U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF INSPECTOR GENERAL

Catalyst for Improving the Environment

Evaluation Report

EPA Needs to Improve Its Efforts to Reduce Air Emissions at U.S. Ports

Report No. 09-P-0125

March 23, 2009

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Abbreviations

CAA	Clean Air Act
CARB	California Air Resources Board
CMAQ	Congestion Mitigation and Air Quality
CO	Carbon Monoxide
ECA	Emission Control Area
EPA	U.S. Environmental Protection Agency
ETV	Environmental Technology Verification
FY	Fiscal Year
HC	Hydrocarbons
IMO	International Maritime Organization
kW	Kilowatts
MARPOL	International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978
MATES III	Multiple Air Toxic Exposure Study III
NAAQS	National Ambient Air Quality Standards
NCDC	National Clean Diesel Campaign
NO_x	Nitrogen Oxides
OIG	Office of Inspector General
OMB	Office of Management and Budget
OTAQ	Office of Transportation and Air Quality
PM	Particulate Matter
PM 2.5	Fine Particulate Matter
ppm	Parts Per Million
SCAQMD	South Coast Air Quality Management District
SO_x	Sulfur Oxides
TEU	Twenty-Foot Equivalent Unit

Cover photos: *Clockwise, from top left:* container ship at berth, heavy-duty diesel trucks entering terminal gates, harbor tug, and cargo-handling equipment (terminal tractors and container handlers). Photos taken by U.S. EPA OIG staff during site visits to the Ports of Los Angeles and Long Beach.

U.S. Environmental Protection Agency
Office of Inspector General

09-P-0125
March 23, 2009

At a Glance

Catalyst for Improving the Environment

Why We Did This Review

Controlling air emissions from ports was identified as a key issue in a prior Office of Inspector General report. For selected major U.S. ports, we sought to determine whether EPA's (1) actions to address air emissions from oceangoing vessels have been effective, and (2) strategy to address air emissions from port sources is sufficient to protect human health and the environment.

Background

The U.S. has about 360 commercial sea and river ports. Emissions from activities at these ports have significant environmental and human health impacts. By 2020, many major U.S. ports are expected to double the amount of container traffic they handle; some will triple. EPA uses a multipronged approach to reduce emissions from these sources, including implementing existing regulations, developing new standards for diesel engines, and promoting emission reductions in existing diesel engines through voluntary strategies.

For further information, contact our Office of Congressional, Public Affairs and Management at (202) 566-2391.

To view the full report, click on the following link: www.epa.gov/oig/reports/2009/20090323-09-P-0125.pdf

EPA Needs to Improve Its Efforts to Reduce Air Emissions at U.S. Ports

What We Found

While EPA has issued air emissions regulations for most port sources, EPA's actions to address air emissions from large oceangoing vessels in U.S. ports have not yet achieved the goals for protecting human health. The Clean Air Act (CAA) provides EPA with the authority to regulate emissions from oceangoing vessel engines when these emissions cause significant harm to human health. For over 14 years, EPA has acknowledged that human health has been significantly harmed by emissions from these sources. Thus far, EPA has only regulated nitrogen oxides emissions from U.S.-flagged vessels. EPA has chosen to defer taking a position on whether it has authority to regulate emissions from foreign-flagged vessels, although these vessels account for about 90 percent of all U.S. port calls. However, after many years, EPA's efforts with the International Maritime Organization (IMO) have the potential to significantly reduce these emissions. In October 2008 the IMO adopted new international standards for oceangoing vessel engines and fuels. Still, EPA must work to establish Emissions Control Areas for U.S. ports if significant emissions reductions are to be realized from oceangoing vessels.

EPA's strategy to address air emissions at U.S. ports is not sufficiently developed. Although the Agency is working to reduce these emissions through various regulatory and voluntary programs, it has not successfully implemented key elements of this approach. Despite the emphasis that EPA has placed on voluntary partnership programs, such as regional diesel collaboratives, such initiatives have not been implemented at many U.S. ports. In 2008, EPA built upon its efforts by publishing a Strategy for Sustainable Ports. This strategy is an Agency-wide, multi-media effort which includes goals and objectives for addressing key environmental issues at U.S. ports. EPA's strategy sets goals, but lacks a transformation plan to assure that the goals are realized. EPA did not include the appropriate performance measures, milestones, and other management controls for many of the action items in the strategy. As a result, EPA lacks the management framework and controls necessary to assure the successful implementation of its strategy.

What We Recommend

We recommended that EPA (1) assess its authorities and responsibilities under the CAA to regulate air emissions from foreign-flagged vessels in U.S. ports, and report any shortfalls to Congress; (2) assess the extent to which Emissions Control Areas should be designated for U.S. coastal areas; and (3) revise its ports strategy to include a transformation plan. EPA's comments on the first recommendation were not responsive and do not satisfy the intent of the recommendation. The Agency concurred with the second recommendation, but did not agree with the third recommendation. We consider Recommendations 1 and 3 open and unresolved.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
INSPECTOR GENERAL

March 23, 2009

MEMORANDUM

SUBJECT: EPA Needs to Improve Its Efforts to Reduce Air Emissions at U.S. Ports
Report No. 09-P-0125

FROM: Wade T. Najjum
Assistant Inspector General for Program Evaluation

TO: Elizabeth Craig
Acting Assistant Administrator for Air and Radiation

This is our report on the subject evaluation conducted by the Office of Inspector General (OIG) of the U.S. Environmental Protection Agency (EPA). This report contains findings that describe the problems the OIG has identified and corrective actions the OIG recommends. This report represents the opinion of the OIG and does not necessarily represent the final EPA position. Final determinations on matters in this report will be made by EPA managers in accordance with established audit resolution procedures.

The estimated cost of this report – calculated by multiplying the project's staff days by the applicable daily full cost billing rates in effect at the time – is $1,680,991.

Action Required

In accordance with EPA Manual 2750, you are required to provide a written response to this report within 90 calendar days. You should include a corrective actions plan for agreed upon actions, including milestone dates. For the recommendations over which we disagree, please reconsider your position in your response to this final report. You may also propose alternative actions that you believe will meet the intent of our recommendations in your response. We have no objections to the further release of this report to the public. This report will be available at http://www.epa.gov/oig.

If you or your staff have any questions regarding this report, please contact me at (202) 566-0827 or najjum.wade@epa.gov; or Rick Beusse, Director for Program Evaluation, Air and Research Issues, at (919) 541-5747 or beusse.rick@epa.gov.

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Chapter 1
Introduction

Purpose

This evaluation focuses on the efforts of the U.S. Environmental Protection Agency (EPA) to control air pollution from mobile sources operating in and approaching U.S. ports.[1] The evaluation, completed in accordance with the 2007 Annual Plan of the EPA Office of Inspector General (OIG), was initiated because a prior OIG report[2] found that EPA faced significant challenges in controlling air emissions from port sources.

The objectives of our evaluation were to determine whether EPA's:

- actions taken to address air emissions from oceangoing vessels at selected U.S. ports have been effective, and
- management plan (strategy) to address emissions from port sources is sufficient to protect human health and the environment at selected major U.S. ports.

Background

The United States has approximately 360 commercial sea and river ports. Air emissions from activities at these ports contribute to local air quality problems impacting communities surrounding port areas. These emissions have significant environmental and human health impacts, such as cancer and asthma. EPA's goal for clean air is to protect and improve the air so it is healthy to breathe, and reduce risks to human health and the environment. EPA employs a multipronged approach to address emissions from port sources. This approach includes implementing existing regulations, developing new standards for diesel engines, promoting voluntary emission reductions from existing diesel engines, and participating in international efforts to address air emissions from oceangoing vessels.

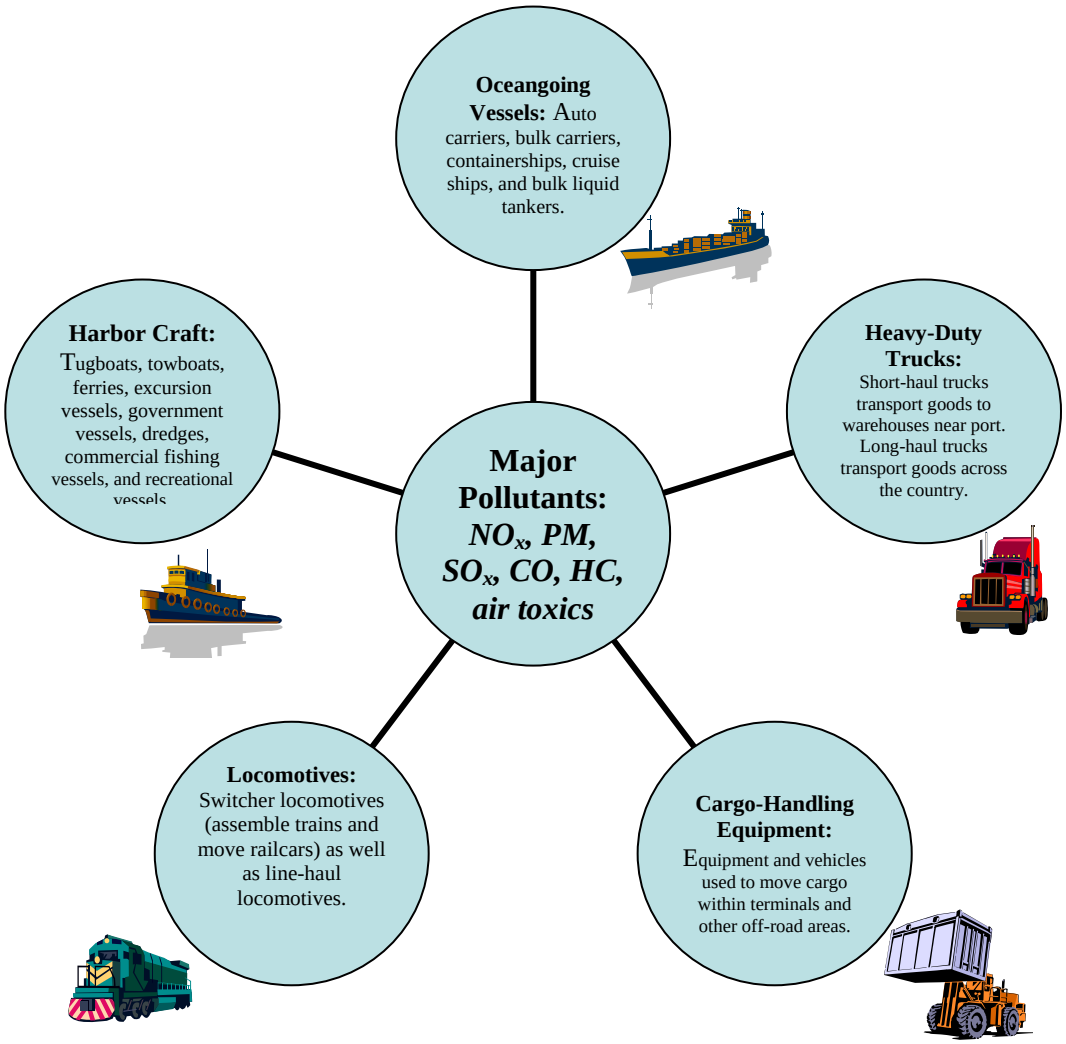
Sources of Emissions

Almost all port emissions come from five diesel-fueled source categories, including oceangoing vessels, heavy-duty trucks, cargo-handling equipment, locomotives, and harbor craft. The emissions of greatest

[1] According to the Agency, air quality modeling recently conducted to support its proposed Emissions Control Area application shows that emissions from as far as 200 nautical miles from ports impact air quality, not only in the immediate port areas, but for 100 miles inland. When this report refers to oceangoing vessels "in U.S. ports," it is also referring to vessels approaching U.S. ports.
[2] *Progress Report on EPA's Nonroad Mobile Source Emissions Reduction Strategies*, Report No. 2006-P-00039, September 27, 2006.

concern from these sources are nitrogen oxides (NO_x), particulate matter (PM), sulfur oxides (SO_x), carbon monoxide (CO), and hydrocarbons (HC), as well as some toxic air pollutants. Figure 1-1 provides brief descriptions for each of these major categories of port pollution.

Figure 1-1: Descriptions of the Five Major Sources of Port Emissions



Source: The OIG compiled source categories based on review of existing literature on port air emissions.

Port sources also emit air toxics, most notably diesel exhaust. Other air toxics emitted from diesel engines include benzene, 1,3-butadiene, formaldehyde, acetaldehyde, acrolein, polycyclic organic matter, and naphthalene. All of these compounds, except acetaldehyde, were identified as national or regional risk drivers in EPA's 1999 National-Scale Air Toxics Assessment. These air toxics pose both cancer and non-cancer health effects. For example, EPA's December 2007 Advanced Notice of Proposed Rulemaking stated that:

> *…mobile sources, including Category 3 marine [oceangoing vessel] engines, were responsible for 44 percent of outdoor toxic emissions and almost 50 percent of the cancer risk among the 133 pollutants quantitatively assessed in the 1999 National-Scale Air Toxics Assessment.*

In January 2008, the South Coast Air Quality Management District (SCAQMD) released its draft final report, Multiple Air Toxic Exposure Study III (MATES III). MATES III studied the cancer risk from exposure to toxic air pollution in the Southern California air basin. The study measured air toxics at 15 locations throughout Southern California from 2004 to 2006. MATES III found the cancer risk rate from air toxics in the Southern California air basin is nearly 1,200 per million, with the highest cancer risks at about 3,700 per million. Most of the risks were from diesel particulates. The highest air toxics risks are found near the port area, an area near Central Los Angeles, and near transportation corridors. The results from this study demonstrate the need for continued efforts to reduce air toxic emissions, particularly from diesel engines. The Clean Air Act set a lifetime cancer risk of 1 in 1 million as a threshold above which regulation may be warranted for individual sources of air toxics.

A July 2008 National Oceanic and Atmospheric Administration study[3] found that emissions from shipping have a significant impact on air quality and health on both local and regional scales. Extensive measurements of the emissions of light absorbing carbon aerosol, or soot,[4] from commercial shipping showed increased concentrations of this aerosol at U.S. ports on the East Coast, West Coast, and Gulf Coast. The study also suggested that large oceangoing vessels may emit up to twice as much aerosol as previously estimated.

Impacts of Air Pollution from Port Activities

Diesel and other emissions from port activities have significant human health and environmental impacts in onshore communities. These impacts include increased cancer rates, asthma, other respiratory and cardiovascular diseases, and premature death. Port emissions also contribute to the formation of ground level ozone, acid rain, and crop damage. EPA has recognized that diesel engines at ports create emissions that affect the health of workers and people living in nearby communities, and contribute significantly to regional air pollution. EPA has determined that diesel exhaust is "likely to be carcinogenic to humans by inhalation" and that this hazard applies to environmental exposures.[5]

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[3] Lack, D., B. Lerner, C. Granier, T. Baynard, E. Lovejoy, P. Massoli, A. R. Ravishankara, and E. Williams. *Light absorbing carbon emissions from commercial shipping*, Geophys. Res. Lett., 35, L13815, doi:10.1029/2008GL033906, 2008.

[4] Soot is diesel particulate matter, and results from burning fuel in diesel engines.

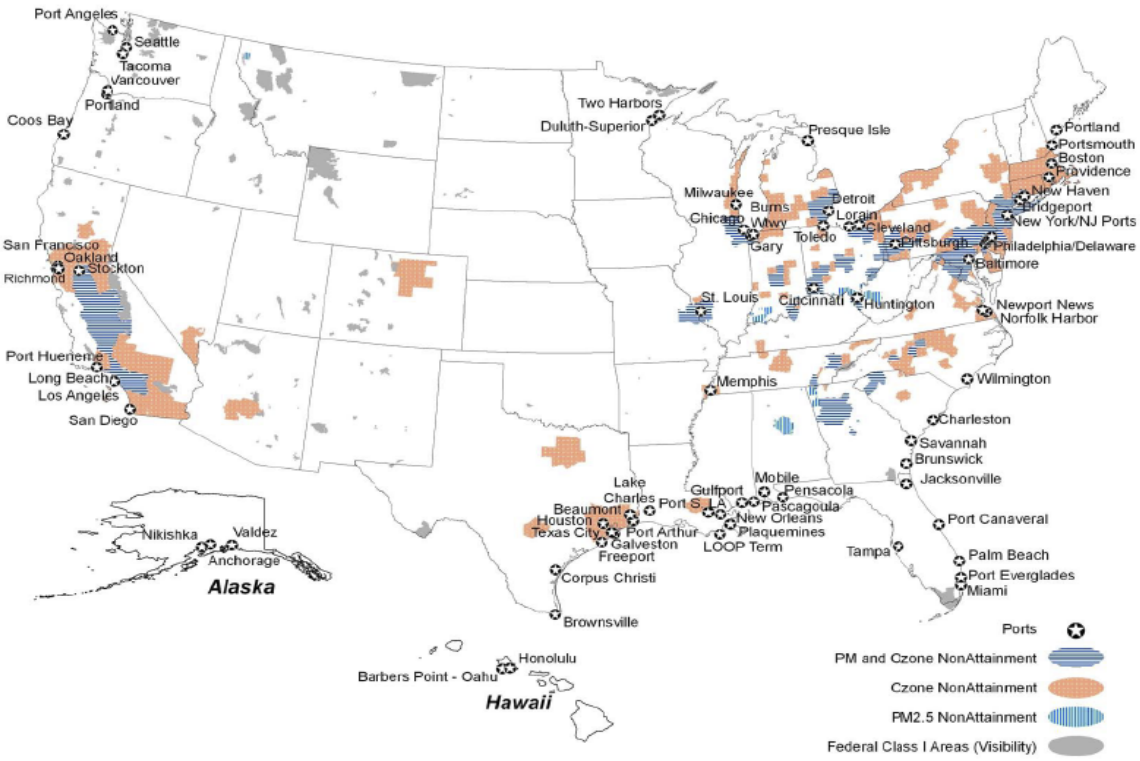
[5] U.S. EPA (2002). *Health Assessment Document for Diesel Engine Exhaust*, prepared by the National Center for Environmental Assessment, Washington, DC, for OTAQ; EPA/600/8-90/057F.

