle, WA	115.3	106.7	134.2	98.6	109.3	118.3	108.7	$1,037.00	$410,540.00
Percent Difference	-32.70%	-24.90%	-53.20%	4.20%	1.40%	0.10%	-17.00%	-48.70%	-52.80%

This shows that a $410,540house in Seattle is worth $870,567 in San Francisco and housing represents 29% of the overall cost of living index. Of course, very few Bay area people actually live in San Francisco. More importantly for our purposes, there is no reason any San Francisco Bar Pilot has to live in San Francisco. Because of their work schedules, pilots everywhere are free to live where they want – often far from where the ships actually are. In San Francisco, the pilots association has a residential facility on Pier 9. Housing is not the issue for pilots that it is for the normal employee who has to go to the office every day and expensive housing in the City is not a deterrent to a pilot applicant.

Again, even assuming that a pilot lives in the city, the difference in the mortgage costs between the above houses is about $36,000 per year (most of which is deductible). Many people view the home as an investment. History has shown

that an investment in San Francisco real estate has been much more profitable than investment in Seattle real estate. The cost of living index makes no adjustment for this appreciation in value.

For many of the same reasons that the Board has a hard time attracting deep sea masters from the American merchant marine, comparisons of independent pilot earnings with the earnings of pilots who are employees is difficult. The employed pilot – who is typically not even state licensed - enjoys many advantages compared to the independent pilot. These advantages allow employers to pay less. However, even with this advantage, these employers do pay comparable wages. For example, in Los Angeles, the pilots are employed by the Port division of the City of Los Angeles. They are members of the ILWU, probably one of the strongest unions in the world. The senior pilot earns a municipal salary of $202,000 and can expect about $40,000 additional per year in overtime. They participate in the municipal retirement plan that provides a secure retirement benefit of 2.16% of highest earnings for each year of service with COLA adjustments. In addition, the pilots have all other normal benefits given to municipal employees such as health insurance.

Again, like the deep sea captain, the municipal employee has the City of Los Angeles standing between the pilot and the outside world in the event of a casualty. The absolutely ruinous potential financial liability that faces a Puget Sound pilot every time he steps on a ship is a non factor for the Los Angeles pilot just like it is not a factor for the deep sea master. As with the deep sea master, the employed pilot only has to show up for work. There are no administrative duties, no business to run – just piloting.

6. THE TARIFF IS AT HISTORIC LOW LEVELS

Analyzing Rates In Dollars Shows Them To Be Lower Than Any Time Since 1984. The Tariff Would Have To Be Increased Over 30% To Restore It To The 1984 Level

There are two ways to look at the current Puget Sound pilotage rates: dollars and tonnage of vessels moved. By either measure, our pilotage tariffs are at historic lows. Much of the reduction has occurred since 2002. Simply restoring the rates to their 2002 dollar level requires a raise of 23%. The following table shows the decline in the rates since 2002 against the value of the dollar. This chart is based on the tariff adopted in July of 2002. Under the LOA table in that tariff, a Zone III, 960 foot ship had a LOA charge of $1,012.[24]

Year	Tariff Adjust-ment	Actual Tariff in LOA Chart	CPI	$1,012 Adjusted for inflation	$ Reduction in Tariff Since 2002
2002		$1,012		$1,012	
2003	-2.02%	$992	.5%	$1,017	-$25
2004	-16.42%	$828	2.1%	$1,038	-$210
2005	+5%	$869	3.0%	$1,070	-$201

As this table shows, the LOA charge for this ship has dropped from $1,012 to today's rate of $869. During those same three years, inflation has increased the value of that $1,012 to its current level of $1,070. Thus, the current LOA charge of $869 for this ship is $201 dollars less than it was in 2002. It would take a 23% increase to restore it.

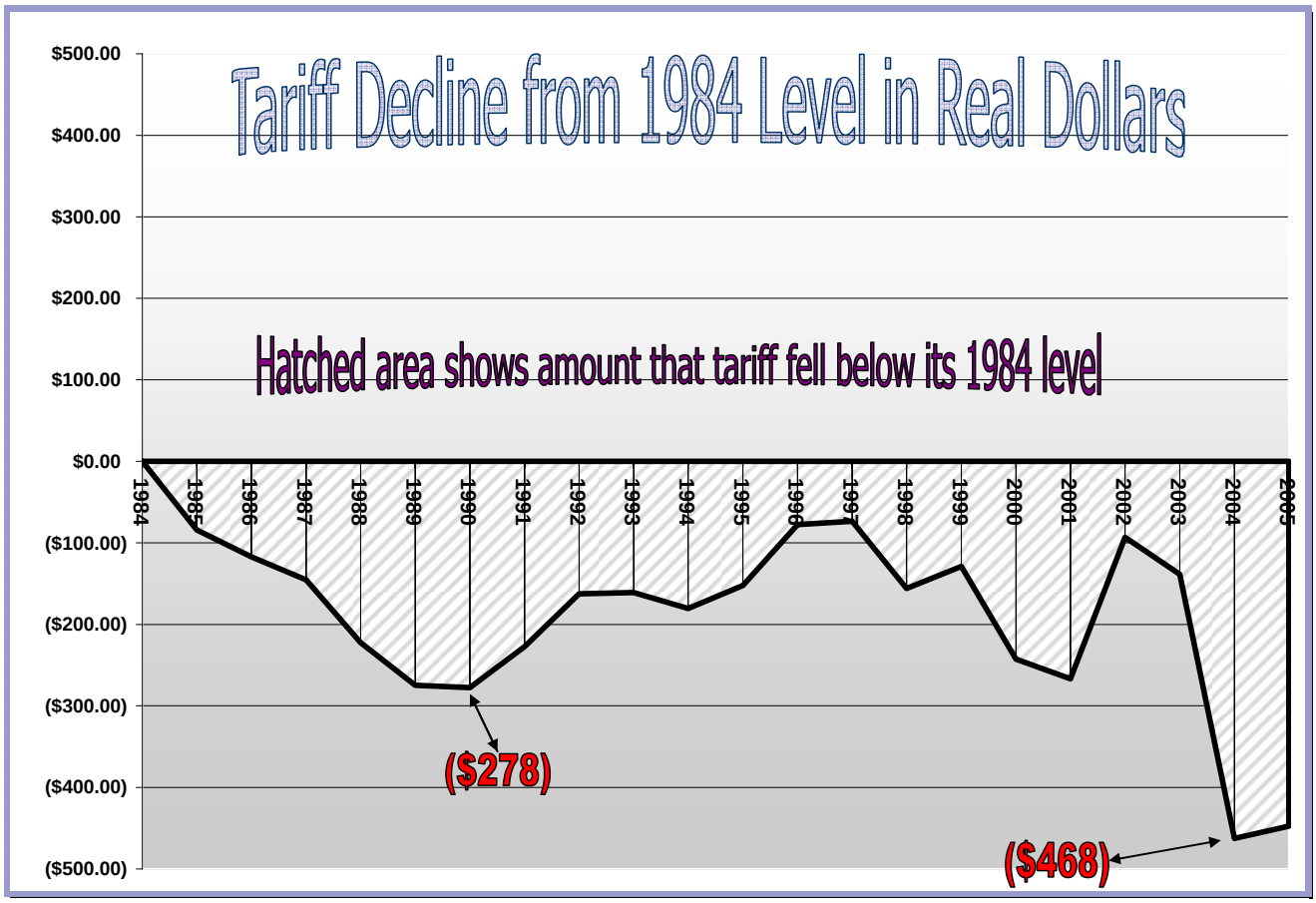
This trend has been amplified over the past 3 years due to the increase in size of the ships and the tariff income that has resulted. Because TNI is relatively fixed, the larger ships – even though they present higher risks to the pilot and increase the difficulty of the pilots' job – have driven down the cost of pilotage.

[24] A chart showing CPI versus the tariff on a hypothetical $1,000 tariff charge since 1984 is shown in **Appendix B - 13**. The chart shows that inflation has increased that $1,000 charge to a current value of $1,970. The tariff has only gone up to $1,523. This would require a 30% increase to get the tariff back to where it was in 1984.

The following charts show just how far our rates have dropped. The example used is a hypothetical $1,000 tariff charge under the 1984 tariff and what has happened to it over the ensuing years. That $1,000 under the 1984 tariff table is now $1,523 in the 2005 tariff tables. During these same years, inflation has almost doubled that $1,000 – it is now worth $1,970. Thus, the tariff has gone down 21.4% against the dollar since 1984. This equates to a 27.25% increase to restore today's tariffs to where they were 22 years ago.

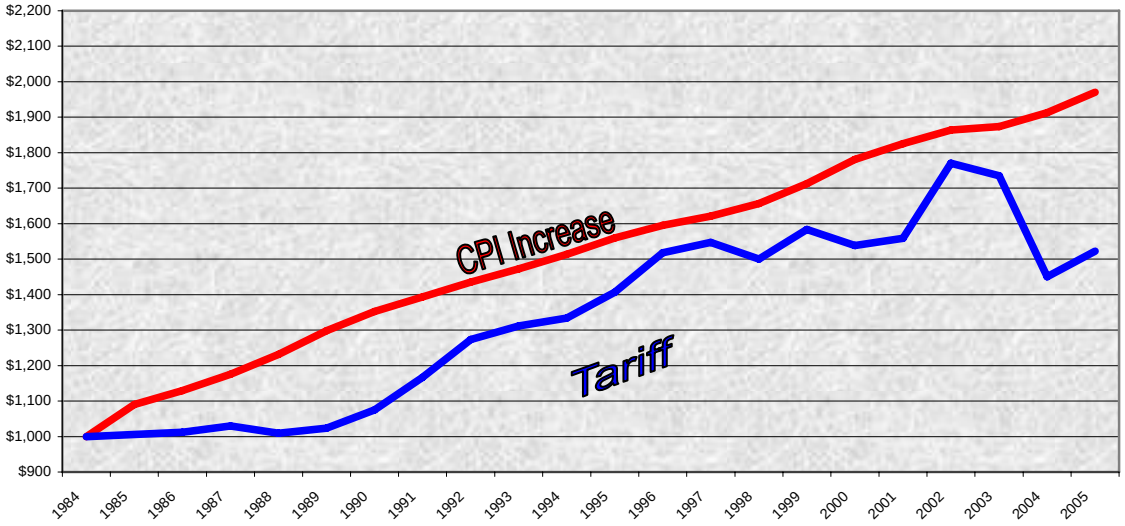
There are two ways to show this. First is a chart showing how the tariff has dropped from its 1984 value. It shows how much lower the actual tariff has been compared to its value in 1984. It shows it for each year. As with the other graphs, the most precipitous activity is since 2002:

At all times since 1984, the tariff increases have been below the CPI. There were low points in 1990, and 2001, but by far the lowest point in this 21 year cycle was 2004, just before last year's 5% increase.



Stated otherwise, the tariff increases have not kept up with the cost of living. The following chart shows the tariff increases and decreases over the years compared to the CPI. Stated otherwise, if the tariff had only been adjusted by the CPI, it would be $1,970 dollars instead of the $1,523 that it is:

1984 - 2005 Increase in CPI v. Increase in Tariff based on a $1,000 Charge in 1984



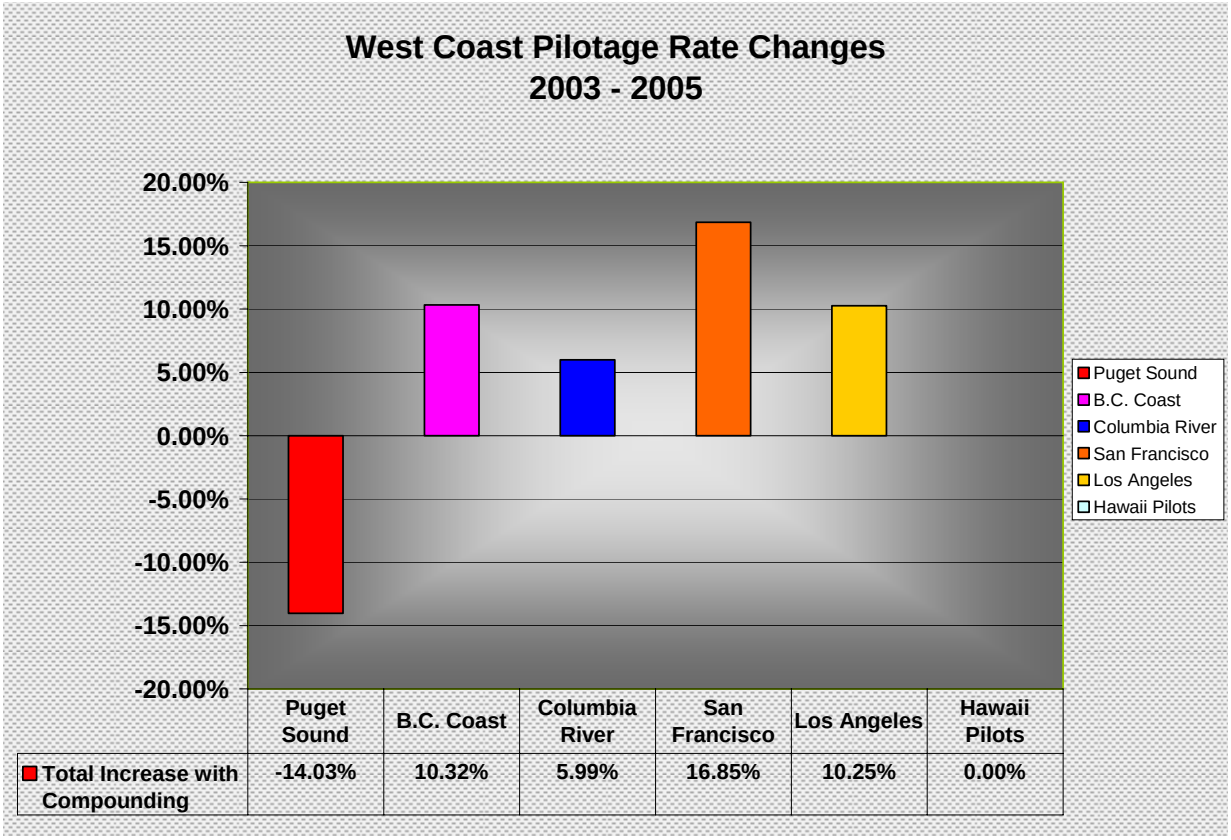
Puget Sound Rates Have Fallen Precipitously In The Last Three Years While Rates In Other Districts Have Increased

Because the productivity of the pilots has increased dramatically with the larger ships and pilot income has been held down by the MOU, there has been a radical drop in pilotage rates in the last three years. We described above how these productivity gains have worked to increase pilot earnings around the country. However, this is not the only way that Puget Sound has departed from the other ports. While we have been reducing rates, the other districts have been increasing them. This has thrown Puget Sound even further out of sync.

The following table shows the pilotage rate increases that have been enacted elsewhere on the West Coast in the last 3 years. These rates are unadjusted for inflation and compounded:

PILOT GROUP	2003	2004	2005	Total Increase with Compounding
Puget Sound	-2.02%	-16.42%	5.00%	-14.03%
B.C. Coast	4.50%	2%	3.50%	10.32%
Columbia River	1.36%	2.04%	2.48%	5.99%
San Francisco	6.00%	6.00%	4.00%	16.85%
Los Angeles/Long Beach	0.00%	5.00%	5.00%	10.25%
Hawaii Pilots	0.00%	0.00%	0.00%	0.00%

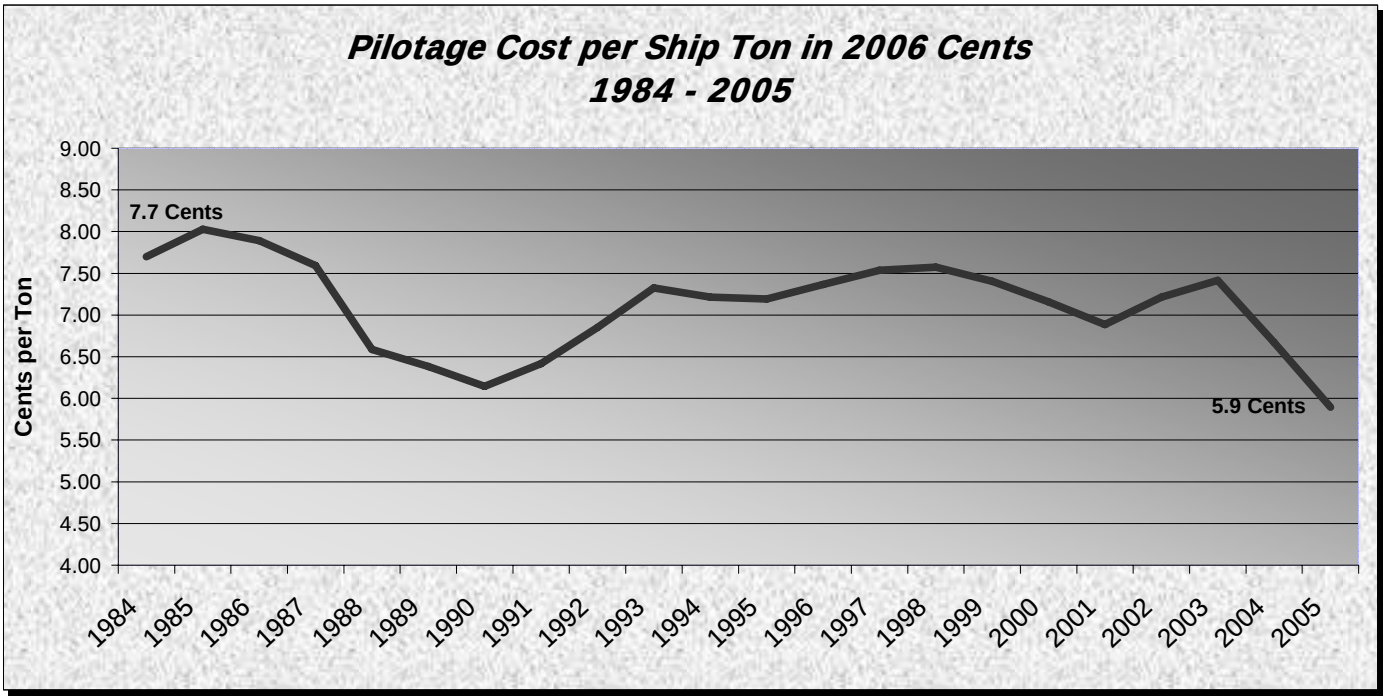
Shown in graph form the data looks like this:



Rates Are At Historic Lows Measured In Terms Of Ship Tonnage As Well

Comparing total pilot revenue to total vessel tonnage shows a real decline in pilotage costs to the shipping industry over the past 20 years. As with the dollar analysis above, the most marked drop has been since 2003. In 2006 dollars, the cost has dropped from 7.7 cents per ton to 5.9 cents during this time. Today's rates would have to be increased 31% to get them back to 1984 levels.

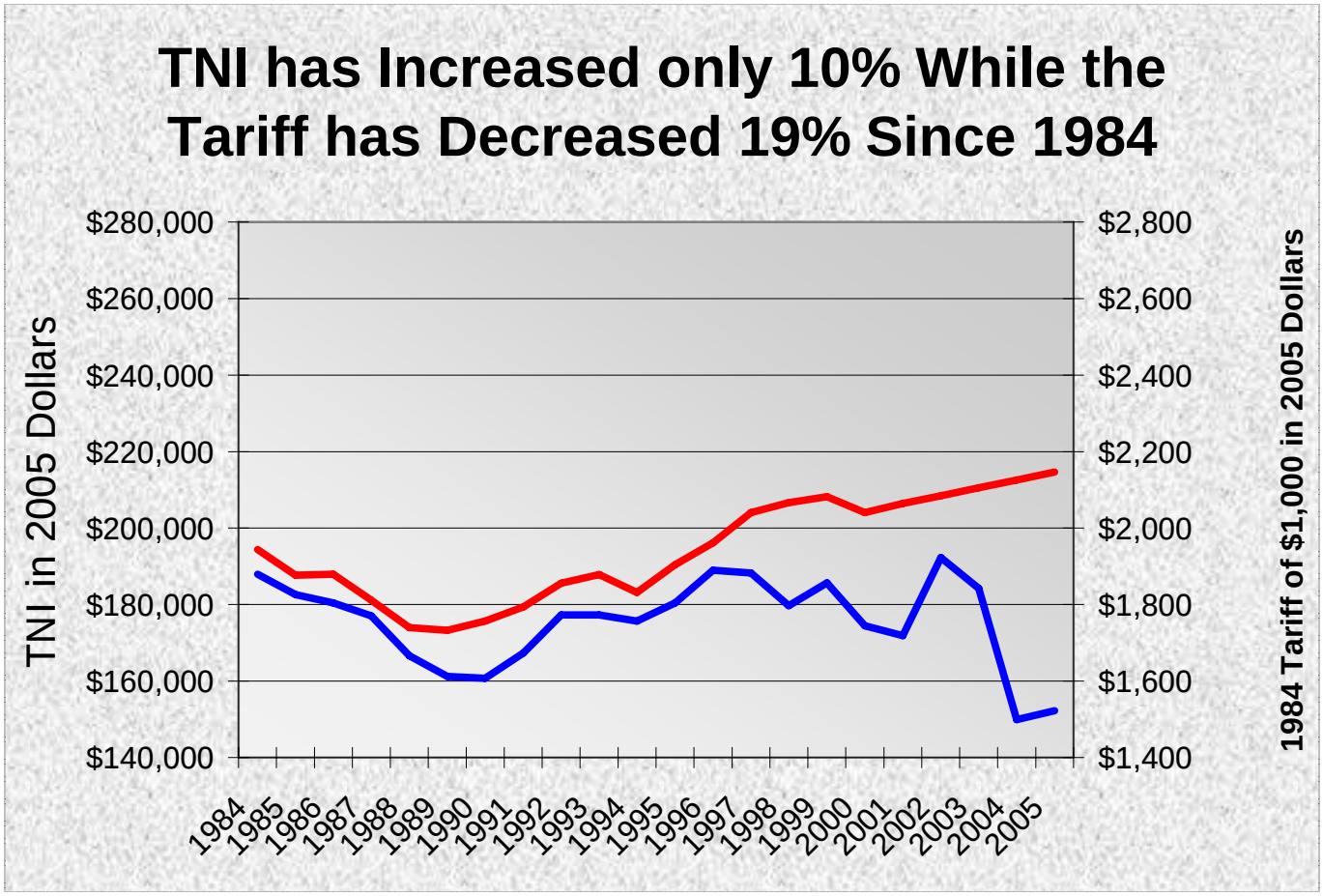
The following chart shows the history of these costs:



This chart also shows the sharp drop in rates over the last two years. Cost per ton has dropped from 7.4 cents in 2003 to 5.9 cents in 2005. Rates would have to be increased 20% just to get them back to 2003 levels.

Tariff Rates Have Fallen Because Pilot Productivity has Increased and Pilot Income Has Remained Flat

Productivity increases have been dramatic over the past 5 years. At the same time, the tariff formula in the MOU has kept pilot income relatively flat. The only other variable in the economic equation is the pilotage rate and, not surprisingly, it has plummeted. In this chart, the red line is TNI adjusted to current value and the blue line is the tariff, also adjusted to present value. Again, the last three years show a marked separation of trends.


TNI has Increased only 10% While the Tariff has Decreased 19% Since 1984
TNI in 2005 Dollars
$280,000
$260,000
$240,000
$220,000
$200,000
$180,000
$160,000
$140,000
$2,800
$2,600
$2,400
$2,200
$2,000
$1,800
$1,600
$1,400
1984 Tariff of $1,000 in 2005 Dollars
1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005

7. THE 2004 - 2007 SHORTAGE OF PILOTS AND ITS COMPROMISE OF THE SAFE ASSIGNMENT LEVEL

An important key to understanding today's tariff situation is the impact of the current pilot shortage in Puget Sound. In 2005, 48½ pilots (51 members minus the President and pilots unable to work for health reasons) did the work of 56¾ (8,260 /149). This has had two impacts.

First, this has brought about the worst violation of the Safe Assignment Level since it was created in 1995. At that time, the Board conducted an in depth analysis of what the safe assignment level should be. It set the level at 149. There was an immediate spike in job numbers in 1996, and a smaller spike in 2000, but in all other years the Safe Assignment Level has been observed. Deducting the president from the actual number of pilots reported in the audited financial statements and dividing the assignments by those pilots shows the following modern work load over the past 10 years.

Year	Assign-ments	Pilots (Including Pres.)	Jobs Per Watch Standing Pilot
1996	8,359	53.2	160
1997	8,118	54.8	151
1998	7,145	54.7	133
1999	7,746	53.8	147
2000	8,254	53.4	158
2001	7,288	54.1	137
2002	7,241	52.6	140
2003	7,338	50.5	148
2004	7,604	50.8	153
2005	8,260	50.9	166
Average	**7,735**	**52.9**	**149.3**

In 2005 the pilots had no choice but to move the ships as they have arrived, in spite of the fact that it required exceeding the Safe Assignment Level by a substantial margin. 2006 promises more of the same, at least until new pilots can be licensed.

The Board recognizes that this regrettable state of affairs should not continue and has expedited its steps to license new pilots and fill the gaps. This effort has been partially frustrated by the fact that 2 applicants who successfully passed the

last pilotage exam declined the Board's invitation to enter the training program and one other candidate from that exam did not complete the program.

The second impact of the pilots' exceeding the Safe Assignment Level is that we had an association of 51 pilots doing the work of 56 ½. This workload has helped keep 2005 pilot income from going down compared to the previous year. Audited net income in 2005 was $235,879 earned by 50.9 pilots based on net revenue of $12,002,020. The number of jobs indicates the need for 56¾ pilots. Had this many pilots shared the overall net income last year; earnings would have been $211,489 – less than Target Net Income.

The fact that earnings were not less than TNI is due to the extra work done by the pilots in response to the current shortage and the dramatic spike in traffic. Over the last three years, traffic has gone from

2003	7,338	Assignments
2004	7,604	Assignments
2005	8,260	Assignments

8. TARIFF FORMULA CALCULATIONS

The Tariff Formula in the MOU Would Require an 15.94% Increase Without Any Resetting Of Target Net Income

The tariff formula in the expired MOU provided a three step process to arriving at the agreed upon tariff: setting the number of pilots to be used in the calculations; updating the amount of the pilots' individual expenses and plugging the expense and revenue figures from the financial statement into the formula to arrive at the adjustment. The TNI increase of CPI plus 1% is then added to the basic adjustment. The formula is no longer in effect, but this analysis is offered to show how last year would typically be handled under the MOU.

The MOU's Formula For Calculation Of The Number Of Pilots Is Mathematically Designed To Help Adjust The Tariff To Compensate For Prior Year Inequities

The primary attraction of the formula to industry and the pilots was that it took the crystal ball out of the rate setting process. Tariff hearings used to be endless squabbling about what might occur in the upcoming year. The formula is designed to be self correcting. Once the MOU was signed, it no longer mattered what the future brought because the formula would make compensatory adjustments the next year. For example, if traffic was down and income was off, the tariff would go up to adjust for it in the following year.

