PORT OF SEATTLE
MEMORANDUM

COMMISSION AGENDA **Item No.** 7a

STAFF BRIEFING **Date of Meeting** December 4, 2012

DATE: November 27, 2012

TO: Tay Yoshitani, Chief Executive Officer

FROM: Stephanie Jones Stebbins, Director, Seaport Environment and Planning
Janice Gedlund, Air Quality Program Manager
Ellen Watson, Environmental Program Manager

SUBJECT: 2011 Puget Sound Maritime Emissions Inventory

SYNOPSIS:

The 2011 Puget Sound Maritime Air Emissions Inventory (Inventory) was released by the Puget Sound Maritime Air Forum (Forum) on October 30, 2012. The inventory update quantifies maritime-related emissions for the calendar year 2011, and compares the data against the 2005 baseline inventory. It also illustrates the effects of emission reduction efforts undertaken by the Port of Seattle and others over the 2005 – 2011 time period. Pollutants inventoried include diesel particulate matter, sulfur dioxides, greenhouse gases and a number of other pollutants. The data shows that maritime-related air pollution in the Puget Sound region has decreased as much as 40 percent, depending on the sector and contaminant.

The 2011 Inventory revealed that Port of Seattle total emissions dropped for every pollutant measured. The report looked at both absolute emissions, as well as normalized emissions (emission rate based on a unit of 10,000 tonnes of cargo.) Emissions of diesel particulate matter (DPM) were reduced 27% overall, and 34% per 10,000 tonnes of cargo. Greenhouse gas emission declined by 5% overall and by 14% per 10,000 tonnes of cargo.

Results of the 2011 Inventory will be used to refine and update the Northwest Ports Clean Air Strategy (NWPCAS) and set long-term goals for 2020.

BACKGROUND:

Overview

The 2011 Inventory updates the 2005 baseline inventory which identified and quantified pollutants emitted from maritime-related diesel equipment and alternatively fueled equipment operating within the greater Puget Sound regional airshed. Similar to the 2005 inventory, the 2011 inventory quantifies annual marine diesel emissions and maritime-

related activities associated with U.S. operations in a defined portion of the greater Georgia Basin/Puget Sound International Airshed. This area spans approximately 140 miles south to north and 160 miles west to east, at its extremities. The geographical domain used in the 2011 inventory is the same as the 2005 inventory and is referred to as the greater Puget Sound airshed.

The inventory provides scientific data and evaluation of emissions from marine-related activities in the region in 2011 and compares those emissions to 2005. This study is anticipated to improve understanding of the nature, location, and magnitude of emissions from maritime-related operations, aid in planning and prioritizing future emission reduction investments in the region, and to help evaluate the success of existing emission reduction programs.

The Inventory was funded a total of $354,572 by the Forum a voluntary association of private and public maritime organizations, ports, air agencies, environmental, public health advocacy groups, and other parties with operational or regulatory responsibilities related to the maritime industry. The Port of Seattle contributed $106,500 to this effort.

Pollutants measured in the inventories include relevant U.S. Environmental Protection Agency (EPA) criteria pollutants and precursors, including carbon monoxide, nitrogen oxides, sulfur dioxides, volatile organic compounds and fine particulate matter, as well as greenhouse gases, and diesel particulate matter. The 2011 inventory update is an activity-based inventory following a similar methodology as the 2005 baseline inventory.

Data was gathered for the following six major source categories associated with marine sectors:

- Ocean-going vessels
- Harbor vessels
- Cargo-handling equipment
- Locomotives
- Heavy-duty trucks
- Fleet vehicles

For 2011, the Port of Tacoma and the Port of Seattle looked at both total Port related emissions in the airshed as well as "on port" emissions. We made this change to get a better understanding of port-related emissions in the region. In 2005, we only looked at "on-Port" emissions. Given community interest and focus on port emissions in the region, we felt it was important to look more broadly at our emissions. This change, coupled with improvements in emissions modeling, resulted in some differences in the methodologies between 2011 and 2005. Where there were differences, the 2005 emissions were updated using the same modeling parameters to ensure a direct comparison between the baseline year and 2011. The inventory also compared TEU and tonnage in 2005 and 2011 to normalize emissions based on level of throughput. Other

Maritime Emission Inventories, such as those done at Ports of LA and Long Beach use a similar approach.

Puget Sound-wide Results

Much of the clean air progress is due to significant, voluntary investments of the maritime industry and government agencies in cleaner technology, cleaner fuels and more efficient systems of operation. Mandatory engine and fuel standards have also spurred adoption of newer engines and cleaner fuels. Some of the decrease can also be attributed to fewer ship calls and less cargo resulting from a sluggish economy.