Recent studies show that populations living near large diesel emission sources such as major roadways,[6] rail yards, and ports[7] are likely to experience greater diesel exhaust exposure levels than the overall U.S. population, exposing them to greater health risk. For example, according to the California Air Resources Board, nearly 60 percent of the 2 million people living in the area around the Ports of Los Angeles and Long Beach have a potential cancer risk of greater than 100 in 1 million (due in part to port emissions), while over 410,000 people living closest to the same ports have a cancer risk greater than 200 in 1 million.[8] Recent studies have also shown an increased risk of cancer at other ports in the United States.[9]

EPA recently conducted an initial screening level analysis on the size of the U.S. population living near 47 marine ports and 37 rail yards selected. According to EPA, this was useful in beginning to understand the populations exposed to diesel particulate matter in these areas. The results indicate that at least 13 million people, including a disproportionate number of low-income households, African-Americans, and Hispanics, live in the vicinity of these facilities and are exposed to ambient diesel particulate matter. Figure 1-2 below shows U.S. port locations and areas exceeding air quality standards in 2007.

[6] Kinnee, E. J., J.S. Touman, R. Mason, J. Thurman, A. Beidler, C. Bailey, R. Cook. *Allocation of onroad mobile emissions to road segments for air toxics modeling in an urban area*. Transport. Res. Part D 9: 139-150, 2004.
[7] California Air Resources Board (CARB), *Roseville Rail Yard Study*, October 14, 2004; and CARB, *Diesel Particulate Matter Exposure Assessment Study for the Ports of Los Angeles and Long Beach*, April 2006.
[8] EPA does not agree with California's methodology to determine cancer risks.
[9] Environmental Science & Technology, 2007, 41, 8512–8518.

Figure 1-2: U.S. Ports and Areas Exceeding Air Quality Standards as of March 2007.



Source: EPA Advanced Notice of Proposed Rulemaking, *Control of Emissions From New Marine Compression-Ignition Engines at or Above 30 Liters per Cylinder*. Federal Register: December 7, 2007, Volume 72, Number 235, pp. 69522-69552. The figure depicts counties which were designated nonattainment for either or both the 8-hour ozone National Ambient Air Quality Standards (NAAQS) and PM2.5 NAAQS as of March 2007. It also shows the location of mandatory class I Federal areas for visibility.

Areas of the country where air pollution levels persistently exceed the ambient air quality standards[10] may be designated as "nonattainment" areas. In 2007, 31 U.S. sea ports were located in nonattainment areas for ozone, fine particulate matter, or both. Further, in March 2008, EPA strengthened the air quality standards for ground-level ozone, revising the present 8-hour ozone standard from 0.084 to 0.075 parts per million (ppm). Many additional counties with ports are projected to be in nonattainment for the 0.075 ppm 8-hour ozone standard. According to EPA's Office of Air Quality Planning and Standards, EPA's goal is to improve the air quality in areas where it is unacceptable and prevent deterioration in areas where the air is relatively free of contamination.

In addition to public health impacts, serious public welfare and environmental impacts are associated with mobile source emissions at

[10] EPA has established National Ambient Air Quality Standards (NAAQS) for six pollutants common throughout the United States. These include ozone and particulate matter.

ports. Pollutants such as NO_x, SO_x, and fine particulate matter ($PM_{2.5}$) can impair visibility in many parts of the United States. These pollutants contribute to structural damage to bridges and other structures by corrosion or erosion, and damage the exteriors of buildings, monuments, and other culturally important articles. Finally, NO_x and SO_x emissions from diesel engines contribute to increased acidity and higher amounts of dissolved chemical nutrients (especially nitrogen and sulfur) in water bodies. For example, airborne NO_x from diesel and other sources contributes about 32 percent of the excess nitrogen load to the Chesapeake Bay, North America's largest and most biologically diverse estuary, home to more than 16 million people and 3,600 species of plants, fish, and animals.[11]

Projected Port Growth and Impacts

Generally, port emissions are expected to grow substantially over the next several decades, with oceangoing vessels showing the largest growth. According to EPA, excluding further regulatory controls,[12] NO_x emissions from oceangoing vessels are projected to more than double by 2030, growing to 2.1 million tons a year (or 34 percent of U.S. mobile source NO_x emissions).[13]

In 2007, Category 3 marine engines (large oceangoing vessel engines)[14] emitted more than half of the mobile source SO_x inventory for the entire United States (almost 530,000 tons). According to EPA, without further regulatory controls, these emissions are expected to increase to approximately 1.4 million tons by 2030, or 95 percent of mobile source emissions. Without additional regulations or controls, some source categories will represent an increasingly larger percentage of the Nation's mobile source emissions inventory. Figure 1-3 illustrates the projected emissions of NO_x, $PM_{2.5}$, and SO_2 for mobile sources categories as a percentage of the total U.S. mobile source inventory in 2001 and 2030.

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[11] *EPA Relying on Existing Clean Air Act Regulations to Reduce Atmospheric Deposition to the Chesapeake Bay and Its Watershed*, EPA Office of Inspector General, Report No. 2007-P-00009, Feb. 28, 2007.

[12] On October 9, 2008, the International Maritime Organization (IMO) adopted new international standards for NO_x from oceangoing vessel engines and sulfur in their fuels. Estimates in this report do not reflect potential reductions that may be achieved from recent revisions to IMO Annex VI standards. As discussed in Chapter 2, EPA will need to assess the impacts of these revisions on the Agency's ability to meet its responsibilities under the CAA.

[13] These projections are based on growth rates ranging from 1.7 to 5.0 percent per year, depending on the geographic region (2007 EPA Advanced Notice of Proposed Rulemaking).

[14] For the purpose of emission regulations, marine engines are divided into three categories based on displacement (swept volume) per cylinder. Each of the categories represents a different engine technology. Category 1 and Category 2 marine diesel engines are used to provide propulsion power on many kinds of vessels including tugboats, pushboats, supply vessels, fishing vessels, and other commercial vessels in and around ports. They are also used as stand-alone generators for auxiliary electrical power on many types of vessels. Category 3 marine diesel engines are very large and are used for propulsion power on oceangoing vessels such as container ships, oil tankers, bulk carriers, and cruise ships.

Figure 1-3: Projected Emissions Contributions of Mobile Source Categories as a Percentage of the Total U.S. Mobile Source Inventory for 2001 and 2030, Based Upon Current Regulations.

Figure 1-3-a: Mobile Source Category NO_x Emissions as a Percentage of Total U.S. Mobile Source Emissions Inventory.

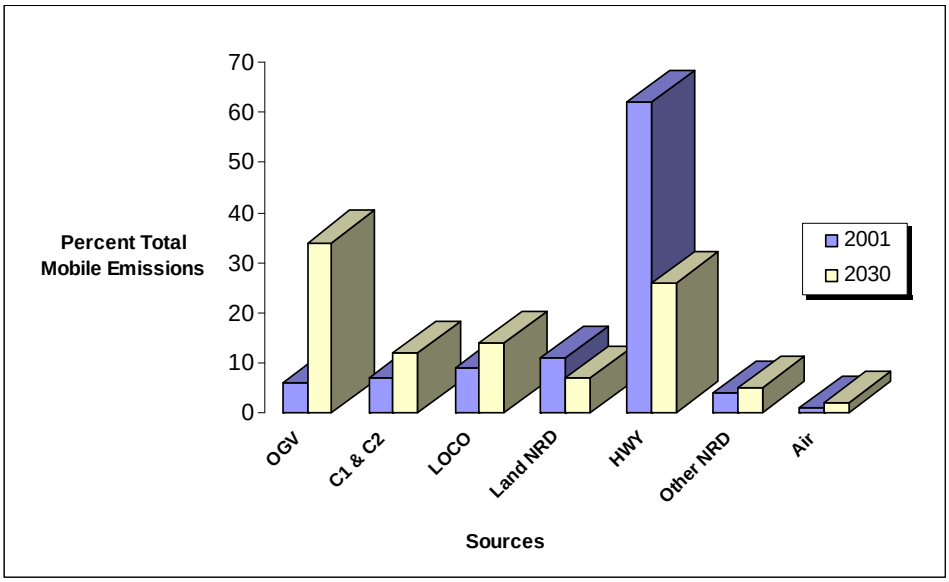


Figure 1-3-b: Mobile Source Category $PM_{2.5}$ Emissions as a Percentage of Total U.S. Mobile Source Emissions Inventory.

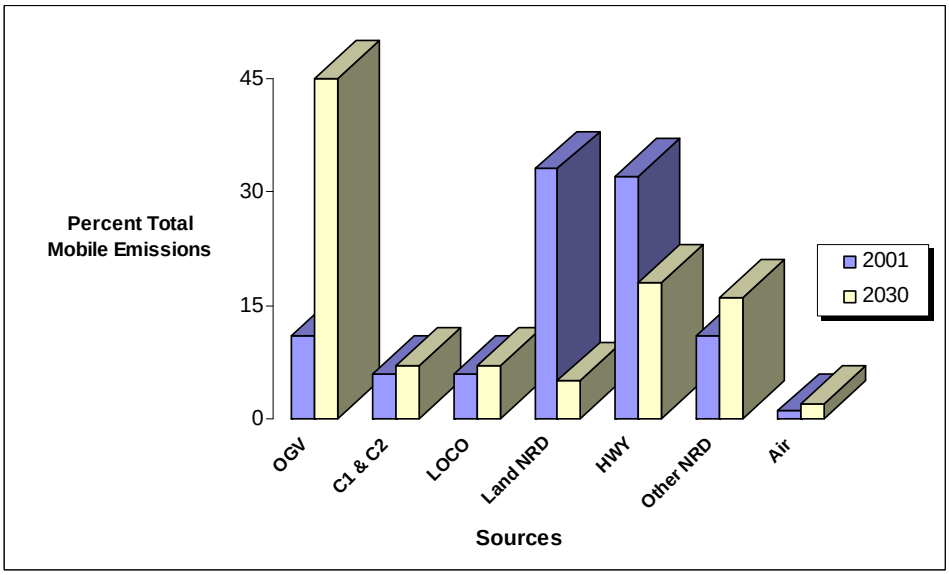
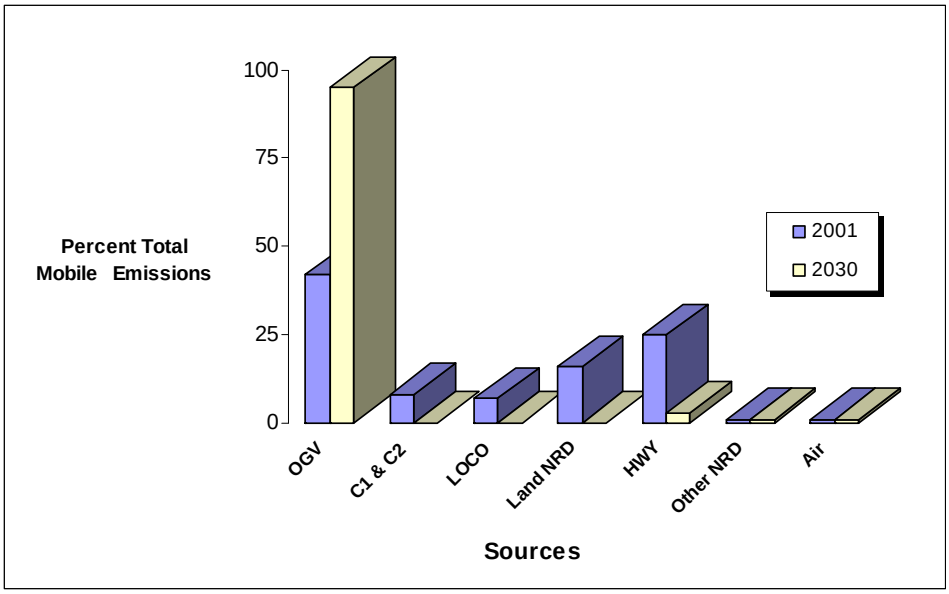


Figure 1-3-c: Mobile Source Category SO_2 Emissions as a Percentage of Total U.S. Mobile Source Emissions Inventory.



Legend for Figure 1-3-a to 1-3-c:

OGV	Oceangoing Vessels
C1 & C2	Category 1 and Category 2 marine engines[15]
LOCO	Locomotives
Land NRD	Land-based nonroad diesel
HWY	Highway
Other NRD	Other nonroad diesel
Air	Aircraft

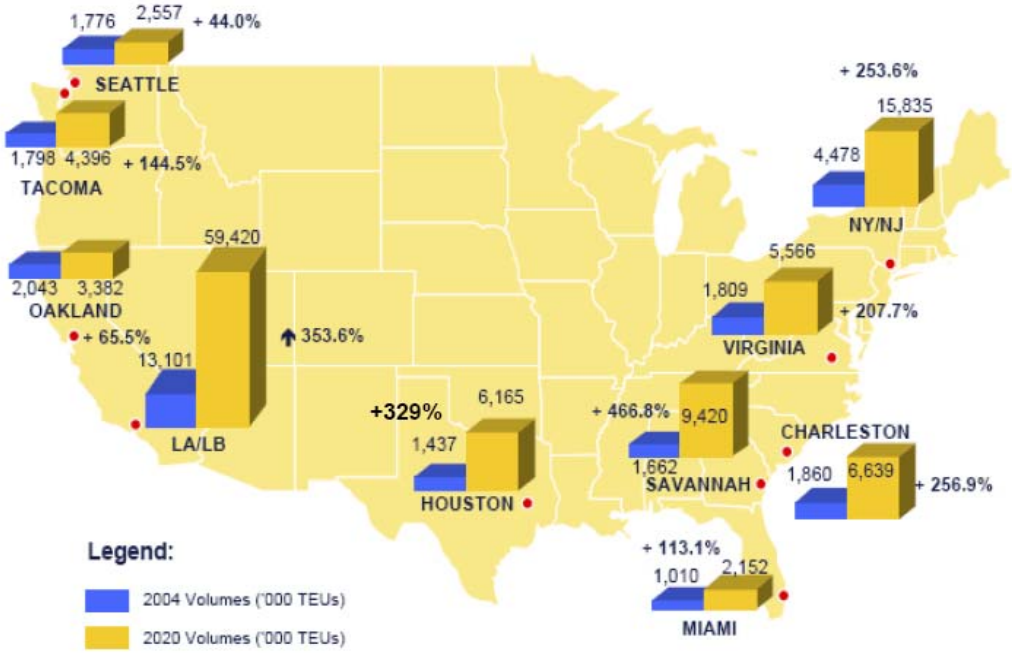
Source: OIG analysis of EPA Advanced Notice of Proposed Rulemaking; *Control of Emissions of From New Marine Compression-Ignition Engines at or Above 30 Liters per Cylinder; Proposed Rule*. Federal Register pp. 69522-69552, December 07, 2007.

Increasing emissions at ports can be attributed to rising demands in international trade, as well as expanded port infrastructure. The Panama Canal is being expanded to accommodate larger oceangoing vessels and allow for more frequent use. According to the Panama Canal Authority, the expansion is scheduled to be completed in 2014. This expansion will include a new wider, deeper channel that will allow larger ships to pass through and the number of ships to increase. To accommodate the increased cargo volume attributable to the Panama Canal expansion, some Eastern U.S. and Gulf Coast ports are expected to significantly increase their capacity.

Figure 1-4 illustrates the expected growth in container trade projected at selected U.S. ports between 2004 and 2020.

[15] These engines are typically are used to provide propulsion power on many kinds of vessels including tugboats, pushboats, supply vessels, fishing vessels, and other commercial vessels in and around ports.

Figure 1-4: Projected Growth in U.S. Maritime Container Trade at Selected U.S. Ports (2004-2020)



Source: American Society of Civil Engineers 2005 Report Card for America's Infrastructure, U.S. Department of Transportation.

For example, according to the U.S. Department of Transportation, by 2020 the Port of Savannah is projected to increase its container traffic by over 400 percent. Similarly, the Ports of Los Angeles and Long Beach (combined) and Houston are expected to increase their container traffic by over 300 percent. Increased cargo volume means more activity for cargo-handling equipment, heavy-duty trucks, harbor craft, and locomotives. This type of growth will add to air quality concerns in these areas. Appendix A provides details on projected growth at U.S. ports due to container shipping and port expansion plans.

EPA's Multipronged Approach to Reducing Emissions at U.S. Ports

EPA employs three main approaches to reduce emissions from port-related mobile sources. These approaches include (1) developing emission standards and regulations, (2) using voluntary strategies to promote emission reductions from existing diesel engines, and (3) participating in a U.S. delegation to establish new international standards for oceangoing vessel emissions.

EPA Regulatory Authority

The Clean Air Act (CAA) seeks to protect human health and the environment by authorizing EPA to set limits on how much of a pollutant

can be in the air anywhere in the United States. EPA's goal is to ensure that all Americans have the same basic health and environmental protection. To achieve this goal, the CAA authorizes EPA to regulate significant sources of pollution from nonroad sources. Specifically, Section 213 of the CAA directs the Administrator to issue (and, from time to time, revise) regulations containing emission standards for those classes or categories of new nonroad engines or new vehicles which the Administrator determines to be significant contributors to air pollution. Since the 1990 amendments to the CAA, EPA has issued various regulations to control emissions from the five major categories of port pollution. For example, the Agency has issued regulations for oceangoing vessels, heavy-duty diesel trucks, cargo-handling equipment, harbor craft, and locomotives. Appendix B contains a detailed description of EPA progress to date in each of these categories.

A key program EPA uses to address air emissions from port sources is the National Clean Diesel Campaign (NCDC). EPA launched the NCDC in 2004 to mitigate the impact of diesel emissions on public health and the environment. The NCDC includes both regulatory and voluntary approaches. EPA stated that the NCDC works aggressively to reduce pollution from diesel engines across the country through implementing varied control strategies and involving national, State, and local partners. The NCDC established a collaborative process to help States meet the National Ambient Air Quality Standards and other air quality goals. The NCDC attempts to help reduce emissions from a variety of industrial sectors including ports, freight, construction, and agriculture.

Key EPA Voluntary Strategies – Clean Ports USA Program, SmartWay Transport Partnership, and Regional Diesel Collaboratives

Operating under the umbrella of the NCDC, EPA established the Clean Ports USA program in 2005 to address diesel emissions from port sources through the use of voluntary strategies. Clean Ports USA is an incentive-based, voluntary program designed to reduce emissions from existing diesel engines and nonroad equipment at ports. The strategies provided as part of the Clean Ports USA program include a list of technological strategies (e.g., clean fuel, retrofit, repair, rebuild, repower, and operational strategies) for stakeholders, as well as information on grants and other funding opportunities. Another component of the NCDC is the SmartWay Transport Partnership, a program between EPA and the freight sector to voluntarily reduce greenhouse gas and air pollution emissions.