One of the most potent self correcting mechanisms in the formula is the Manning Formula set out on pages 1 to 3 of the MOU. Every year, this formula would be used to project a number of assignments for the upcoming year. That number would be divided by 149 to come up with a number of pilots to be plugged into Line I of the final tariff adjustment calculation. Each year, the projected number of jobs is based on the difference between what was projected for the prior year compared to what actually happened. The more wrong the projection, the greater the adjustment to the number of pilots in the following year.

This is how the formula makes up for past miscalculations. For example, take the formula's severe under-projection for the number of assignments in 2005. The formula projected 7,768 jobs and the need for 53 pilots. There were actually 8,260 jobs and 57 pilots were needed. When the formula under-predicts the number of jobs in a given year, this will likely result in pilots doing extra work. It also will result in income in excess of target net for those overworked pilots. More income than expected would normally work through the formula to lower the tariff in the following year.

However, it is patently unfair to lower the tariff in the next year when the extra income results only from the pilots being overworked in the current year. This would be a windfall to industry based on extra work done by the pilots! Not surprisingly, the formula protected against this by increasing the number of pilots to be used in the next year calculations. This assures that the overworked pilots

are not penalized the next year by having to give back the extra money they made.

Turning to the specifics of the Vessel Traffic Formula in the MOU for projecting vessel traffic during 2006 would work as follows:

Step 1:	2005 Actual	8,260 assignments
	LESS:	
	2005 Projection	-7,768 assignments
	Subtotal	492 assignments
	Divided by 2	246 assignments
Step 2:	2005 Actual	8,260 assignments
	PLUS:	
	Adjustment	246 assignments
2006 Projection for Tariff Formula		8,506 assignments

The MOU goes on to establish the minimum number of pilots is as follows:

$$\frac{\text{8,506 projected assignments}}{\text{149 assignments}} = 57.09 \text{ pilots} + 1 \text{ (President)} = \textbf{58 pilots}$$

This figure of 58 pilots is then carried to “Line I” of the MOU formula’s final calculations for the tariff adjustment.

Individual Pilot Expense Allowance

As we have reached the end of the five year MOU, the next step in applying the MOU formula would be to recalculate the individual expense allowance. During the term of the MOU these expenses were increased by the CPI. In the past, when the MOU expired and was renewed, the expense allowance was readjusted to then current levels. This was last done in 2001 when the original 1996 MOU was extended. Medical insurance expenses have outpaced the CPI by a considerable amount since 2001. In 2001, these were re-indexed to the MM&P then current amounts and this has to be done again this year to apply the formula.

The other individual expense category that has significantly changed since 2001 is in the area of technology. Today’s pilot is much more dependent now on computers, cell phones, PDAs and other modern equipment

Subsistence and lodging figures have also been updated to reflect the latest US Government per diem rates using the benchmark of Anacortes. The GSA publishes a first and last day meal only per diem in addition to its regular lodging

rate. The chart below assumes the meal only rate for 75 inbound assignments. Outbound assignments wind up at the station where food is provided. It also assumes that hotels are used by pilots twice on every watch and uses the full GSA per diem for Anacortes for those two days.

The following chart breaks out the individual expense items. It assumes a three year amortization on the technical equipment listed, e.g. computers, fax machines, printers, Blackberry's etc.

The personal expenses can be broken down as follows:

Medical Insurance (MM&Plan @$1,650 mo)		$19,800.00
Disability Insurance		$4,753.00
State License Fee		$3,000.00
Physical Exam		$350.00
Subsistence and Lodging		$4,880.75
2006 GSA Anacortes 1st and last day meal only per diem x 75 inbound work days @ $44.25	$3,318.75	
2006 GSA Anacortes lodging allowance twice per watch @ $71	$1,562.00	
Business Communication		$3,180.00
Cell phone @ $120 mo.	$1,440	
Extra Phone line at home @ $30 mo.	$360	
Internet Access @ $50 mo.	$600	
Pager @ $5 mo.	$60	
PDA (amortized and service@ $50 mo.	$600	
Fax (amortized) @10 mo.	$120	
Navigation/Office Supplies		$2,516.00
Computer amortized @$42 mo.	$500	
Navigation Software amortized @ $18 mo.	$216	
Misc Hardware amortized @ $30 mo.	$360	
Scanner amortized @$25 mo.	$300	
Printer amortized @25 mo.	$300	
Charts @ $25 mo.	$300	
Misc Supplies @$45 mo.	$540	
TOTAL INDIVIDUAL EXPENSE		$38,479.75

Computation of the Formula

Taking this basic data and plugging in the audited financial data from 2005, the formula calculation would look like this:

Target Net Income for preceding year		$214,665
MINUS:		
Total Pilotage Revenue		$20,673,996
MINUS:		
Operating Expenses		-$6,615,867
Seattle	-$2,211,757	
Port Angeles	-$592,402	
Pilot Boats	-$2,495,872	
Retirement	-$1,315,836	
Other Expenses		-$2,056,109
Travel Reimbursement	-$837,837	
Individual Business Expense Allowance	-$1,218,272	
PLUS:		
Excluded Expenses		$132,579
MINUS:		
Recapture of previously-approved expenses		$0
Projected change in State fees and/or taxes		$0
Projected Major Capital expenditures or extraordinary expenses		-$981,675
2005 Equipment Line of Credit Interest expense	$23,260	
2005 Equipment Loan Interest expense	$12,934	
2006 Equipment Phase II Line of Credit interest expense	-$10,000	
2006 Equipment loan interest expense	-$38,471	
2006 Seattle depreciation (new assets - net increase for year)	-$74,131	
2006 Pilot Boat Safety Equipment Line of Credit	-$7,121	
Increase in New Pilot Expense Allowance	-$843,146	
Increase in Fuel Costs	-$45,000	
SUBTOTAL - (Net Pilotage Revenue)		$11,152,924
DIVIDED BY:		
Number of Pilots per formula		58
PLUS:		
Compensatory Duty Days (as a decimal of a pilot)		1
TOTAL PILOTS FOR TARIFF FUNDING		59
DIVIDED BY:		
Target Net Income for preceding year		$214,665
SUBTOTAL		11.94%
PLUS:		
Consumer Price Index (CPI) (preceding year)		3.00%
Special Target Net Income Adjustment		1.00%
TARIFF ADJUSTMENT		**15.94%**

9. PUGET SOUND PILOTS' TARIFF REQUEST

PSP Requests a 25.94% Increase in the Tariff

Puget Sound is due for a large increase in pilot income and the timing could not be better. We are on the heels of a steep drop in rates at a time when industry is enjoying unparalleled prosperity – a prosperity based on large ships that have drastically altered the challenges facing the Puget Sound pilot. There will never be a better time to absorb the type of increase that Puget Sound needs to restore competitive pilot earnings. With good applicants turning away from Puget Sound, San Francisco seeking pilots, another exam needed, the merchant marine shrinking and ships being built; the time to act is now.

It is essential that Puget Sound pilot earnings be equivalent to those of other pilots in similar ports handling similar ships. It is essential that Puget Sound resume its role as an attractive place to pilot rather than continue to slip behind other ports. Our marine environment deserves the same protection as the other districts.

Our pilots are entitled to equal pay for equal work. They have the same skills and assume the same growing risks and responsibilities as the pilots in other districts. Other districts have recognized these growing responsibilities and compensated pilots accordingly. Basic economic principles require that we do likewise.

Therefore, PSP requests that the Board enact a rate increase in the amount of 25.94%[25]. This is based on the formula calculation under the old MOU to make up for last year, plus 10% to fund an appropriate increase in Target Net Income.

PSP Requests 2006 Target Net Income of $295,000

There are many ways to determine the appropriate Target Net Income for today's Puget Sound pilot:

- The national average for pilot earnings is $350,000 to $400,000;[26]
- Pilots in Hawaii and Alaska, many of whom handle the same tankers and cruise ships that call on Puget Sound, are at or above the national average;
- 2004 earnings for the San Francisco Bar Pilots are documented at $354,000. 2005 will be available in April 2006 and is expected to be over $400,000;
- Puget Sound pilots move many of the same ships calling in the Bay Area and many of the tankers and cruise ships that call in Alaska;

[25] This is a few points lower than the request in the CR 102 presentation in March 2006. The differences result from using audited financial statement numbers and other slight refinements.
[26] See Quick Testimony, Appendix A – 8-9.

- The disparity that formerly existed between earnings of East and Gulf Coast pilots compared to the West Coast pilots has disappeared.

Therefore, PSP proposes that the Board set Target Net Income for 2006 in the minimum amount of $295,000. This is a larger first year increase than was suggested by PSP in its CR 102 filing in March. The refined financial data and analysis since then makes it clear that a large rate increase is needed and can easily be absorbed.

Ultimately, PSP requests that the Board set TNI be set in the range of the then prevalent national average. This can be addressed in more detail next year when we have the financial results from 2006.

PSP Requests Risk and Efficiency Related Changes to the Tariff

In addition, PSP requests certain changes to the rate structure to more properly reflect the added risks and difficulties of the larger ships and to discourage the inefficient use of pilots by some parts of the shipping industry. These charges are:

Draft Charges. PSP proposes adding a new component to the tariff to partially reflect the increased risk of the newer, deeper ships to the pilots. Unlike many other pilotage grounds, Puget Sound does not currently have draft charges. Draft charges reflect the fact that vessels with significant draft are more difficult to maneuver, present more risk and often must be moved more slowly. They should be charged more than vessels with less draft.

PSP suggests a draft charge of $10 per foot of draft. As this money would go toward calculating net income, after 2006 it represents only a reallocation of income – not an increase in revenue. In 2005, the total combined draft of the ships moved was approximately 260,000 feet (31.83 feet average). This new charge would generate approximately $1.3 million in additional revenue during the last 6 months of 2006.

Boarding Fees. PSP proposes that these fees be doubled from their current level of $35 per boarding and deboarding at Port Angeles. This will more closely approximate the cost of providing the pilot boat service. It is only fair that the ships that use this service pay more of the cost of the service. As this money would go toward calculating net income, after 2006 it represents only a reallocation of income – not an increase in revenue. In 2005, the total revenue from this source was $209,000. This new charge would generate approximately $104,000in additional revenue during the last 6 months of 2006.

Hourly Charges. One of the impacts of the recent large reductions in the tariff is that the tariff charges based on hours of pilots' time, e.g. standby, late arrival and delay fees have become so low as to be meaningless.

The current charge for these fees is $118 per hour. These fees need to be higher to discourage the inefficient use of pilots. We have a pilot shortage and

assignments utilizing pilots inefficiently should be asked to pay more. It makes no sense to take a pilot out of circulation for $118 per hour. The Board has been made aware of situations where pilots have been tied up for hours waiting for an assignment to start. This needs to be discouraged.

We suggest doubling these fees and increasing the hourly rate by an additional 15% for each hour of delay after the first one. Thus the first hour would cost $236; the second $271; and the third $312, etc. As this money would go toward calculating net income, after 2006 it represents only a reallocation of income under the formula – not an increase in revenue. 2005 revenue from these time charges was $215,132. This would add approximately $108,000 in revenue for the second half of 2006.

Travel Charges. Currently, the tariff provides that cancelled jobs only have one way travel time if cancelled before the time the pilot was ordered to arrive. This is unfair to pilots who take the initiative to leave, often many hours before the job is to begin, to make sure that they get through surface traffic and arrive on time. We are suggesting that the travel provisions for cancelled jobs be changed to provide that if a job is cancelled after the travel time to the job begins, that transportation be round trip.

Puget Sound Pilots looks forward to addressing the issues raised in its rate increase request at the upcoming May 11, 2006 hearing.

Respectfully Submitted

Puget Sound Pilots

PUGET SOUND PILOTS
Protecting your waterways since 1935

APPENDIX A TESTIMONY

Captain Andy Coe Testimony

I have been a Puget Sound pilot since 1991. In attending recent Pilotage Commission meetings I have heard the statement made by industry representatives, that the modernization of ships and the addition of new electronics has made these massive container ships and tank vessels less risky and less stressful to the pilot. It all sounds great on paper, but in the real world of day-to-day piloting, it is not true.

Some of the new tankers and cruise ships have quite a bit of advanced technology equipment on the navigating bridge. This equipment can be very helpful and is another source of information. However, electronic chart and display systems and AIS systems are also more tools the pilot has to manage and present challenges of their own. They can be a help when they are used properly and a huge distraction and hindrance when they are not. Both systems come with many different possible errors, from the initial installation to operator input in the set-up.

The biggest problem I come across is what is happening to the crews from the Captain on down. They are becoming overly reliant and confident on electronics, which are often inaccurate. They have stopped looking out the window in critical situations and often rely on the machine instead of what they see or what I tell them. It is becoming more regular that I have to tell the crew members to quit looking in the box and pay attention to what I am saying and what is happening to the ship.

For example, the mate has a crucial role during docking. Sometimes, when he should be at the engine controls, he will instead be looking at the ECDIS or AIS, trying to answer alarms or inputting information on a keyboard. In situations such as this, the modern equipment requiring attention is distracting him from what the mate should be doing. These distractions are one more issue the pilot has in his environment that needs managing.

Risk from a pilot's point of view is directly related to size of the vessel in many ways - from bottom clearances in waterways and alongside berths, to how much room you have for error in any maneuvering situation. Larger ships are more difficult to pilot and maneuver and by and large, the electronic equipment does not affect the physics of how the ship handles. ECDIS and AIS don't help with many of the assessments that a pilot has to make in close quarters situations, like docking or transiting the narrow waterways. The ship's relation to wind and current, its mass and momentum are what matter to the pilot in these critical situations. The bigger the ship, the less room for error, the more risk to the pilot and the State.

A small minority of the ships we handle have more advanced propulsion and

control systems such as twin screws, Azipod and Kamewa. These systems are wonderful advances and are helpful in handling the ship. If you took two ships that were identical except that one had Azipod and the other had traditional propulsion, the Azipod ship would be easier to handle. However, the advantages offered by these new systems have been far outweighed by the difficulties presented by the increase in the size of the ships. Even with these new systems, the larger ships are more challenging and stressful to pilot than the older smaller ships.

I have also heard industry say that new tugboat technology and power reduces our risk. Again this is nice on paper, but misleading at best. Tugboat improvements always come after the pilots demand it. Pilots demand it because the size of the ships requires it. For example, as tractor tugs became more available, they were an improvement in helping us handle the larger ships in tight quarters. The pilots' world changed for the better. But, then the ships got bigger again – as they always do - and we found the limits of these new tugs. Bigger tugs were built and the risk went down until the ships got bigger. Again bigger ships, found new limits and bigger tugs were built.

The bigger and newer tugs that come after the ships that need them are always the response to the pilots' assessment of risk. When we feel it is not safe anymore, we drive the industry to make changes. We are the experts at making these safety judgments, and it always cost the industry money. Our new waterway guidelines, which were challenged by industry early on as too expensive, have already saved one possible tragedy. Industry has already quantified the cost of these new guidelines and presented it to the Board as a cost associated with pilots. When a job becomes too risky and unsafe, the pilots demand the change. When the change comes it reduces the pilot's risk back to a level that we can live with.

Signed this 11 day of April, 2006 at Seattle, Washington under the laws of perjury of the State of Washington.

Frank Coe

Captain F. Anderson Coe

Capt Delmar G. Mackenzie Testimony

I have been a Puget Sound pilot since 1987. During that time I have piloted vessels of all sizes, starting with what now appear to be smaller ships and growing to those that we see today. When I first started, my most typical ship was a log ship that might have been 525 LOA with a beam of 82 feet. Tonnage would have been in the vicinity of 12,000 GT. Container ships at this time would have averaged about 750 feet in length with a 105 foot beam and perhaps 35,000 GT. During the last 10 years, there has been a significant increase in the physical size of the ships. This has been most noticeable in the container ships but we have also seen the increase in car ships, tankers and bulk ships.

The waterways leading to the berths visited by these container ships within our ports have not changed in dimensions except depth in many years. Because of the narrow waterways and the increased size of ships transiting these waterways, the pilot's margin for error has been greatly reduced over the years.

For example, the Blair Waterway in Tacoma has very large vessels calling, ranging from 7,402 TEU container ships to 120,000 DWT tankers. These ships are more than double the size of vessels calling there ten years ago, but the waterway dimensions haven't changed. Those dimensions range from 650 feet wide at the entrance narrowing to 355 feet midway up the waterway, then between 520 feet to 600 feet wide until reaching a 1,400 foot turning basin. Berths for other ships line the waterway. The ships' beams moored alongside range from 90 feet to 133 feet, narrowing the waterway further. With container crane booms down, the distance is further reduced. A 7,402 TEU container ship has a length of 1,000 feet and a beam of 141 feet. The vessel must be kept to a transit speed of 3.5 to 4 kts., although its slowest engine command is 7 kts. To reduce the ship's speed, a tug of considerable bollard pull (50 ton) is hooked up astern and used as a brake. As the tug pulls back on the ship, it reduces the ship's headway but also makes it more difficult to steer the ship because of the tug's drag on the ship's stern. So even on a no-wind clear day the transit is considered a demanding job.

Tugs and tug management have always been an issue on these waterway jobs. The tugs have gotten more powerful over the years, but on balance it is more challenging today to pilot the large ships even with the new tugs than it used to be to pilot the smaller ships with the older tugs. The newer ships with their increased mass are much more difficult to maneuver in the waterways.

Now add wind to the scenario. Wind in Tacoma is usually SW, which is directly on the beam of the vessels transiting the Blair. These large ships have a very large sail area – the more sail area, the more wind effect. Many of the larger ships today have wind scale charts posted on the bridge. A 7,400 TEU container ship loaded on the westbound voyage, exposes approximately 8,000 sq. meters of sail area to the wind. A smaller container ship such as Evergreen's Zeus II is 2,728 TEU's and would present about 5,000 sq meters of area to the wind. On the larger ship, 12 knots of wind would require 15 tons bollard pull to offset it. On the smaller ship, this wind would apply 9 tons of force to the ship. A doubling of the wind speed quadruples the force of the wind on a ship. Thus, a 24 knot wind

would apply 60 tons to the larger ship and 36 to the smaller. The larger ship is much more impacted by the same increase in wind.

In the Blair Waterway if the wind is blowing we cannot keep the ship in the center of the channel. The vessel must be kept on the windward side of the channel, thus passing very close to moored vessels (within 100 feet to 150 feet), with the ship's engines and rudder working with the tug's power to offset the wind force. A common technique for dealing with wind in waterways is to angle the ship with the bow slightly into the wind. This puts less demand on the tugs and allows the pilot to keep tug power in reserve in case it is needed. This technique is not available to us anymore with a 1,000 foot x 141 foot container ship. This ship is so large that it sweeps an area 240 feet wide if put at a 5 degree angle. Thus, we have lost one of the most commonly used techniques to mitigate wind on the beam with these larger ships.

When loaded, these very large ships are much deeper than previous generation container ships and are restricted in their maneuvering due to less under keel clearance. Ships with limited under keel clearance have a tendency to interact with the bottom more. Docking a vessel is basically an exercise in steering and stopping and this interaction with the bottom makes these large ships harder to steer and stop.

Another added problem with large ships is the blind area created by the stacked containers on deck forward and aft of the wheelhouse. Standing in the middle of the wheelhouse in the waterways, the pilot cannot see either side of the waterway or up to one ship's length ahead.

Larger ships are more difficult to pilot for many reasons. It would be safe to conclude that the difficulties stem from the large ships sheer mass over smaller ships. In order to achieve the speed needed for the large container ship of today, their propulsion plants are enormous (e.g. 90,000 hp), with propellers over 8 meters in diameter and a dead slow bell of 7 kts. You can no longer just give a small kick ahead to maneuver the vessel short distances alongside a dock. These large ships have considerable thrust when the main engine is started, and the turbulence from the propeller can be dangerous to the tug if not warned in advance. If unexpected, the tug can be pushed out of position and/or possibly break his head line just from the sheer force of the propeller wash.

This detailed example of some problems in piloting in the Blair Waterway is repeated and extended to various scenarios throughout all Puget Sound ports. Larger ships simply present larger problems with less margin for error.

Signed this 11 day of April, 2006, in Seattle Washington under the perjury laws of the state of Washington.

Capt. Delmar G. Mackenzie

Captain Stephan E. Moreno Testimony

Testimony of Captain Stephan E. Moreno in connection with the May 11, 2006 tariff setting process of the Washington State Board of Pilotage Commissioners

I am an Alaska State licensed marine pilot and a member of the Alaska Marine Pilots, LLC (AMP). I am 48 years old. My work is centered in the Western Region of Alaska and I reside in Olympia, Washington. I graduated from the California Maritime Academy in 1981 with a degree in Nautical Industrial Technology and a Third Mates license.

After Cal Maritime I went to sea as Third Mate for the Military Sealift Command. I became a Second Mate with the US Army Corps of Engineers in 1985, Chief Mate in 1988 and Master in 1990 on the SS Ocean Phoenix. I currently hold an Unlimited Masters license with pilotage endorsements for Western Alaska, Puget Sound, Columbia Bar and River, and San Francisco Bar and Bay. In 1991 I joined AMP and started piloting in Alaska. Over the years I have been served on the Board of Directors and as President of AMP twice.

In 1997 I started riding in Puget Sound for my federal pilotage. I obtained my pilotage license for all Puget Sound ports and waterways in 2000. When I started riding in 1997, I fully expected to take the next available Washington State pilotage exam upon completion of my federal pilotage. It really wasn't until the middle of 2005 that I decided not to take the Puget Sound pilotage examination. There is no one factor that dictated this decision, but important factors were the lower pilot earnings, the workload and the schedule of the Puget Sound Pilots. If any of these factors changes in the near future I will certainly reconsider my decision. But my current situation in Western Alaska is significantly better.

When I applied to ride nine years ago, Puget Sound was a more attractive place to pilot than it is now. The earnings in Puget Sound were more consistent with those of other pilotage districts and were higher than what I was earning in Western Alaska. And, of course, I live here in Washington, which made it attractive. However, in the last few years April 11, 2006there has been a complete reversal of the relative pay scales. To remain competitive in the market for highly qualified pilots and retaining those pilots income has to be reflective of industry standards. Comparatively, Puget Sound Pilots is lagging significantly behind these income standards. At this point in my career, I simply cannot consider the reduced earnings that a move to Puget Sound would require.

There are always candidates willing to become a pilot. But for Puget Sound Pilots and more importantly the State of Washington to attract the highest qualified pilots industry standards must be maintained. There is an ever-declining pool of highly qualified pilots in the United States and to attract these top candidates income must be consistent with industry standards. The State of Washington or for that matter any pilotage jurisdiction should not compromise the selection process just to fill the ranks.

In summary, recent legislative changes to the laws governing pilotage in Washington have raised the standards for becoming a pilot in Puget Sound. However, unless income is commensurate with these standards the current difference in income between Puget Sound and most other pilot groups is a strong deterrent to top candidates who are considering a career move. For me the decision was not easy considering the amount of time and effort spent preparing for the exam. In the end I could not ignore the compromises to my income and other factors that a move to Puget Sound would have brought at this point in my career.

Signed this 11th day of April 2006 at Olympia, Washington under penalty of perjury under the laws of the State of Washington.

Capt Stephan E. Moreno

Capt George A. Quick Testimony

Before the
Board of Pilotage Commissioners of
the State of Washington

Testimony of
Captain George A. Quick, Vice President, Pilot Membership Group
International Organization of Masters, Mates and Pilots
May 11, 2006

My name is George A. Quick and I am the vice president of the International Organization of Masters, Mates and Pilots. Our organization represents the masters and deck officers on U.S. flag ships and pilots throughout the United States. I head the Pilot Membership Group of that organization and as part of my duties I liaison with pilot associations around the nation and keep them informed of events in the pilotage community. I monitor ongoing events including rates and regulations in the various States. As a result I am generally familiar with conditions and standards that prevail in pilotage throughout the United States.

Pilot earnings

In establishing pilotage tariffs a major consideration is always comparable earnings of similar professionals doing similar work under similar conditions. This inevitably leads to a comparison of the earnings of those pilots seeking a tariff adjustment with the earnings of pilots in other ports.

It is impossible to precisely pinpoint the earnings of pilots in other ports though out the United States. Pilots are professionals working on a fee for service basis so their earnings vary with ship traffic levels and the size of the ships serviced. Also, pilot earning levels are not generally disclosed on the public record except in the context of proceedings to establish pilotage tariffs. Over the past five years there have been very few tariff proceedings on the

record in the United States. The last round of pilotage tariff proceedings about five years ago ended with many associations receiving multi-year tariffs adjustments, or automatic tariff adjustments based on the changes in the consumer price index (CPI). The result is that there have been few tariff proceedings and little data in the public record within the last five years on current pilot earnings in other ports.

During that last series of increases the Louisiana Public Service Commission (LPSC) under a guideline that required "*comparison to regulated state ship pilotage in other United States ports*" authorized its Division of Economic and Rate Analysis to conduct an evaluation based on recognized standards of economic and statistical theory to determine pilot compensation at other ports in the United States. Based on the results of that evaluation the LPSC approved annual pilot compensation of $314,100 in 1999 with an annual automatic tariff adjustment tied to the five year rolling average increase in the CPI. [1]

In 2001 the Port Everglades Pilot Association retained Mercer Management Consulting, a well known national consulting firm specializing in executive compensation issues, to prepare a report on pilot compensation levels in the Gulf Coast and Southeast region of the United States. The report was submitted to the Florida Pilotage Rate Review Board at a hearing for a tariff adjustment in April of 2001.[2] That report indicated that in the year 2000 pilot compensation levels for the 15 pilot associations' covering 505 pilots out of the 1,150 pilots nationwide ranged between a low of $300,000 to a high of $475,000.

One of the results of multi-year or automatic tariff adjustments based on CPI is that many pilot associations are receiving annual increases as a matter of course without going through formal tariff proceedings. In 2000 we had relatively hard data to estimate that pilot compensation nationwide, for a majority of pilots

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[1] LPSC Docket No. T-23268, Stipulation dated 2/19/99
[2] Mercer Management Consulting Report for PEP Rate Application, dated April 26, 2001

was in the $300,000 to $350,000 range. Since then we have seen pilot compensation increases brought about by both increases in the CPI and increases in the size of ships calling at United States ports. These two forces combined have had the effect of increasing the earnings of many pilot groups. I believe it is a fair assumption, based on my experience and familiarity with what is happening in the Pilotage community, that current pilot compensation levels for a majority of State licensed pilots falls in the $350,000 to $400,000 range.