Emissions in the Puget Sound airshed dropped since 2005 from the following pollutants:

- Nitrogen oxides: reduced 14 percent
- Volatile organic compounds: reduced 40 percent
- Sulfur oxides: reduced 14 percent
- Particulate matter (PM_{10}): reduced 16 percent
- Fine particulate matter ($PM_{2.5}$): reduced 16 percent
- Diesel particulate matter: reduced 16 percent
- Carbon dioxide: reduced 5 percent

Overall, Puget Sound airshed emissions fell for most sources since 2005. DPM emissions are summarized below:

- Ocean-going vessels: reduced 16 percent
- Harbor vessels: increased 7 percent
- Locomotives: reduced 24 percent
- Cargo-handling equipment: reduced 40 percent
- Heavy-duty vehicles: reduced 52 percent
- Fleet vehicles: reduced 47 percent

In the harbor vessels sector, this includes ferries, tugs, fishing and recreational boats, some categories of pollutants increased. This is likely due to a 12 percent increase in vessel traffic, as well as an increase in the use of larger engines, which have higher emissions.

Port of Seattle Results

Total Port of Seattle emissions within the airshed dropped since 2005 from the following pollutants:

- Nitrogen oxides: reduced 24 percent
- Volatile organic compounds: reduced 16 percent
- Sulfur oxides: reduced 21 percent
- Particulate matter (PM_{10}): reduced 27 percent
- Fine particulate matter ($PM_{2.5}$): reduced 27 percent
- Diesel particulate matter: reduced 27 percent
- Carbon dioxide: reduced 5 percent

Data was gathered for the following six major source categories associated with marine sectors: At the Port of Seattle we saw the following absolute reductions in DPM:

- Ocean-going vessels transit, 21% reduction
- Ocean-going vessels hoteling, 34% reduction
- Harbor vessels: 27% reduction
- Cargo-handling equipment: 39% reduction
- Trucks; 53% reduction
- Rail operations. 14% reduction

Green House Gas Emissions also declined by 5% at the Port of Seattle.

Next Steps

The original 2005 Inventory was the foundation on which the NWPCAS was developed in 2007. The NWPCAS was a collaborative effort by the Port of Tacoma, the Port of Seattle and Port Metro Vancouver (BC), along with the Puget Sound Clean Air Agency, the EPA, the Washington State Department of Ecology and Environment Canada. Emission reduction initiatives and potential actions were defined in the Strategy and emission reduction goals were set, based to a great extent, on the 2005 Inventory. The Strategy has helped the ports to achieve reduced at-berth emissions for ocean going vessels through the use of low-sulfur fuels and shore power; reduced cargo-handling equipment emissions, reduced on-terminal truck emissions through engine retrofits and scrap-and-replace incentive programs, and reduced locomotive emissions through application of idle-reduction technologies.

Marine diesel engines, like all diesel engines, are significant generators of fine particles and toxic emissions. Exposure to these pollutants can contribute to increased rates of lung cancer, chronic respiratory and cardiovascular disease, and other health effects. Diesel emissions also contribute to acid deposition, climate change and impaired visibility. Given the implications for public health and the environment, reducing and minimizing diesel particulate matter (DPM) has been a top priority for the Port of Seattle, and has been the primary focus of our emission reduction programs.

Results of the 2011 Inventory will be used to refine and update the NWPCAS and set long-term goals for 2020.

OTHER DOCUMENTS ASSOCIATED WITH THIS BRIEFING:

- Powerpoint presentation on results of the Inventory

PREVIOUS COMMISSION ACTIONS OR BRIEFINGS:

- On February 9, 2005, the Commission adopted Resolution No. 3534, expressing its commitment to Maritime Air Quality.

- On April 26, 2005, the Commission authorized joint development of the Puget Sound Maritime Air Emissions Inventory and $500,000 for support and implementation of the project.
- On February 16, 2007, the Commission passed a series of environmental motions that required, in part, that staff present an air quality action plan for Commission approval.
- On March 27, 2007, the Commission authorized the amendment of the existing contract for the Air Emission Inventory in the amount of $25,000, and to receive and spend supplemental funding for the Puget Sound Maritime Air Emissions Inventory Project.
- On April 10, 2007, the Commission was briefed on the Puget Sound Maritime Air Emissions Inventory Project.
- On August 25, 2009, the Commission received a Clean Air Update.
- On January 12, 2010, the Commission was briefed on the Seaport's Air Quality Program.
- On December 7, 2010, the Commission was briefed on the Northwest Ports Clean Air Strategy Implementation Status.
- On July 12, 2011, the Commission was briefed on the Northwest Ports Clean Air Strategy 2010 Implementation Report and interim report on Accelerating Clean Air Goals.
- On Feb 7, 2012, the Commission was briefed on the Northwest Ports Clean Air Strategy draft recommendations on accelerating Seaport Clean Air Goals.