While the NCDC and Clean Ports USA programs are national in scope, EPA said that much growth in these programs will come from focused partnerships and collaborative efforts at the State and local level, including regional diesel collaborative initiatives. The goal of these collaboratives is

to create partnerships with businesses, government, community organizations, and other stakeholders at the regional level in an effort to reduce diesel emissions. According to EPA, regional diesel collaboratives are able to acquire funding for local projects in addition to what can be provided at the national level for local emission reduction projects. The NCDC and the seven regional diesel collaboratives are broad-based efforts to reduce diesel emissions and do not necessarily focus on those sources specifically operating at ports.

EPA's Work with the International Maritime Organization

In addition to the Agency's regulatory efforts and promoting voluntary initiatives and partnerships, EPA has pursued emission reductions among the international community through negotiations at the International Maritime Organization (IMO). Created in Geneva in 1948, the IMO's main task has been to develop and maintain a comprehensive regulatory framework for shipping. Its scope of activity today includes safety, environmental concerns, legal matters, technical cooperation, maritime security, and shipping efficiency.

One function of the IMO is to administer the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 (known as MARPOL). The purpose of MARPOL is to minimize sea pollution, including dumping, oil, and exhaust pollution. MARPOL Annex VI specifically relates to air pollution from ships. Annex VI was adopted in 1997 and entered into force in May 2005. It applied to engines installed on ships constructed on or after January 1, 2000, or engines that undergo a major conversion on or after that date. The IMO originally estimated that Annex VI standards would result in a 30 percent reduction in new engine NO_x emissions. However, the actual reduction will be significantly smaller, perhaps on the order of 15 to 20 percent by 2030, due to the long transition time required for new engines to enter the fleet, according to EPA.

In February 2007, the U.S. delegation submitted a proposed revision to MARPOL Annex VI which included long-term standards for NO_x, PM, and SO_x based on advanced technology and providing industry with appropriate lead time. In April 2008, an IMO subcommittee reached agreement on revised standards for MARPOL Annex VI that were similar to those proposed by the U.S. In October 2008, parties to MARPOL Annex VI adopted new international standards for NO_x emissions for marine diesel engines above 130kW (including oceangoing vessel engines) and the sulfur content of fuel used onboard ships (to address SO_x and PM emissions). At the same time, according to EPA, the U.S. deposited its instrument of ratification with the IMO and adopted amendments to the "Act to Prevent Pollution from Ships," a U.S. Act

which makes it possible for the U.S. to enforce the Annex VI standards for foreign-flagged vessels that enter U.S. ports and territorial waters.

Noteworthy Achievements

Through its regulatory process, EPA has successfully implemented several emission reduction requirements for port sources. For example, the Agency has issued emission standards that apply to engines on heavy-duty diesel trucks, cargo-handling equipment, small marine vessels, and locomotives. While emission reductions from these regulations may not be fully realized for several years, EPA projects its rulemakings to achieve significant emission reductions from these categories of port sources by 2030.

In addition to these regulations, the Agency has helped to reduce emissions from the existing fleet of diesel engines operated at U.S. ports through its NCDC. Some examples include:

- Retrofitting cargo-handling equipment at the Port of Tacoma with emission reduction technology.
- Using low sulfur diesel fuel at the Ports of Boston, Houston, and New York/New Jersey.
- Retrofitting rubber tire gantry cranes, stackers, and tractors at the Port of Boston with emission reduction technology.
- Facilitating installation of shore power infrastructure at the Los Angeles, Long Beach, and Seattle ports.

Scope and Methodology

We conducted our evaluation from November 2006 to December 2008. We conducted a site visit to the Ports of Los Angeles and Long Beach, interviewed managers and staff and collected data from eight EPA regions, one State agency, three port authorities, and one global shipping company. We designed and implemented a survey to collect data on EPA's efforts to reduce air emissions at 18 of the largest U.S. ports.

We conducted this performance evaluation in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the evaluation to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our evaluation objectives. We believe the evidence obtained provides a reasonable basis for our findings and conclusions based on our evaluation objectives. Appendix C provides details on our scope and methodology.

Chapter 2
Recent Agency and International Actions Have Potential to Significantly Reduce Harmful Emissions from Oceangoing Vessel Engines

To date, EPA's actions to address air emissions from oceangoing vessel engines in U.S. ports and along U.S. coastlines have not been successful in achieving EPA's clean air goal of protecting and improving air quality. The CAA provides EPA with the authority to promulgate standards to regulate emissions from oceangoing vessel engines when these emissions cause significant harm to human health. Oceangoing vessels contribute significantly to elevated air pollution levels in many nonattainment areas around U.S. ports. For over 14 years, EPA has acknowledged that human health is being significantly harmed by air emissions from these vessels in U.S. ports. While EPA has issued regulations for air emissions from most other port sources, to date EPA has only regulated NO_x emissions, and only from U.S.-flagged vessel engines.

EPA has not regulated any air emissions from foreign-flagged vessel engines in U.S. ports, although these vessels account for approximately 90 percent of all U.S. port calls. EPA has chosen to defer taking a position on whether the Agency has authority to regulate air emissions from foreign-flagged vessel engines. EPA decided not to issue emission standards for oceangoing vessel engines while negotiating with IMO to set more stringent standards. This decision not to issue emission standards has delayed controlling emissions from foreign-flagged vessels entering U.S. ports. However, after many years, EPA's efforts to work with the IMO have the potential to significantly reduce oceangoing vessel emissions. In October 2008, the IMO adopted new international standards for NO_x emissions from oceangoing vessel engines and the sulfur content of fuels used by such vessels. Still, EPA must work with the IMO to establish Emission Control Areas (ECAs) if significant reductions are to be realized from foreign-flagged vessels.

Air Emissions from Large Oceangoing Vessel Engines Have Been Essentially Unregulated by EPA

In 1994, EPA proposed to regulate emissions from oceangoing vessel engines along with other nonroad engine sources. However, due in part to comments to the proposal, EPA chose to delay the establishment of emission standards for oceangoing vessel engines.

To date, EPA has not developed emission standards for large diesel engines, known as Category 3 marine engines, except for a NO_x standard

issued in 2003. Also, EPA's NO_x standard only applies to engines on U.S. vessels, which represent about 10 percent of U.S. port calls. Category 3 marine engines emit significant amounts of air pollution in and around ports, as well as along U.S. coastlines. For example, the SCAQMD in California stated in 2007 that marine vessels in the South Coast Air Basin (which includes Los Angeles) emitted more nitrogen oxides than the combined total of all refineries, power plants, and the other 350 largest stationary sources in the area.

NO_x

In its 2003 rulemaking, EPA set its NO_x standards for U.S.-flagged vessel engines equivalent to the Tier 1 standards adopted by the IMO in MARPOL Annex VI in 1997. These international standards allow oceangoing vessel engines to emit relatively high levels of NO_x. For example, EPA's NO_x standards for heavy-duty diesel trucks[16] are from 36 to 63 times more stringent than those for Category 3 oceangoing vessel engines, depending on engine speed. EPA's 2003 NO_x emission standards for oceangoing vessel engines are projected to result in a 20 percent reduction in NO_x emissions from oceangoing vessel engines by 2030. According to EPA, without more stringent controls on Category 3 oceangoing vessel engines, NO_x emissions from oceangoing vessels are projected to more than double by 2030, growing to 2.1 million tons a year. According to EPA's projections, Category 3 oceangoing vessel engine emissions alone would represent 34 percent of all U.S. mobile source NO_x emissions.

PM and SO_x

In its 2003 rulemaking, EPA's regulation for Category 3 marine engines did not contain any emissions limits or standards for PM or SO_x, although PM and SO_x emissions from such engines are expected to increase substantially in the future. $PM_{2.5}$ emissions are expected to almost triple to become 45 percent of U.S. mobile source $PM_{2.5}$ emissions by 2030, and SO_x emissions are expected to increase to 94 percent of mobile source emissions at that time.[17] A 2007 study estimated that $PM_{2.5}$ emissions

[16] Office of Transportation and Air Quality (OTAQ) representatives said comparing emission standards between mobile source sectors should be made on "an equivalent technology basis." According to OTAQ, Tier 1 Category 3 marine engine standards should not be compared against Tier 4 onroad standards. They suggested a more appropriate comparison might be between Tier 1 Category 3 standards and Tier 2 nonroad standards. We believe it is illustrative to compare the existing standards since, prior to 1993, heavy-duty diesel trucks used fuel with 5,000 ppm sulfur, but now use fuel with 15 ppm sulfur, a more than 99 percent reduction achieved over approximately the same period of time that EPA has acknowledged that human health is being significantly harmed by oceangoing vessel emissions in U.S. ports. It is also illustrative because EPA overcame concerns about the potential impact to diesel engines, costs, and lead time for manufacturers and refineries.

[17] Particulate matter is a complex mixture of extremely small particles and liquid droplets. Particles are made up of a number of components, including acids (such as nitrates and sulfates) and organic chemicals. The size of particles is directly linked to its potential for causing health problems. "Fine particles" are those particles that are 2.5 micrometers in diameter and smaller. There is a NAAQS standard for $PM_{2.5}$.

from ships are responsible for approximately 8,800 deaths in North America annually.[18]

Although EPA has not issued a standard for SO_x emissions, the Agency said in its 2003 rule that it fully expected that vessels would comply with the IMO Annex VI standards, which included a fuel standard for SO_x. The Tier 1 fuel standards in Annex VI require that oceangoing vessels use fuel with a sulfur content less than or equal to 45,000 parts per million (ppm).[19] These standards allow oceangoing vessels to use residual fuel, which is a waste product of the oil refining process and produces high SO_x and direct sulfate PM emissions. It is the least expensive fuel that oceangoing vessels can burn. When residual fuel is burned, it emits high levels of SO_x. The higher the sulfur content in the fuel, the greater the SO_x and PM emissions. The former OTAQ Associate Director said that residual fuel with a sulfur content of 50,000 ppm would be the highest sulfur fuel that a Category 3 engine would be capable of burning. By comparison, the EPA standard for sulfur content in fuel used in on-highway diesel engines (such as trucks and buses) in the United States is set at 15 ppm. Thus, the SO_x emission standard for cars, trucks, and some other nonroad sources is 3,000 times more stringent than the standard for Category 3 marine diesel engines. EPA said it would consider requiring lower sulfur fuel in a future rulemaking.

CO, HC, and Air Toxics

In its 2003 rulemaking, EPA's regulation for Category 3 marine engines did not contain any emissions limits or standards for carbon monoxide (CO), hydrocarbons (HC), or air toxics. EPA stated in its 2003 rulemaking that CO and HC emission standards for oceangoing vessel engines may be necessary to prevent increases in these pollutants that might otherwise result from controlling NO_x emissions alone. EPA also has not established any air toxics emission standards for Category 3 marine engines on oceangoing vessels. The Agency expects to achieve air toxic emissions reductions as a co-benefit of reducing SO_x and PM emissions in a future rulemaking requiring use of lower sulfur fuel in marine diesel engines.

During our fieldwork, OTAQ told us the Agency did not have a timetable for regulating CO or HC emissions from oceangoing vessel engines because EPA's focus should be on higher priority SO_x, NO_x, and PM emissions. However, in its comments to our draft report the Agency stated that "EPA's approach to addressing HC and CO has evolved since the IG discussed this with OTAQ representatives." The Agency now plans to

[18] Corbett, James J., James J. Winebrake, Erin H. Green, Prasad Kasibhatla, Veronika Eyring, and Axel Lauer, *Mortality from Ship Emissions: A Global Assessment*, Journal of Environmental Science & Technology, 2007, 41, 8512-8518.
[19] A standard of 45,000 ppm allows for sulfur concentrations of up to 4.5 percent of the fuel, by weight.

address emission limits for CO, HC, and air toxics in its Category 3 marine engine rule scheduled to be finalized in December 2009.

EPA Has Chosen to Defer Taking a Position on Whether It Has Authority to Regulate Foreign-Flagged Vessel Engine Emissions

For more than 14 years, EPA has not taken a position on whether it has the authority to regulate emissions from foreign-flagged vessel engines when operating in and around U.S. ports. The issue concerns interpreting the words "new nonroad engines" in the Clean Air Act. The Act provides that EPA may regulate new nonroad engines. In a draft notice of proposed rulemaking (Draft Notice),[20] EPA stated it would be reasonable to interpret new nonroad engines to include marine engines installed on foreign-flagged vessels that enter U.S. ports. According to EPA's Office of General Counsel, EPA has identified arguments both for and against this interpretation. EPA included in a draft proposed rule to OMB arguments supporting such an interpretation, stating that the Agency "has discretion in interpreting [CAA] section 213 as it applies to new marine engines and vessels, and is considering which interpretation is most appropriate from a policy perspective." In its final rule, EPA did not interpret new nonroad engines to include engines installed on foreign-flagged vessels.

After more than 5 years, EPA still has not taken a position on whether such an interpretation would be reasonable in light of the language and purpose of section 213 of the CAA. Therefore, according to OTAQ and the Office of General Counsel, this issue is still before the Agency, and will be considered again in a 2009 Category 3 marine engine rulemaking. The Agency's rationale for not taking a position is detailed in Appendix D. The OIG believes strong arguments support the conclusion that EPA has the authority under the Clean Air Act to regulate foreign-flagged vessel engine emissions when operating in and around U.S. ports.

EPA Stated a Need to Regulate Foreign-Flagged Vessel Engine Emissions in 2002

EPA identified marine diesel engines as a significant source of emissions that could be regulated under Section 213 of the CAA. Section 213(a)(3) requires EPA to adopt regulations that contain standards reflecting the greatest degree of emission reductions achievable through the application of technology that will be available, taking into consideration the availability and costs of the technology, and noise, energy, safety factors, and existing motor vehicle standards. In 2002, EPA indicated in its Draft Notice to the Office of Management and Budget (OMB) that it was appropriate to regulate emissions from new engines installed on foreign-

[20] *Draft Proposal for the Control of Emissions from New Marine Compression-Ignition Engines at or Above 30 Liters/Cylinder,* documents forwarded to the Office of Management and Budget, April 5, 2002, EPA Docket ID No.EPA-HQ-OAR-2003-0045-0077.

flagged vessels. EPA stated in its Draft Notice to OMB that emissions from foreign-flagged vessel engines contributed significantly to air quality problems in the U.S. Therefore, EPA regulation of engines on these vessels would be consistent with the goal of CAA Section 213. EPA stated that:

> *…it may be appropriate and within EPA's authority to treat engines on foreign vessels that enter U.S. ports as new engines and subject to regulation under section 213 based on their significant emissions contribution to air quality problems in the United States.*

Further, the Agency indicated that "the significance of... [marine engine] emissions in coastal areas and port cities, warrants interpreting 'new nonroad engine' under section 213 to include marine engines on foreign vessels…."

The Draft Notice (a) requested comments on the merits of regulating foreign-flagged vessel engine emissions, and (b) stated that EPA might decline to regulate foreign-flagged vessel emissions "because of the potential implications that setting engine emission standards for foreign vessels might have on international commerce and future international negotiations...." After interagency and OMB review, EPA deleted the rationale for regulating foreign-flagged vessel engine emissions. However, EPA requested comments on the merits of regulating foreign-flagged vessel engine emissions in the notice the Agency subsequently issued. EPA received comments both supporting and opposing regulation of foreign-flagged vessel engine emissions. Ultimately, according to OTAQ, the Agency deferred addressing the issue to a future rulemaking. In its 2003 rule, EPA said that by April 2007 it would consider regulating emissions from foreign-flagged vessels as new engines under section 213 of the CAA. However, EPA did not adopt more stringent standards for emissions from large oceangoing vessel engines by this date but instead extended the deadline for addressing such emissions until December 2009.

Agency Efforts Have Only Recently Resulted in an International Agreement Which Could Achieve Substantial Emission Reductions

EPA, through a U.S. delegation, has worked through the IMO to gain international consensus to establish more stringent emission standards for oceangoing vessel engines. Due in part to EPA's efforts, and the U.S. proposal, the IMO revised Annex VI standards in 2008. Over the 14 year period (1994 to 2008) since EPA first proposed to regulate emissions from oceangoing vessel engines, EPA only issued emission standards for NO_x from Category 3 U.S.-flagged oceangoing vessel engines, and these standards only matched the existing international NO_x standards (Appendix E provides a timeline of EPA's efforts to regulate oceangoing vessel engines since 1990). The revised Annex VI standards have the potential to result in substantial emission reductions.

In 1994, EPA proposed more stringent NO_x emission standards for Category 3 marine engines than those contained in Annex VI. The Agency also proposed to regulate emissions of CO, HC, and PM. Annex VI did not establish emissions standards for any of these other pollutants. However, several commenters requested that EPA "harmonize" its proposed emission standards for U.S marine diesel engines with the IMO's emissions standards. Due in part to these comments, EPA delayed its development of further emission standards for Category 3 marine engines until 2003.

EPA stated in its 2003 rule that its standards would not result in any emission reductions beyond the Annex VI standards.[21] The Agency deferred promulgating more stringent emission standards for Category 3 engines on both U.S. and foreign-flagged vessels to April 2007. In its 2003 rule, EPA stated that:

> *We [EPA] believe that deferring this decision may help facilitate the adoption of more stringent consensus international standards… Adoption of appropriate international consensus standards has the clear potential to maximize the level of emission reductions from domestic and international vessels.*[22]

Proposed Revisions to MARPOL Annex VI Adopted

In February 2007, the U.S. Government developed a proposal for the IMO to revise MARPOL Annex VI emission standards. In April 2008, the IMO Marine Environment Protection Committee reached agreement on revising these standards, and this agreement has the potential to significantly reduce emissions from U.S.- and foreign-flagged oceangoing vessel engines. These standards were adopted by parties to MARPOL Annex VI in October 2008.

The IMO agreement provides for revised NO_x emission standards for both new and existing engines. It also provides for limits on the percentage of sulfur contained in marine engine fuel. This percentage varies depending on whether a vessel is operating inside or outside of an IMO-designated Emission Control Areas (ECAs). A lower sulfur percentage would be required inside ECAs than would be required outside ECAs. For example, proposed reductions include reducing:

- NO_x by 80 percent beginning in 2016 from new vessels in designated ECAs; and

[21] International standards for Category 3 marine engines were adopted in September 1997. These standards were not enforceable until a sufficient number of member countries ratified the treaty in May 2005.
[22] *Control of Emissions From New Marine Compression-Ignition Engines at or Above 30 Liters Per Cylinder*; Final Rule; Federal Register/Vol. 68, No. 40/Friday, February 28, 2003, page 9759.