At one time pilots on the West Coast had compensation levels that were generally below the Gulf Coast and East Coast pilots. That was due, at least in part, to the Tariff Net Income (TNI) rate setting methodology that gave some West Coast pilots certainty in earnings in return for giving up the rewards and risks that might come about as a result of changes in shipping traffic. Over the last five years there has been an unprecedented boom in shipping traffic on a global scale coupled with an ever increasing size of the ships being piloted as shipowners increased productivity through economy of scale. The result for pilots under TNI rate setting was a lowering of the pilotage charges relative to the tonnage being carried in a booming shipping environment. While for pilots not under TNI the result has been increasing pilot compensation as traffic and ship sizes increased. We see the latter as fair participation by the pilot in the productivity gains that are made possible, at least in part, by the increased professional demands place on the pilot in handling these new extremely large ships.

San Francisco has gone away from the TNI and opened up the opportunity for pilots to be compensated for their contribution to the increase in productivity. As a result San Francisco pilot compensation in 2004 was $354,000. Compensation figures for 2005 have not yet been made public but it is anticipated that they will be considerably above 2004 levels. I believe that, except for Puget Sound and the Columbia Bar and River, most State licensed pilots on the West Coast, including Alaska and Hawaii, are now within or close to the same pilot compensation range as the rest of the United States.

Need for comparable pilot compensation

There are few people in the world who are given the degree of direct responsibility for life, property or for the environment that is entrusted to a maritime pilot. The decisions of a pilots, based on their experience and judgment - if wrong – can result in maritime casualties and losses in the tens, if not hundreds, of millions of dollars. This is generally recognized by pilotage commissions and similar regulatory bodies across our country. They place enormous importance on attracting the very best candidates from among maritime professionals into the pilotage service. This is one of the reasons pilots are well compensated.

In the current political climate with a public that has zero tolerance for maritime accidents that cause environmental damage there is no room for anything other than the highest achievable standards in maintaining a State regulated pilotage system. The most cost effective way of addressing maritime casualties and resultant oil pollution is investing the resources in preventing them from happening in the first place. Historically compulsory Pilotage laws have been the primary port safety system and the most effective defense against maritime casualties.

Pilot associations attract applicants from a number of different sources. The few associations that require applicants to have full federal pilot licensing in the district – especially if there are a number of ports in the district – tend to attract mostly local applicants. This has historically been the case in Puget Sound. It is my understanding that Puget Sound is shifting to the more usual practice of incorporating federal pilot licensing into the pilot training program. Nationwide most pilot associations have federal pilot licensing as one of the first steps in their training programs. As a result they open up the process to a much broader group of mariners. Applicants are drawn from a mobile national pool of younger masters and officers that routinely apply for all openings that they are aware of throughout the nation. There are 24 coastal States and well over 50

pilot associations. If you total all the applicants on the lists of pilot associations around the United States they would probably number in the hundreds. But, the total number of applicants on all lists is deceiving as many applicants are on multiple lists. Because of my position, many of them initially contact me for information on potential openings and I usually give them a list of all the pilot associations and recommend that they apply everywhere there is a possibility of an opening and acceptance.

With all the multiple applications taken into account, I would estimate that there is really only a pool of less than 100 applicants nationwide from the deep-sea sector of the industry. Perhaps 40-50 of those would be candidates that most pilot associations would consider suitable. The low number is not surprising when you consider that the U.S. merchant marine is in serious decline because of the shift of international trade to Flag of Convenience shipping to escape American taxes and regulations. We only have 209 U.S. deep-sea commercial ships left. A ship has a captain and three officers for a total of four positions per ship or a little over 800 officer positions in the commercial deep-sea sector of the industry. To put those numbers in perspective there are about 1150 State licensed pilots in the United States. There are now as many or more State licensed pilots in the U.S. as there are available positions for masters and officers on U.S. deep-sea ships. Because of vacations, training, personal and medical leave, and other factors, those 800 positions are shared or rotated among a pool of about 2,500 licensed masters and deck officers.

Attracting deep-sea masters or experienced senior officers to piloting is not easy. Pilotage commissions competing for the best applicants must deal with the fact that masters are well compensated with good salary, benefit and vacation plans. For example, compensation under our current contract with Horizon Line, which serves Puget Sound, provides the following for the master on an A-3 class ship:

Total daily shipboard compensation	$1,503.41
Less pension contribution	183.64

Less misc. contributions for training, etc.	33.47
Net daily compensation	$1,286.30
Annual number of shipboard days	182
Net annual compensation	$ 234,106.60*

*There is an increase effective June 1, 2006 of 3% on wage related items that will increase the net annual compensation to $241,129.80.

The master receives medical insurance coverage as a non-taxable benefit under a MM&P Health Plan funded by employer contributions. The master also participates in a employer funded MM&P Pension Plan that provides a pension at any age after 20 years service based on 2% for each year of service for the first 20 years and 2 ½ % for each additional year, i.e., after 20 years the pension benefit would be 40% of his last wages and after 30 years it would be 65% of last wages. The Pension Plan has a provision that prohibits a retiree from working on his license to avoid the pension plan subsidizing a retiree who continues to work in a licensed capacity for another employer. This provision would freeze pension payments to retired officers while they work as pilots to avoid "double dipping". A relatively young retiree choosing a second career has to factor this into the equation when deciding on a second career as a pilot.

Pilotage associations must offer net compensation substantially in excess of these typical compensation packages to attract highly qualified individuals to piloting. There are many reasons for this.

In a nationwide pool of pilot applicants the best qualified and most desirable candidates will compete for the openings in the pilot associations that have the highest income and best working conditions. Locality, climate, cost of living, personal preferences as to life style, etc, will play a part but the compensation package offered is always a major consideration. A pilot association that is below the nationwide norms for pilot compensation and not significantly above the current earnings of shipmasters will have little to offer the most desirable candidates to change their career paths.

Becoming a fully qualified pilot, regardless of the past experience or license held by the candidate, requires a long period of time at substantially reduced income. The eventual income of a fully qualified pilot must make up for the years of lost income during initial training and reduced income on limited licenses as experience is gained to qualify for full share earnings.

Masters or senior officers have a substantial vested interest in pension plans maintained by employer contributions. Those pension rights are not transportable and are lost if the employee leaves the employment of the companies in the joint industry wide pension plan. Even a relatively young master or chief officer will have 10 to 15 years of pension credits that he will forfeit after three years of broken service if he enters a pilot training program. The pilot compensation package must be sufficient to offset that loss.

There are a number of non-economic factors that an applicant will consider in changing his career goals from shipmaster to pilot.

- Boarding or disembarking, often under adverse weather conditions, from small boats with a hazardous climb up a rope ladder to the safety of the ship's deck can often be a feat of near heroic proportions. A pilot, quite literally, puts his life on the line to service the ships he pilots. There is no comparable risk on the part of the ship's master.
- Out of the approximately 1,150 pilots working in the United States, two to three are lost each year in boarding accidents. This may not seem like a high percentage on an annual basis, but if a pilot has a thirty year career, his odds of being lost in a boarding accident are about one out of 20. A pilot lives with this knowledge on his mind, and in the mind of others familiar with the hazards, this risk alone is sufficient justification for his income.
- The physical demands and agility required in boarding or disembarking places a further burden on a pilot apart from death or

physical injury. A physical disability that would be of minor concern to a master or someone in a management position can easily cut short a pilot's career.

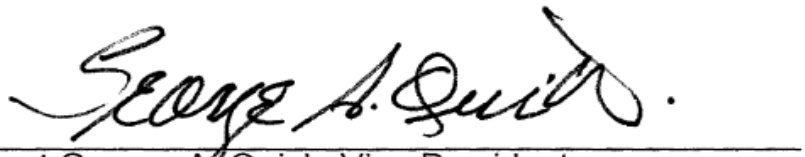
- Pilots have charge of ships during the most hazardous part of the voyage when it is most vulnerable to casualties from groundings or collisions. That is the very reason pilots are required with their highly specialized skills. They work in a high risk and high stress environment where success or failure can have immediate consequences. It can be a satisfying challenge, but the impact of an error can be disastrous. Not everyone is suited for an adrenaline charged stress filled environment.
- Pilots in pilot associations are not wage earners on a salary. Although regulated, they are essentially self-employed with the risks and liabilities that flow from that status. They are directly exposed to the financial consequences of their actions, without the protection of an intervening company or municipality.

In any discussion of appropriate pilot compensation it is not unusual to have comparisons with masters earnings raised as a guideline. As you can probably ascertain from the comments above, we do not consider master's earnings to be an appropriate guideline. It may be a useful benchmark as to what is happening in one sector of the industry, but for all the reasons we have outlined average pilot net income nationwide is more than 50% above that of deep-sea masters

One method of determining a professional fee is the value of the service rendered. An appropriate question to consider is the value of bringing safely through the most hazardous part of the voyage a ship and cargo that may be worth several hundred million dollars or carrying several thousand passengers and accomplishing it on schedule with a casualty rate approaching zero. What is it worth relative to the ship's total revenue or operating costs? What is it worth relative to the increased insurance premiums if pilots were less skilled or not

available? What is the service worth relative to similar services in other ports? And finally, what is it worth to the shipowner to assure the public that his ship is under the control of the best qualified and competent pilots available when it is transiting environmentally sensitive local waters?

Signed this 12th. day of April in Baltimore, Maryland, under penalty of perjury under the laws of the State of Washington.



Capt George A. Quick, Vice President
International Organization of Master, Mates and Pilots

APPENDIX B - DATA

Target Net Income Since 1984 in then current dollars

(unadjusted for inflation)

1984	$103,425
1985	$103,425
1986	$105,425
1987	$105,425
1988	$105,425
1989	$110,000
1990	$117,500
1991	$125,000
1992	$133,271
1993	$139,000
1994	$139,000
1995	$148,535
1996	$157,536
1997	$167,713
1998	$172,577
1999	$177,582
2000	$182,909
2001	$192,237
2002	$198,965
2003	$205,133
2004	$208,210
2005	$214,665

Average Vessel Tonnage per Assignment

Puget Sound Pilots
1984-2005

1984	20,848
1985	20,850
1986	21,395
1987	23,067
1988	24,507
1989	26,028
1990	25,961
1991	26,460
1992	26,990
1993	27,879
1994	29,036
1995	29,432
1996	30,218
1997	31,489
1998	32,915
1999	34,075
2000	35,555
2001	38,099
2002	39,771
2003	41,397
2004	42,036
2005	44,138

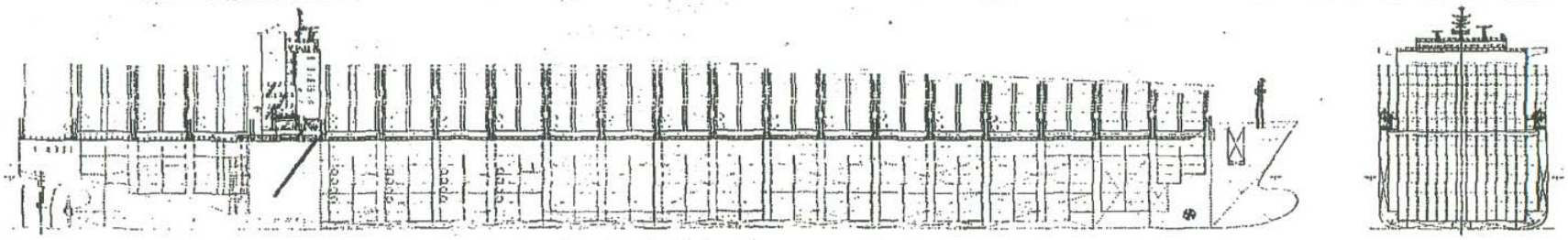
Comparison of Ships 1996 – Today

1996 VESSEL	CURRENT VESSEL	DATE PUT IN SERVICE	1996 GROSS TONS	CURRENT GROSS TONS	% IN-CREASE	1996 LOA	CUR-RENT LOA	% IN-CREASE	1996 BEAM	CUR-RENT BEAM	% IN-CREASE	1996 MAX DRAFT	CUR-RENT MAX DRAFT	% IN-CREASE
PRESIDENT HARRISON	APL BELGIUM	2004	30,836	65,792	113%	820	910	11%	100	131	31%	38	46	21%
OVERSEAS ALASKA	ALASKAN FRONTIER	2004	32,418	110,693	241%	731	942	29%	106	164	55%	43	62	44%
EVER GENIUS	HATSU SIGMA	2000	37,033	75,246	103%	757	984	30%	106	141	33%	38	47	24%
NUOVA LLOYDIANA	EVER UNITED	2005	35,629	69,218	94%	760	935	23%	106	131	24%	41	41	0%
HANJIN KEELUNG	HANJIN YANTIAN	2005	36,266	83,133	129%	791	984	24%	106	141	33%	38	48	26%
GOLDEN GATE BRIDGE (K-Line)	VANCOUVER BRIDGE	2005	34,846	54,519	56%	749	965	29%	106	106	0%	38	44	16%
MAERSK VANCOUVER	KNUD MAERSK	2006	34,382	81,488	137%	781	1045	34%	100	141	41%	40	46	15%
MANUKAI (Matson)	MANOA	2003	23,785	37,811	59%	721	860	19%	95	106	12%	34	35	3%
ALLIGATOR PRIDE	MOL EFFICIENCY	2001	41,126	53,822	31%	804	965	20%	106	106	0%	38	44	16%
OOCL FRONTIER	OOCL JAPAN	2003	57,393	66,046	15%	950	906	-5%	106	131	24%	42	46	10%
ARCO TEXAS	POLAR ENDEAVOUR	2002	47,766	85,387	79%	899	895	0%	106	152	43%	48	57	19%
GREAT LAND (Tote)	MIDNIGHT SUN	2002	31,515	65,314	107%	791	839	6%	92	118	28%	29	29	0%
	AVERAGE				**97%**	**796**	**936**	**18%**	**103**	**131**	**27%**	**39**	**45**	**16%**

Samsung Ship Specifications

SAMSUNG HEAVY INDUSTRIES CO., LTD. GEOJE SH. ARD
530, Jangpyeong-ri, Sinhyeon-eup, Geoje-si Gyeongnam, Korea, 656-710
E-MAIL : chullyun@samsung.co.kr
HOMEPAGE : shi.samsung.co.kr

SAMSUNG HEAVY INDUSTRIES



MAIN PARTICULARS

Length over all	Max.	334.0	m
Length between perp.		319.0	m
Breadth		42.8	m
Depth to main deck		24.6	m
Draught, design		13.0	m
Draught, scantling		14.5	m
Deadweight on Td		apprx. 81,300	T
Deadweight on Ts		apprx. 98,700	T
Service Speed		apprx. 25.2	kts

(scantling draught, 90% MCR, 15% power margin)
AIR DRAFT 48.0 M
Class : GL, ⊡100A5, Container ship, ⊛MC, AUT, IW, "SOLAS II-2, Reg. 19".
G/T 90,466 NT 66,478

TANK CAPACITIES

Heavy fuel oil	apprx. 10,800	m^3
Marine diesel oil	apprx. 400	m^3
Lubricating oil	apprx. 600	m^3
Fresh water	apprx. 400	m^3
Ballast water	apprx. 24,500	m^3

COMPLEMENT Crew of 29 P + 6 Suez

MAIN ENGINE

Wartsila NSD Licensee made 12RTA96C
MCR 93,360 BHP/102 RPM
Fixed-pitch propeller 6 Blades

Bow thruster 1 x 2,500 kW

FUEL OIL CONSUMPTION

(L.C.V=10,200kcal/kg)
D.F.O.C at NCR apprx. 247.8 MT/day

(L.C.V=9,800kcal/kg)
Cruising range apprx. 20,200 NM

POWER SUPPLY

Diesel Generators 3 x 2,195 kW, 2 x 2,820 kW
Emergency Generator 1 x 500 kW

CARGO HATCH COVER

Type : Steel pontoon type

Stack weight : 90MT/20ft & 120MT/40ft
Panel weight : Max. 40.0 MT of each panel
(excluding container loose fittings)

CONTAINER CAPACITIES

With max. number of Containers

	IMO visibility guidance
On deck (6/7 tiers)	3,792 TEU / 4,213 TEU
In hold	3,860 TEU
Total (6/7 tiers)	7,652 TEU / 8,073 TEU
Rows max. in holds/on hatches	15/17 Rows
Tiers max. in holds/on hatches	9 / 7 Tiers

El. Plugs (for reefer Container)

On deck	500 FEU
In hold	200 FEU
Total	700 FEU

Stability(10T/TEU homo. at Ts) : apprx. 7,660 TEU
(based on 8ft 6inches, 45% Container V.C.G)
(14T/TEU HOMO 6,170 TEU)

NAVIGATION EQUIPMENT

3 - Radar scanner 2 - DGPS
1 - Auto Pilot 2 - Gyro compass
1 - VDR, 1 - AIS

GROSS TONNAGE apprx. 90,300 GT

CONTAINER SHIP SAMSUNG 8,100 TEU

Project No.	HN1512s
Revision No.	01
Date	2003. 05. 09

Total Ship Tons Moved per Pilot 1984 to 2005

Puget Sound Pilots

	Ship Tons Moved Per Pilot
1984	4,208,653
1985	4,082,342
1986	4,122,351
1987	4,310,379
1988	4,275,479
1989	4,646,247
1990	4,504,259
1991	4,411,626
1992	4,460,232
1993	3,967,466
1994	4,251,762
1995	4,574,081
1996	4,765,833
1997	4,647,735
1998	4,275,928
1999	4,887,862
2000	5,537,249
2001	5,141,907
2002	5,433,671
2003	5,956,272
2004	6,267,513
2005	7,148,572

Tacoma Harbor 5 year history of cargo volumes handled: 2001 – 2005

	2001	2002	2003	2004	2005
Containerized cargo in TEUs					
Total International TEUs	827,356	986,883	1,250,850	1,289,388	1,551,678
Total Domestic TEUs	492,917	483,951	487,217	508,172	511,586
Grand Total TEUs	1,320,273	1,470,834	1,738,067	1,797,560	2,063,264
Metric Tons by category					
Total Containerized Metric	9,127,990	10,193,423	12,287,847	11,491,031	12,825,653
Non-containerized breakbulk					
Autos					
Metric Tons		0	0	0	0
No. of Units		0	0	0	0
Grain	4,099,912	3,461,530	4,537,522	6,688,026	6,968,666
Petroleum					
Molasses					
Tallow	0	0	0	0	0
Grand Total Tonnage	**14,452,817**	**14,531,925**	**17,370,952**	**18,817,129**	**20,388,046**
Vessel Calls	1067	1043	1,029	1,065	1,163

Seattle 5 year history of cargo volumes handled: 2001 – 2005

	2001	2002	2003	2004	2005
Containerized cargo in TEUs					
Int'l Import full TEUs	497,068	537,504	542,863	704,664	846,311
Int'l Export full TEUs	329,390	358,521	348,856	387,503	484,997
Int'l empty TEUs	226,331	277,223	293,062	374,084	414,490
Total International TEUs	1,052,789	1,173,248	1,184,781	1,466,251	1,745,798
Total Domestic TEUs	262,320	265,624	301,684	309,607	342,131
Grand Total TEUs	1,315,109	1,438,872	1,486,465	1,775,858	2,087,929
Metric Tons by category					
Total Containerized Metric Tons	9,941,504	9,704,293	9,790,946	11,767,710	14,460,124
Non-containerized break bulk	220,427	174,780	117,725	149,749	144,280
Autos					
Metric Tons	52,173	0	0	0	0
No. of Units	30,534	0	0	0	0
Grain	2,714,874	1,679,821	3,107,732	3,877,991	5,049,107
Petroleum	1,591,481	1,098,352	909,879	853,756	874,475
Molasses	52,917	53,349	46,814	43,541	36,874
Tallow	0	0	0	0	0
Grand Total Tonnage	**14,573,376**	**12,710,597**	**13,973,296**	**16,692,747**	**20,564,860**
Vessel Calls	964	990	1,012	1,094	1,345

Source: Poort of Seattle Web Page, from Port of Seattle Container and Tonnage St Reporting System

Fact Sheet: New Container Cranes

Source: Port of Seattle Web Page

What:
The arrival of four new 385-foot high container cranes owned by SSA Terminals at the port of Seattle's Terminal 18.

When:
Sunday, April 2, at approximately noon.

Where:
The vessel will berth at Terminal 18 and begin unloading the cranes on Monday, April 3.

Details:
The four, fully-assembled container cranes will provide a dramatic visual image a they steam into Elliott Bay aboard the Zhen Hua 1, a specially-built ship designed for hauling cranes and other cargo handling equipment.

Size

Height: Boom up, 385.5 feet
Height: Apex, 242 feet
Outreach: 203 feet or all the way across a containership that is 23 containers wide. That is 85 feet or 10 containers wider than the cranes they replace.
Weight: 1,200 ton apiece
Lifting Capacity
65 long tons - the equivalent of ten adult African elephants
Trolley Speed

- 800 feet per minute. Trolleying moves the containers horizontally along the boom.

Hoist Speed

- 395 feet per minute with a container, 590 feet per minute without a container. Hoisting lifts the containers vertically.

Ship Construction Schedule

FIGURE 14. CONTAINER LINERS PLANS FOR NEW SHIPS FOR NORTH AMERICAN & EUROPEAN ROUTES

	Containership fleet End of 2005		New ships											
			CY06E						CY07E		CY08E		CY09E	
			Total		Already added		To be added							
	No. of ships	'000TEU	No. of ships	'000TEU	No. of ships	'000TEU	No. of ships	'000TEU	No. of ships	'000TEU	No. of ships	'000TEU	No. of ships	'000TEU
TNWA Total	91	448.3	7	46.7	0	0.0	7	46.7	17	101.8	17	118.3	0	0.0
MOL	22	112.4	2	12.7	0	0.0	2	12.7	9	55.5	6	48.6	0	0.0
APL	42	201.7	0	0.0	0	0.0	0	0.0	2	11.8	2	11.8	0	0.0
Hyundai	24	118.5	5	34.0	0	0.0	5	34.0	6	34.5	9	57.9	0	0.0
Grand Alliance Total	129	695.7	18	126.7	3	22.7	15	104.0	27	172.4	9	63.5	2	13.0
NYK	33	164.8	0	0.0	0	0.0	0	0.0	16	104.0	5	37.3	2	13.0
OOCL	27	161.7	10	61.9	2	14.0	8	48.0	8	42.6	2	9.0	0	0.0
Hapag-Lloyd	20	122.9	3	25.6	1	8.8	2	16.8	3	25.8	2	17.2	0	0.0
MISC	4	16.6	5	39.3	0	0.0	5	39.3	0	0.0	0	0.0	0	0.0
P & ON	41	212.9	-	-	-	-	-	-	-	-	-	-	-	-
CKYH Total	206	909.6	20	149.0	4	30.1	16	118.9	11	72.2	33	224.4	9	86.0
Cosco	46	200.0	10	82.0	3	24.6	7	57.4	3	15.2	6	55.1	7	70.0
KL	34	141.4	6	38.0	1	5.5	5	32.5	3	21.5	2	16.0	2	16.0
YMTC	39	156.5	2	16.0	0	0.0	2	16.0	2	16.0	10	62.3	0	0.0
Hanjin	72	355.9	2	13.0	0	0.0	2	13.0	3	19.5	7	36.7	0	0.0
Senator	1	3.0	0	0.0	0	0.0	0	0.0	0	0.0	8	54.4	0	0.0
UASC	12	43.5	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
CMA CGM/Norasia Total	98	388.3	14	90.3	3	24.6	11	65.7	11	60.3	12	91.7	4	36.2
CMA CGM	78	313.9	7	57.4	3	24.6	4	32.8	11	60.3	12	91.7	4	36.2
Norasia	21	74.4	7	32.9	0	0.0	7	32.9	0	0.0	0	0.0	0	0.0
Maersk Sealand	91	474.5	16	105.3	4	25.9	12	79.4	17	116.8	24	177.3	6	42.4
Evergreen	62	285.4	11	76.9	4	30.2	7	46.7	6	35.9	0	0.0	0	0.0
Zim	33	111.2	4	17.4	0	0.0	4	17.4	4	17.4	2	12.7	2	12.7
MSC	56	289.0	23	160.7	2	16.4	21	144.3	9	80.0	6	34.8	0	0.0
China Shipping	54	275.5	19	99.6	2	6.4	17	93.3	8	59.3	9	55.4	0	0.0
Lykes	21	49.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Wan Hai	18	55.0	4	17.0	2	8.5	2	8.5	5	23.0	5	26.6	0	0.0
Westwood	6	11.8	1	2.0	0	0.0	1	2.0	3	6.1	0	0.0	0	0.0
Hamburg Sud	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	9	50.0	1	5.6
Sinotrans	5	12.6	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
CSAV	0	0.0	2	13.0	0	0.0	2	13.0	4	26.0	0	0.0	0	0.0
U.S. Lines	5	8.5	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
FESCO/Great Western	10	20.8	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Total	885	4,035.3	139	904.6	24	164.7	115	739.9	122	771.2	126	854.6	24	195.9

Source: Company data, Nikko Citigroup Limited forecasts.

Capt Doug Johnson Email

From: johnson.j.douglas@att.net [mailto:johnson.j.douglas@att.net]
Sent: Sunday, July 10, 2005 12:24 AM
To: Larson, Peggy
Cc: president@pspilots.org
Subject: Re: Pilot training

---------- Original message from "Larson, Peggy" <Larsonp@wsdot.wa.gov>: ----------

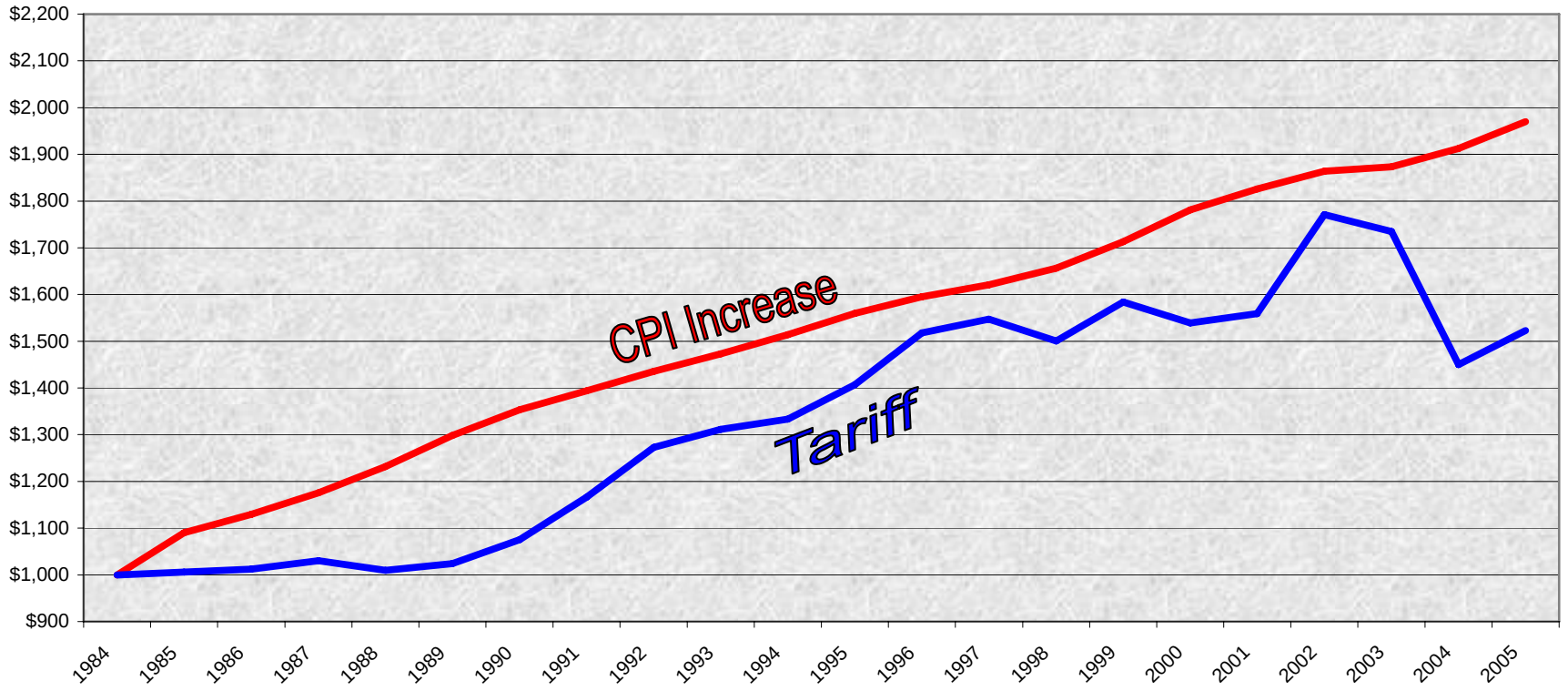
This is to confirm that I will not be training with the Puget Sound Pilots' Assoc. Such a move would decrease my income, not provide time off in large blocks, or give me an option of a possible future reduced work schedule. Five years ago you would have had different answer.

Best Regards

Capt. Doug Johnson

CPI v. Tariff – 1984 – 2005

1984 - 2005 Increase in CPI v. Increase in Tariff based on a $1,000 Charge in 1984



APPENDIX C SUPPORTING MATERIALS

Star Center Draft Report Pierce County Terminal

APPENDIX D – SUPPORTING MATERIALS

Criminal Liability – Professional Mariner Article

Rising risks to mariners of criminal prosecution

by David Tyler

PROFESSIONAL MARINER From Professional Mariner #90 August/September 2005

Life is getting more dangerous for mariners, and it's not because of an increase in physical risks.

The first mate of a tug involved in a 2003 oil spill in Massachusetts faces up to 18 months in prison.

Image Credit: Courtesy U.S. Coast Guard

Increasingly mariners are finding themselves caught up in a legal system that treats many maritime accidents as crimes, especially when environmental damage has taken place. In some cases, prosecutors or agencies no longer have to prove criminal intent; they just have to prove that an incident took place.

Even mariners who do a reasonable job of following proper procedures and standards should be aware that if they make a mistake, even an innocent mistake, they could face criminal charges.

The only way for mariners to protect themselves from unfair prosecutions is “to stop going to sea,” said James T. Shirley, a lawyer who specializes in marine casualties and pollution response for the firm Holland & Knight.

The Exxon Valdez spill in 1989 put public pressure on federal and state governments to prosecute environmental crimes vigorously. Between 1989 and 1999, the Department of Justice indicted more than a dozen ship-operating companies and more than two dozen crewmembers and corporate officers with environmental crimes.

The Exxon Valdez incident produced two important trends in maritime prosecution. One came out of the Oil Pollution Act of 1990 (OPA ’90), which set a lower standard for criminal negligence.

Under OPA ’90, if a mariner negligently spills oil, he or she is criminally liable. In the past, if there was no evidence of recklessness or criminal intent, simple negligence was prosecuted as a civil matter. That changed with OPA ’90. “Criminal negligence implies a recklessness,” Shirley said. “You have to commit the act knowing the consequences are going to be harmful to other people. With the Oil Pollution Act of 1990, we criminalized simple negligence.”

In addition, the federal Clean Water Act provides for criminal penalties, including severe fines and up to a year in jail, if simple negligence results in oil spilling into navigable waters, according to an article by William R. Dorsey, a former president of the Maritime Law Association of the United States.

A second and far more dangerous trend for mariners and maritime companies is the use of old laws that follow the standard of strict liability, which means a person can be criminally charged even if there was no criminal intent or negligent act. These older laws include the 1918 Migratory Bird Treaty Act, passed to protect birds from illegal hunting, and a section of the 1899 Rivers and Harbors Act banning the dumping of refuse. These laws are being used to prosecute mariners and company officers for actions that until recently weren’t considered criminal.

The Migratory Bird Treaty Act first was used to prosecute a mariner in the Exxon Valdez case. It was used recently in the prosecution of the first mate who was at the helm of a Bouchard Transportation Co. barge when it struck a ledge in Buzzards Bay, Mass., on April 27, 2003, spilling 97,000 gallons of oil.

The first mate left the wheelhouse for an extended time period, allowing the barge to go off course. On May 25, the first mate pleaded guilty to criminal charges of violating the Clean Water Act and the Migratory Bird Treaty Act. He faces fines and up to 18 months in prison.

Under these strict-liability laws, mariners can be charged just because they’re on a boat that caused pollution, even if they did nothing wrong. “Strict liability imposes criminal sanctions without requiring a showing of criminal knowledge, intent or even negligence,” the American Waterways Operators said in written testimony submitted in September 2003 to the U.S. Senate Committee on Environment and Public Works.

It is much easier for prosecutors to criminally charge mariners using these strict-liability laws. “You don’t have to show any fault whatsoever,” Shirley said about the refuse act and bird act. “If oil gets in the water and you own the ship, you’re criminally liable.”

In the past, in order to be charged with a crime, a person needed to have acted with criminal intent or in a reckless or willful manner, according to Michael G. Chalos, a partner in the law firm Fowler, Rodriguez & Chalos. Chalos helped defend Capt. Joseph Hazelwood after the Exxon Valdez incident. But courts have decided that the need to protect the public welfare outweighs the requirement to prove criminal intent. Since environmental laws are designed to protect public safety, courts have interpreted these laws to ensure maximum protection. "The result being the criminalization of maritime accidents in a draconian and, for the most part, unfair manner," Chalos said.

Chalos believes the maritime industry should mount a public relations campaign to emphasize its economic importance to help counter this legal trend. "At the same time, he said, "the industry has to take steps to minimize the possibility of these types of accidents occurring: better trained crews and better equipment."

For mariners, these changes can be troubling. When contracts are written with captains, the terms used are negligence and gross negligence, said Capt. Timothy Brown, international president of the International Organization of Masters, Mates and Pilots. That standard should be the same for prosecutions. "I really think the test should be that if you go after a captain for something, you should be able to prove, at the minimum, that he was negligent, and hopefully, that he was grossly negligent," Brown said.

The legal climate has changed how mariners and marine companies view their roles. "I believe it is important for everyone in our industry to understand that spilling oil is a crime," said Douglas A. Eklof, former president of Eklof Marine Corp. (now K-Sea Transportation Corp.), at a 1998 conference. "It does not need to be intentional or willful to be a crime. Any error or omission could be grounds for a negligence charge being brought against you or your company."

Eklof's company was criminally investigated after its tug Scandia, hauling the barge North Cape, grounded on Moonstone Beach in Rhode Island on Jan. 19, 1996, spilling about 828,000 gallons of home heating oil. The tug caught fire during a storm, and the crew had to abandon ship. Over the next week, more than 3 million gallons of oil was removed from the barge, which was refloated.

Despite cooperating with authorities, Eklof's company was subject to a lengthy investigation. The company reached an agreement with prosecutors, pleading guilty to violations under OPA '90, the Migratory Bird Treaty Act and the Rhode Island Pollution Control Act. Criminal penalties of $8.5 million and civil penalties of $11.3 million were assessed.

Shirley, of Holland & Knight, called the North Cape case, "the most egregious case I've ever seen. It really got my attention," he said. "It concerned me a lot because a prosecutor who admitted he was totally lacking in maritime knowledge imposed as part of the plea-bargain agreement construction and operational requirements on Eklof Marine greater than those imposed by the Coast Guard."

This trend means that mariners involved in oil spills or other casualties are in the awkward position of having to help authorities clean up the incident, while worrying that their actions may end up being used against them in a criminal trial. "Managing the pervasive threat of strict criminal liability, by its very nature, prevents a responsible party from cooperating fully and completely in response to an oil-spill situation," said Thomas A. Allegretti, president of the American Waterways Operators.

The way the laws are being enforced also makes it difficult for salvors. “What happens now when a ship has a casualty, because of the risk and concern for criminal liability, everybody shuts up, and the salvor does not get the information he needs from the most readily available sources,” Shirley said. Instead, the salvors must get the information for themselves. That takes time, during which the vessel remains an environmental hazard.

Mariners have to work with the authorities during an emergency, Chalos said. “I’m not saying that when the ship is floundering around, call your lawyer instead of the Coast Guard. But once everything calms down, the mariner has to try and consult with his legal adviser.”

Pierce County Terminal Expansion Article

Tacoma port prepares for a major expansion

By STEVE WILHELM
STAFF WRITER

The Port of Tacoma, which opened three new or upgraded marine cargo terminals this year, is now maneuvering to develop yet another terminal that would dwarf them all.

At nearly 300 acres in its largest possible configuration, the proposed container terminal is attracting attention from ocean carriers around the world.

Carriers are running out of space on the West Coast at the same time that cargo volumes and ship size are increasing. Large new container terminals have become almost impossible to develop.

"The only place you could find it is Los Angeles or Long Beach, and they've hit the wall in terms of new terminals because of community opposition," said Paul Sorenson, a partner at BST Associates in Seattle, a maritime consultancy. "There's nothing in Seattle of that size."

But bringing the huge new container terminal to fruition is a subtle business, because 150 acres of the site are owned by the Puyallup Tribe of Indians, and tribal leaders have not decided if they want to develop the land on their own or with the port. Until last fall the tribe's Emerald Queen casino was on the property, but the tribe has since moved the casino to a new site near Interstate 5.

The tribe has been contacted by "several" companies offering to help it develop the site for a container terminal, tribal spokesman John Weymer said, adding that the tribe is just beginning to assess what will serve its needs best.

"It's a huge issue, the future economic growth of this area, and the tribe is very excited about that opportunity," Weymer said. The tribe will use outside experts, as well as its own staff, "to analyze the options best suited to the tribe," he said.

The Puyallup Tribe got the property in 1989 with the resolution of a longtime dispute over the tribe's treaty rights.

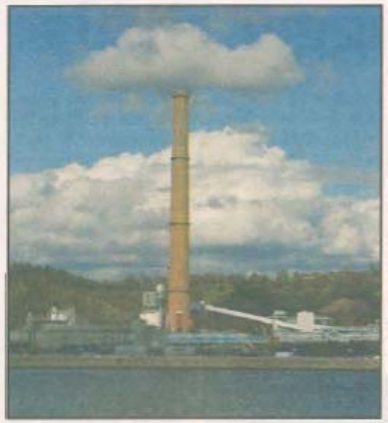
The properties in question are on the east side of the Blair Waterway, adjacent to the port's largest new terminal, the 171-acre Pierce County Terminal, which opened earlier this year.

The Blair Waterway, with its 51-foot depth and protected waters, has been the port's most fruitful growth area since the port in 1993 removed the former 11th Street Bridge at the waterway's entrance, clearing a bottleneck.

The port now plans to widen the entire waterway to 850 feet to accommodate huge container vessels capable of carrying up to 15,000 containers. Such ships would be about 50 percent larger than the largest vessels now calling at Northwest ports.

Port of Tacoma Executive Director Tim Farrell, speaking carefully because of the sensitivity of the subject, said the port prefers to reach some kind of joint venture with the tribe to develop the 300 acres.

"We happen to think that's the best option in terms of terminal development, and community development, but if that's not the best for the tribe, we're prepared to go ahead and do some big things just as the port," he said. "One of the things the tribe is doing, is they're looking at diversifying their portfolio of business, and they want to take a close look at it and make sure they know what they're getting into."



PORT OF TACOMA PHOTO

The Port of Tacoma plans to tear down the Kaiser Aluminum plant on land it owns to build a new cargo terminal.

If the tribe decides to develop its own terminal on its property, the port could develop a terminal on its current 125 acres plus some other properties it could acquire, Farrell said.

Volume at the port is growing so fast that staff members expect it will handle the equivalent of 2 million 20-foot containers (called TEUs) this year. Just four years ago that was expected to occur in 2008. Now the port directors expect to hit 3 million TEUs by 2009.

Farrell said "five to 10" ocean carriers have been talking to the port about moving into this next large terminal, although he declined to name the interested companies.

With trade with China continuing to boom, and Chinese ports being expanded at a furious pace, a logical candidate to use the proposed terminal might be a Chinese carrier, two of which now call at the Port of Seattle.

"The market right now is pretty hot. There's a lot going on, there are growth opportunities, and the question on our mind is how long will this window stay open?" Farrell said.

If carriers can't find room for big, new terminals within the United States, they may locate at proposed container ports in Prince Rupert, British Columbia, or even Mexico, he said.

While negotiations continue between the port and the tribe, port authorities are preparing their own properties with plans to tear down the Kaiser Aluminum plant on 96 acres that the port bought in 2003. This is the largest single piece of the package the port would commit to the new terminal.

The Tacoma Port Commission also has approved a new general cargo terminal, just 28 acres, that will be developed near the mouth of the Blair Waterway. And plans are under way to expand existing terminals by another 180 acres by developing existing property owned by the port.

"The good news about that, is every single one of our terminals that exists today has room to expand," Farrell said. "Within the next few years, we'll add enough space that it will be like adding another terminal."

Contact: swilhelm@bizjournals.com · 206-447-8505x113

Port of Tacoma Newsletter Article – March 2006

Gateway to the World
March 2006
PIERCE COUNTY'S
PORT REPORT
The Port of Tacoma Community Newsletter

PORT SHATTERS CARGO RECORDS

2005 STRONGEST YEAR IN PORT HISTORY

Driven by record volume in total tonnage, containers, intermodal lifts and grain, the Port of Tacoma completed the strongest year by cargo volume in Port history.

Port of Tacoma Commission President Connie Bacon said the expansion of Trans-Pacific trade and continued diversification of port of entry by shippers helped fuel Tacoma's growth. "The Port of Tacoma's record-setting year is a reflection of our investment in facilities, infrastructure and regional transportation. It can also be attributed to the hard work and dedication of our customers, transportation partners, labor partners and our Port staff," she said.

The Port's grain terminal handled a record volume of grain in 2005. Corn from the Midwest is the major grain export.

The Port invested $95 million in capital projects in 2005, highlighted by the grand opening of three new and renovated container terminals – Pierce County Terminal (Evergreen Marine, Hatsu Marine and Italia Marittima), Husky Terminal ("K" Line) and Olympic Container Terminal (Yang Ming Line).

Timothy J. Farrell, Port of Tacoma Executive Director, emphasized it wasn't just expanded terminal capacity that drove the growth in container cargo; the entire transportation and logistics system expanded.

"Once again, the Port of Tacoma and our partners showed why this Port is the most efficient and reliable intermodal gateway in North America," he said. "The Port, our terminal operators, our labor partners, Tacoma Rail, the Union Pacific Railroad and BNSF Railway stepped up with new operating efficiencies and infrastructure to handle a nearly 30 percent increase in intermodal volume, and we're planning on another 16 percent growth in 2006."

The Port's 2005 volumes include:

- Record 20.4 million short tons in overall tonnage – up 8.3%
- Record 2.07 million TEUs (Twenty-Foot Equivalent "Container" Units) – up 15% (of this total, international volume was up 20.3% and domestic was up 1.3%)
- Record 633,620 intermodal lifts (a measurement of container rail activity) – up 29.4%
- Record 6.97 million short tons of grain – up 4.2%
- Breakbulk cargo maintained a strong volume – 116,680 short tons – down slightly from 2004
- Auto volumes came in at 135,900 units – down 13.6%

STATE OF WASHINGTON
BOARD OF PILOTAGE COMMISSIONERS
2901 Third Avenue, Suite 500 | Seattle, Washington 98121 | (206) 515-3904 | www.pilotage.wa.gov

Fatigue Management Committee (FMC)
Meeting Minutes
March 6, 2018
1300 – 1500 hours

Attendees: Phil Morrell (BPC, TOTE), Sheri Tonn (BPC), Sara Thompson (BPC, Dept. of Ecology), Captain Mike Anthony (BPC, PSP), Captain John Scragg (BPC, PSP), Eric vonBrandenfels (PSP), Dr. Paul Darby (CHI Franciscan Health), Rik Krombeen (Holland American Line), Captain Ivan Carlson (PSP), Captain Mike Moore (PMSA), Eleanor Kirtley (BPC, Green Marine), Jaimie Bever (BPC), Shawna Erickson (BPC), Jolene Hamel (BPC)
Absent: Captain Jason Mihok (Clipper)

I. Welcome and Introductions. The first meeting of the Washington State Board of Pilotage Commissioners' Fatigue Management Committee (FMC) was convened at 1305 hours by committee Chair Phil Morrell in the Agate Conference Room, 2901 Third Avenue, Seattle, Washington. Member introductions followed.

II. Committee Guidelines. Chair Morrell reviewed the committee guidelines with the members, which included committing to meeting 4-6 times over the next 4-6 months, being prepared for each meeting, being productive at each meeting, and being respectful of committee members. All were in agreement.

III. Committee Goals. Chair Morrell reiterated to the group that the main goals of the committee were to review the recommendations from Dr. Czeisler and to identify the ones that were top priority. The committee will vote at the end of the meeting, via stickers, to determine the top priorities after reviewing each one. In addition, the group will need to reach consensus on changes to the Board's WAC and RCW regarding rest rules. Chair Morrell suggested that the group review the National Transportation Safety Board's (NTSB) findings on fatigue in conjunction with Dr. Czeisler's recommendations.

IV. Review/Discussion of Dr. Czeisler's Findings and Recommendations. In the spirit of camaraderie, Captain Carlson began this portion of the meeting with a quote from a Canadian study regarding pilots and industry working together for a common good. BPC Chair, Sheri Tonn, reminded the group that the recommendations needed to be considered for the Grays Harbor Pilotage District as well. Captain Moore offered that the NTSB's findings cited a lack of oversight regarding fatigue management. He believes that the solution is to find a balance between flexibility and oversight when reviewing the recommendations. Captain Moore also recommended that the Board update the letter to the Governor regarding fatigue management efforts. The original letter was sent from previous Board Chair, Captain Harry Dudley, to previous Washington Governor, Christine Gregoire.

a. **Recommendation #1(a)** – Personal Responsibility

The group defined "comp day" to those present who were unfamiliar. The pilots explained how comp days work and when they are required to inform dispatch that they will be taking one. All agreed that the Board's RCW needs to be revised to incorporate Dr. Czeisler's recommended language. Sheri Tonn questioned the definition of the term "refuse". The group agreed it needs

further clarification. The group also agreed that this recommendation was going to be high on the priority list.

Recommendation #1(b) – Promoting and fostering a safety culture that recognizes fatigue as a primary safety concern

The group discussed some possibilities for how to encourage education and conversation around fatigue management. Some examples included adding a fatigue management component to trainee orientation, exploring online training as a part of the annual state pilot license renewal, or a fatigue management training requirement every 5-years. Sheri Tonn suggested looking at what Canada has in place. Captain Scragg also suggested looking at Australia as a resource. Jaimie Bever commented that this particular recommendation may not necessarily need a Board WAC or RCW change. Sheri Tonn suggested that the dispatchers be involved in the training, to which all agreed. Eleanor Kirtley inquired whether or not there were internal conversations about this topic within the pilot group. Several pilot committee members commented that there is already a fatigue safety culture in place at Puget Sound Pilots. There are many discussions among new and seasoned pilots on a regular basis.

b. **Recommendation #2** – Maximum consecutive work hours

The pilot members agreed that trying to implement this recommendation as written would be a huge impact on their operation. Captain Scragg pointed out that there aren't many jobs that fit within the timeframe proposed in the recommendation. The group reviewed the definition of "assignment", which is currently defined by a Board policy. Dr. Darby was asked about his own experience with fatigue management, as a physician. He offered that medicine has changed. They are no longer expected to work the long hours without rest as it was when he was a younger doctor. He added that he was shocked by Dr. Czeisler's recommendations in that they seemed too rigid and restrictive for this particular operation.

c. **Recommendation #3** – Minimum consecutive hours between shifts

This recommendation could affect both dispatching and the number of pilots. Captain Carlson stated that while 8 hours of rest between shifts is not necessarily enough, the 12 hours recommended by Czeisler was probably excessive. Captain vonBrandenfels offered that the changes to this recommendation should be incremental and gradual. That way the effect can be monitored closely. Captain Scragg warned that changes could lead to increased comp days.

d. **Recommendation #4** – Weekly work limit

Captain Carlson stated that PSP currently averages about 9.7 hours for time on task. According to Captain Scragg, PSP is currently around the 60 hours in a 7-day interval, as recommended by Czeisler. Dr. Darby inquired whether or not the pilots keep a rest log. Captain vonBrandenfels answered that he does. However, it is not required. Apparently the NTSB will request one if there is an incident, and if one is not provided, they will piece it together based on various records and technology such as phone usage. Dr. Darby would be interested in doing a study of the pilots before these recommendations and after. Eleanor Kirtley stated that she too would be interested in that data. Captain Carlson reminded the group that pilots don't fall under the standard US Coast Guard watch standards.

e. **Recommendation #5** – Consecutive night shifts

PSP already has a "3 and out" policy in place to address the concern behind this recommendation. The Board's WAC and RCW will need to be revised to acknowledge it. Language such as "consideration of circadian rhythm" was recommendation for the RCW, with possible further elaboration in the WAC.

f. **Recommendation #6** – Weekly rest
Per Captain Carlson, a staggered shift start was explored by PSP. The pilot members agreed that it might be a hard sell to the whole pilot group. Captain Carlson reiterated that whatever the Board decides regarding this recommendation, PSP will make it work. There was consensus among the members that this particular recommendation was not a critical endeavor at the moment.

g. **Recommendation #7** – Maximum number of days on duty
Per Captain vonBrandenfels, PSP does not have an internal rule regarding this recommendation. There was consensus from the pilot members that they will need a broad recommendation from the committee in order for PSP to work through it. Eleanor Kirtley commented that a written limit would be an improvement.

h. **Recommendation #8** – Monthly rest
The group was reminded that while PSP works 2 weeks on/2 week off, Grays Harbor works one month on/one month off. Captain Scragg offered that PSP has achieved this recommendation, but it is not documented.

i. **Recommendation #9** – Schedule design
Captain vonBrandenfels explained that PSP doesn't have a way to stabilize the schedule while offering board-on-arrival services. The pilot members explained how the schedule can shift. Captain Moore offered that real-time tracking can help mitigate radical schedule changes. Captain Carlson added that there are AIS traffic displays at the pilot station. The recommendation was marked as an area of interest for the committee.

j. **Recommendation #10** – Incorporate vital components of a comprehensive fatigue risk management program into regulations
This recommendation is specifically targeted at identifying sleep apnea conditions in pilots. Captain Anthony reminded the group the Coast Guard physical form asks about this condition. Dr. Darby expressed concern over Dr. Czeisler's recommendation that anyone with a body mass index over 30 kg/m² be subject to mandatory screening. He stated that 40 was a more reasonable number to target at risk groups and stated that both the DOT and FAA use 40 as their threshold. The pilot members expressed concern over this particular recommendation, stating that it was a raw nerve within the pilot group and that there is fear of Coast Guard retaliation based on the findings of the screenings. An example of a pilot losing his license due to sleep apnea was cited.

V. Wrap up and review. The committee members, upon conclusion of review of the recommendations, voted for their top four priorities. The recommendations below are listed in order of priority based on voting results:

1. Recommendation #1 – 12 votes
2. Recommendation #3 – 11 votes
3. Recommendation #5 – 7 votes
4. Recommendation #7 – 5 votes
5. Recommendation #9 – 4 votes
6. Recommendation #10 – 3 votes
7. Recommendation #2 – 2 votes

Recommendations #4, #6, and #8 received 0 votes

VI. Meeting schedule review/next meeting. The group reviewed several meeting date options for April. Unable to reach consensus, it was decided that Jolene Hamel would send out a Doodle Poll to identify a date. Eleanor Kirtley asked for a deadline to complete the Doodle Poll. Chair Morrell requested of staff that the recommendation priorities be overlaid with NTSB research for the next meeting. He's curious how the committee's priorities compare to the NTSB's priorities.

The meeting was adjourned at 1300 hours.

MEETING MINUTES
STATE OF WASHINGTON ~ BOARD OF PILOTAGE COMMISSIONERS
August 16, 2018

REGULAR MEETING - Call to Order

The regular meeting of the Board of Pilotage Commissioners was convened at 10:00 a.m. by Chair Sheri Tonn in the Westport Maritime Museum Conference Room, 2201 Westhaven Drive, Westport, Washington.

Present:
Chair: Sheri Tonn Vice Chair: Ned Kiley
Commissioners: Chuck Adams, Mike Anthony, Eleanor Kirtley, John Scragg, Sara Thompson, Phil Morrell (via phone) and Grant Stewart (via phone)
Assistant Attorney General: Albert Wang
Administration: Jaimie Bever, Shawna Erickson, Jolene Hamel

Eric vonBrandenfels, Linda Styrk, and Ivan Carlson: Puget Sound Pilots
Gary Nelson, Jack Thompson, Molly Bold, Kayla Dunlap, David Cunningham, Randy Lewis, Mike Folkers, Leonard Barnes, Art Blauvelt, and Captain Ryan White: Port of Grays Harbor
Mike Moore, Jordan Royer: Pacific Merchant Shipping Association (via phone)
Ermelindo Escobedo: Work Strategies
Kevin Campbell: Brusco Tug, Grays Harbor Safety Committee
Rob Dengel: Department of Ecology
Brandi Bednarik: Grays Harbor Historical Seaport, Sea School Northwest
Craig Lee: Public, Former BPC Commissioner
Lyn Tully: Public

Chair Tonn started the meeting by thanking the Westport Maritime Museum for hosting the Board and the Port of Grays Harbor for arranging the meeting space and planning the after-meeting events.

Minutes. Motion: Thompson/Kiley – approve the July 19, 2018 Minutes as written – Carried.

BPC Staff Report.