- SO_x by 93 percent beginning in 2015 for all vessels operating in designated ECAs.

Comparing the IMO Agreement and the U.S. Proposal

Neither the IMO agreement nor the U.S. proposal contains standards for CO, HC, or air toxics. According to OTAQ representatives, the Agency does not have a timetable for regulating CO or HC emissions from oceangoing vessel engines because the foreseeable benefits would not be significant. The Agency expects to achieve air toxic emissions reductions as a co-benefit of reducing PM and SO_x emissions.

The IMO agreement differs from the U.S. proposal in a number of ways including the following five ways:

- It requires NO_x percentage reductions that are either within the lowest range or slightly below the level recommended in the U.S. proposal[23] for emissions from engines on vessels constructed after January 1, 2011.
- In regard to engines on existing vessels, both contain the same recommended standard for NO_x. However, the agreement would apply a NO_x standard to engines on vessels constructed 5 years later than the date in the U.S. proposal (1990 instead of 1985).
- In regard to sulfur emissions, while both contain the same standard for sulfur content in fuel, the agreement provides for achieving a sulfur level goal (0.1 percent of fuel composition in Emissions Control Areas) 4 years after the date in the U.S. proposal (2015 instead of 2011).
- The agreement does not establish an emissions limit for SO_x but does allow alternative means to meet the fuel standard for the limits on the percentage of sulfur contained in fuel. In contrast, the U.S. proposed a performance-based approach for reducing sulfur emissions. Under this approach, in addition to proposed sulfur limits, the U.S. proposal contained a specific SO_x standard (0.4 g/kW-hr) which might be met by different compliance methods, such as exhaust gas cleaning technology.
- The agreement also does not contain specific PM standards. In contrast, the U.S. proposed PM standards (from 0.2 to 0.5 g/kW-hr) that would vary according to engine characteristics. The U.S. proposal provided that these PM standards could be met by seawater SO_x scrubbers or low sulfur fuel.

[23] The U.S. proposed a Tier 2 NO_x limit ranging from 15 percent to 25 percent below the current limit and a Tier 3 NO_x limit 80 percent below the Tier 2 NO_x limit. The agreement calls for a Tier 2 NO_x limit 15.3 - 21.4 percent (depending on engine speed) below the current limit and a Tier 3 NO_x limit 74.0 - 76.4 percent (depending on engine speed) below the Tier 2 NO_x limit (80 percent below tier 1) for emissions from marine diesel engines above 130 kilowatts (kW) installed on vessels constructed after January 1, 2011.

Appendix F provides a summary of the revised Annex VI standards adopted in October 2008.

Importance of IMO Emission Control Areas

According to the IMO agreement, the most stringent SO_x and NO_x standards will only apply in ECAs. Where an ECA is not established, oceangoing vessels can use fuel with a sulfur content up to 35,000 ppm until 2020, and up to 5,000 ppm thereafter. By comparison, in areas where an ECA is established, oceangoing vessels will be required to use fuel with a sulfur content of 10,000 ppm by 2010 and 1,000 ppm by 2015.

The IMO agreement will not reduce NO_x emissions more than 15.3 percent below the current Annex VI standards where an ECA has not been established. In contrast, where an ECA has been established, oceangoing vessels must reduce NO_x emissions by 80 percent from the current Annex VI standards. Therefore, ECAs must be established if significant SO_x and NO_x emission reductions are to be realized.

Next Steps in the IMO Process

The IMO adopted new international standards for NO_x emissions from oceangoing vessel engines and the sulfur content of fuels used by such vessels in October 2008. In addition, in October 2008, the U.S. ratified Annex VI. According to OTAQ, EPA is now preparing an ECA application that implements the proposed geographic-based standards along U.S. coasts. The application must be submitted to and approved by the IMO prior to becoming effective. EPA will need to work with its Federal partners to prepare an ECA application for U.S. coastal areas. Among other things, the application will describe the adverse health and environmental impacts caused by oceangoing vessel emissions to U.S. populations, terrestrial and aquatic ecosystems, critical habitats, water quality, and areas of cultural and scientific significance. The most immediate emissions reductions possible for the U.S. from the IMO agreement would be from establishing an ECA. Therefore, the U.S. expeditiously submitting an application for an ECA is important.

EPA's Delay in Controlling Oceangoing Vessel Engine Emissions May Have Long-Term Effects

Delays in establishing additional emissions regulations for oceangoing vessels may result in uncontrolled emission levels for some pollutants and a growing fleet of unregulated diesel engines. These emissions contribute to pollution levels in many nonattainment areas in the United States. New unregulated engines have the potential to contribute pollution to these areas for several decades. In its 2007 proposal, the United States informed the IMO that emissions from oceangoing vessels prevent many areas in the United States from attaining ambient air quality levels that protect

human health and the environment. As shown in Table 2-1, emissions from large commercial marine engines account for substantial percentages of mobile source inventories in many port areas.

Table 2-1: Contribution of Commercial Marine Vessels[a] to Mobile Source Inventories for Selected Ports in 2002

Port Area	NO_x Percent	$PM_{2.5}$ Percent	SO_x Percent
Baltimore, MD	12	27	69
Beaumont, TX	6	20	55
Boston, MA	4	5	30
Charleston, SC	22	33	87
Galveston, TX	5	12	47
Houston, TX	3	10	41
Jacksonville, FL	5	11	52
Los Angeles/Long Beach, CA	5	10	71
Miami, FL	13	25	66
New Orleans, LA	14	24	59
New York/New Jersey, NY/NJ	4	9	39
Oakland, CA	8	14	80
Port Everglades, FL	9	20	56
San Francisco, CA	1	1	31
Savannah, GA	24	39	80
Seattle, WA	10	20	56
South Louisiana, LA	12	24	58
Tacoma, WA	20	38	74
Valdez, AK	4	10	43
Wilmington, NC	7	16	73

[a]This category includes emissions from Category 3 propulsion engines, as well as Category 2 and 3 auxiliary engines used on oceangoing vessels.

Source: *EPA Advanced Notice of Proposed Rulemaking, Control of Emissions From New Marine Compression-Ignition Engines at or Above 30 Liters per Cylinder*. Federal Register: December 7, 2007, Volume 72, Number 235, pp. 69522-69552. Table VIII-4, p. 69547.

At least one nonattainment area may not meet the 8-hour ozone standard by the deadline established by EPA because of emissions from large oceangoing vessel engines. A representative from California's SCAQMD told us that EPA standards for oceangoing vessels would not reduce emissions enough for the Los Angeles area to achieve air quality standards for ozone and particulate matter. In 2006, the California Air Resources Board (CARB) adopted emission limits for auxiliary diesel engines that were more stringent than EPA's current standards for these engines. However, the Pacific Merchant Shipping Association challenged California's authority to enforce these standards, and the Court found that CARB lacked authorization to enforce such standards.[24]

[24] Pacific Merchant Shipping Association v. James Goldstene, No. 07-16695 (9th Cir. Feb. 27, 2008). The Federal District Court found that CARB needs EPA authorization under Clean Air Act, Section 209(e) to enforce such standards; upheld on appeal.

According to EPA, the average age of an oceangoing vessel in the global fleet is 25 years. Delays in establishing additional emissions regulations for oceangoing vessels result in uncontrolled emission levels for some pollutants and a growing fleet of unregulated diesel engines. These emissions contribute to pollution levels in many nonattainment areas in the U.S. New unregulated engines have the potential to contribute pollution to these areas for several decades into the future.

Conclusions

Recent EPA and international actions have the potential to significantly reduce harmful air emissions from oceangoing vessel engines if an ECA is established for the U.S. The international agreement addresses harmful emissions from oceangoing vessels differently, and in some instances less stringently, than the U.S. delegation's February 2007 proposal to the IMO. In the event that additional actions to address oceangoing vessel emissions are warranted in the future, EPA should determine its authorities to regulate air emissions from foreign-flagged vessels in U.S. ports, and report any limitations to Congress. The Agency also needs to show how the IMO provisions meet the Agency's responsibilities under the Clean Air Act.

Recommendations

We recommend that the Assistant Administrator for Air and Radiation:

2-1 Assess EPA's authorities and responsibilities under the CAA to regulate air emissions from foreign-flagged vessel engines in U.S. ports, in light of the new IMO Treaty, and report any shortfalls in such authorities to Congress. EPA should include in its analysis key air pollutants emitted by Category 3 marine engines not covered by the IMO Treaty and show how the Agency will meet its responsibilities under the CAA.

2-2 Assess the extent to which Emission Control Areas (ECAs) should be designated for all U.S. coastal areas, under the revised Annex VI provisions. For all areas where ECAs are needed, ensure that the appropriate application materials and supporting documentation are submitted to the IMO in a timely manner.

Agency Comments and OIG Evaluation

The Agency said that it concurred, with comment, with Recommendation 2-1. However, EPA did not agree to assess its authorities and responsibilities under the CAA to regulate air emissions from foreign-flagged vessel engines in U.S. ports and report that assessment to the Congress. EPA's comments were not responsive and do not satisfy the

intent of the recommendation. Due to the length of time it has taken EPA to get more stringent standards for oceangoing vessel engines by working with the IMO, we believe that EPA should conduct such an assessment and report any shortfalls in its authorities to Congress. We consider Recommendation 2-1 to be open and unresolved.

The Agency concurred with Recommendation 2-2, with comment. EPA stated that it is working with other U.S. Government agencies and the Government of Canada to develop a comprehensive application to establish ECAs along all U.S. and Canadian coasts. We view this effort as being essential to any significant reduction of emissions from oceangoing vessels in or approaching U.S. ports. The actions the Agency outlined in its response to Recommendation 2-2 satisfy the intent of our recommendation.

The Agency also provided several technical clarifications and comments on Chapter 2. We made changes to the final report based on these comments, as appropriate. The Agency's complete written response is in Appendix I. Our evaluation of the Agency's response is in Appendix J.

Chapter 3
Implementing EPA's Approach to Reducing Air Emissions at U.S. Ports Needs Improving

EPA has not successfully implemented all the key elements of its approach to address air emissions at U.S. ports. EPA's approach generally falls under the scope of the National Clean Diesel Campaign (NCDC), and consists of (1) developing standards and regulations, (2) using voluntary initiatives to promote emission reductions from existing diesel engines, and (3) supporting the establishment of revised international emission standards for oceangoing vessel engines (as discussed in Chapter 2). However, regulations to significantly reduce emissions from oceangoing vessel engines have not been established by the Agency, and were only recently adopted by the IMO. Additionally, despite the emphasis that EPA has placed on voluntary partnership programs, such as those within the NCDC and regional diesel collaboratives, voluntary initiatives had not been implemented through these programs at many U.S. ports.

During our evaluation, EPA built upon its NCDC efforts by developing and publishing a Strategy for Sustainable Ports (Strategy). This Strategy is an Agency-wide, multi-media effort which includes goals and objectives for addressing key environmental issues at U.S. ports, as well as some timeframes for action. However, EPA's Strategy lacks an adequate transformation plan for achieving the Strategy's goals. For example, the Strategy does not include appropriate performance measures, milestones, and other management controls for many of the action items in it. As a result, EPA's Strategy lacks the management framework and controls necessary to assure that it will be successfully executed.

EPA's Approach Is Incomplete

EPA's approach to reducing emissions from U.S. ports includes developing emission standards and regulations for the five major categories of port sources. EPA has issued regulations to significantly reduce emissions from heavy-duty diesel trucks, cargo-handling equipment, harbor craft, and locomotives. If properly implemented and enforced, EPA projects that these regulations will achieve significant emission reductions from each of these four categories of port sources over the years. EPA projects that these regulations will achieve the following emissions reductions:

Heavy-Duty Diesel Trucks – 2.6 million tons of NO_x and 109,000 tons of PM emissions annually by 2030.

Cargo-Handling Equipment – over 129,000 tons of $PM_{2.5}$ and 738,000 tons of NO_x emissions annually by 2030.[25]

Harbor Craft and Locomotives – 27,000 tons of $PM_{2.5}$ and 800,000 tons of NO_x emissions annually by 2030 (for both harbor craft and locomotives combined).

However, implementation of EPA's approach is incomplete because it has not yet been successful in promulgating regulations to significantly reduce emissions from oceangoing vessels. As discussed in Chapter 2, oceangoing vessel engine emissions are a significant and growing source of emissions. For example, in 2007, large oceangoing vessel engines emitted more than half of the mobile source SO_x inventory for the entire U.S. (almost 530,000 tons). The Agency's lack of success in establishing more stringent emission standards for Category 3 marine diesel engines has been a significant limitation to the implementation of EPA's approach to controlling air emissions at U.S. ports. The revised Annex VI standards, adopted by the IMO in October 2008, should help advance EPA's approach to reducing air emissions at U.S. ports.

Limited Data to Verify Results of Voluntary Actions

Another component of EPA's approach involves voluntary initiatives to reduce emissions from the existing legacy fleet of diesel engines. These voluntary initiatives are important because of the long useful life of many diesel engines, and because EPA regulations generally apply only to newly built engines.[26] Implementation of EPA's Strategy for Sustainable Ports[27] relies heavily on a voluntary partnership with key stakeholders in the port sector. The success of many action items in the strategy hinges on the voluntary participation of port authorities, private marine terminal operators, and other entities within the marine transportation system. However, we found EPA has little data to demonstrate the results of the voluntary activities to control air emissions at U.S. ports.

Each port is unique in its operations and the impacts that it has on the air quality in surrounding communities. As such, EPA needs reliable information on emissions sources at each individual port to understand the challenges each port faces in reducing its emissions. We asked OTAQ personnel to list all significant port-related air quality projects for which

[25] The projected emission reductions represent all nonroad diesel engines subject to EPA's 2004 Nonroad Diesel Rule. Cargo handling equipment operating at ports are subject to these standards, but emission reductions from these sources represent only a portion of the overall projected emission reductions.
[26] Beginning in 2008, EPA required that marine diesel engines above 600 kW and locomotives built in or after 1973 meet more stringent emission limits when they are remanufactured, if a certified remanufacture system is available (73 FR 25098). The MARPOL Annex VI amendments also contain a similar program for existing marine engines that will begin to apply as soon as kits are certified.
[27] EPA's Strategy for Sustainable Ports, issued in February 2008, is discussed later in Chapter 3 and in Appendix H.

EPA Headquarters provided complete or partial funding from fiscal years (FY) 2002 through FY 2007. OTAQ identified 24 projects EPA had supported at ports throughout the country. However, OTAQ only provided results for 5 of the 24 emission reduction projects listed. OTAQ did not provide results for 19 of the projects listed. These projects were either listed as "ongoing," or had not yet started. According to OTAQ, 13 of the 24 projects were funded in FY 2004, FY 2005, or FY 2006 but were still listed as ongoing projects with no results. Because OTAQ did not provide results for the majority of the projects it listed, the success or failure of those projects could not be assessed.

The Agency has not obtained consistent and reliable emissions data on voluntary initiatives that would allow for evaluation. However, according to OTAQ, EPA encourages local government and port authorities to quantify air emissions. The Agency has several tools to estimate emissions reductions by modeling, including the MOBILE and NONROAD emission inventory models, the Diesel Emissions Quantifier, and the FLEET model. While EPA can use these tools to estimate emission reductions, the tools rely on EPA verified technologies. They also rely on activity data provided by the project (e.g., hours of operation, age, and other properties of the affected vehicles). According to OTAQ, improvements to the Diesel Emissions Quantifier and FLEET models are underway to expand the scope of the fleets it evaluates.

According to OTAQ, it completed an additional modeling tool, called DrayFLEET, after our draft report was issued. This model was developed to assist terminal operators and drayage[28] companies in evaluating emissions reduction efforts. OTAQ also said that the SmartWay Transport Partnership is working with its stakeholders to develop an emissions database. According to OTAQ, this database will interface with existing logistics models currently used by major shippers to make shipping choices that minimize the environmental impacts of goods movement on a systemwide basis.

EPA has contributed funding and technical assistance for developing emission inventories for some U.S. ports.[29] Nevertheless, according to the Director of OTAQ, a consistent baseline emissions inventory has not been established for many U.S. ports. In its Strategy for Sustainable Ports, EPA committed to work with the 75 largest ports in the U.S. to develop baseline emission inventories. If this initiative is successful it may aid EPA in evaluating the effectiveness of future emission reduction activities.

[28] The term "dray" means any vehicle, such as a truck, used to haul goods, especially one used to carry heavy loads.

[29] According to OTAQ, EPA has funded efforts to establish emissions inventories for ports in the Pacific Northwest, and a project for the Port of Los Angeles and the Port of Shanghai to work together on emissions inventory issues. OTAQ said EPA has also reviewed, commented, or provided technical assistance on numerous port emissions inventories (e.g., Baltimore, Houston, Los Angeles, Long Beach, MASSPORT (Boston), New York/New Jersey, Seattle, Tacoma, and Vancouver (Washington).

Voluntary Initiatives Have Not Been Implemented at Many U.S. Ports

EPA utilizes several voluntary partnership programs that impact ports. A voluntary "partnership" program, according to EPA's 2006 definition:[30]

- is designed to proactively target and motivate external parties to take specific environmental action steps;
- does not compel by law external parties to take environmental action steps; and
- [is one where] EPA is responsible for providing leadership and decision-making authority [for the partnership].

According to OTAQ, EPA provides multiple ways for ports to participate in its programs. Port stakeholders can work on diesel emissions reductions programs on their own (i.e., by using EPA verified technologies), through their State air agencies, with EPA Headquarters, or via EPA regional collaboratives. Regional diesel collaboratives, Clean Ports USA, and EPA's technology verification program are all key partnership programs in EPA's NCDC. In addition, EPA's SmartWay Transport program includes freight owners and carriers, many of whom operate in and around ports. However, EPA's voluntary initiatives to reduce air emissions from port sources have not been implemented at many U.S. ports

Opportunities Exist to Improve Participation in Regional Diesel Collaboratives

Regional diesel collaboratives are a significant component of the Agency's overall effort to reduce diesel emissions. Six of eight EPA regions we surveyed identified their respective regional diesel collaboratives as key elements of their strategies to address emissions from port sources. Nonetheless, we found that many sea ports located in nonattainment areas for either ozone or particulate matter were not participating in regional diesel collaboratives. Of 31 U.S. sea ports located in nonattainment areas for ozone or $PM_{2.5}$, 14 were not participating in regional diesel collaboratives. Five of the 14 ports not participating in diesel collaboratives were located in nonattainment areas for both ozone and $PM_{2.5}$. Appendix G provides details on participation in regional diesel collaboratives by ports located in nonattainment areas.