- The 2017 BPC Annual Report was submitted to the Legislature on August 10th. Staff appreciates all of the comments on the draft and will use these to continue to improve the reports in the future.
- On Tuesday, August 7th the Board held another Train-the-Trainer class that included both trainees and pilots. 4 of the 6 Puget Sound Pilots who had not previously taken the training were in attendance as well as 6 trainees and 1 candidate who is starting the training program in November.
- The Board reviewed a letter from soon-to-retire Puget Sound Pilot Captain Ed Marmol requesting inactive status on his license for a reduced licensing fee, until he retires on September 28, 2018, in accordance with WAC 363-116-070. His license officially expires on September 13, 2018. Inactive status would allow him to pay a reduced license fee for the two week gap until retirement.
  Motion: Anthony/Kiley – acknowledge receipt of Captain's Marmol's request and allow his license to go into inactive status with a reduced license fee – Carried.

BPC Chair Report.

- Chair Tonn and Jaimie Bever had a meeting with Representative Fey last week to discuss upcoming legislation.
- Chair Tonn reported that Maine Maritime will be hosting the Women on the Water Conference November 1st - 3rd. Chair Tonn will sit on a panel regarding pilotage. Maine Maritime is hoping that Puget Sound Pilot trainee, Captain Sandy Bendixen, will participate as well.

Activity Reports. Mike Moore representing Pacific Merchant Shipping Association, Captain Eric von Brandenfels representing Puget Sound Pilots, and Gary Nelson representing the Port of Grays Harbor offered current and projected statistical data as well as updates on current maritime issues and activities.

Gary Nelson introduced all of Grays Harbor staff in attendance. Captain Kevin Campbell, Brusco Tug and Chair of the Grays Harbor Safety Committee, Brandi Bednarik of Sea School Northwest, Molly Bold, Westport Marina District Business Manager, and Kayla Dunlap, Public Affairs Manager for Port of Grays Harbor shared aspects of their roles and duties, as well as information about their organizations. Board members, staff, and the public were invited to tour the marina and harbor aboard the pilot boat *CHEHALIS* after the meeting.

NEW BUSINESS

Salish Sea Vessel Safety Report. Rob Dengel from the Department of Ecology was introduced. He stated that the report goal was to provide information for an informed, sound decision on specific vessel safety measures and focused mainly on tug escorts and an Emergency Response System (ERS) for Haro Strait and Boundary Pass. A thorough literature review was completed and the 250 page draft report is currently out for review with a deadline of September 7th. It is due to the Governor's Office on October 1st and to the Legislature by December 1st for feedback. A final submission is due to the Legislature by July 1st 2019. Chair Tonn thanked Rob for his presentation and directed Commissioners to submit written comments by September 7th. A copy of the presentation will be sent to all Commissioners after the meeting. The presentation was followed by a Q&A. Chair Tonn concluded the presentation by inviting Commissioners to join any of the prescheduled conference calls with the Department of Ecology, if they are interested.

Approval of Pilot License Upgrade Program for Captain Ryan White. Captain White is nearing completion of his fourth license year and is due for a license upgrade program. However, because he is currently the only pilot operating in Grays Harbor, he will remain at his current license level until the other pilot returns. A draft letter detailing the proposed license level freeze was reviewed by the Board. Waivers for exceptions of vessels above Captain White's license level will continue to be reviewed by the TEC and addressed by Chair Tonn.
Motion: Scragg/Anthony – accept letter to freeze Captain White's license level and postpone his upgrade program as drafted by the TEC – Carried with abstentions by Commissioners Morrell and Stewart, who were unable to reference the letter.

2018 Annual Tariff Hearing Preparation. A letter dated August 16, 2018, from the Port of Grays Harbor (PGH) to the Board was presented. It detailed their request for one rule amendment to the GHPD tariff. This request was approved by the Grays Harbor Port Commission on August 14, 2018. Motion: Adams/Thompson – file a CR102 reflecting a decrease to the *Pension Charge* from $500 to $450 – Carried.

Fatigue Management – Recommendations from the Fatigue Management Committee. The most recent committee meeting had a good turnout. The future of the committee was discussed. It was decided that it would continue to meet to review the remaining recommendations from Dr. Czeisler and to continue to monitor and evaluate fatigue management in both pilotage districts. The next meeting will be scheduled for the end of October. Chair Tonn pointed out that one of the successful activities of the committee was to determine what should be considered by the Board as an RCW change versus a WAC change or policy implementation. The work from the last several months of the Fatigue Management Committee was presented as recommendations for RCW changes. The most significant is to RCW 88.16.103 was increasing the mandatory rest period from 7 hours to 10 hours with the opportunity for 8 hours of sleep. PMSA submitted a letter to the Board on August 15, 2018 which detailed their concerns with the proposed RCW changes. A copy was reviewed by the Board. PMSA recommends that policy direction, PSP procedures, or WAC changes should be further utilized before implementing restrictive RCW changes and urged the use of metrics to measure implementation and compliance. Mike Moore, PMSA (via phone) further explained their position regarding the need for flexibility in the RCW. Chair Tonn requested, via letter to Puget Sound Pilots, additional data to help with independent data verification to support the RCW change.

Proposed Agency Request Legislation. The Board reviewed and considered the proposed RCW changes for both Z-0077.1 AN ACT Concerning mandatory rest periods for pilots; amending RCW 88.16.103 and Z-0087.1 AN ACT Relating to joint self-insurance programs for property and liability risks; amending RCW 48.62.011, 48.62.021, 48.62.031, 48.62.111, and 48.62.121, and adding a new section to chapter 48.62 RCW, which is identical language to a bill that ran in the 2018 Legislative Session.

Motion: Scragg/Kiley – Support the proposed RCW 88.16.103 revisions as recommended by the Fatigue Management Committee for 2019 Agency Request Legislation – Carried with abstention from Commissioner Stewart, who was unable to reference the draft bill.
Motion: Adams/Anthony – Support the proposed RCW 48.62 revisions for 2019 Agency Request Legislation – Carried with abstention from Commissioner Stewart, who was unable to reference the draft bill.

2018 Annual Tariff Hearing Preparation – Puget Sound Pilotage District. The Board reviewed the Puget Sound Pilotage District Tariff hearing timetable, to roll over the effective dates only.
Motion: Kiley/Adams – Adopt the timetable as proposed – Carried.

MIDNIGHT SUN Investigation – Update. The investigation is nearly complete and a draft will go out to Commissioners prior to the September Board meeting.

Discussion Concerning Setting the Number of Pilots in the Grays Harbor Pilotage District. The Board reviewed the Pilot Continuity Plan dated July 17, 2018 presented by the Port of Grays Harbor (PGH), which detailed a current request for a third pilot and future needs for pilots through year 2026.
Motion: Thompson/Kirtley – Accept the Pilot Continuity Plan as proposed and ask for annual updates from the Port of Grays Harbor – Carried.

Pilot's Report of Marine Safety Occurrence: *OVERSEAS LOS ANGELES*, 07-13-18

Ferndale, Cherry Point BP	A mechanical issue (#6 cylinder) was reported, however the issue was corrected and did not have to go to anchor.	Motion: Scragg/Adams File as a Marine Safety Occurrence – Carried.

Pilot's Report of Marine Safety Occurrence: *EVERGREEN STATE*, 7-26-18
This incident was deferred to the September 20, 2018 meeting to allow for attendance from the Coast Guard.

Consideration of Request for Vessel Exemption:

Motor Yacht *INCEPTION* – 164', 637 gt, Marshall Islands registry, Captain Robert Graffam.
Motion: Kiley/Adams – concur with Chair's granting of an interim 3 month exemption – Carried.

Motor Yacht *SARAH LISSA* – 92', 65 gt, Marshall Islands registry, Captain Cameron Warren.
Motion: Kiley/Thompson – concur with Chair's granting of an interim 3 month exemption – Carried.

Sailing Yacht *EMERALD SEA*– 45', 265 gt, Malaysia registry, Captain Stephen Poulson.
Motion: Adams/Kirtley – concur with Chair's granting of an interim 3 month exemption – Carried.

Motor Yacht *RENT SPENT*– 112', 208 gt, Marshall Islands registry, Captain Robert Davey.
Motion: Kiley/Adams – concur with Chair's granting of an interim 3 month exemption – Carried.

Committee Reports.

Trainee Evaluation Committee (TEC):

- The TEC met on August 14, 2018. Training Program progress was reviewed for all current trainees: Kridler, Bendixen, Grieser, McGrath, Ninburg, Seamans, Miller, Melin, and Bozina. There was nothing significant to report, no interventions. One trainee has nearly completed the State portion of the training program and is now finishing the federal requirement. Another trainee will be done with training by the end of August, has completed the federal requirement, and will need to complete the PPU requirements.
  Motion: Scragg/Kiley – Approve Captain Bendixen to start PPU training provided that she satisfactorily completes the remaining State training requirements – Carried.
- Two of the final three candidates from the 2016 exam have accepted the invitation to train in the Puget Sound District, Captains Peter Velarde and Joe Siddell. Captain Matt Stevens declined the invitation to our program to train in San Francisco. Orientation is scheduled for October 29th at 8am. Their training will begin on November 1, 2018.
- The TEC is working on revisions to WAC 363-116-078 *Training Program*.
- A CV for Captain Jeff Slesinger, recent TEC appointee, was provided to the Board.

Legislative/WAC Committee:

- Commissioner Adams is reviewing draft language for several WACs. Upon completion of his review and comment, they will be sent to Assistant Attorney General Albert Wang for review.

BPC/PSP Joint Diversity Committee (JDC):

- JDC on hiatus the summer months.

Exam Committee:

- The Exam Committee has received 7 applications and approved 6 of the 7. The applications are from very diverse geographic locations and industries, and include 1 female.
  Motion: Scragg/Kiley – Approve the 6 committee-approved applicants to sit for the exam – Carried.
- The next written exam focus groups will convene on August 17th, 20th and 21st to finalize and publish the written exam.
- The next simulator workshop is on August 21st and 22nd.

Fatigue Management Committee:

- Committee report given in prior agenda item.

Commission Investigative Committee:

- The Committee members are currently working on language and will have a draft to present at the September meeting.

Review of Pilot/Trainee Physical Examination Reports.
Motion: Anthony/Adams - approve the physicians' reports for Captains D.A. Brouillard, B.W. Bouma, B.F. Henshaw, P.S. Kelly and E. Marmol for annual pilot license renewal – Carried with abstentions from Commissioners Morrell and Stewart, who were unable to reference the materials.
Motion: Kiley/Anthony - approve the physicians' report for Captain K.C. Kridler for annual trainee pilot license renewal – Carried with abstentions from Commissioners Morrell and Stewart, who were unable to reference the materials.

Confirmation of Next Regular Meeting Dates. The next regular meeting dates are set for:

- September 20 – Meeting will start at 11:00am to accommodate a TEC meeting beforehand. Commissioners are invited to attend the TEC meeting.
- October 18 – Resume regular time schedule – Grays Harbor Pilotage District Tariff Hearing

There being no further business to come before the Board, Chair Tonn adjourned the regular session Board meeting at 12:30 p.m.

Respectfully submitted,

_____
Jaimie C. Bever, Executive Director

_____
Sheri J. Tonn, Chair

_____	_____
Edmund I. Kiley, Vice Chair	Commissioner Charles F. Adams
_____	_____
Commissioner Philip Morrell	Commissioner J. Grant Stewart
_____	_____
Commissioner John Scragg	Commissioner Michael Anthony
_____	_____
Commissioner Eleanor Kirtley	Commissioner Sara Thompson

MEETING MINUTES

STATE OF WASHINGTON ~ BOARD OF PILOTAGE COMMISSIONERS

December 7, 2017

REGULAR MEETING - Call to Order

The regular meeting of the Board of Pilotage Commissioners was convened at 10:00 a.m. by Chair Sheri Tonn in the Agate Conference Room, 2901 Third Avenue, Seattle, Washington.

Present:
Chair: Sheri Tonn Vice Chair: Ned Kiley
Commissioners: Chuck Adams, Scott Ferguson, Eleanor Kirtley, Don Mayer, Ed Marmol (via phone), and Phil Morrell
Assistant Attorney General: Albert Wang
Administration: Jaimie Bever, Shawna Erickson, Jolene Hamel

Eric vonBrandenfels, Linda Styrk, Ivan Carlson, John Scragg, Mike Anthony, Eric Klapperich, Larry Emerson, Alec Newman, Scott Anacker, Jamie Galvin, Majken Ryherd, Teresita Torres: Puget Sound Pilots
Gary Nelson: Port of Grays Harbor
Mike Moore and Jordan Royer: Pacific Merchant Shipping Association
Lou Paulsen: The Northwest Seaport Alliance
Peter Giese: Retired Puget Sound pilot
Lee Vestal: Puget Sound Pilotage District trainee
Dan Jordan, Joe Brady: Columbia River Bar Pilots
Lyn Tully: Public
Robert Czeisler: Public
Dr. Charles Czeisler: Public, Presenter

Minutes. Motion: Mayer/Adams – approve the November 9, 2017 Minutes as written – Carried.

Presentation by Dr. Charles Czeisler, PhD, M.D. on Fatigue Management – Discussion Concerning Setting the Number of Pilots in the Puget Sound Pilotage District as Provided in WAC 363-116-065. The Board engaged fatigue and sleep expert Dr. Charles Czeisler to review the current State rest rules and Puget Sound Pilot's rest rules, and to provide critique and recommendations for improvement to those rules. Dr. Czeisler gave a presentation of his findings to the Board outlining several policy recommendations.

CLOSED SESSION – Call to Order

A Closed Session of the Board of Pilotage Commissioners was convened from 12:20 p.m. to 1:30 p.m. in the Agate Conference Room, 2901 Third Avenue, Seattle, Washington to discuss matters relative to the pilot training program. In attendance were Commissioners Tonn, Kiley, Adams, Ferguson, Kirtley, Mayer, Marmol (via phone), Morrell; Assistant Attorney General Albert Wang; BPC staff Shawna Erickson, Jolene Hamel and Jaimie Bever.

REGULAR MEETING RECONVENED

The regular meeting of the Board of Pilotage Commissioners was reconvened immediately following the Closed Session by Chair Tonn in the Agate Conference Room, 2901 Third Avenue, Seattle, Washington.

Consideration of Training Program of Captain Lee Vestal.
Motion: Kiley/Morrell – terminate Captain Lee Vestal's training program based on his failure to maintain the minimum federal licensure required by RCW 88.16.090 and WAC 363-116-078(14)(a) – Carried.

BPC Staff Report.

- Jaimie Bever attended several functions over the last month including the 2017 Maritime Economic Forecast Breakfast held at the Pacific Marine Expo on November 17, 2017, and the Puget Sound Harbor Safety Committee meeting on December 6, 2017. She reported on some of the speakers and topics addressed at both events.
- The Board has received its Delegated Authority and Procurement and Contracting Risk Assessment from the Department of Enterprise Services. The next review is scheduled for May 24, 2019.

BPC Chair Report.

- Sheri Tonn and Jaimie Bever gave a presentation about the Board to the Joint Transportation Committee on November 15, 2017. Chair Tonn reported that the response to the presentation was a positive one.
- Sheri Tonn and Jaimie Bever met with Senate Transportation Committee Chair-Elect, Senator Steve Hobbs to provide an update on the Board.
- On March 2, 2018, the Board along with Puget Sound Pilots, Columbia River Bar Pilots, Columbia River Pilots, and San Francisco Bar Pilots will give a presentation on pilotage at the Women in Maritime Leadership conference at CalMaritime.
- Puget Sound pilot, Captain Vic Engstrom, retired as of November 27, 2017. The Board recognized him for his great service and wished him well on his retirement.

Activity Reports. Lou Paulsen representing The Northwest Seaport Alliance; Mike Moore representing Pacific Merchant Shipping Association; Eric vonBrandenfels and Linda Styrk representing Puget Sound Pilots; and Gary Nelson representing the Port of Grays Harbor (via handout) offered current and projected statistical data as well as updates on current maritime activities.

Linda Styrk reported that she is close to wrapping up negotiations for replacement Personal Piloting Units (PPUs) and that she has negotiated the same price point for the Board and for Grays Harbor. The Trainee Evaluation Committee (TEC) will review PPU trainee use.

NEW BUSINESS

Joint Transportation Committee (JTC) Study Update. Consultant findings and recommendations will be presented to the JTC on December 14, 2017 at 11:15 a.m. in Olympia, WA. Sheri Tonn and Jaimie Bever will be meeting with the consultants to review their presentation on December 11, 2017. The final report is due to the legislature on January 8, 2018.

Approval of Pilot License Upgrade Program. Captain Eric Lichty is nearing completion of his fourth license year.
Motion: Mayer/Kiley – approve license upgrade program as drafted by the TEC – Carried.

Approval of Training Programs for Captains McGrath, Ninburg, and Seamans. Captains Travis McGrath, Pat Ninburg, and Adam Seamans are scheduled to begin training on February 1, 2018.
Motion: Marmol/Kiley – approve the pilot Training Programs for Captains McGrath, Ninburg, and Seamans as drafted by the TEC – Carried.

Consideration of New Board Designated Physician: Dr. Mel K. Strange. The Board reviewed the CV of a doctor recommended by a pilot in the Grays Harbor Pilotage District.
Motion: Ferguson/Morrell – appoint Dr. Mel K. Strange as a Board Designated Physician – Carried.

Committee Reports.

Trainee Evaluation Committee (TEC):

- The TEC met on December 5, 2017. Captains Vestal and Grieser were in attendance to discuss the status of their training programs.
- Training Program progress was reviewed for all current trainees: Vestal, Kridler, Bendixen, and Grieser.
- Training programs were developed for Puget Sound pilot candidates Captains McGrath, Ninburg, and Seamans.

- Pilot retirements were reviewed. An exam will need to be held either November 2018 or January/February 2019. The TEC will narrow down a date for Board consideration at the January 18, 2018 meeting.
- The TEC is looking at a potential WAC change regarding the maximum length of the training program.
- It was recommended that Puget Sound pilot and potential future BPC commissioner, Captain Mike Anthony be added to the TEC.
  Motion: Mayer/Kiley – add Captain Mike Anthony to the TEC – Carried.

Legislative/WAC Committee:

- Staff will be filing the semi-annual Rules Agenda with the WA State Code Reviser by December 31, 2017. This agenda will include the WACs that will be under consideration between January and June 2018.

BPC/PSP Joint Diversity Committee (JDC):

- The JDC will meet on December 11, 2017 to review committee progress including outreach materials, making the exam process more accessible, the March 2018 Women on the Water conference presentation, and a proposal regarding diversity funding opportunities.

Review of Pilot/Trainee Physical Examination Reports.
Motion: Kiley/Morrell - approve the physicians' report for Captains E.M. vonBrandenfels, L.P. Emerson, and B.R. Jensen for annual pilot license renewal – Carried.

Board Appointments. Chair Tonn informed the Board of conversations she has had with the Governor's office regarding Board appointments. There is the potential of the appointment of two new pilot members before the next Board meeting. Commissioners Mayer and Marmol received much gratitude from the Board for their outstanding work and contributions to the commission. Commissioner Mayer will stay on as a member of the TEC. Two of the public positions will be open, as well as the foreign shipping representative position.

Confirmation of Next Regular Meeting Dates. The next regular meeting dates are set for:

- January 18 (at the Port of Seattle)
- February 15

There being no further business to come before the Board, Chair Tonn adjourned the regular session Board meeting at 2:55 p.m.

Respectfully submitted,

Jaimie C. Bever, Executive Director

Sheri J. Tonn, Chair

Edmund I. Kiley, Vice Chair	Commissioner Charles F. Adams
Commissioner Philip Morrell	**Absent** Commissioner J. Grant Stewart
Commissioner Donald W. Mayer	Commissioner Edmund Marmol
Commissioner Eleanor Kirtley	Commissioner Scott Ferguson

Best Practices for Fatigue Management

*Charles A. Czeisler, PhD, MD**

Baldino Professor of Sleep Medicine
Director, Division of Sleep Medicine
Harvard Medical School
Director, Sleep Matters Initiative
Brigham Health

December 7, 2017

State of Washington Board of Pilotage Commissioners

Seattle, Washington


PILOTS OFFICE
COLUMBIA RIVER BAR PILOTS


PILOT
COLUMBIA RIVER BAR PILOTS


Captain
Nelson

Acknowledgements/Conflict of Interest Disclosure

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C. O'Brien
R. E. Kronauer, PhD
J.F. Duffy, PhD
S.W. Rajaratnam, PhD
S.W. Lockley, PhD
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National Institute on Aging (NIA)
National Heart, Lung and Blood Institute (NHLBI)
National Institute for Neurological Diseases & Stroke
National Institute of Mental Health (NIMH)
National Center for Research Resources (CTSC)
National Aeronautics and Space Administration (NASA)
National Space Biomedical Research Institute (NSBRI)
Air Force Office of Scientific Research (AFOSR)
Naval Medical Research and Development Command
Harvard Catalyst
Philips Lighting
National Geographic Society
Harvard Medical School
Defense Advanced Research Projects Agency (DARPA)

*COI Disclosures: *Dr. Czeisler is/was a paid consultant to Bose, Boston Celtics, Boston Red Sox, Cleveland Browns, Columbia River Bar Pilots, Institute of Digital Media and Child Development, Jazz Pharma, Merck, National Basketball (NBA) Coaches Association, Purdue Pharma, Quest Diagnostics, Samsung, Teva, Vanda Pharmaceuticals, Inc.; Dr. Czeisler holds equity in Vanda Pharmaceuticals, Inc.; receives research/education support from Cephalon, Mary Ann & Stanley Snider via Combined Jewish Philanthropies, NFL Charities, Jazz Pharma, Optum, ResMed, San Francisco Bar Pilots, Schneider, Simmons, Sysco, Philips, Vanda Pharmaceuticals, Inc.; is/was an expert witness in legal cases, including those involving Bombardier, Columbia River Bar Pilots, Continental Airlines, Fedex, Greyhound, Purdue Pharma, UPS; serves as the incumbent of a professorship endowed by Cephalon; and receives royalties from McGraw Hill, Houghton Miflin Harcourt, and Philips Respironics for the Actiwatch-2 & Actiwatch Spectrum devices. Dr. Czeisler's interests were reviewed and are managed by Brigham and Women's Hospital and Partners HealthCare in accordance with their conflict of interest policies.

Collision of Tankship *Eagle Otome* with berthed Cargo Vessel *Gull Arrow* and Subsequent Collision with the Kirby 30406 Barge Pushed by the *Dixie Vengeance Tow* in Sabine-Neches Canal, Port Arthur, Texas, January 23, 2010

NTSB: "Contributing to the accident was the first pilot's fatigue, caused by his untreated obstructive sleep apnea and his work schedule, which did not permit adequate sleep."

462,000 gallons oil spilled

"The NTSB has identified fatigue as a factor in at least two highly visible marine accidents. The NTSB determined that the March 24, 1989, grounding of the vessel *Exxon Valdez* on Bligh Reef, an accident that … was caused, among other factors, by the—failure of the third mate to properly maneuver the vessel **because of [his] fatigue and excessive workload** …."

National Transportation Safety Board. 2011. Collision of Tankship Eagle Otome with Cargo Vessel Gull Arrow and Subsequent Collision with the Dixie Vengeance Tow, Sabine-Neches Canal, Port Arthur, Texas, January 23, 2010. Marine Accident Report NTSB/MAR-11/04. Washington, DC.

"A schedule that alternates **daytime work with nighttime work in the same week** is **detrimental** to optimum **performance** in that it is difficult for someone to compensate for the sleep deprivation that has resulted from working at a time when one is typically sleeping."

National Transportation Safety Board. 2009. Allision of Hong Kong-Registered Containership M/V Cosco Busan with the Delta Tower of the San Francisco–Oakland Bay Bridge, San Francisco, California, November 7, 2007. Marine Accident Report NTSB/MAR-09/01. Washington, DC.

Goals of a Comprehensive Fatigue Risk Management Program

A comprehensive fatigue risk management program should be designed to:

- improve the **long-term health** of the pilots; and
- improve pilot performance and **decrease the risk of pilot errors and consequent accidents.**

Ensure that the NTSB does not again find that:
"Contributing to the accident was the first pilot's fatigue,
caused by his untreated obstructive sleep apnea
and his work schedule,
which did not permit adequate sleep."

National Transportation Safety Board

In 2011, the United States National Transportation Safety Board recommended (NTSB Recommendation M-11-20) that governors of states in which pilots operate should "**require local pilot oversight organizations** that have not already done so to implement fatigue mitigation and prevention programs that:

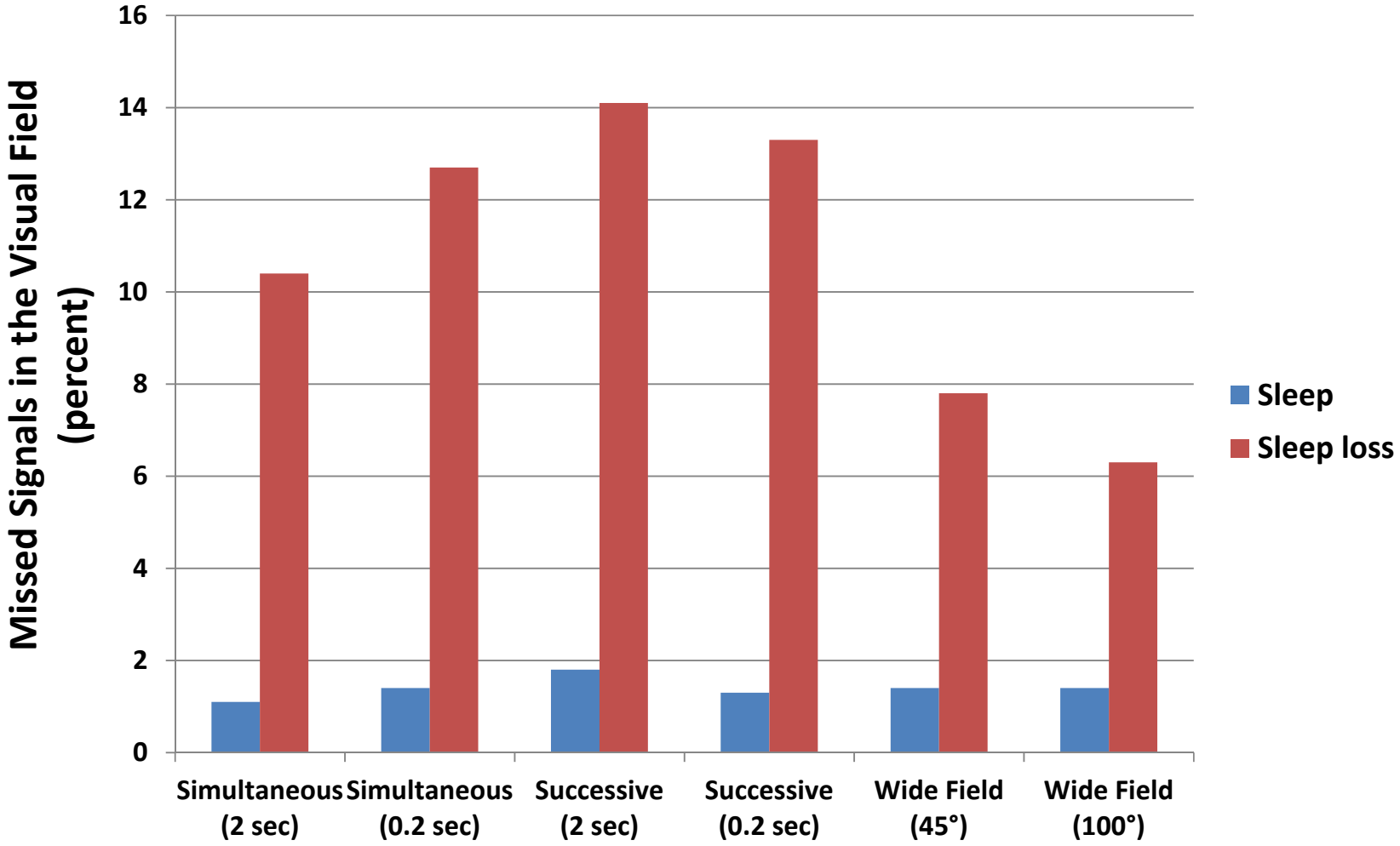
(1) **regularly inform mariners** of the **hazards of fatigue** and effective **strategies to prevent [fatigue]**, and

(2) promulgate **hours of service rules** that **prevent fatigue resulting from**

- **extended hours of service**,
- **insufficient rest within a 24-hour period**, and
- **disruption of circadian rhythms**."