OTAQ and the EPA regions we surveyed cited multiple reasons for lack of port participation in regional diesel collaboratives. These included:

[30] EPA, *OPEI Definition of EPA Partnership Programs*, December 2006.

- many small ports do not have the resources to attend meetings of the collaboratives (which focus on many sectors, such as school buses, transit buses, agriculture, etc);
- some port authorities are not convinced of a need to participate in collaborative efforts;
- smaller ports may not see a need to participate in a collaborative because they do not experience the magnitude of air quality issues associated with large ports;
- some State environmental agencies do not participate in port workgroups organized by regional collaboratives;
- some port authorities do not have staff devoted to managing environmental issues; and
- ports have not been a focus of diesel collaborative efforts in one EPA region.

Because regional diesel collaboratives are a key component of EPA's voluntary partnership program, and a tool for reducing emissions from port sources, the Agency needs to proactively target and motivate port stakeholders to participate in these collaborative efforts, particularly for those ports located in nonattainment areas.

EPA Verified Technologies Are Major Component of Voluntary Emission Reduction Efforts, But Funding is Limited

One of the key resources that EPA has in promoting voluntary emission reductions is its ability to independently verify engine retrofit technologies. Through EPA's technology verification efforts, the Agency certifies that certain retrofit technologies will achieve the emission reductions claimed by the manufacturer. EPA uses data from projects employing verified technologies to estimate emission reductions for clean diesel activities.

According to EPA's Diesel Retrofit Technology Verification Website, EPA and CARB have verified 22 nonroad engine retrofit technologies.[31] However, OTAQ said that more nonroad retrofit technologies could be developed. According to OTAQ staff, manufacturers have only just begun to project an adequate market volume for certain nonroad retrofit technologies. Continued Agency work in this area may help to broaden the menu of EPA-verified technologies available to source owners and operators. For example, no verified retrofit devices exist for three of the seven retrofit technologies identified by the Clean Ports USA Website.[32] Ports are hesitant to adopt new technologies that are not verified because

[31] CARB also verified nonroad engine technologies that were recognized by EPA under a reciprocity agreement. For nonroad engines, EPA has verified 4 engine retrofit technologies, and CARB has verified 18. All 22 technologies are officially recognized by EPA.

[32] At the time we surveyed OTAQ in 2007, EPA had not verified any Lean NO_x Catalyst Closed Crankcase Ventilation or Exhaust Gas Recirculation retrofit technologies for nonroad engines.

they cannot risk interrupting their business operations, according to a 2006 report by the Clean Air Act Advisory Committee.[33] Further EPA work with manufacturers may result in a broader list of verified nonroad retrofit devices that could be applied to voluntary emission reduction activities at ports.

Despite the fact that EPA acknowledges the importance of verified technologies in obtaining voluntary emission reductions, funding for EPA's Environmental Technology Verification (ETV) program was discontinued in FY 2007. The ETV program provided a complementary, independent role for OTAQ's technology verification program.[34] According to OTAQ representatives,[35] discontinuing funding for the ETV program may impact EPA's technical coordination with industry stakeholders, and result in delays in getting products verified.

Limited Resources for Implementing EPA's Efforts to Reduce Port Emissions

In responding to our 2007 survey, OTAQ and EPA regions said that obtaining more funding for voluntary and incentive programs was one of the most important options available to EPA for reducing diesel emissions from port sources. EPA's regulations generally only apply to newly built engines. The existing fleet of diesel engines may last up to several decades before being replaced by new engines subject to EPA regulations. Thus, EPA's initiatives also need to address the existing fleet.

Port emission reduction activities can be costly to implement. For example, the Ports of Los Angeles and Long Beach developed a comprehensive plan (the San Pedro Bay Clean Air Action Plan) to address air emissions at their ports. The estimated cost to implement the San Pedro Bay Clean Air Action Plan exceeds $2 billion over a 5-year period (2006-2011).[36] A bond initiative for California's Goods Movement Plan is expected to fund over half of the San Pedro Bay Clean Air Action Plan's total cost. The Port Authorities of Los Angeles and Long Beach, as

[33] Recommendations for Reducing Emissions From the Legacy Diesel Fleet. Report from the Clean Air Act Advisory Committee, April 10, 2006.

[34] OTAQ and EPA's Office of Research and Development work in partnership to verify engine retrofit technologies and certify emission reductions. OTAQ works with manufacturers to assure that the engines are appropriately tested in the ETV process. OTAQ is responsible for interpreting the ETV testing results and assigning the appropriate level of emission reductions for the engine technologies.

[35] The key OTAQ representatives were a manager in the Innovative Strategy Group, a team leader for the Diesel Retrofit Technology Verification Team, and an engineer for the Compliance and Innovative Strategies Division.

[36] The San Pedro Bay Clean Air Action Plan describes measures that the Ports of Los Angeles and Long Beach will take toward reducing emissions related to port operations. The major stakeholders involved in the plan's development were the Ports of Los Angeles and Long Beach, California's South Coast Air Quality Management District, the California Air Resources Board, and U.S. EPA Region 9.

well as the SCAQMD, have budgeted over $400 million to implement the plan.

EPA has attempted to leverage Federal funding with partnerships formed through efforts such as regional diesel collaboratives. Only recently has EPA begun to allocate funding for port emission reduction activities. In FY 2003, EPA Region 9 was the only Region that committed funding to port emission reduction activities. OTAQ did not allocate any funds for Federal grants for port emission reduction activities in FY 2002 or FY 2003. According to OTAQ, EPA had its first port-related demonstration grants under the Clean Air Act in FY 2004 ($368,000). Our survey results show that over the 6-year period from FY 2002 to FY 2007, EPA headquarters and regions collectively contributed less than $5.3 million for air quality projects that impacted the ports in our sample.[37]

Some EPA regions with major U.S. ports did not allocate funds for port emission reduction activities until FY 2006 or later. For example, EPA Region 4, with over 35 key ports, did not commit any funding to address port air quality issues until FY 2006. Region 4 cited the fact that the majority of ports in its Region were in attainment of EPA's National Ambient Air Quality Standards as the primary reason for not allocating funds to address these sources. Although ports may be located in attainment areas, emissions from port sources can still have a significant impact on local communities. For example, EPA's 2003 marine rule cited local air quality impacts from ports in Wilmington, NC, and Miami, FL (both located in EPA Region 4) as examples of why EPA action was necessary to control marine engine emissions.

In FY 2008, Congress appropriated approximately $50 million to help reduce emissions from diesel engines.[38] While not all of this funding is allocated for the port sector, port stakeholders are eligible to receive some of this grant funding, according to OTAQ. Port authorities, State and local governments, and other eligible entities can apply for competitive Federal grants under this program to deploy verified and certified technologies for reducing diesel emissions. Additionally, funding from the Congestion Mitigation and Air Quality (CMAQ) Improvement Program can be used for projects that reduce pollution from port sources, such as on-highway trucks and construction equipment.[39]

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[37] For 18 major ports, we asked OTAQ and 8 EPA regions to identify all port-related air quality projects that they contributed partial or complete funding to from FY 2002 to FY 2007 (Appendix C lists the 18 ports). EPA headquarters contributed about $2.7 million to 24 such projects from FY 2002 to FY 2007, and EPA regions funded 21 projects over the same time with approximately $2.5 million. Because OTAQ and EPA regions responded individually to our survey, some of the projects identified and the funds claimed may have been duplicated.

[38] Under authority of the Energy Policy Act of 2005.

[39] According to the U.S. Department of Transportation, Federal Highway Administration, Congress adopted the Intermodal Surface Transportation Efficiency Act in 1991. This law authorized the CMAQ program, and provided $6.0 billion in funding for surface transportation and other related projects that contribute to

EPA's New Strategy for Sustainable Ports Lacks a Transformation Plan

In February 2008, EPA released its Strategy for Sustainable Ports. According to OTAQ, the Strategy is multi-media oriented, and cuts across the various EPA offices to leverage Agency resources and opportunities to work with ports towards sustainability. OTAQ stated that the Strategy is intended to bring together the various programs that deal with ports across the Agency. It was developed with the participation of EPA Regional and Assistant Administrators through Regional Leadership Forums to address the environmental implications of port operations and growth. Two forums have been held: the first was held in September 2006 at the Ports of Los Angeles/Long Beach; the second in September 2007 at the Port of New York/New Jersey.

EPA's Strategy has six themes, one of which directly relates to air quality issues at U.S. ports. The Agency has committed to several action items and goals as part of this Strategy. While this Strategy is a step in the right direction, it does not contain all the components necessary to assure its success. Specifically, EPA's Strategy does not contain a transformation plan which would link strategies to goals through programs, milestones, and metrics. EPA provided us with a draft, working document that generally identified lead and participating offices and regions for the action items in its Strategy; however, the Strategy does not clearly link action items to desired outcomes.

The stated mission of EPA's Strategy for Sustainable Ports is to:

> *…collaborate with marine port authorities, their business partners and port communities to promote sustainability and to minimize the negative effects of inter-modal marine and land-side goods movement on human health and the environment.*

However, parts of the Strategy related to reducing air emissions in ports do not have milestone dates for achieving many of the specific action items listed. For example, four of five action items listed under the "Goods Movement Actions" section (Clean Air and Affordable Energy theme) of the Strategy do not provide milestone dates as to when those actions are expected to be completed. Further, some action items in the Strategy contain vague language as to how the Agency will complete the item or how success will be measured. For example, 7 of 16 action items listed under the "Clean Air and Affordable Energy" theme of the Strategy

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air quality improvements and reduce congestion. However, prior to passage of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) in 2005, CMAQ funds were not eligible for offroad diesel retrofit projects.

use vague directives, such as "utilize," "work with," "collaborate," and "actively work with." Examples include:

- "1.B. Utilize existing EPA programs, such as the National Clean Diesel Campaign, Regional Diesel Retrofit Collaboratives, and Smartway Transport to promote emission reductions in the supply chain."
- "1.E. Work with ports to encourage their business partners to establish meaningful (LEED-like) agreements with SmartWay Transport Partners (e.g., freight owners) to reduce the impacts of shipping goods by using cleaner fuels and more efficient routes, operations & technologies."
- "1.P. Participate actively in the DOT/MARAD National Congestion Initiative, the Committee on Marine System Transportation, and other relevant efforts."

None of the action items listed above present information that indicates how EPA plans to execute the action, or how and when performance will be measured. Appendix H provides details on EPA's Strategy for Sustainable Ports that relate to air quality issues.

Our detailed review of three EPA regions' efforts at the Ports of New York/New Jersey, Houston, Long Beach, and Los Angeles demonstrated that some EPA regions have assisted some ports on an individual basis in implementing clean diesel initiatives. For example, EPA Regions 2 and 6 worked through their respective regional diesel collaboratives to help facilitate clean diesel activities at the Ports of New York/New Jersey and Houston. Similarly, EPA Region 9 staff assisted in developing a comprehensive strategic plan to address air emissions at the Ports of Los Angeles and Long Beach.

EPA's Strategy for Sustainable Ports lacks appropriate performance measures, milestones, and other management controls that would enable the Agency to transform its strategic goals into measurable results. It also contains vague language as to how some action items are to be completed. These deficiencies raise concerns as to whether the Strategy can be successfully executed. OTAQ representatives noted that an Agency-wide team is updating the Strategy.

Conclusions

The Agency's implementation of voluntary initiatives to reduce emissions from port sources has been hampered by a lack of emissions data, participation, and funding. EPA regulations requiring further air emission reductions from oceangoing vessel engines have not been promulgated. Nevertheless, EPA has made some progress towards improving air quality in port areas through its initiatives. EPA has developed a Strategy for Sustainable Ports in an effort to leverage Agency resources and

opportunities across various EPA offices to work proactively with ports towards sustainability. The multi-media strategy establishes goals and a general direction for EPA's ports initiatives.

However, EPA's strategy does not include the management controls necessary to execute, oversee, and measure the success of its approach to addressing air quality issues at ports. Despite recognizing the significance of air quality issues from port sources, EPA's strategy only provides general guidance for coordinating efforts to reduce emissions from U.S. port sources. The Agency has not developed a transformation plan to link its desired strategic results with the actions that EPA regions and stakeholders need to take. EPA's strategy should include designations of accountability and responsibility with appropriate milestones, performance measures, and other management controls. Currently, EPA's strategy lacks the management framework and controls, as well as an assessment of the resources, necessary to successfully implement it.

Recommendation

We recommend that the Assistant Administrator for Air and Radiation:

3-1 Revise the Strategy for Sustainable Ports to include a transformation plan with appropriate designations of authorities and responsibilities, milestones, performance measures, other management controls, and an assessment of resources, to assure the Agency's port-related efforts under the NCDC are successfully implemented.

Agency Comments and OIG Evaluation

The Agency generally agreed with the importance of establishing milestones, performance measures, and other reporting requirements to ensure successful implementation of EPA's port-related efforts. EPA also agreed that a general lack of funding has hampered implementation of voluntary initiatives at ports. However, EPA disagreed with our finding that voluntary initiatives had not been effectively implemented at many U.S. ports, and stated that participation in regional diesel collaboratives is not sufficient to judge whether a port is engaged with EPA to voluntarily reduce air pollution. EPA also said that the Strategy for Sustainable Ports was not an appropriate vehicle for closely monitoring progress toward reducing air emissions at ports. EPA further stated that it already had management processes in place that are adequate for the broader purposes for which the Strategy for Sustainable Ports was developed.

We disagree with the Agency. We continue to believe that voluntary initiatives have not been effectively implemented at many U.S. ports. EPA identified regional diesel collaboratives as key elements of its NCDC. These collaboratives are significant parts of EPA's effort to

reduce emissions from port sources through voluntary initiatives, thus we focused on port participation in these programs. Although the Agency has provided multiple ways for ports to participate in voluntary emission reduction programs, EPA has yet to address air emissions from ports with a focused, comprehensive management plan that specifically targets air quality improvements in port areas.

EPA's Strategy for Sustainable Ports was the strategic plan for reducing pollution at U.S. ports that EPA provided to the OIG and which the Agency has provided to the public. The Strategy for Sustainable Ports remains a public document on EPA's Website with its stated purpose being to "… support existing and new EPA programs and projects that will produce measurable results within the next 18 months…." The Agency's NCDC does not have a specific strategy to direct the Agency's port-related efforts. If EPA intends for its efforts to reduce air emissions from U.S. ports to remain outside of the Strategy for Sustainable Ports, then an appropriate framework for overseeing these activities should be in place. We concluded that such a framework is not in place. Given the health and environmental impacts of air emissions in port areas, and the projected growth in these emissions, we believe that EPA needs to develop a plan to address the major sources of air emissions at ports that EPA plans to reduce. The plan should include appropriate designation of authorities and responsibilities, milestones, performance measures, other management controls, and an assessment of resources to transform the Agency's port-related efforts under the NCDC into successful implementation. We consider this recommendation open and unresolved.

The Agency's complete written response is in Appendix I. Our evaluation of those comments is in Appendix J.

Status of Recommendations and Potential Monetary Benefits

RECOMMENDATIONS						POTENTIAL MONETARY BENEFITS (in $000s)	
Rec. No.	Page No.	Subject	Status[1]	Action Official	Planned Completion Date	Claimed Amount	Agreed To Amount
2-1	22	Assess EPA's authorities and responsibilities under the CAA to regulate air emissions from foreign-flagged vessel engines in U.S. ports, in light of the new IMO Treaty, and report any shortfalls to Congress. EPA should include in its analysis key air pollutants emitted by Category 3 marine engines not covered by the IMO Treaty and show how the Agency will meet its responsibilities under the CAA.	U	Assistant Administrator for Air and Radiation			
2-2	22	Assess the extent to which Emission Control Areas (ECAs) should be designated for all U.S. coastal areas, under the revised Annex VI provisions. For all areas where ECAs are needed, ensure that the appropriate application materials and supporting documentation are submitted to the IMO in a timely manner.	O	Assistant Administrator for Air and Radiation			
3-1	33	Revise the Strategy for Sustainable Ports to include a transformation plan with appropriate designations of authorities and responsibilities, milestones, performance measures, other management controls, and an assessment of resources, to assure the Agency's port-related efforts under the NCDC are successfully implemented.	U	Assistant Administrator for Air and Radiation			

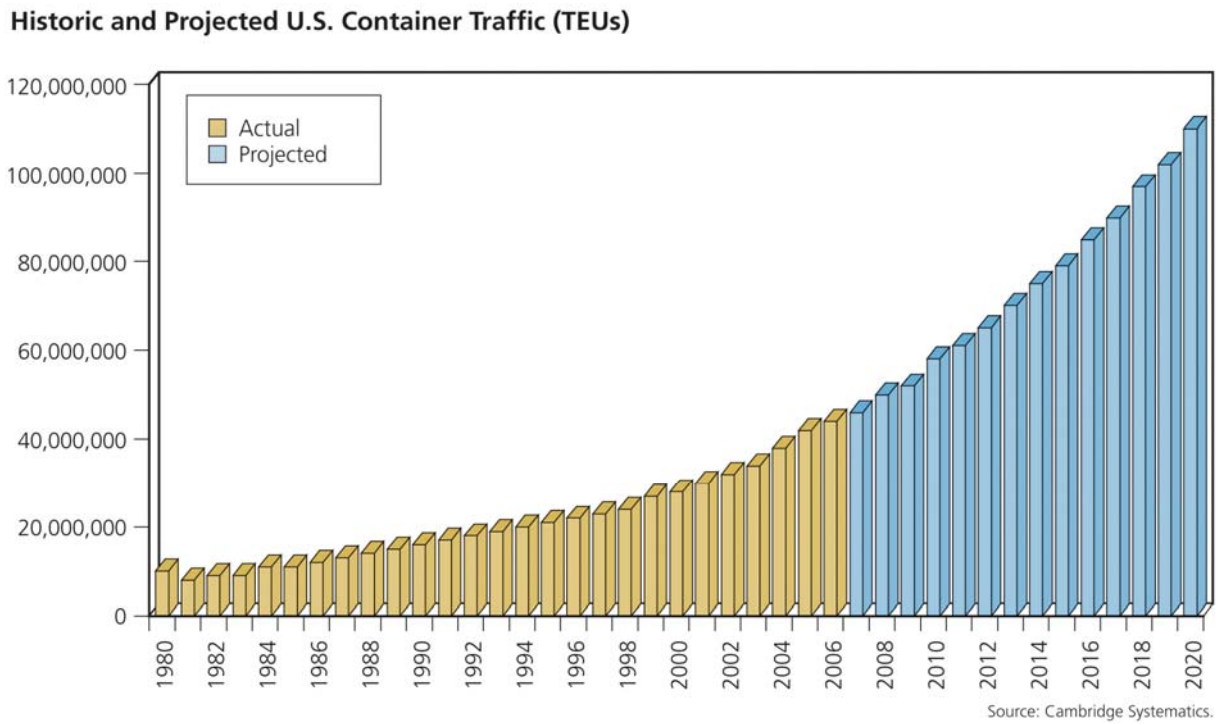
[1] O = recommendation is open with agreed-to corrective actions pending
C = recommendation is closed with all agreed-to actions completed
U = recommendation is undecided with resolution efforts in progress

Appendix A

Projected Growth of U.S. Ports Due to Container Shipping

Since 1995 container growth worldwide has increased by at least 10 percent every year and this growth is expected to continue. A Bureau of Transportation Statistics report shows that one in every nine maritime containers in the world is either bound for or coming from the United States. The United States expects to have total container traffic (imports and exports) of greater than 60 million containers in 2010 and 110 million in 2020. See Figure A-1.

Figure A-1: Historic and Projected Increases in U. S. Container Traffic (TEUs)[40]



Source: PowerPoint presentation by John Horsley, Executive Director, American Association of State Highway and Transportation Officials (AASHTO), February 13, 2007.

Contributing to this growth is the use of very large container ships (post-Panamax)[41] and the use of these large ships is occurring globally. Through the economies of scale achieved by deploying these ships on major trade routes between Asia, Europe, and North America, many more containers are moving through ports worldwide. The proposed widening of the Panama Canal (projected completion in 2014) would bring

[40] Twenty-Foot Equivalent Unit (TEU) is a unit of measurement equal to the space occupied by a standard 20-foot container. It is used in stating the capacity of container vessel or storage area.

[41] *Post-Panamax* and *Over-Panamax* are the terms used to describe ships larger than Panamax that do not fit in the current Panama Canal. The current canal can handle vessels of 5,000 TEU, after expansion, the Panama Canal is expected to be able to handle vessels up to 12,000 TEU.

more post-Panamax ships to ports along the Gulf of Mexico and the East Coast of the United States.

In order to receive the growth in container traffic, by 2020 every major U.S. container port is expected to double the volume of cargo it must process with East Coast ports tripling in volume and some West Coast ports quadrupling in volume. Table A-2 shows the projected increases of specific ports by 2020, starting from 2004. This shows the anticipated impact of the Panama Canal expansion on port growth.

Table A-2: Growth of Container Traffic in Selected U.S. Ports

Port	2004 volume (1000 TEUs)	2020 Volume (1000 TEU)	Increase (Percent)
Seattle	1,776	2,557	44
Tacoma	1,798	4,396	144.5
Oakland	2,043	3,382	65.5
Los Angeles/Long Beach	13,101	59,420	353.6
Houston	1,437	6,165	329
Miami	1,010	2,152	113.1
Savannah	1,662	9,420	466.8
Charleston	1,860	6,639	256.9
Virginia	1,809	5,566	207.7
New York/New Jersey	4,478	15,835	253.6

Source: American Society of Civil Engineers – 2005 Report Card for America's Infrastructure, U.S. Department of Transportation.

Table A-3 on the next page shows examples of actual and planned port expansion projects for selected ports contained in our survey (see Appendix C).

Table A-3: Examples of Actual and Planned Expansion Projects in Selected U.S. Ports

Port	Examples of Increasing Port Capacity
Seattle	• Plans building a capacity by 2013 of 4 million TEUs, including planned transfer of 32 acres from cruise operation into an expanded 70-acre container handling facility ($125 million).
Tacoma	• Plans to build a $300 million, 168-acre container terminal. • investing in its near-terminal rail facility, including a $10.5 million capital project. • Developing a logistics center south of Olympia, Washington.
Oakland	• Half of the former Oakland Army Base was conveyed to the port (2003 and 2006). • Negotiations with the two class I carriers-BNSF and Union Pacific, to establish an expanded intermodal rail facility (September 2007). • Current 5-year plan allocates $341 million in capital investment for the port. • Priority at Oakland is deepening both its channel and berth areas.
Long Beach	• Port of Long Beach sees no capacity issues surfacing in the next 2-5 years. • "Green Port" covenants with two of its seven major cargo terminals. The more recent-carried in a long-term lease agreement with International Transportation Service, Inc. (a subsidiary of NYK Line) targets a 90-percent reduction in air pollution.
Houston	• Bayport Container Terminal at Houston will be expanded over the next 15-20 years as market conditions dictate. Eventual container traffic capacity at the site will be 2.3 million TEUs, which will triple container traffic at the site. • Bayport facility follows the 2005 completion of a 5-year effort to deepen the port's main channel from 40-45 feet, while widening that channel from 400-530 feet.
Miami	• Federal water bill includes authorization for the Miami Harbor Project: an Army Corps of Engineers deepening of the 6,200-foot wharf to 50 feet. • Nearly $1 billion 1.1 mile underground Miami Tunnel Project, which would give truckers "seamless access from the Interstate" (currently, the port's considerable truck traffic is routed through surface streets). • New $90 million cruise ship facility, multi-level garage, new office space, and bulk head improvements.
Savannah	• Savannah Harbor Expansion Project will deepen the harbor to 48 feet (before the Panama Canal improvements are completed). • Georgia Port Authority wants to raise the port's potential capacity to 6.5 million TEUs by 2018.
Charleston	• The port expansion includes a $600 million terminal at the former Navy base. • $300 million highway to take terminal traffic to I-26.
Virginia (Norfolk, Newport News, Portsmouth, Hampton Roads, and the Virginia Inland Port in Front Royal)	• Renovation of Norfolk International Terminal-South (by 2010) will add eight new Suez class cranes to operation and completely re-figure the back lands. At NIT-North, 1,900 linear feet of new berth is being added, with new cranes. • Increase TEU capacity from 2.1 million to 3 million. • Heartland Corridor, slated for completion late in 2009 (a major inland port project).
New York/ New Jersey	• $1.7 billion investment package to pay for reconfiguring existing terminals, deepening harbors and berths, and improving inland rail access. • The Port Authority acquired a 153-acre parcel in nearby Bayonne, New Jersey ($50.5 million, September 2007).

Source: America's Ports Take on the Challenge of Trade Growth, World Trade Magazine, February 2008.

Appendix B

Key EPA Regulations for Five Major Sources of Port Emissions

Oceangoing Vessels

The EPA has undertaken a parallel regulatory effort for oceangoing vessels, setting emissions standards for U.S.-flagged vessels under the Clean Air Act (CAA) while seeking international standards for foreign-flagged vessels under the International Maritime Organization (IMO).

In February 2003, EPA adopted Tier 1 NO_x emission standards for Category 3 new marine diesel engines that would be installed on vessels flagged or registered in the United States. This regulation did not apply to foreign-flagged vessels which were held to an equivalent set of international standards under the International Maritime Organization. These standards went into effect in 2004 and were based on readily available emission-control technology. EPA committed to issue a second tier of more stringent standards for Category 3 marine engines by April 2007. At the same time, EPA continued to work as part of the U.S. delegation to the IMO to seek more stringent international standards for oceangoing vessels.

EPA has since delayed its Tier 2 standards for Category 3 marine engines, citing a need for additional time to evaluate new data becoming available on control technologies for this category of engines. EPA issued a rule on April 27, 2007, that extends the deadline to issue Tier 2 rules for Category 3 marine engines to December 17, 2009. Further, on December 7, 2007, EPA issued an Advance Notice of Proposed Rulemaking to invite comment from all interested parties on its plan to propose new emission standards and other related provisions for new Category 3 engines. EPA is considering standards for achieving large reductions in NO_x and PM with technologies such as in-cylinder controls, after-treatment, and low sulfur fuel, starting as early as 2011.

Heavy-Duty Diesel Trucks

In 2001, EPA issued a rule that established new PM and NO_x emission standards for heavy-duty highway engines and vehicles. The new standards were required to be phased in beginning in 2007, and relied on a low-sulfur fuel requirement (sulfur content of fuel was not to exceed 15 ppm) that was required to be in place for all terminal and retail fuel stations by September 2006. Because of this rulemaking, EPA projected a reduction of 2.6 million tons of NO_x emissions and an annual emission reduction of 109,000 tons of PM by 2030.

Cargo-Handling Equipment

In June 2004, as part of the Clean Air Nonroad Diesel Rule, EPA adopted new emission standards for nonroad diesel engines and sulfur reductions in nonroad diesel fuel to reduce harmful emissions and to help States and local areas designated as 8-hour ozone

nonattainment areas to improve their air quality. Diesel engines used on cargo-handling equipment at U.S. ports were generally subject to these standards. EPA concluded that the standards would achieve reductions in PM and NO_x emission levels in excess of 95 percent and 90 percent, respectively. It also concluded that the standards would reduce the sulfur level in nonroad diesel fuel by 99 percent. These fuel improvements began to take effect in 2007.

Harbor Craft and Locomotives

EPA's standards for small marine diesel engines were adopted in 1998 for engines under 37 kilowatts (kW), in 1999 for commercial marine engines, and in 2002 for recreational marine engines. EPA's standards provided for various Tier 1 and Tier 2 standards phased in from 1999 through 2009, depending on engine size and application.

In 1999, EPA issued a rule controlling emissions from new marine compression-ignition engines for Category 1 and 2 marine diesel engines (i.e., engines generally used on harbor craft such as tugboats and fishing vessels). The rule did not set mandatory emissions standards for marine compression-ignition engines before 2004. Rather, the rule urged manufacturers to voluntarily comply with international standards until the proposed Tier 2 standards for Category 1 and Category 2 marine diesel engines were scheduled to come into effect.

EPA's standards for newly-built and remanufactured locomotives were adopted in 1998 and were implemented in three tiers (Tiers 0, 1, and 2) between 2000 and 2005. EPA's current program includes Tier 0 emission limits for existing locomotives originally manufactured in 1973 or later, that apply when they are remanufactured. The most stringent of these existing locomotive and marine diesel engine standards are similar in stringency to EPA's nonroad Tier 2 standards that are now being replaced by Tier 3 and 4 standards.

On May 6, 2008, EPA finalized regulations for more stringent emission standards for Category 1 and Category 2 diesel marine engines, as well as diesel locomotives. These categories include harborcraft vessels found at ports as well as ferries, fishing vessels, Great Lakes freighters, and recreational boats. According to EPA, the regulations will, by 2030, reduce annual $PM_{2.5}$ emissions by about 27,000 tons, and annual NO_x emissions by 800,000 tons.

The finalized rule is a three-part program to address both new and existing diesel engine emissions from these sources.

First, stringent emission standards for existing locomotives and for existing commercial marine diesel engines above 600 kilowatt (kW) (800 horsepower) were adopted. These standards apply when the engines are remanufactured. This part of the program will take effect as soon as certified remanufacture systems are available, for some engines as early as late 2008. Under the existing program, locomotives have been certified to one of three tiers of standards: Tier 0 for locomotives originally built between 1973 and 2001, Tier 1 for those built between 2002 and 2004, and Tier 2 for those built in or after 2005. Under the new program, certified locomotive remanufacture systems must be made available by

2010 for Tier 0 and Tier 1 locomotives, and by 2013 for Tier 2 locomotives. Remanufactured systems certified for use in marine engine remanufactures are likewise required to be used.

Second, a set of near-term emission standards, referred to as Tier 3, for newly-built locomotives and marine engines, was adopted. The Tier 3 standards reflect applying technologies to reduce engine-out particulate matter (PM) and NO_x. Longer-term standards, referred to as Tier 4, for newly-built locomotives and marine engines, will also occur. Tier 4 standards reflect applying high-efficiency catalytic aftertreatment technology enabled by the availability of ultra-low sulfur diesel fuel. These standards take effect in 2015 for locomotives, and phase in over time for marine engines, beginning in 2014.

Finally, provisions to eliminate emissions from unnecessary locomotive idling were also adopted for each of the above described program phases.

According to EPA, locomotives and marine diesel engines designed to these Tier 4 standards will achieve PM reductions of 90 percent and NO_x reductions of 80 percent, compared to engines meeting the current Tier 2 standards. The new standards will also yield sizeable reductions in emissions of nonmethane hydrocarbons, carbon monoxide (CO), and hazardous compounds known as air toxics.

Appendix C

Details on Scope and Methodology

Our evaluation focused on EPA's Office of Air and Radiation, Office of Transportation and Air Quality (OTAQ), located in Washington, DC, and Ann Arbor, MI. We reviewed documentation and interviewed EPA Regions 2 (New York), 6 (Dallas), and 9 (San Francisco); and administered a survey to OTAQ and EPA Regions 1, 2, 3, 4, 5, 6, 9, and 10 as part of our evaluation. The staff we contacted at these EPA offices all dealt with air quality issues at U.S. ports to varying extents. We met with EPA's Office of General Counsel, located in Washington, DC. We also interviewed representatives from the following non-Federal stakeholder groups: A.P. Moller-Maersk, the California Air Resources Board, the Los Angeles/Long Beach Port Community Advisory Committee, the Port of Long Beach, the Port of Los Angeles, and the SCAQMD.

To determine whether Agency actions to address air emissions from oceangoing vessels at selected U.S. ports have been effective, we reviewed EPA's actions related to oceangoing vessels dating back to EPA's 1994 determination that human health is being significantly harmed by emissions from large oceangoing vessels in U.S. ports. We reviewed EPA's 1994 final nonroad rule, the Agency's Advanced Notices of Proposed Rulemakings, Proposed, and Final Rulemakings for 1999, 2002, 2003, and 2007, as appropriate. We reviewed selected documents in EPA's docket for these rulemakings, as appropriate. We also reviewed the February 2008 testimony of the former Associate Director of OTAQ before the Senate Committee on Environment and Public Works. We also interviewed OTAQ officials and reviewed the U.S. proposal to the IMO.

To determine whether EPA's management plan to address emissions from port sources was sufficient to protect human health and the environment at selected major U.S. ports, we reviewed documentation and studies related to air quality issues at selected U.S. ports including:

- EPA's Vision, Mission, and Strategy for Sustainable Ports dated February 12, 2008
- Final 2006 San Pedro Bay Clean Air Action Plan, November 2006.
- U.S. Department of Transportation, Maritime Administration report, *Vessel Calls at U.S. & World Ports 2005*.
- Summary Judgment in United States Court of Appeals Case No. 03-1120-Bluewater Network v. Environmental Protection Agency (EPA) and Michael O. Leavitt, Administrator, United States Environmental Protection Agency.
- EPA's 2006-2011 Strategic Plan.
- U.S. proposal to the IMO, MARPOL Annex VI, and the NO_x, Technical Code: Development of Standards for NO_x, PM, and SO_x. Submitted to the IMO Subcommittee on Bulk Liquids and Gases, February 9, 2007.
- Emission inventory and emission reduction efforts documentation for the Ports of Houston, Los Angeles, Long Beach, and New York/New Jersey.

- Various EPA regulations for controlling emissions from nonroad sources, particularly those regulations relating to heavy-duty trucks, cargo-handling equipment, locomotives, and marine diesel engines.
- Studies and stakeholder comments in the EPA docket for selected regulations.
- Journal of Environmental Science & Technology, 2007, 41, 8512-8518, Article entitled *Mortality from Ship Emissions: A Global Assessment*, James J. Corbett, James J. Winebrake, Erin H. Green, Prasad Kasibhatla, Veronika Eyring, and Axel Lauer.

As part of the evaluation, we conducted Web reviews and analyzed documentation from OTAQ, the American Association of Port Authorities, the International Maritime Organization, the U.S. Army Corps of Engineers, and the U.S. Department of Transportation, among others. We also reviewed information related to the Panama Canal Expansion.

In addition to document reviews, we selected four U.S. ports for more in-depth analysis. Based upon size, volume of shipping traffic, and proximity to population centers, we chose the ports of Houston, Long Beach, Los Angeles, and New York/New Jersey. Our analysis of issues and activities at these ports included reviews of emissions inventories for each port, studies of potential health impacts from port pollution, and air emission reduction efforts. We interviewed EPA region personnel familiar with port operations and Agency activities at each port. We toured the port facilities in Los Angeles and Long Beach, and met with staff at EPA Region 9, the California Air Resources Board, SCAQMD, A.P. Moller-Maersk, and the Port Authorities for both the Port of Long Beach and the Port of Los Angeles.

We obtained data independently, as part of a survey, to assess the extent of air pollution problems and EPA actions at selected ports across the U.S. We surveyed OTAQ and eight EPA regions that had coastal or Great Lakes ports located within their jurisdiction. As part of our survey, we asked EPA regions to provide information about their efforts to reduce air emissions at 18 specific ports. The 18 ports we identified in the survey were: the Port of Boston, Port of Providence, Port of New York and New Jersey, Port of Camden, Port of Baltimore, Port of Philadelphia, Port of Savannah, Port of Charleston, Port of Chicago, Port of Detroit, Port of Houston, Port of Greater Baton Rouge, Port of Los Angeles and Port of Long Beach (grouped together for the purposes of the OIG survey), Port of Oakland, Port of Seattle and Port of Tacoma (grouped together for the purposes of the OIG survey), and the Port of Portland, OR. The survey was also administered to OTAQ, with general questions about EPA activities to reduce air emissions. We field tested our survey with both OTAQ and EPA Region 9.