National Transportation Safety Board. 2011. Collision of Tankship Eagle Otome with Cargo Vessel Gull Arrow and Subsequent Collision with the Dixie Vengeance Tow, Sabine-Neches Canal, Port Arthur, Texas, January 23, 2010. Marine Accident Report NTSB/MAR-11/04, p. 70. Washington, D.C.

Impact of One Night of Sleep Loss on Missed Signals in the Visual Field



Sanders, A. F. and W. D. Reitsma (1982). The effect of sleep-loss on processing information in the functional visual field. *Acta Psychologica* 51: 149-162.

Components of a Comprehensive Fatigue Risk Management Program

(1) an **education program**, with annual certification testing, to train pilots, pilot managers and pilot dispatchers on the principles of sleep and circadian science;

http://www.railroadersleep.org/

http://www.railroadersleep.org/

Railroaders' Guide to Healthy Sleep

Getting Sleep
- Working the Rails
- Sleep Tips A to Zzzz
- Sleep Drive, Naps, & Caffeine
- Listen to Your Body Clock
- How to Avoid Sleep Debt

Read Your Signals
- Stories from the Rails
- TIPS: Stay Safe on the Job
- TOOLS: Sleep-Wake Diary & More
- QUIZ: How Well Do You Sleep?
- GAME: Test Your Reaction Time

Problems? Get on Track
- The Snoring Sickness: Obstructive Sleep Apnea
- Could YOU Have Obstructive Sleep Apnea?
- Other Sleep Problems & Their Treatment
- Why Better Sleep = Better Health
- Find a Sleep Center

Listen to Your Body Clock

Everyone has an inner clock that helps organize daily life. This clock directs ups and downs in alertness and sleepiness over the day.

What time is it in your body?

AUDIO OFF

In Sync: Example

If our internal clock matches the external clock time, we are "in sync." This is shown in the example on the right.

Click on the blue play button to the right to start.

When a person awakens at 6 a.m., the internal clock soon supports alertness (shown as yellow turning to green). In daylight the internal clock continue to promote alertness for daytime activities (indicated by green), and this persists into the evening. This continued alertness makes it difficult to fall asleep when the body's internal clock is in the evening mode, even though hours awake have increased.

Eventually the internal clock switches to nighttime mode, promoting sleep (indicated by red). The strongest push for sleep normally occurs in the wee hours of the morning, while it is still dark outside.

Next

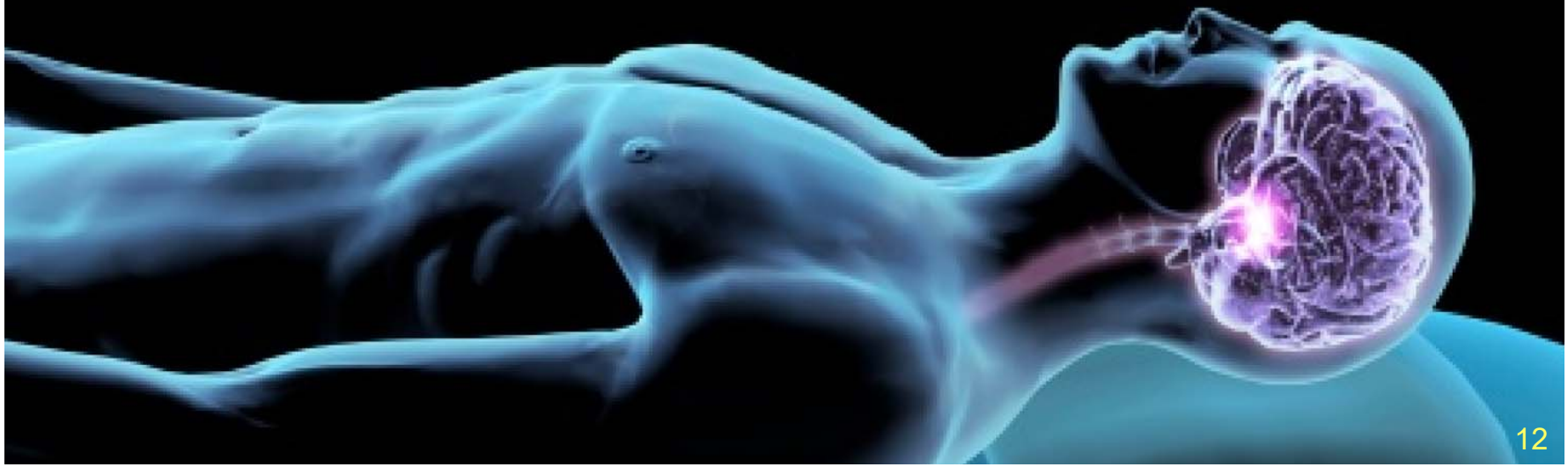
How Your Body Clock Works

Everyone has an internal clock, a clock that organizes daily life. The clock mechanism is a pinhead-sized cluster of nerve cells in the brain. The body clock controls when you sleep and stay awake. It also directs the timing of hundreds of functions in your body. A few examples of functions that cycle over the day include the rise and fall of body temperature and blood

The hard part is getting rest in the middle of the day or the early evening. We know that we should be resting, but we are not tired

Why the Brain Needs Sleep

fulfill basic biological needs **(Deep SWS and REM sleep)**	keep brain cells healthy for life	repair, maintenance of excessive connections **(Deep SWS)**
consolidation of memory **(Deep SWS)**	integration of daily learning with prior experience **(REM sleep)**	restoration of energy stores of cells requires the brain to be offline



Changes in Brain Energy Use

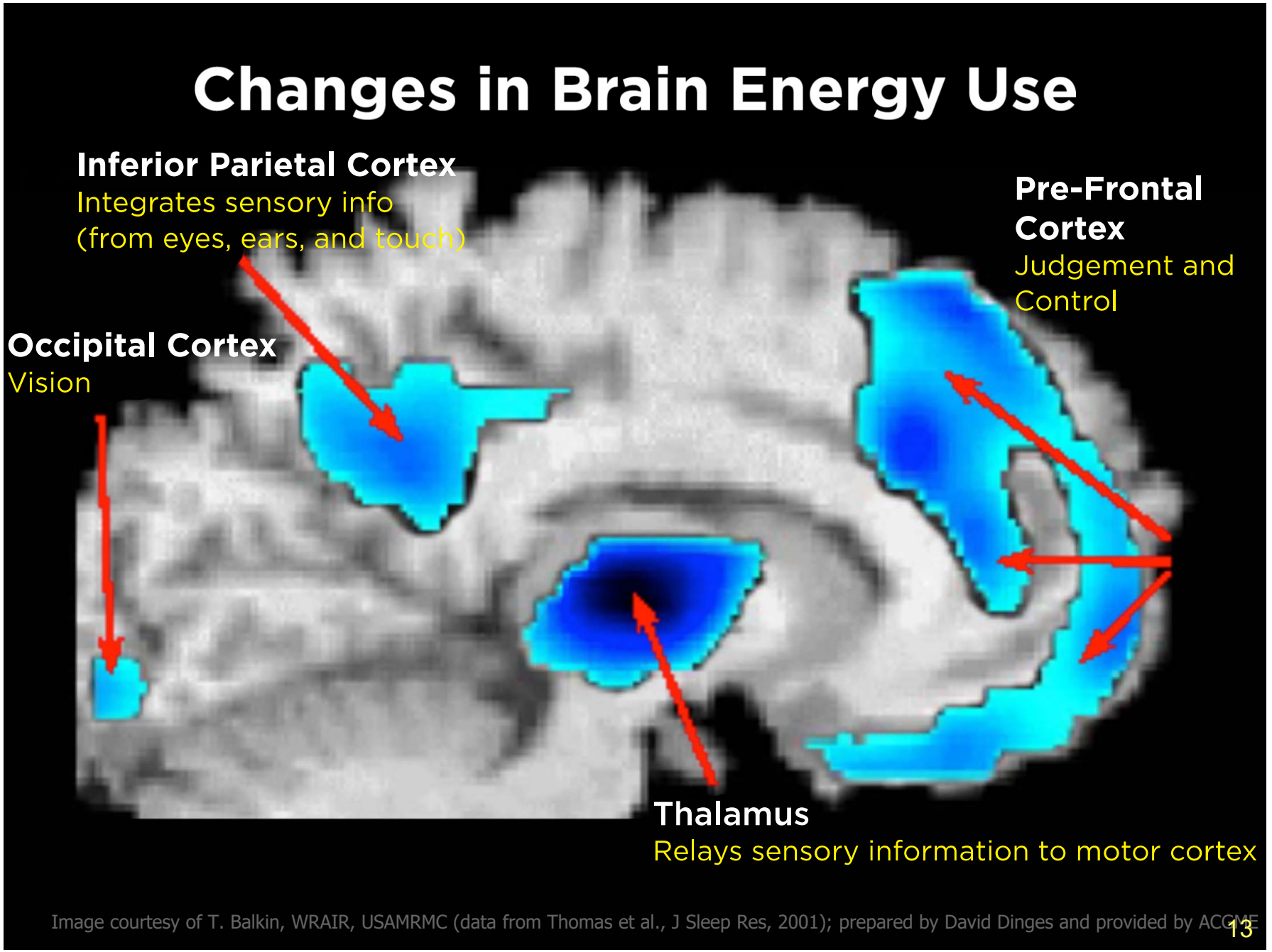


Image courtesy of T. Balkin, WRAIR, USAMRMC (data from Thomas et al., J Sleep Res, 2001); prepared by David Dinges and provided by ACGME

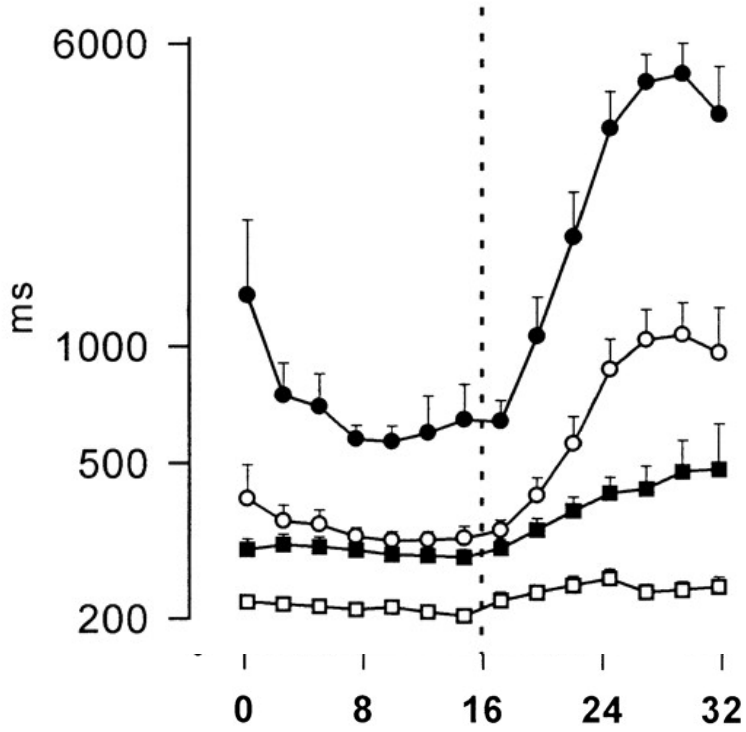
Neurobehavioral performance impact of sleep deficiency/circadian disruption

- Slowed **reaction time**
- Increased risk of **lapses of attention**
- Increased risk of **automatic behavior**
- Increased **distractibility**
- Impaired **judgment** (not as risk averse)
- Fast and **sloppy** (speed/accuracy tradeoff)
- Impaired **memory**, insight and creativity
- *Increased risk of **falling asleep***
- *Increased risk of **errors and accidents***

Performance Impairment in Cognitive Psychomotor Performance

24 hours of wakefulness (at 8 am) induces impairment equivalent to **blood alcohol concentration of 0.10%**

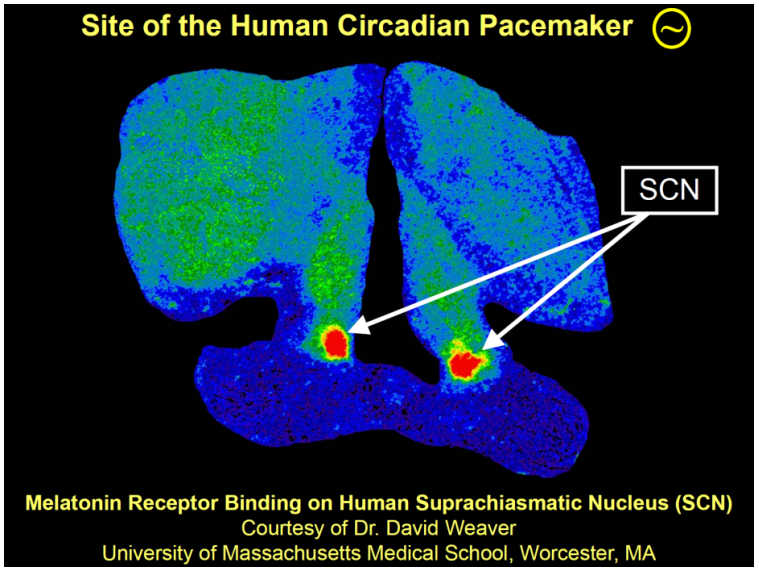
D. Dawson and K. Reid, *Nature* 388: 235, 1997



Christian Cajochen,PhD

Psychomotor Vigilance Performance

- 10% slowest reaction time
- mean reaction time
- median reaction time
- 10% fastest reaction time

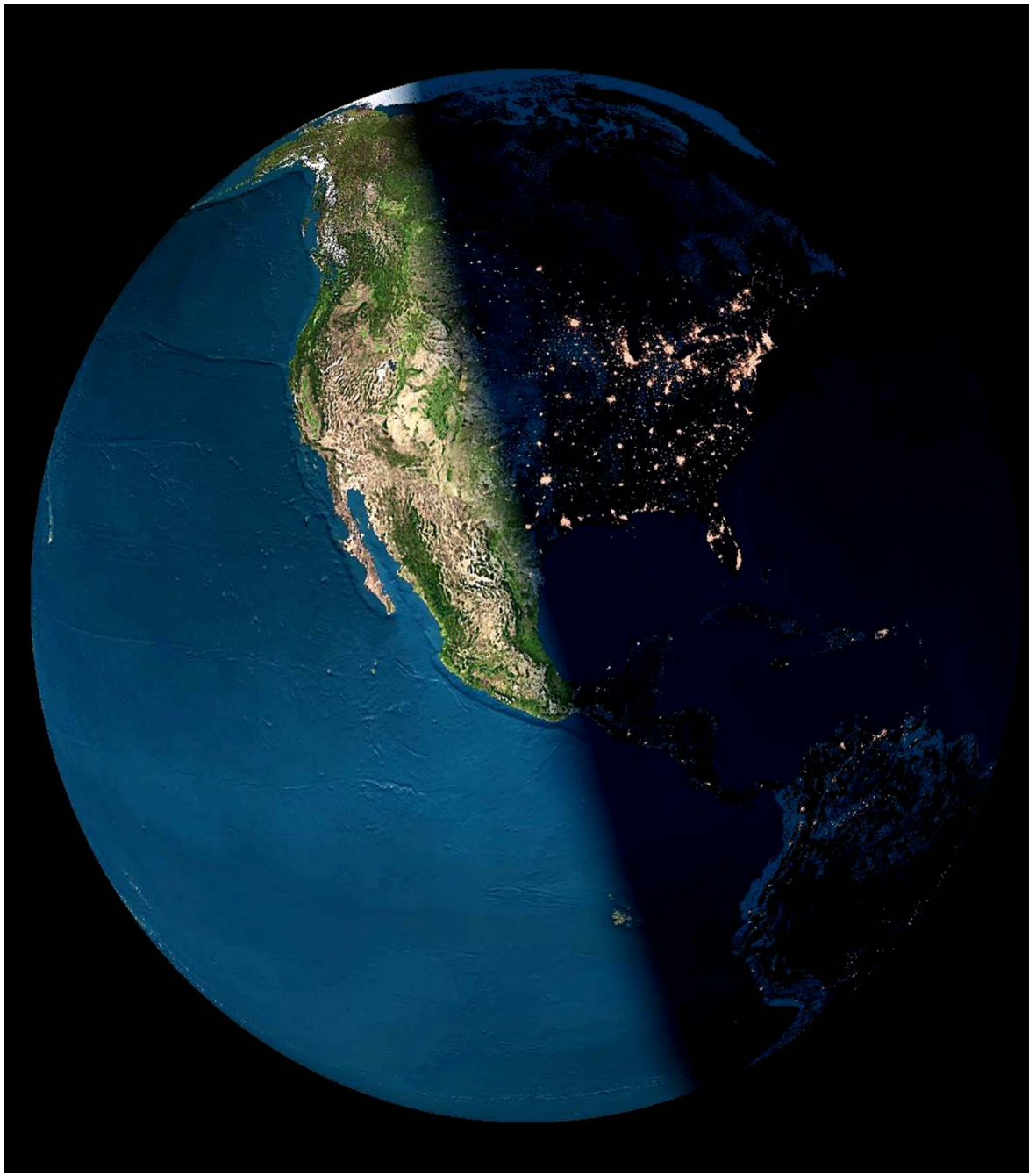


Cajochen C, Khalsa SBS, Wyatt JK, Czeisler CA, Dijk D-J. *Am J Physiol 277*: R640-R649, 1999


Why the Body Needs Sleep
heart, blood pressure and other functions
insulin secretion
glucose metabolism
regulates appetite
nervous system functioning
liver function
resistance in infection
abdominal fat cells: response to insulin
16

Health Consequences of Sleep Deficiency

Diabetes Risk
Inflammation
Cancer
Weight Gain
Vaccination Response
Burnout
Infection Risk
Cardiovascular Disease
Distractibility
Hormone Regulation
Hyperactivity
Emotional Instability
Depression



DETERMINANTS OF ALERTNESS AND PERFORMANCE

- Consecutive Waking Hours
- Biological Time of Day (circadian rhythms)
- Night Sleep Duration
- Sleep Inertia
- Sleep Disorders

- **109% more attentional failures at night >16 hours**
- **36% more serious medical errors** working 30-h
- **464% more serious diagnostic errors** in the ICU
- **168% more car crashes** commuting after >24-h shifts
- **468% more near-miss car crashes** after >24-h shifts
- **73% greater risk of needle stick or scalpel lacerations** after >20 consecutive hours at work
- **171% more complications** in patients undergoing elective surgery if attending surgeon had <6 h sleep opportunity during prior night on call

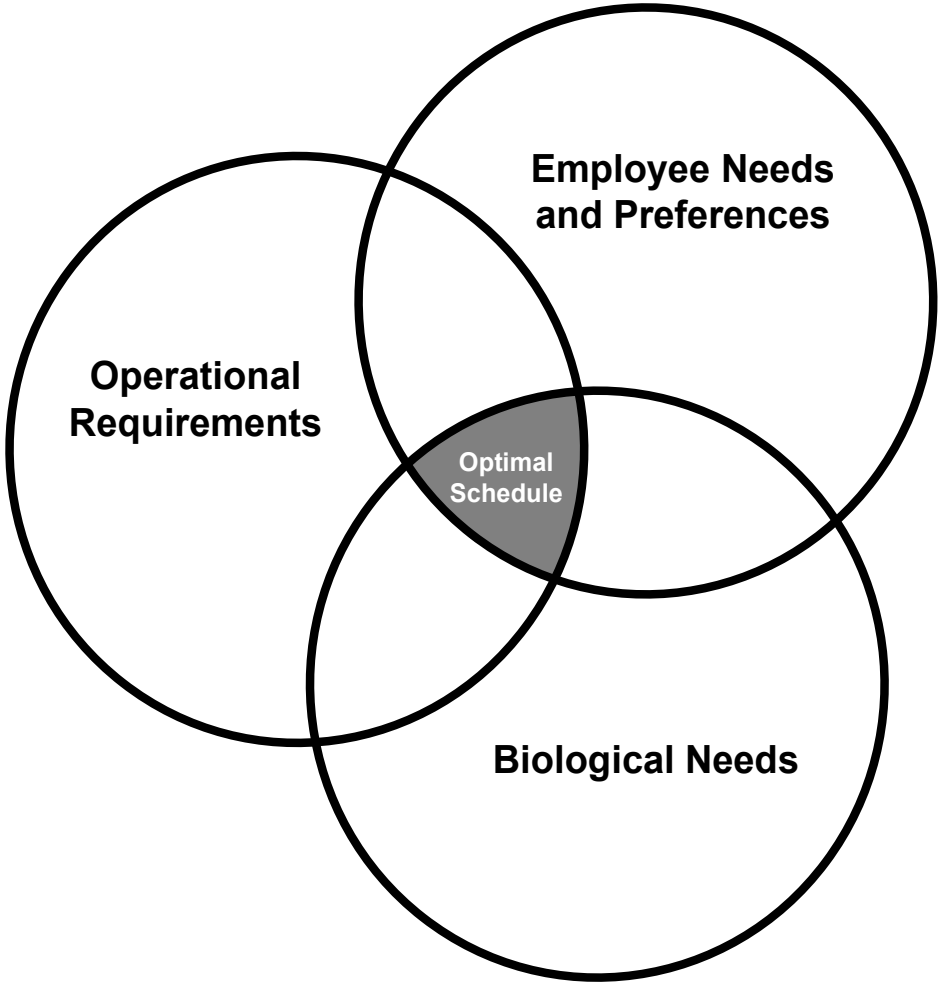
JAMA
The Journal of the American Medical Association

Components of a Comprehensive Fatigue Risk Management Program

(2) **work scheduling policies** grounded on sleep and circadian science, resulting in work schedules that consistently provide adequate time for sleep, with effective disincentives for and required reporting of violations of work-rest policies;

(3) **monitoring of effectiveness** of, **adherence** to and **enforcement** of work-rest policies;

Three major factors that should be considered in schedule design



Work hour regulations in other safety-sensitive industries

Occupation	Limit
US nuclear power plant operators: 1982; 2009	<16 consecutive work hours <72 work hours per week >34 consecutive hours off every 9 days
US railroad operators: 1907, modified 1969 and 1976	<12 work hours per day >8–10 hours rest required per day
US interstate truck and bus drivers: 1938; 1962; 2003; 2005; 2008	<11 driving hours within a 14-hour interval <14 consecutive hours from start to end of work >10 consecutive rest hours <60 work hours per 7 days; <70 work hours per 8 days >34 consecutive hours off between workweeks
EU all occupations (including resident physicians and practicing physicians): 2004; 2009	<13 consecutive work hours <56 work hours per week until 2009; 48 hours thereafter >11 hours rest time per day

From: Czeisler, CA. Chapter 21. Ethical considerations for the scheduling of work in continuous operations: physicians in training as a case study. Oxford University Press, 2010.

Federal Aviation Administration, Part 117

Table A to Part 117—Maximum Flight Time Limits for Unaugmented Operations Table	
Time of report (acclimated)	Maximum flight time (hours)
0000-0459	8
0500-1959	9
2000-2359	8

Table B to Part 117—Flight Duty Period: Unaugmented Operations							
Scheduled time of start (Acclimated time)	**Maximum flight duty period (hours) for lineholders based on number of flight segments**						
	1	**2**	**3**	**4**	**5**	**6**	**7+**
0000-0359	9	9	9	9	9	9	9
0400-0459	10	10	10	10	9	9	9
0500-0559	12	12	12	12	11.5	11	10.5
0600-0659	13	13	12	12	11.5	11	10.5
0700-1159	14	14	13	13	12.5	12	11.5
1200-1259	13	13	13	13	12.5	12	11.5
1300-1659	12	12	12	12	11.5	11	10.5
1700-2159	12	12	11	11	10	9	9
2200-2259	11	11	10	10	9	9	9
2300-2359	10	10	10	9	9	9	9

- WORK DURATION. **60** flight duty period hours in any **168** consecutive hours. OR 190 flight duty period hours in any 672 consecutive hours.
- **100** hours in any **672** consecutive hours or 1,000 hours in any 365 consecutive calendar day period.

Electronic code of Federal Regulations. Title 14: Aeronautics and Space. Part 117- Flight and Duty Limitations and Rest Requirements: Flightcrew and Members. SOURCE: Doc. No. FAA-2009-1093, 77 FR 398, Jan. 4, 2012, unless otherwise noted. e-CFR Data is current as of January 28, 2014

FAA Part 117

REST POLICY…no flightcrew member may accept an assignment for any reserve or flight duty period unless the flightcrew member is given a rest period of at least 10 consecutive hours immediately before beginning the reserve or flight duty period measured from the time the flightcrew member is released from duty. **The 10 hour rest period must provide the flightcrew member with a minimum of 8 uninterrupted hours of sleep opportunity.**

REST POLICY…flightcrew member must be given at least **30 consecutive hours** free from all duty within the **past 168** consecutive hour period.

CONSECUTIVE NIGHT SHIFTS. **Three to five night shifts** are allowed depending on rest opportunities.