We selected two significant ports from each EPA region above in order to identify the issues and challenges being faced by a variety of ports throughout the U.S. We selected regions with either coastal or Great Lakes ports for our survey (EPA regions 1, 2, 3, 4, 5, 6, 9, and 10). We obtained responses to our survey from OTAQ and the eight EPA regions in 2007. Follow-up was conducted as necessary via phone interviews with appropriate staff from each survey respondent. The following table shows the criteria used to select the 18 ports:

Table B.1: Criteria for Port Selection

Criteria	Source Title	Data Source
Annual tonnage passing through the port	Final Waterborne Commerce Summary Tables for Calendar 2005.	U.S. Army Corps of Engineers, February 2007
Population of the area surrounding the port	Data from U.S. Census Bureau's 2000 Census	http://www.census.gov/
Attainment status of the port area	EPA Green Book data as of April 9, 2007	http://www.epa.gov/air/oaqps/greenbk/
Number of vessel calls (10,000 deadweight tons or greater)	Vessel Calls At U.S. & World Ports 2005	U.S. Department of Transportation Maritime Administration, April 2006.
Container traffic through the port (TEUs)	North American Port Container Traffic 2006	American Association of Port Authorities

Source: Developed by OIG staff based on information from sources cited

Review of Management (Internal) Controls

Generally accepted government auditing standards require that auditors obtain an understanding of internal controls significant to the audit objectives and consider whether specific internal control procedures have been properly designed and placed in operation. We examined management and internal controls as they related to our objectives. We reviewed the laws that impact air emissions from port sources, and EPA's authority to regulate marine engines on foreign-flagged vessels with assistance from the OIG Office of Counsel. We focused on the responsibilities and authorities that EPA has to protect human health from unsafe ambient air quality, including the extent to which EPA has statutory authority to develop a regulatory-based program to control emissions from port sources. We reviewed the policies and procedures and performance measures that EPA had established to carry out voluntary emission reduction initiatives at ports. We reviewed results of an Office of Management and Budget Program Assessment Rating Tool for the Mobile Source Standards and Certification Program. We also reviewed analytical, documentary, and testimonial evidence from OTAQ and EPA regions 1, 2, 3, 4, 5, 6, 9, and 10. Sections 2 and 3 identify findings and recommendations where EPA can improve the implementation of its strategy to reduce emissions from mobile sources operating at U.S. ports.

Prior Reports

The OIG conducted one prior evaluation that related to air emissions at ports. This report, *Progress Report on EPA's Nonroad Mobile Source Emissions Reduction Strategies, Report No. 2006-P-00039*, dated September 27, 2006, noted that EPA was addressing the overall diesel emissions program's progress based on total emissions reductions.

The OIG also conducted a prior evaluation related to voluntary programs. This report, *Voluntary Programs Could Benefit from Internal Policy Controls and a Systematic Management Approach, Report No. 2007-P-00041*, dated September 25, 2007, identified issues related to this evaluation. The report noted that EPA does not have uniform implementation policies that allow staff to determine whether voluntary programs are achieving their overall goals. The report also noted that EPA has not implemented a

systematic process to develop, test, and market voluntary programs, or to regularly evaluate the impact of these programs on the environment.

Prior GAO Reports

- Air Pollution. *EPA Could Take Additional Steps to Help Maximize the Benefits from the 2007 Diesel Emissions Standards*, GAO-04-313, March 2004.
- Environmental Justice. *EPA Should Devote More Attention to Environmental Justice When Developing Clean Air Rules*, GAO-05-289, July 2005.

Appendix D

Details on EPA's Rationale for Not Taking a Position on Whether It Has Authority to Regulate Foreign-Flagged Vessels

EPA's Office of General Counsel and OTAQ provided the following rationale for delaying its decision to regulate foreign flagged vessels:

- In its 1999 rulemaking to regulate emissions from new diesel marine engines, EPA interpreted "new" marine engines and vessels to include imported marine engines and vessels, and relied on the Harmonized Tariff Schedule of the United States (HTSUS) for determining when a marine engine and vessel is imported. "According to the HTSUS, vessels used in international trade or commerce or vessels brought into the territory of the United States by nonresidents for their own use in pleasure cruising are admitted without formal customs consumption entry or payment of duty. … This means that engines installed on vessels flagged in another country that come into the United States temporarily will not be subject to the emission standards, because they are not imported and are therefore not new engines under the Clean Air Act Section 216(3) and 213(d)." 64 Fed. Reg. at 73302 (December 29, 1999).

- As part of the follow-up rulemaking process to regulate emissions from ocean-going vessels, the largest of the diesel marine engines, EPA considered the merits of amending the regulatory definition of a "new" marine engine to find that marine engine emission standards apply to Category 1, 2, and 3 marine diesel engines that are built after the standards become effective and that are installed on foreign flag vessels that enter U.S. ports. EPA included in a draft proposed rule to OMB arguments supporting such amended definition, stating that it "has discretion in interpreting section 213 as it applies to new marine engines and vessels, and is considering which interpretation is most appropriate from a policy perspective."

- As part of the interagency review process, EPA revised the proposed rule to solicit comment "on whether it would be appropriate and within EPA's authority to exercise this discretion to define 'new nonroad engine' to include marine engines on foreign vessels that enter US ports, in light of environmental and international oceans policy and any other relevant factors, including consideration of their significant emissions contribution to air quality problems in the United States." 67 Fed. Reg. at 37565/3.

- In the final rule, EPA did not revise the definition of "new" marine engine to include marine diesel engines installed on foreign flag vessels. EPA explained that it need "not decide whether we have the discretion to interpret 'new' nonroad engine or vessel …" to include foreign vessels at that time because "no significant emission reductions would be achieved by treating foreign vessels as 'new' for purposes of the

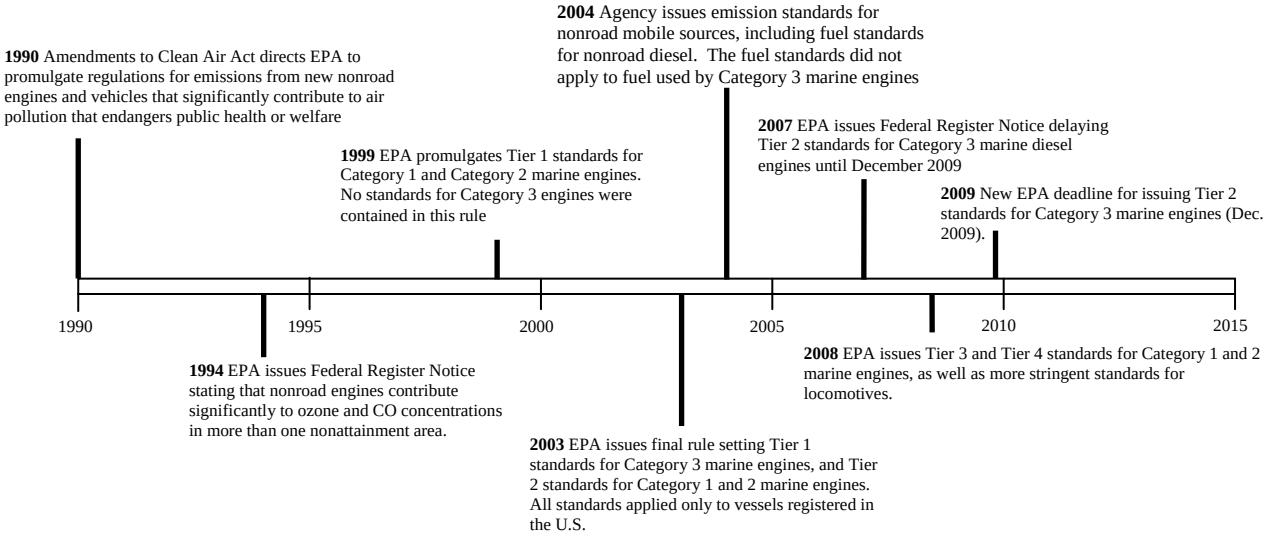
near-term standards in this final rule and there is no significant loss in emission reductions by not including them." 68 Fed. Reg. at 9759/2.

- EPA's decision to defer whether it had authority to revise the definition of "new" marine engine to include engines installed on foreign flag vessels was challenged as arbitrary and capricious in the D.C. Circuit Court. That Court denied Petitioner's challenge on this issue; the Court held that Petitioner's challenge was premature given EPA had adopted standards of similar stringency as those that already applied to foreign flag vessels and thus there would be no significant loss of emission reductions by the deferral. Bluewater Network v. EPA, 372 F.3d 404, 413 (D.C. Cir. 2004).

- Thus, although EPA has identified arguments for revising the definition of "new" to include foreign flag vessels, it has not taken a position on whether such an interpretation would be reasonable in light of the language and purpose of section 213 of the CAA. EPA's decision not to take a position on the issue was upheld by the D.C. Circuit Court.

Appendix E

Timeline of Selected EPA Regulatory Actions Since 1990 to Address Air Emissions from Port Sources



Source: Timeline constructed by OIG staff based on proposed and final EPA actions published in the Federal Register.

Appendix F

Summary of Revised MARPOL Annex VI Standards Adopted by the IMO in October 2008

Summary of Proposed Revisions to Annex VI Standards			
Effective Date	**Pollutant(s)**	**Engines Subject to Standard**	**Standard**
Upon ratification of revised Annex VI standards	NO_x (Tier I)	All engines on vessels registered to treaty members constructed between 1990 and 2011.*	Current Annex VI requirements (up to 17.0 g/kW-hr)
January 1, 2011	NO_x (Tier II)	Diesel engines installed on any ship, registered to treaty members or operating in ports of treaty members, that is constructed on or after January 1, 2011	Up to 14.4 g/kW-hr
January 1, 2016	NO_x (Tier III)	Diesel engines installed on any ship that is constructed on or after January 1, 2016 which is operating in an established emission control area.	Up to 3.4 g/kW-hr
July 1, 2010	PM and SO_x	All engines on vessels operating within emission control areas approved by the IMO	Use of fuel with 10,000 ppm sulfur content
January 1, 2012	PM and SO_x	All oceangoing vessel engines on vessels registered to treaty members, or operating in ports of treaty members	Use of fuel with 35,000 ppm sulfur content
January 1, 2015	PM and SO_x	All engines on vessels operating within emission control areas approved by the IMO	Use of fuel with 1,000 ppm sulfur content
January 1, 2020**	PM and SO_x	All oceangoing vessel engines on vessels registered to treaty members, or operating in ports of treaty members	Use of fuel with 5,000 ppm sulfur content

*Engines built after January 1, 2000 were already subject to Tier 1 standards. The revised Annex VI standards will also apply Tier 1 standards to engines that were built between 1990 and 2000. Exceptions to this standard would be allowed if the required emission reduction was impractical.
**The IMO may, after review, delay the effective date of this standard to 2025 if there is evidence that application of the standard is impractical at that time.
Source: Associate Director, EPA OTAQ

Appendix G

Status of Participation in Regional Diesel Collaboratives for Ports in Nonattainment Areas

Port	State	Pollutant Exceeding NAAQS	Participant in Regional Diesel Collaborative?
Albany	New York	8 hr ozone	Yes
Baltimore	Maryland	8 hr ozone, PM 2.5	Yes
Greater Baton Rouge	Louisiana	8 hr ozone	No
Beaumont[42]	Texas	8 hr ozone	No
Boston	Massachusetts	8 hr ozone	Yes
Bridgeport	Connecticut	8 hr ozone, PM 2.5	Yes
Camden	New Jersey	8 hr ozone, PM 2.5	Yes
Chicago	Illinois	8 hr ozone, PM 2.5	No
Cleveland	Ohio	8 hr ozone, PM 2.5	No
Detroit	Michigan	8 hr ozone, PM 2.5	No
Freeport	Texas	8 hr ozone	No
Galveston	Texas	8 hr ozone	No
Houston	Texas	8 hr ozone	Yes
Hueneme	California	8 hr ozone	No
Indiana (Burns Harbor)	Indiana	8 hr ozone, PM 2.5	No
Los Angeles	California	8 hr ozone, PM 2.5	Yes
Long Beach	California	8 hr ozone, PM 2.5	Yes
Milwaukee	Wisconsin	8 hr ozone	No
New Bedford	Massachusetts	8 hr ozone	Yes
New York & New Jersey	New York/New Jersey	8 hr ozone, PM 2.5	Yes
Oakland	California	8 hr ozone	Yes
Orange[1]	Texas	8 hr ozone	No
Philadelphia	Pennsylvania	8 hr ozone, PM 2.5	Yes
Port Arthur[1]	Texas	8 hr ozone	No
Portsmouth	New Hampshire	8 hr ozone	No
Providence	Rhode Island	8 hr ozone	Yes
Redwood City	California	8 hr ozone	Unsure
San Diego	California	8 hr ozone	Yes
San Francisco	California	8 hr ozone	Yes
Stockton	California	8 hr ozone	Yes
Wilmington	Delaware	8 hr ozone, PM 2.5	No
Total Ports in Nonattainment Status <u>Not Participating</u> in Regional Diesel Collaboratives			**14 of 31 (45%)**

Source: OIG-developed table based on information provided by EPA and the American Association of Port Authorities (AAPA). Attainment status for each port area determined by combining August 2007 data from AAPA and EPA's Green Book Nonattainment Areas for Criteria Pollutants (http://www.epa.gov/air/oaqps/greenbk/). Information on port participation in regional diesel collaboratives obtained from EPA regional responses to our survey.

[42] According to EPA Region 6, the Beaumont-Port Arthur area, which includes the Ports of Beaumont, Port Arthur, and Orange, has made strides toward attaining the 8-hr. ozone NAAQS. A maintenance plan for these areas has been proposed to EPA.

Appendix H

Details of EPA's Strategy for Sustainable Ports

Purpose	Using the framework of the Administrator's Action Plan, support existing and new EPA programs and projects that will produce measurable results within the next 18 months and lay the groundwork for further actions in support of EPA 's Vision for Sustainable Ports, as well as related components of EPA's 2006-2011 Strategic Plan.	
Theme: Clean Air & Afford-able Energy	**Goods Movement Actions**	
	1.A	Develop a transportation supply chain approach to reducing air pollution from freight movement that recognizes the critical role the ports play in goods movement and allows shippers to choose cleaner methods to move goods.
	1.B	Utilize existing EPA programs, such as the National Clean Diesel Campaign, Regional Diesel Retrofit Collaboratives & SmartWay Transport, to promote emission reductions in the supply chain.
	1.C	Develop a supply chain model to help shippers & carriers quantify the environmental footprint of goods movement & establish corporate improvement goals for emissions performance by December 2008.
	1.D	Develop a tiered set of emissions reductions goals for major ports responsible for a significant percentage of U.S. international trade, focusing on port operations/expansion, intermodal fleet modernization & key maritime sources.
	1.E	Work with ports to encourage their business partners to establish meaningful (LEED-like) agreements with SmartWay Transport Partners (e.g., freight owners) to reduce the impacts of shipping goods by using cleaner fuels and more efficient routes, operations & technologies.
	Emissions Inventory Actions	
	1.F	Work with the top 75 ports in the U.S. to develop port specific baseline emissions inventories and emissions reduction targets based on 1) EPA's national port inventory guidance (to be completed this winter 2007/2008) or 2) air emissions inventories completed by the port authorities in accordance with EPA-approved methodologies.
	1.G	Where port authorities have complete port-specific emissions inventories, initial emission reduction targets should be developed by mid to late 2008.
	1.H	Where port authorities are relying on an EPA-generated inventory guidance, initial emission reduction targets will be developed by late 2008 to early 2009.
	1/I	Emission reduction targets should promote early retirement of vehicles/engines and encourage the purchase of new or upgraded vehicles/equipment and the early introduction of 2010-compliant trucks in the supply chain.
	1.J	All targets should include a reduction of emissions from Category 1 and Category 2 marine vessels and harbor craft of at least 20 percent NOx and PM2.5 by 2020.
	Innovative Funding & New Technologies Actions *Note: the extent to which these targets can be met is dependent upon available funding.*	
	1.K	Innovative Financing Funds (e.g. state low-interest loan funds) will be set up in up to 25 states with EPA seed money to provide small owner-operators of equipment like drayage trucks, incentives or access to funds to facilitate vehicle/engine upgrade or replacement and meeting targets.
	1.L	Start at least 3 emerging technology demonstration projects each year between 2008-12, demonstrating new emissions reduction technologies of strategically high value on equipment used at ports or to carry freight to and from ports including maritime shipping, intermodal transport modes.
	1.M	EPA will collaborate with other key federal entities to facilitate the use and exportation of cleaner technology, such as the hydraulic hybrid, through partnerships with domestic and foreign ports and other key stakeholders.
	General Collaborations/Programs Actions	
	1.N	Work within EPA, across federal agencies and with stakeholders to support ratification of MARPOL Annex VI and adoption of the U.S. proposal for stricter Annex VI standards by October 2008.
	1.O	Actively work with the Department of Transportation, other government entities and key stakeholders on broader transportation system planning and financing efforts that will reduce congestion in goods movement and enable ports to meet their emission reduction targets (e.g. expand the use of CMAQ funds).
	1.P	Participate actively in the DOT/MARAD National Congestion Initiative, the Committee on Marine System Transportation, and other relevant efforts.

Theme: Clean & Safe Water		
		[Note: EPA's actions to achieve Clean and Safe Water are not included in this appendix as these do not relate to port air pollution issues. EPA's full Strategy is available at the website listed below.]
Theme: Healthy Com-munities & Eco-systems	**National Environmental Policy Act (NEPA) Actions**	
	3.A	Promote the use of NEPA as a tool to evaluate and promote efforts to address impacts from transportation infrastructure development plans.
	Trade Associations Actions	
	3.B	Support development and implementation of the Sustainability Plan of the American Association of Port Authorities (AAPA).
	3.C	Support issue analysis and development of tools and web-based resources, e.g. revised Port Environmental Mgmt. Handbook.
	3.D	Support the development of industry environmental goals and performance measures.
	3.E	Continue to promote the development of Environmental Management Systems (EMS). (e.g. encourage ports to participate in the third round of AAPA's EMS assistance project)
	Environmental Justice (EJ) Actions	
	3.F	Work with communities surrounding ports to address environmental justice and public health concerns (e.g. capacity building)
	3.G	Consider the advice and recommendations of the National Environmental Justice Advisory Council to be developed in the next 18 months.
	Portfields/Solid Waste Actions	
	3.H	Track the progress of the Southern Louisiana Regional Portfields and the Port of New York/New Jersey Portfields Initiatives, and facilitate engagement of appropriate federal, state, and local partners through EPA's "convening" role.
	3.I	Encourage, facilitate, and support diesel emissions & greenhouse gas reductions technologies & practices at Superfund cleanup and redevelopment sites through Cleanup- Clean Air Program.
	3.J	Identify venues and forums to share information regarding material reuse & recycling related to port operations & redevelopment, & redevelopments surrounding ports.
	Security Actions	
	3.K	OHS will assist with any of the activities that have homeland security implications.
	3.L	Encourage ports to minimize environmental impacts during the development of systems that address security management and other security requirements (e.g. gate efficiencies). Encourage ports to make green purchasing decisions in all of their security procurements.
	General Collaborations/Programs Actions	
	3.M	Promote regional transportation planning & national congestion initiative.
	3.N	Work with ports to explore ways to incorporate Base Realignment and Closure (BRAC) activities into long-range planning.
	3.O	Encourage the use of environmental commitments in port lease agreements and contracts.
Theme: The Global Environ-ment	**Emission Reductions Actions**	
	4.A	Continue efforts to better quantify emissions of air pollution from maritime shipping around the world and to assist major foreign ports in developing emission inventories.
	4.B	Using voluntary measures and binding international agreements (e.g., MARPOL Annex VI), promote cuts in air pollution from maritime shipping and land-side transportation networks, both domestically and internationally.
	4.C	Engage maritime shipping interests in mechanisms for reducing NOx, SOx, PM, and greenhouse gas emissions globally.
	Invasive Species Actions	
	4.D	Continue to raise awareness domestically and abroad of the problem of invasive species in freight transportation (e.g., in pallets and packaging).
	4.E	Promote efforts to address this problem, including through learning networks for Customs, USDA APHIS, and other inspections entities, and the development of a mechanism to respond rapidly to reports of infestations.