Electronic code of Federal Regulations. Title 14: Aeronautics and Space. Part 117- Flight and Duty Limitations and Rest Requirements: Flightcrew and Members. SOURCE: Doc. No. FAA-2009-1093, 77 FR 398, Jan. 4, 2012, unless otherwise noted. e-CFR Data is current as of January 28, 2014

Maritime

- Deep Sea Industry
  - Even time off (e.g., 2 months on/2 months off)
  - Watch system: 4 hours on/8 hours off
  - No breaks/resets during time aboard ship
- Tug Boat Industry
  - Even time off (e.g., 1 week on/1 week off, 2 weeks on/2 weeks off)
  - Watch system: 6 hours on/6 hours off
  - No breaks/resets during time aboard tug boat

Institute of Medicine, 2009[1]

- No more than 16 consecutive hours
- No more than 4 consecutive night shifts
- At least 10 hours off after a day shift; 12 hours after a night shift; 14 hours off after a 16-hour shift
- One day off per week; two consecutive days off per month
- All work included (e.g., moonlighting)

[1]Institute of Medicine. Resident Duty Hours: Enhancing Sleep, Supervision, and Safety. Ulmer C, Wolman DM, Johns MME, eds. Washington, DC: National Academies Press; 2009.

State of Washington, Board of Pilotage Commissioners Current Rest Rules

RCW 88.16.103

Mandatory rest periods for pilots and pilot trainees—Rules—Assignment refusal—Penalty.

(1) Pilots and pilot trainees, after completion of an assignment or assignments which are seven hours or longer in duration, shall receive a mandatory rest period of seven hours.

(2) A pilot or pilot trainee shall refuse a pilotage assignment if the pilot or pilot trainee is physically or mentally fatigued or if the pilot or pilot trainee has a reasonable belief that the assignment cannot be carried out in a competent and safe manner. Upon refusing an assignment under this subsection, a pilot or pilot trainee shall submit a written explanation to the board within forty-eight hours. If the board finds that the pilot's or pilot trainee's written explanation is without merit, or reasonable cause did not exist for the assignment refusal, such pilot or pilot trainee may be subject to the provisions of RCW **88.16.100**.

(3) The board shall quarterly review the dispatch records of pilot organizations or pilot's quarterly reports to ensure the provisions of this section are enforced. The board may prescribe rules for rest periods pursuant to chapter **34.05** RCW. [**2008 c 128 § 7; 1986 c 122 § 2; 1977 ex.s. c 337 § 9.**]

Rest period. **WAC 363-116-081**

(1) Pilots shall observe rest period requirements as set out in RCW **88.16.103** as now or hereafter amended. For purposes of applying this rule an assignment shall begin at the pilot's dispatched departure time if the pilot is on board, regardless of when the ship actually sails. The assignment ends when the pilot leaves the vessel. Travel time shall not be included in an assignment.

[WSR 97-08-042, recodified as § 363-116-081, filed 3/28/97, effective 3/28/97. Statutory Authority: RCW **88.16.035**. WSR 79-05-023 (Order 79-2, Resolution No. 79-2), § 296-116-081, filed 4/17/79; Order 73-6, § 296-116-081, filed 5/11/73.]

National Transportation Safety Board

In 2011, the United States National Transportation Safety Board recommended (NTSB Recommendation M-11-20) that governors of states in which pilots operate should "**require local pilot oversight organizations** that have not already done so to implement fatigue mitigation and prevention programs that:

(1) **regularly inform mariners** of the **hazards of fatigue** and effective **strategies to prevent [fatigue]**, and

(2) promulgate **hours of service rules** that **prevent fatigue resulting from**

- **extended hours of service**,
- **insufficient rest within a 24-hour period**, and
- **disruption of circadian rhythms**."

National Transportation Safety Board. 2011. Collision of Tankship Eagle Otome with Cargo Vessel Gull Arrow and Subsequent Collision with the Dixie Vengeance Tow, Sabine-Neches Canal, Port Arthur, Texas, January 23, 2010. Marine Accident Report NTSB/MAR-11/04, p. 70. Washington, D.C.

Critique of Agency's Current Rest Rules

- **Current rule excludes travel time in hours of service, potentially allowing unsafe, extended duration work shifts**
  - **Bridge time is an inadequate proxy for required duty time**
  - **Duty hours should explicitly include travel time, as pilots are required to service vessels traveling to, from and within 12 ports covering 7,000 square miles of territory within the Puget Sound Pilotage District**
  - **Current rule is not compliant with the NTSB recommendation that "local pilot oversight organizations … implement fatigue mitigation and prevention programs that promulgate hours of service rules that prevent fatigue resulting from … extended hours of service…."**

Critique of Agency's Current Rest Rules

- **Current rule does not limit duration of work shifts, and therefore allows unsafe, extended duration work shifts**
  - **As written, a 6.9-hour pilotage assignment could be followed by an assignment of 22 or more hours, resulting in a 29-hour work shift, including travel time**
  - **Current rule is not compliant with the NTSB recommendation that "local pilot oversight organizations … implement fatigue mitigation and prevention programs that promulgate hours of service rules that prevent fatigue resulting from … extended hours of service…."**

Critique of Agency's Current Rest Rules

- **Current rule provides inadequate time for rest between work shifts, creating an unsafe condition**
  - **Seven (7) hours of off-duty time is inadequate for pilots to fulfill their daily sleep need, inducing sleep deficiency that causes fatigue;**
  - **11 hours of off-duty time is required each day to ensure that pilots can obtain an adequate amount of sleep**
  - **Current rule is not compliant with the NTSB recommendation that "local pilot oversight organizations … implement fatigue mitigation and prevention programs that promulgate hours of service rules that prevent fatigue resulting from … insufficient rest within a 24-hour period…."**

Critique of Agency's Current Rest Rules

- **Current rule fails to ensure that pilots are provided with 34 consecutive hours of uninterrupted rest, including two nights between midnight and 6 am, within every running 7-day interval**
  - **Pilots currently work for 14 consecutive days and are allowed to trade assignments**
  - **Allowing pilots to work for 14, 28 or 42 consecutive days and nights can induce chronic sleep deficiency and fatigue**
  - **Current rule is not compliant with the NTSB recommendation that "local pilot oversight organizations implement fatigue mitigation and prevention programs that promulgate hours of service rules that prevent fatigue…."**

Critique of Agency's Current Rest Rules

- **Current rule requires pilots who refuse a pilotage assignment because of physical or mental fatigue to submit a written explanation to the Board within 48 hours, and that if the Board finds the pilot's explanation to be "without merit," the pilot may be subject to Pilot License revocation or suspension, reprimand, fine or other disciplinary actions**
  - **NTSB recommends pilots be required to decline pilotage assignments when they are impaired by fatigue without fearing disciplinary action**
  - **Pilots who have slept less than 5 hours in the prior 24 hours should be required to refuse a pilotage assignment**

Critique of Agency's Current Rest Rules

- **Current rule provides the State of Washington Board of Pilotage Commissioners with the authority to enhance the guidance that the legislature has provided. "The board may prescribe rules for rest periods pursuant to chapter 34.05 RCW."**
  - **Given the limited scope of the current rest rules mandated by the legislature, the advances in sleep and circadian science that have been made since the legislation was enacted, and the NTSB Recommendations that were issued by the NTSB, the Commission has the responsibility to use the authority granted to the Commission by the legislature to provide further regulatory guidance.**

Summary of Rest Rules of Puget Sound Pilots

- **Two hours of advance notice required for assignment**
- **Travel time is included in work hours, for example:**
  - **2 hours before and 1 hour after is allotted for travel to/from vessel assignments in Seattle Harbor;**
  - **3 hours before and 3 hours after is allotted for travel to and from vessel assignments in Olympia, Manchester, Bangor, Port Townsend;**
  - **4 hours before and 3 hours after is allotted for travel to and from vessel assignments in Anacortes, March Point;**
  - **7 hours before and 7 hours after is allotted for travel to and from vessel assignments in Vancouver, New Westminster, Delta Port or Port Moody;**

Summary of Rest Rules of Puget Sound Pilots

- **At Seattle, a minimum off-duty time "before and after an inter-port or sea-trial assignment, and before the first of multiple harbor shift assignments is eight hours."**
- **Pilots who work three consecutive nights (between 0100 and 0459) shall [not work the next night]**

Critique of Rest Rules of Puget Sound Pilots

- **Inclusion of travel time in work hours is a great improvement over the Agency rule**
- **Voluntary inclusion of travel time in work hours restrictions by the Puget Sound Pilots is not sufficient to substitute for regulatory action by the Commission**

Critique of Rest Rules of Puget Sound Pilots

- **Current rules do not limit duration of work shifts, and therefore allows unsafe, extended duration work shifts**
  - **Current rules are not compliant with the NTSB recommendation that "local pilot oversight organizations … implement fatigue mitigation and prevention programs that promulgate hours of service rules that prevent fatigue resulting from … extended hours of service…."**

Critique of Rest Rules of Puget Sound Pilots

- **Current rule provides inadequate time for rest between work shifts, creating an unsafe condition**
  - **Eight (8) hours of off-duty time is inadequate for pilots to fulfill their daily sleep need, inducing sleep deficiency that causes fatigue;**
  - **11 hours of off-duty time is required each day to ensure that pilots can obtain an adequate amount of sleep**
  - **Current rule is not compliant with the NTSB recommendation that "local pilot oversight organizations … implement fatigue mitigation and prevention programs that promulgate hours of service rules that prevent fatigue resulting from … insufficient rest within a 24-hour period…."**

Critique of Rest Rules of Puget Sound Pilots

- **Current rules fail to ensure that pilots are provided with 34 consecutive hours of uninterrupted rest, including two nights between midnight and 6 am, within every running 7-day interval**
  - **Pilots currently work for 14 consecutive days and are allowed to trade assignments**
  - **Allowing pilots to work for 14, 28 or 42 consecutive days and nights can induce chronic sleep deficiency and fatigue**
  - **Current rule is not compliant with the NTSB recommendation that "local pilot oversight organizations implement fatigue mitigation and prevention programs that promulgate hours of service rules that prevent fatigue…."**

Policy Recommendation 1 (a)

- ***Personal responsibility.*** **Work-rest requirements should include a provision requiring pilots to take personal responsibility for coming to work rested and fit for duty. If a pilot were to report that he or she is fatigued and unfit for duty, the pilot must be removed from the assignment immediately, without penalty for reporting that he or she is fatigued and unfit for duty.**

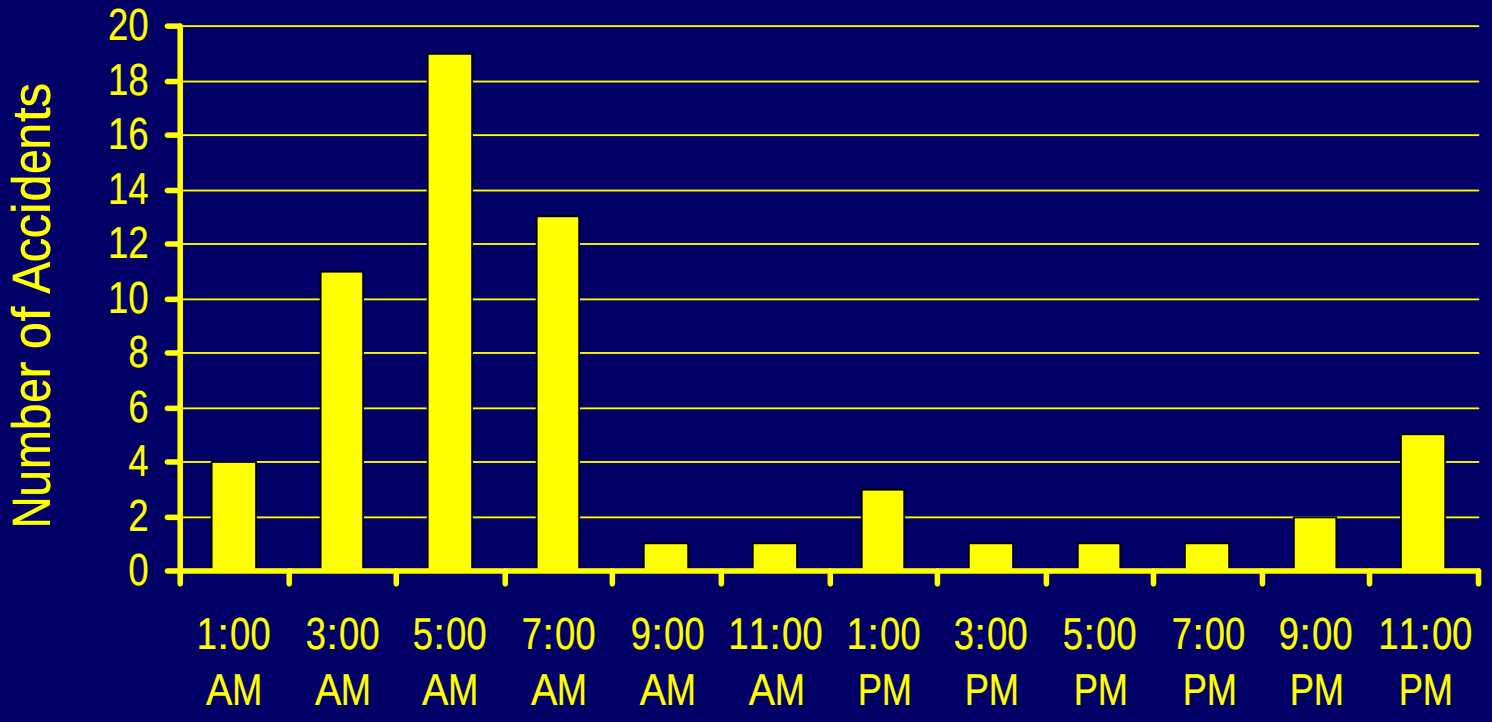
Policy Recommendation 1 (b)

- ***Promoting and fostering a safety culture that recognizes fatigue as a primary safety concern.*** **The Commission should be responsible to provide an annual mandatory education program on sleep, health and safety, with annual certification testing, to train all Puget Sound Pilots, pilot managers and pilot dispatchers on the principles of sleep and circadian science, highlighting the hazards of fatigue and effective strategies to prevent fatigue.**

Policy Recommendation 2

- ***Maximum consecutive work hours.*** **Each work episode of a Puget Sound Pilot should be limited to no more than 12 consecutive hours during the daytime (all work hours between 6 am to midnight) [maximum extended day work duration] and should be limited to no more than 8 consecutive hours if more than one of the work hours occurs between midnight to 6 am [maximum night work duration] before a mandatory rest break is started.**

Temporal Distribution of Fatigue-related Single Vehicle Truck Accidents

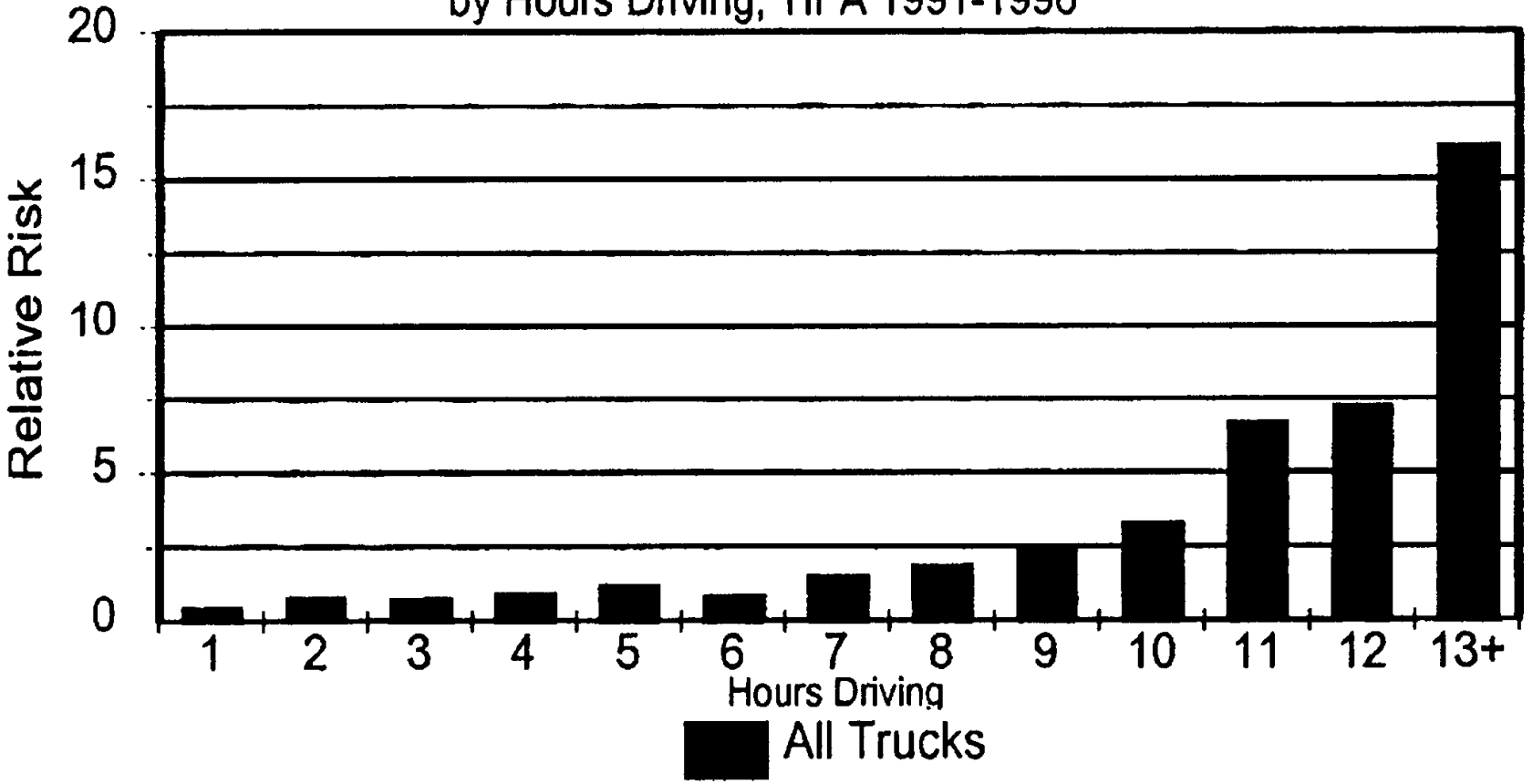


National Transportation Safety Board Safety Study (SS-1995/01)

Chart 5

Relative Risk of Fatigue Crash

by Hours Driving, TIFA 1991-1996



To Promote the Science and Art of Medicine and the Betterment of the Public Health
September 6, 2006, Vol 296, No. 9 Pages 1021-1192
JAMA
The Journal of the American Medical Association

Artist Unknown, *Jar With Both a Plumed Serpent and a Macaw-Headed Serpent*, 1280-1450 CE, Casas Grandes.

Occupational Injuries

73% greater rate of needle stick or scalpel lacerations after > 20 consecutive hours at work

Ayas NT, Barger LK, Cade BE, Hashimoto DM, Rosner B, Cronin JW, Speizer FE, Czeisler CA. *JAMA* 2006;296:1055-1062.

Policy Recommendation 2 (continued)

- ***Exceptions.*** **Each work episode of a Puget Sound Pilot should be limited to no more than 13 consecutive hours during the daytime, if all work hours occur between 8 am to 10 pm) [maximum day work duration] and should be limited to no more than 9 consecutive hours if more than one but less than 3 of the work hours occurs between midnight to 6 am [maximum night work duration] before a mandatory rest break is started.**

Policy Recommendation 2 (continued)

- **Each work episode should, by definition, begin from the time that a pilot is ordered by and assigned to a vessel and will include preparation time, transit time to and from the vessel, time between pilotage assignments and any other compensated work performed by the pilot, whether or not it is related to pilotage, until such time as a mandatory rest break is begun.**

Policy Recommendation 2 (continued)

- **No pilot should begin a pilotage assignment or board a vessel if the expected time of completion of the assignment, including return travel, would cause the pilot's work episode to exceed the maximum allowed work durations.**

Policy Recommendation 2 (continued)

- **If a pilot's work episode duration has exceeded the maximum work durations due to unforeseen adverse weather conditions, traffic conditions or unplanned detention aboard a vessel, then: (1) the reason, duration and time of day of the work-hour exception should be recorded by the Puget Sound Pilots; and (2) all such work-hour exceptions should be compiled by the Puget Sound Pilots.**

Policy Recommendation 2 (continued)

- **The Puget Sound Pilots should report all such scheduling exceptions to the State of Washington Board of Pilotage Commissioners. In case of emergency, a waiver to allow a pilot to exceed the Maximum Work Durations could be issued; the reason, duration and time of day of all such waivers should be reported by a representative of the State of Washington Board of Pilotage Commissioners.**

Policy Recommendation 3

- ***Minimum consecutive hours between shifts*. A mandatory off-duty rest break of a minimum of 12 consecutive hours, when the pilot is not on duty or available to accept pilotage assignments, and is free from transportation to or from a vessel, and is not performing any other compensated work, whether or not it is related to pilotage, should be taken before a pilot can be assigned to a vessel.**
  - **Free of all paid work and required travel time**
  - **Free of administrative pilotage work**

Policy Recommendation 3 (continued)

- **The mandatory rest break may be shortened to a minimum of 11 hours if the rest break includes six consecutive hours between 2200 and 0800. All 11-hour rest breaks should include a pilot-chosen, eight consecutive hour interval, excluding travel time, that is free from calls from dispatch.**

[Consistent with European Working Time Directive]

Policy Recommendation 3 (continued)

- **In case of emergency, a waiver to allow a pilot to accept a pilotage assignment with fewer than 11 or 12 consecutive hours of off-duty time between work episodes may be issued; the reason, duration and time of day of all such waivers should be reported to the Washington Board of Pilotage Commissioners.**

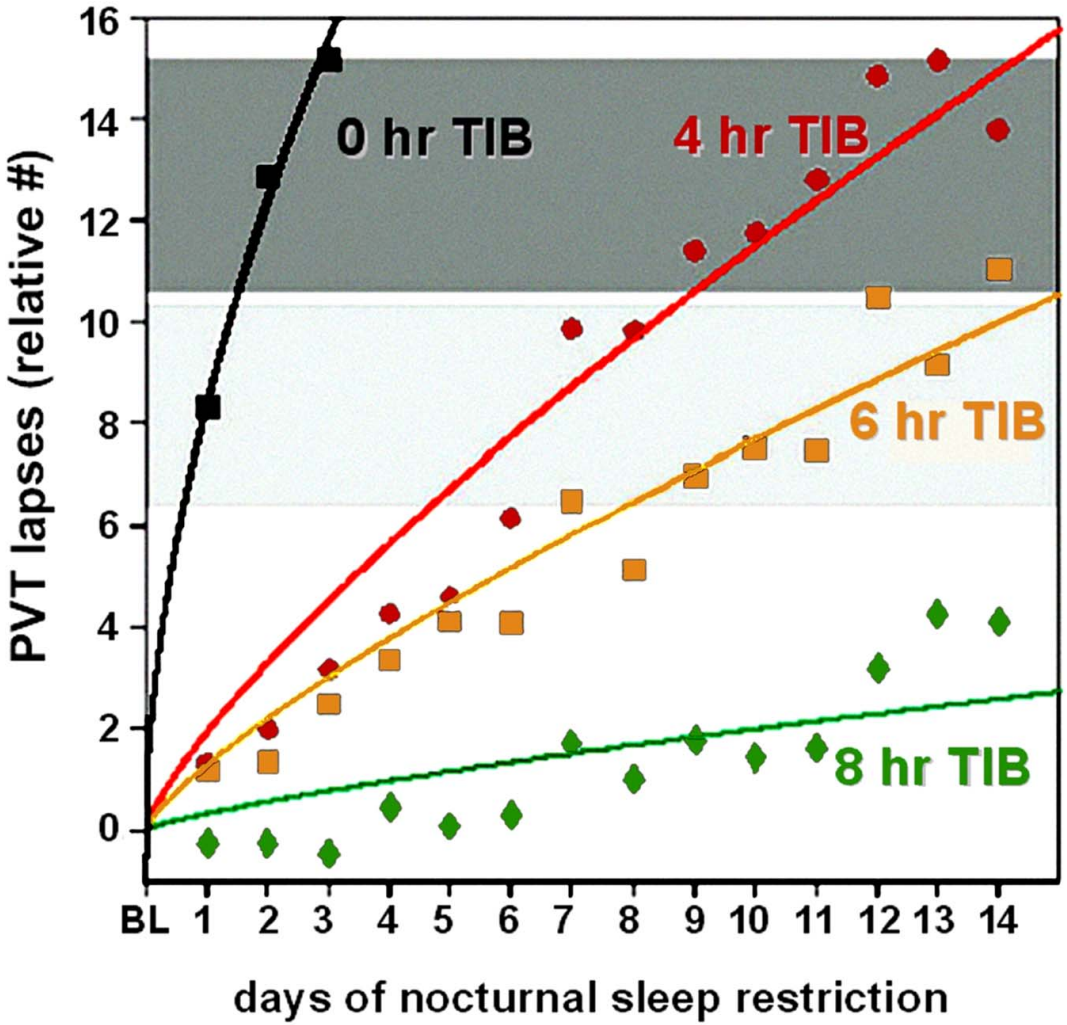
Policy Recommendation 4

- ***Weekly work limit.*** **The maximum cumulative duration of all of the pilotage work episodes and all other compensated work performed by each pilot within any running 7-day interval should not exceed 60 hours. In case of emergency, a waiver to allow a pilot to accept a pilotage assignment that would result in the cumulative duration of the work episodes of that pilot to exceed 60 hours within a 7-day interval may be issued; the reason, duration and time of day of all such waivers should be reported to the State of Washington Board of Pilotage Commissioners.**

Policy Recommendation 5

- ***Consecutive night shifts.*** **The maximum number of consecutive night shifts (defined as involving more than one work hour between midnight and 6 am) worked by Puget Sound Pilots should not exceed three (3). In case of emergency, a waiver to allow a pilot to accept a pilotage assignment that would result in the pilot working up to four (4) consecutive night shifts, but no more, may be issued; the reason, duration and time of day of all such waivers should be reported to the State of Washington Board of Pilotage Commissioners.**

Cumulative Impact of Daily Sleep Curtailment on Risk of Vigilance Lapses



poor performance

Vigilance lapses

Differences <u>among conditions</u>
p = 0.036

<u>Curvature (SEM)</u>

θ = 0.78 (0.04)

<u>Effect sizes</u>

4 hr vs 8 hr: 1.45

6 hr vs 8 hr: 0.71

4 hr vs 6 hr: 0.43

Van Dongen et al. <u>Sleep</u> (2003)

Policy Recommendation 6

- ***Weekly rest*. A mandatory off-duty rest break of a minimum of 24 consecutive hours should be obtained within every running 7-day interval by each Puget Sound Pilot. This Policy Recommendation should not be eligible for waiver. For each pilot working more than 7 consecutive days: a mandatory off-duty rest break of a minimum of 34 consecutive hours, including 2 nights between midnight and 0600, should be obtained within every running 7-day interval. This Policy Recommendation should not be eligible for waiver.**

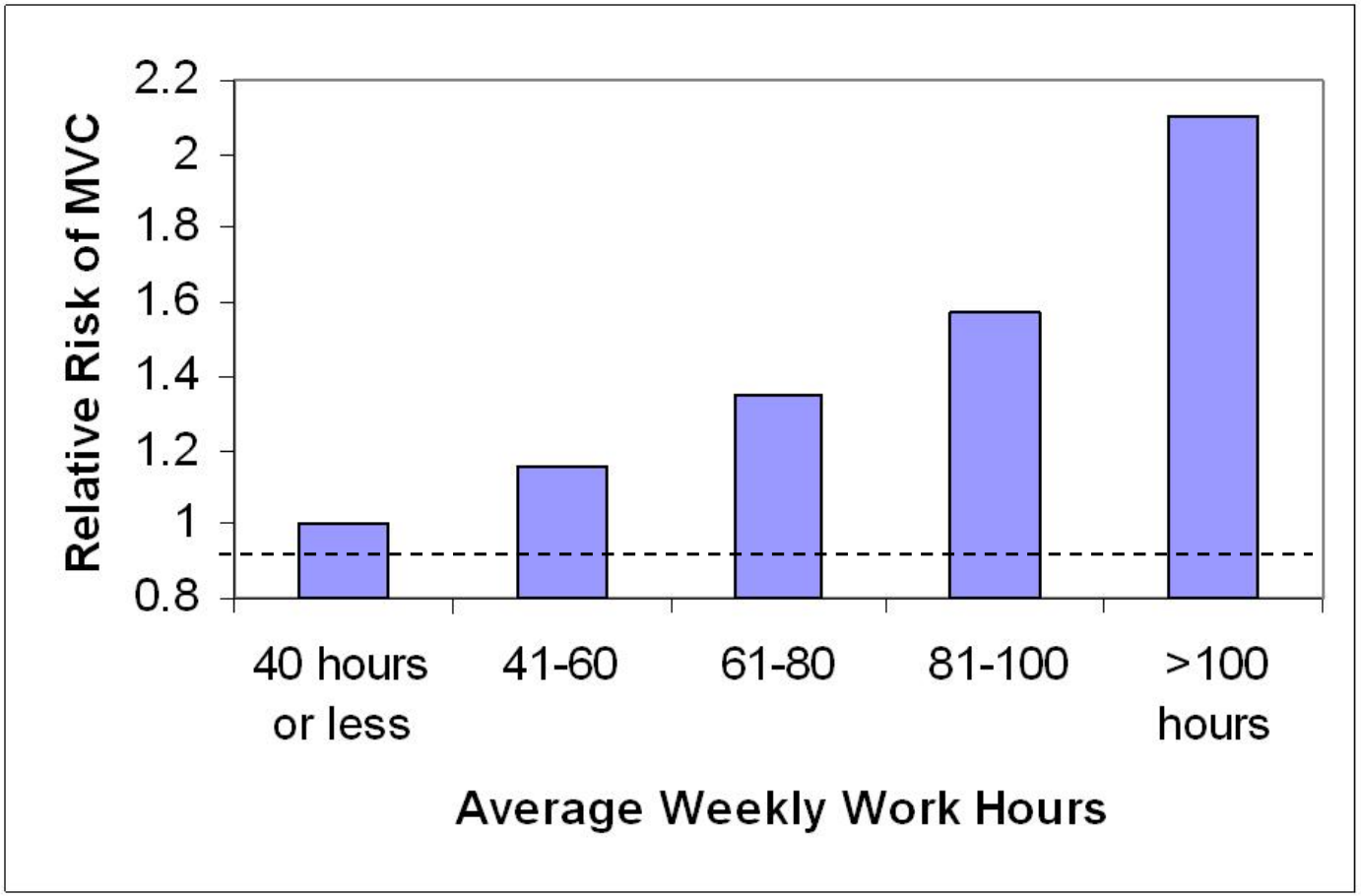
Policy Recommendation 7

- ***Maximum number of days on the duty*. The maximum number of scheduled days on the board should not exceed 15. As stated in Recommendation 6, a minimum of 34 consecutive hours, including 2 nights between midnight and 0600, should be obtained within every running 7-day interval of these 15 scheduled days on the board, such that no pilot will work more than 6 consecutive days. This Policy Recommendation should not be eligible for waiver.**

Policy Recommendation 8

- ***Monthly rest*. A mandatory off-duty rest break of a minimum of 60 consecutive hours, including three (3) nights between midnight and 0600, should be obtained within every running 30-day interval by each Puget Sound Pilot. In case of emergency, a waiver to allow a pilot to reduce the duration of this mandatory monthly off-duty break from 60 to 36 hours, but no shorter may be issued; the reason, duration and time of day of all such waivers will be reported to the State of Washington Board of Pilotage Commissioners.**

Dose Response Relationship Between Resident Work Hours and Risk of an MVC



Barger LK, Cade BE, Ayas N, Cronin JW, Rosner B, Speizer FE, Czeisler CA.
***N Engl J Med* 2005;352:125-134.**

Policy Recommendation 9

- ***Schedule design*. The Puget Sound Pilots should move to stabilize work hours to minimize uncertainty and maximize consistency, particular during the vulnerable nighttime hours (0000-0600). Every effort should be made to increase the regularity and predictability of scheduled work times.**
  - "A schedule that **alternates daytime work with nighttime work in the same week is detrimental to optimum performance** in that it is difficult for someone to compensate for the sleep deprivation that has resulted from working at a time when one is typically sleeping."

    National Transportation Safety Board. 2009. Allision of Hong Kong-Registered Containership M/V Cosco Busan with the Delta Tower of the San Francisco–Oakland Bay Bridge, San Francisco, California, November 7, 2007. Marine Accident Report NTSB/MAR-09/01. Washington, DC.
  - Pilots consistently rate **irregular night work schedule** as most difficult aspect of schedule

"The NTSB also found that the June 23, 1995, grounding of the passenger vessel *Star Princess* in Alaskan waters was fatigue related. It determined that the probable cause of that accident was the pilot's—poor performance, which may have been exacerbated by **chronic fatigue caused by sleep apnea**."

"The NTSB has recommended that the Coast Guard implement a program to:

- Identify licensed mariners … who are at high risk for OSA, and require that those mariners provide evidence through the medical certification process of having been appropriately evaluated and, if treatment is needed, effectively treated for that disorder before being granted unrestricted medical certification. (M-09-15)
- Develop and disseminate guidance for mariners, employers, and physicians regarding the identification and treatment of individuals at high risk of OSA, emphasizing that mariners who have OSA that is effectively treated are routinely approved for continued medical certification. (M-09-16)"

National Transportation Safety Board. 2011. Collision of Tankship Eagle Otome with Cargo Vessel Gull Arrow and Subsequent Collision with the Dixie Vengeance Tow, Sabine-Neches Canal, Port Arthur, Texas, January 23, 2010. Marine Accident Report NTSB/MAR-11/04. Washington, DC.

50-70 million Americans suffer from sleep disorders

- Excessive daytime sleepiness
- Difficulty initiating or maintaining sleep

- Early morning awakening
- Abnormal movements, behaviors or sensations during sleep

Source: IOM Report on Sleep Disorders and Sleep Deprivation: An Unmet Public Health Problem, April, 2006

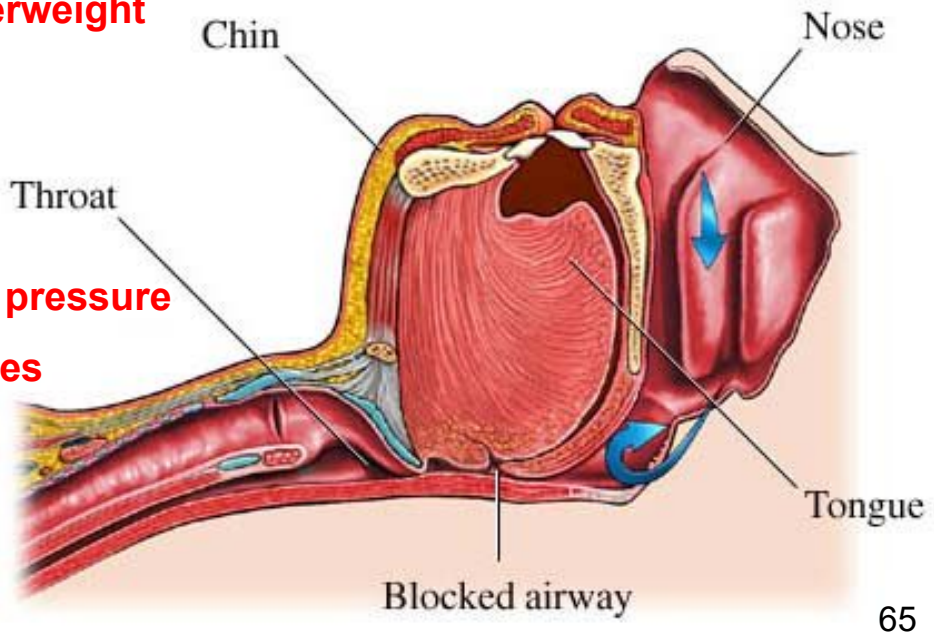
Obstructive Sleep Apnea (OSA)

Temporarily stopping breathing during sleep

- Caused by narrowing of airway during sleep
- Reduces oxygen to the lungs

Symptoms

- **Snoring plus 'gasping' or stopping breathing**
- **Tired during the dayime**
- **High prevalence in men who are overweight or have a collar size >17 inches**
- **Higher risk of CV disease, high blood pressure, and stroke**
- **Leading known cause of high blood pressure**
- **Higher rate of 'fall asleep' car crashes**
- **Most people are undiagnosed**



http://understandingsleep.org

Apnea

Understanding and treating obstructive sleep apnea

What Is OSA
- Understanding OSA
- What Happens During OSA
- Symptoms
- Risk Factors

Living with OSA
- How Does OSA Affect Me
- Physical Characteristics
- Health Consequences
- Personal & Societal Consequences
- Associated Medical Conditions

Diagnosing OSA
- Getting a Diagnosis
- Self-Evaluation
- Testing
- Understanding the Results

Treating OSA
- Treating OSA
- Nonsurgical Treatments
- Understanding PAP
- Surgical Treatments
- Impact of Treatment

DIVISION OF
SLEEP MEDICINE
HARVARD MEDICAL SCHOOL

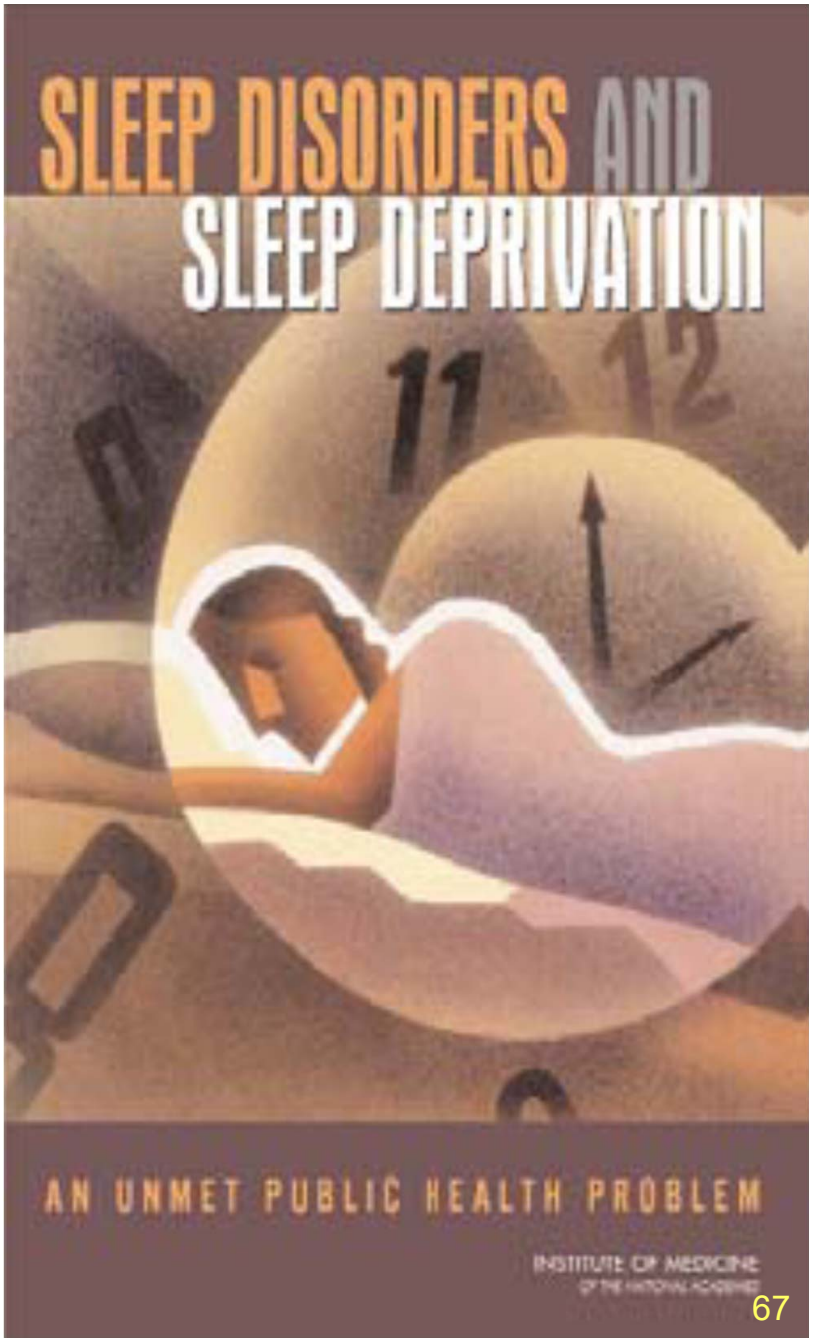
REPORT BRIEF • APRIL 2006

SLEEP DISORDERS AND SLEEP DEPRIVATION: AN UNMET PUBLIC HEALTH PROBLEM

The cumulative effects of sleep loss and sleep disorders represent an under-recognized public health problem and have been associated with a wide range of health consequences, including an increased risk of hypertension, diabetes, obesity, depression, heart attack, and stroke.

INSTITUTE OF MEDICINE
OF THE NATIONAL ACADEMIES

Advising the Nation. Improving Health.



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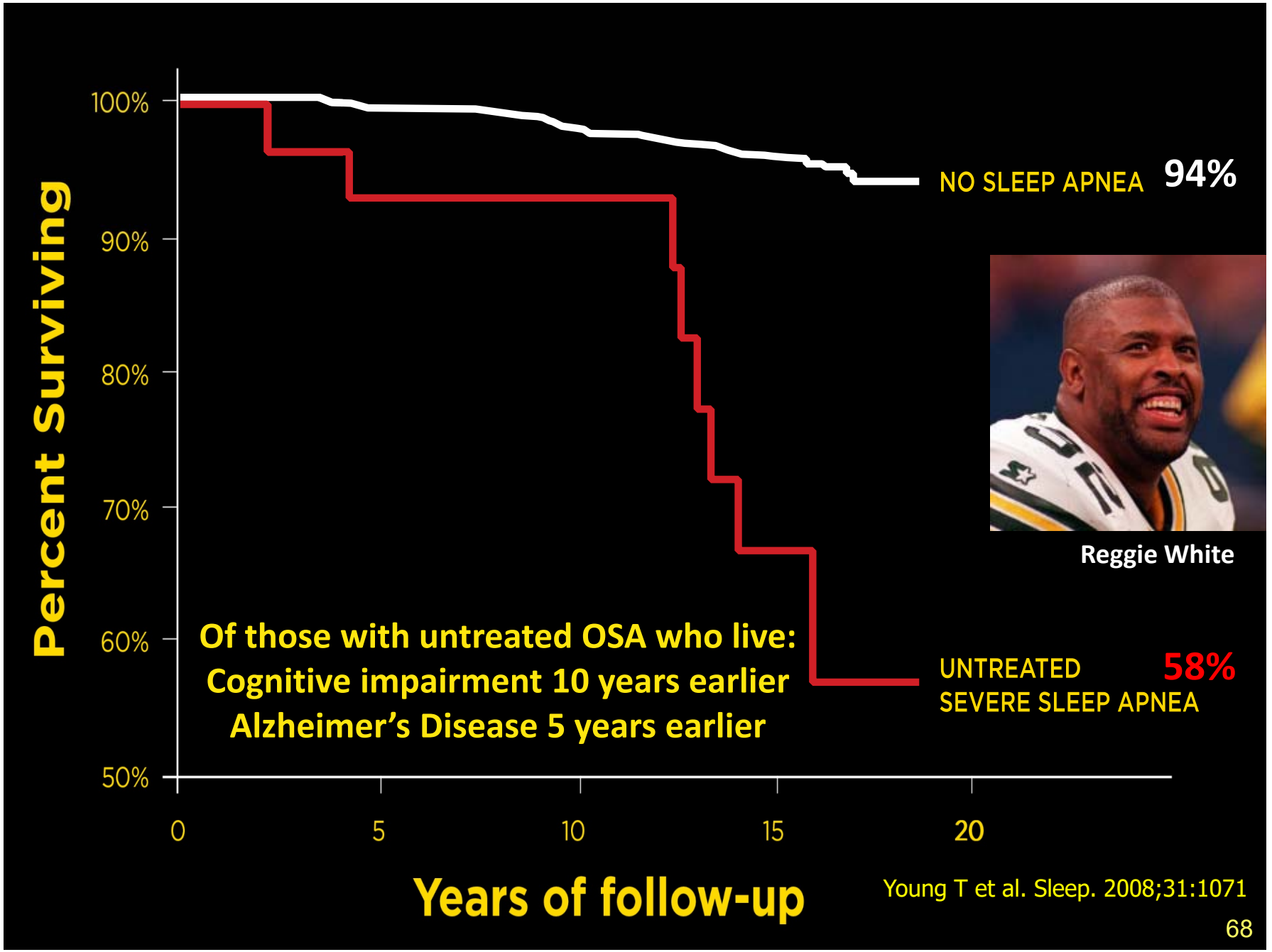

Percent Surviving
100%
90%
80%
70%
60%
50%
0
5
10
15
20
Years of follow-up
NO SLEEP APNEA 94%
UNTREATED SEVERE SLEEP APNEA 58%
Of those with untreated OSA who live:
Cognitive impairment 10 years earlier
Alzheimer's Disease 5 years earlier
Reggie White
Young T et al. Sleep. 2008;31:1071

Policy Recommendation 10

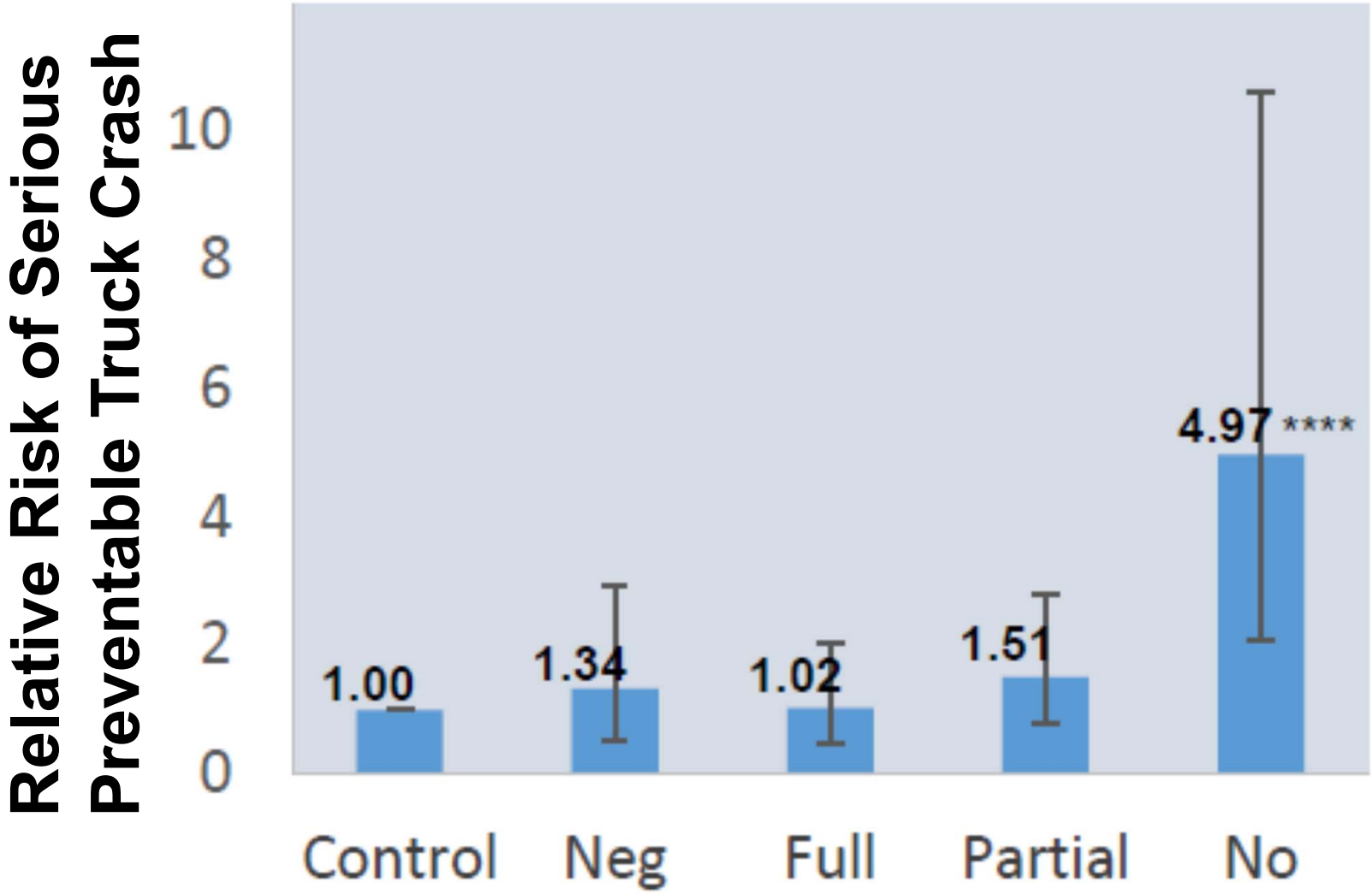
Incorporate Vital Components of a Comprehensive Fatigue Risk Management Program into Regulations

(4) **mandatory screening**, using validated questionnaires, of all employees for sleep disorders, **specifically including obstructive sleep apnea**, with follow-up mandatory objective at-home or in-lab diagnostic testing for obstructive sleep apnea in those who screen positive on a validated obstructive sleep apnea screening questionnaire;

(5) **mandatory objective at-home** or in-lab diagnostic testing for obstructive sleep apnea in all employees with a body mass index greater than 30 kg/m^2;

(6) in pilots diagnosed with obstructive sleep apnea or another sleep disorder, **mandatory demonstration of the effectiveness of, and ongoing compliance with, treatment** of obstructive sleep apnea or another sleep disorder prior to resumption of pilotage duties.

Non-Compliance with Employer-Mandated Sleep Apnea Treatment and Increased Risk of Serious Truck Crashes



Burks SV, Anderson JE, Bombyk M, Haider R, Ganzhorn D, Jiao X, Lewis C, Lexvold A, Liu H, Ning J, Toll A, Hickman JS, Mabry E, Berger M, Malhotra A, Czeisler CA, Kales SN: ***Sleep In press, 2016.***

Benefits of Fatigue Management

- Improve health and safety of pilots
- Fewer environmental catastrophes
- Increase productivity
- Reduce absenteeism
- Reduce motor vehicle crashes
- Improved on-the-job performance
- Reduce liability for sleep-related incidents

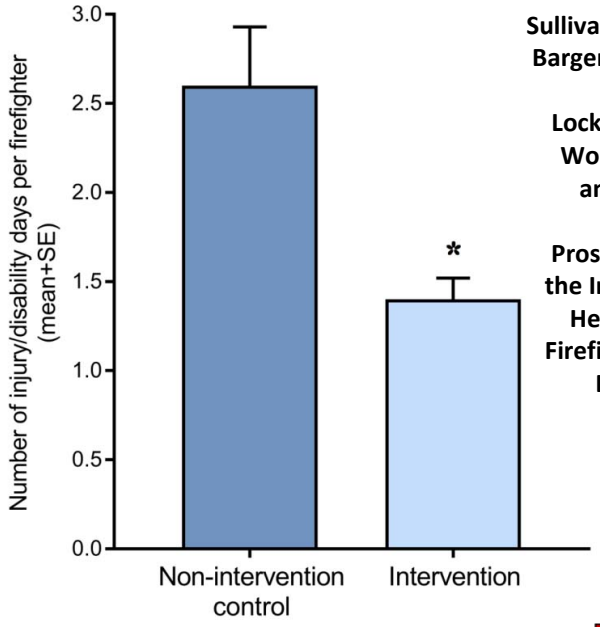
Sleep Disorders, Health, and Safety in Police Officers: Harvard Work Hours, Health and Safety Group

	All partici-pants	Subgroups			Participant with current sleep disorder diagnosis
		Online	State Police	Municipal Police	
Obstructive sleep apnea, *%*	33.6 %	36.0 %	20.3 %	32.2 %	15.1 %
Insomnia (moderate to severe) , *%*	6.5 %	7.0 %	3.8 %	-	21.7 %
Shift work disorder, *%*	14.5 %	15.3 %	7.0 %	-	7.6 %
Restless legs syndrome, *%*	1.6 %	1.7 %	1.0 %	-	34.3 %
Narcolepsy with cataplexy, *%*	0.4 %	0.4 %	0	-	0

Rajaratnam SMW, Barger LK, Lockley SW, Shea SA, Wang W, Landrigan CP, O'Brien C, Qadri S, Sullivan JP, Cade BE, Epstein LJ, White DP, Czeisler CA. JAMA 2011 306: 2567-78

Improved Health and Safety following Sleep Health Education and Screening

- 24% Fewer Injuries among fire-fighters during year-long follow up
- 46% reduction in disability day usage ($2.2M annual savings)
- 5-fold higher rate of serious preventable crashes among truck drivers diagnosed with OSA who were not compliant with treatment
- ~$3,000 per year savings in health care costs for each truck driver compliant with OSA treatment



Sullivan JP, O'Brien CS, Barger LK, Rajaratnam SM, Czeisler CA, Lockley SW; Harvard Work Hours, Health and Safety Group. Randomized, Prospective Study of the Impact of a Sleep Health Program on Firefighter Injury and Disability. Sleep. 2017;40:1-10.

Burks SV … Czeisler CA, Kales SN. Nonadherence with Employer-Mandated Sleep Apnea Treatment and Increased Risk of Serious Truck Crashes. Sleep. 2016 May 1;39(5):967-75