	Non-Compliant Goods Actions	
	4.F	Promote the use of all available authorities to stop the importation of illegal and harmful products at the border.
	4.G	Coordinate with OPPTS to participate in the inter-agency Working Group on Import Safety to address this problem, including improvement of inter-agency coordination with customs, USDA, and other inspection entities.
	4.H	Work with major trading partner countries to identify and address environmental and human health problems with non-compliant goods, e.g. through MOUs.
	General Collaborations/Programs Actions	
	4.I	Expand collaborative efforts with key foreign ports and nations to better understand and address environmental concerns associated with maritime shipping, port operations, and intermodal transportation at national, regional and international scales.
	4.J	Establish an International Sustainable Ports and Carriers Partnership that would serve as a mechanism for international collaboration on projects to address the range of environmental problems associated with shipping and ports.
	4.K	Identify an appropriate clearinghouse, agency or organization (e.g., UNCSD, IAPH etc.), similar to other successful international partnerships supported by OIA, to support the International Sustainable Ports and Carriers Partnership and increase international awareness of and interest in the Partnership.
	4.L	Work with the Office of the United States Trade Representative and other economic agencies in the development and negotiation of trade policies and agreements to help minimize adverse localized consequences associated with growth in international trade.
	4.M	Work with the International Maritime Organization's London Convention to complete international guidelines on environmental action levels for assessment and management of dredged material for disposal into marine waters.
	4.N	Support State Department in working with the Senate in ratification of the London Protocol to prevent pollution of marine waters, which focuses upon ocean dumping of wastes.
	4.O	Continue to work with UNEP, IMO and other appropriate entities on the development and implementation of marine pollution treaties that pertain to port and maritime shipping operations.
Theme: Ports Com-muni-cation	**Actions**	
	5.A	Regularly communicate to ports and port stakeholders the status of and accomplishments attributable to EPA initiatives that have and present opportunities for positive environmental impacts on port operations, e.g. Clean Ports USA, WasteWise, etc.
	5.B	Establish and sustain dialogues with communities adjacent to Ports through which accomplishments of EPA and its partners can be shared and explained, and communities can share their concerns regarding environmental impacts of Ports with EPA.
	5.C	EPA Regions will host Port Summits with the leadership of their respective state environmental agencies and port authorities where opportunities for and barriers to improved environmental performance of ports can be shared and discussed.
	5.D	EPA Regions will establish and utilize multi-media Green Teams comprised of regional staff experts, to communicate through a highly coordinated approach, best environmental practices associated with the various media to port operators and their business partners
	5.E	Establish an Agency communications plan to publicly release EPA's Sustainable Ports Vision and Strategy within a target timeframe of early 2008
Theme: Enforce-ment	**Actions**	
	6.A	Promote opportunities to integrate clean port projects with linkages to enforcement actions, e.g. through Supplemental Environmental Projects.
	6.B	Continue to use EPA tools to ensure enforcement of and compliance with all applicable laws.

Source: Strategy taken from EPA Port Sector Strategies Website, http://www.epa.gov/sectors/ports/index.html on March 12, 2008. See http://www.epa.gov/sectors/ports/epastrategy.xls for a direct link to EPA's Strategy for Sustainable Ports identified above.

Appendix I

Agency Response to Draft Report

MEMORANDUM

SUBJECT: Draft Office of Inspector General (OIG) Evaluation Report, "EPA Needs to Improve Its Efforts to Reduce Air Emissions at U.S. Ports"

FROM: Elizabeth Craig
Acting Assistant Administrator

TO: Bill Roderick
Acting Inspector General

I am writing to provide you the Office of Air and Radiation's comments on the draft Inspector General Evaluation Report, "EPA Needs to Improve Its Efforts to Reduce Air Emissions at U.S. Ports Assignment No. 2007-00296, January 12, 2009." Thank you for the opportunity to comment. We appreciate your interest on our work to reduce air emissions at U.S. ports.

As a general matter, OIG's findings are consistent with our experience with regard to addressing emissions from large ocean going vessels. We were pleased to see that this current draft has been updated to reflect the success we have had over the past year in working with the International Maritime Organization (IMO) to adopt new international standards for oceangoing vessels and engines. We are also pleased that it recognizes the need to further enhance the benefits of these standards though the establishment of Emissions Control Areas for the U.S.

We believe that the report's assessment of the efficacy of the Agency's voluntary programs to address air pollution at ports is currently incomplete and does not reflect many of the activities of our National Clean Diesel Campaign (NCDC), our regional offices and collaboratives, or the ports themselves. We realize that the research for this report was done sometime ago. Today, most ports located in nonattainment areas, along with their tenants and customers, are undertaking actions to address air pollution, whether or not they are members of their regional diesel collaborative. Therefore, as written, we believe that the report under-represents the activities of the port authorities, their tenants and customers to voluntarily address air issues. We also believe that the intent and purpose of Regional Administrators and Assistant Administrators in developing the Agency Sustainable Ports Strategy are not fully captured by the report.

See Appendix J
Note 1 for OIG Response

I trust the attached comments from OAR, as well as Regions 1, 2 and 4, will be helpful in completing your work on this report. Please feel free to contact Gay MacGregor at 734 214-4438 if you have any questions about our comments or if we can provide additional information.

Attachments

Attachment 1

Comments on the Draft Inspector General Evaluation Report
"EPA Needs to Improve Its Efforts to Reduce Air Emissions at U.S. Ports,
(No. 2007-00296, January 12, 2009)"

Recommendations-Chapter 2

"We recommend that the Principal Deputy Assistant Administrator for Air and Radiation:

2-1 Assess EPA's authorities and responsibilities under the CAA to regulate air emissions from foreign-flagged vessel engines in U.S. ports, in light of the new IMO Treaty, and report any shortfalls in such authorities to Congress. EPA should include in its analysis key air pollutants emitted by Category 3 marine engines not covered by the IMO Treaty and show how the Agency will meet its responsibilities under the CAA."

Response: Concur with comment. As part of EPA's rulemaking for Category 3 Engines, which EPA is under a regulatory deadline to finalize no later than December 17, 2009, EPA plans to discuss how best to address emissions from foreign-flagged vessels in light of the new IMO Treaty and the U.S. Government's subsequent submittal to the IMO proposing Emission Control Areas (ECAs) along all U.S. coastlines. We believe that our decision to defer addressing this issue has been appropriate and necessary and has been upheld by the D.C. Circuit Court by our understanding of the court's statement that the delay would not "lead to any significant loss in emission reductions." Bluewater Network v. EPA, 372 F.3d 404, 413 (D.C. Cir. 2004). With regard to key air pollutants emitted by these engines, EPA plans to discuss and evaluate other pollutants emitted by Category 3 marine engines in its upcoming rule. Under the requirements of the Congressional Review Act the rule will be submitted to Congress.

See Appendix J
Note 2 for OIG Response

2-2 "Assess the extent to which Emissions Control Areas (ECAs) should be designated for all U.S. coastal areas, under the revised Annex VI provisions. For all areas where ECAs are needed, ensure that the appropriate application materials and supporting documentation are submitted to the IMO in a timely manner."

Response: Concur with comment. OAR's Office of Transportation and Air Quality is working with the U.S. State Department, U.S. Coast Guard, and the Government of Canada to develop a comprehensive application to establish ECA's along all U.S. and Canadian coasts. EPA expects to submit the application to the IMO so that it may be considered by the IMO at its next regularly scheduled meetings in July 2009. Approval by the IMO of this joint U.S. and Canadian Government ECA application could then take place as early as the IMO's March 2010 meeting.

See Appendix J
Note 3 for OIG Response

Recommendation-Chapter 3

"We recommend that the Principal Deputy Assistant Administrator for Air and Radiation:

> 3-1 *Revise the Strategy for Sustainable Ports to include a transformational plan with appropriate designations of authorities and responsibilities, milestones, performance measures, and other management controls, and an assessment of resources, to assure the Agency's port-related efforts under NCDC are successfully implemented.*"

Response: We generally agree that it is important to establish milestones, performance measures and reporting requirements to ensure successful implementation of EPA's port related efforts. It is important to recognize that the National Clean Diesel Campaign (NCDC) already has a stringent set of milestones, performance measures and reporting requirements, including a bi-annual Report to Congress and quarterly reporting through the Agency reporting processes that are intended to outline a transformational plan toward continued air emission reductions including reduced air emissions at U.S. Ports. The Strategy for Sustainable Ports addresses all of EPA's programs and all environmental media and would not be an appropriate vehicle for closely monitoring progress toward the reduction of air emissions at ports.

We believe we already have management processes in place that are adequate for the broader purposes for which the Strategy for Sustainable Ports was developed. The Strategy is the product of two meetings of Regional Administrators (RAs) and Assistant Administrators (AAs) from across the agency; one in September of 2006 and the other in September 2007. The Strategy was developed with the intent of supporting all EPA programs by fostering knowledge across the Agency of efforts underway in various offices and regions to address environmental issues at the nation's ports. In addition, it was intended to clarify and provide a uniform Agency view as well as promote coordination and synergy between the EPA program offices and regions working with ports and other port-related stakeholders. It was not intended to be a stand alone plan of action. An EPA-wide Ports Team, comprised of headquarters and regional representatives, meets periodically for the purpose of keeping each other updated on the activities in the strategy. The Agency-wide Team has offered semi-annual informational updates for the Regional Administrators.

At the meeting of the RAs and AAs in New York in September 2007, there was consensus among the RAs, AAs and the EPA Deputy Administrator, that the items captured in the Strategy for Sustainable Ports were ongoing activities in existing programs that already had adequate management controls in place, as well as designated responsible organizations. All managers agreed that the program offices and regions had sufficient management controls in place for each of the action items in the Strategy and, therefore, any added controls or reporting beyond these informational updates would be

duplicative rather than value-added. This further underscores the rationale for using the NCDC program as the best vehicle for monitoring air emission reductions at ports.

See Appendix J
Note 4 for OIG Response

General Comments and/or Clarifications

p. 2: "At a Glance"… " *Despite the emphasis that EPA has placed on voluntary partnership programs, such as the diesel collaborative, such initiatives have not been implemented at many U.S. ports.*" Based on our experience, this statement is inaccurate as most of the port authorities located in nonattainment areas have established programs to address air pollution at their ports (see list of additional ports in comments on Attachment G below). Even in attainment areas, the EPA regions are engaged with their port authorities on the issue of air pollution-whether or not they are part of the regional diesel collaborative. In addition, EPA is active with the American Association of Port Authorities (AAPA) to promote action at the ports to reduce air emissions. Membership by port authorities in the regional diesel collaborative is not sufficient to judge whether a port is engaged with EPA to voluntarily reduce air pollution. Smaller ports may not have staff to actively participate in the collaborative, but it does not mean that they are not addressing air pollution or working with EPA to do so. In our comments on Appendix G (below), we provide several examples of activities not captured by the report.

See Appendix J
Note 5 for OIG Response

p. 4: "EPA's actions to address air emissions from large oceangoing vessels in U.S. ports have not yet achieved the goals for protecting human health." While it is true that ocean going vessels contribute to air emissions while "in" port, the EPA is also greatly concerned about emissions from ocean going vessels "entering" ports. "Entering" ports could include distances up to 200 nautical miles (nm) from an actual "in" port area and significant river transit. This distinction goes to the heart of the foreign-flag vessel issue regarding the reach of EPA's authority under the CAA to establish emission standards to control Category 3 emissions. Air quality modeling recently conducted by the EPA to support its proposed ECA application show that emissions from as far as 200 nm from ports impact air quality, not only of the immediate port areas, but for 100 of miles inland from these ports. These findings will be a key element of EPA's application to the IMO for establishing Emissions Control Areas -- oceangoing vessel significantly contributes to air quality problems at great distances from the port proper. This same language either "in port" or "at ports" is found throughout the report on pages 1, 3, 8, 13, 14 and 16. EPA suggests clarifying this language to make clear EPA's actions are meant to include emissions from oceangoing vessels "entering" and "in" port.

See Appendix J
Note 6 for OIG Response

p. 11: Last paragraph, we suggest clarifying the last sentence as follows:

"In October 2008 Parties to Annex VI of the MARPOL Protocol adopted new international standards for NOx emissions for marine diesel engines above 130kW (including ocean going vessel engines) and the sulfur content of fuel oil used onboard ships to address both SO_X and PM emissions. At the same time, the U.S. deposited its instrument of ratification and adopted amendments to the Act to Prevent Pollution from Ships making it possible for the U.S. Government to enforce the Annex VI standards for foreign vessels that enter our ports and territorial waters."

With regard to PM, the Annex was revised to make it very clear that the fuel sulfur limits are intended to address both SOx and PM emissions (the title of Regulation 14 is now Sulphur Oxides (SOx) and Particulate Matter). We've also change the language to make clear that the Annex does not address just residual fuel, but covers all fuel, including distillate. This is important because distillate fuel sulfur levels can be quite high in some countries, and the 1,000 ppm fuel sulfur level can easily be exceeded.

See Appendix J
Note 7 for OIG Response

p. 13: 2nd paragraph, 3rd sentence beginning with "EPA", delete sentence and replace with following, "EPA deferred more stringent emissions standards for ocean going vessel engines because EPA believed it needed additional technical data to determine feasibility of new emission control technologies prior to developing a proposed rule. During this time, negotiations with the IMO continued regarding the creation of more stringent emissions standards for ocean-going vessels." This change more accurately states the rationale for EPA's decision to defer rulemaking. EPA issued a final rule on November 29, 2007 deferring Category 3 engine emission standards until December 17, 2009 because it needed additional information regarding promising control technologies. The advance notice of proposed rulemaking (ANPRM) on controlling emissions from marine diesel engines was published on December 7, 2007 and requested that interested parties provide us with any additional technical data they might have (72 FR 69522). We received a number of comments and new data as a result.

See Appendix J
Note 8 for OIG Response

p.14: 1st sentence, revise as follows, "While this NO_X standard only applies to engines on U.S. vessels, which represent about 10 percent of U.S. port calls, foreign-flagged vessels meet IMO/Annex VI - Tier 1 standards because they are required under Annex VI. However …" This rephrasing makes clear that, while modest, currently all OGVs

whether U.S.-flagged or not are currently subject to the same NOx standards, and this is why we didn't apply the CAA standards to foreign-flag vessels; this approach was upheld by the D.C. Circuit Court.

See Appendix J
Note 9 for OIG Response

p. 14: 2nd paragraph… Suggest revising first sentence so that it reflects current state of standards in U.S. and world. "In its 2003 rulemaking, EPA set its NO_X standards for U.S.-flagged vessel engines equivalent to the Tier 1 standards adopted by the IMO in MARPOL Annex VI."

See Appendix J
Note 10 for OIG Response

p.15: 1st paragraph, footnote 19. Suggest either moving footnote to 3rd sentence right after "residual fuel" or deleting since the clause following the first use of this term essentially states the same information that is in the footnote.

See Appendix J
Note 11 for OIG Response

p.15: Section entitled "CO, HC, and Air Toxics", 3rd sentence, suggest adding text so that it would now read, "The Agency plans to address emission limits for CO, HC and air toxics in their C3 rule scheduled to be finalized in December 2009. According to OTAQ representatives,..." EPA's approach to addressing HC and CO has evolved since the IG discussed this with OTAQ representatives. This proposed language incorporates the most recent status of how these emissions will be addressed.

See Appendix J
Note 12 for OIG Response

p. 17: 2nd paragraph, last two sentences. The last sentence in this paragraph inaccurately characterizes EPA actions with regard to the Category 3 April 2007 rulemaking date. EPA did not miss this date rather it proposed and finalized a new rule which extended the deadline to December 17, 2009. A correct statement would be, "However, EPA extended that deadline to December 17, 2009".

See Appendix J
Note 13 for OIG Response

p. 18: 3rd paragraph, After the last sentence we suggest an additional sentence be inserted to clarify that the Marpol Annex VI revisions were finalized and adopted by the Parties to MARPOL Annex VI in October 2009. Add the following, "These standards were adopted by Parties to Annex VI of the MARPOL Protocol in October 2008."

See Appendix J
Note 14 for OIG Response

p. 19: There are a number of bullets which outline the differences between the U.S submittal and the final IMO agreement which inaccurately state the differences. We request the following changes be made to these bullets:

- ∀It requires NOx percentage reductions that are either within the lowest range or slightly below the level recommended in the U.S. proposal"… change footnote to read: The U.S. proposed a Tier 2 NOx limit ranging from 15% to 25% below the current limit and a Tier 3 NOx limit 80% below the Tier 2 NOx limit. The agreement calls for a Tier 2 NOx limit 15.3%-21.4% (depending on engine speed) below the current limit and a Tier 3 NOx limit 76.4%-74.0% (depending on engine speed) below the Tier 2 NOx limit (80% below Tier 1) for emissions from engines above 130 kW installed on vessels constructed after January 1, 2011.

See Appendix J
Note 15 for OIG Response

- The following statement is not correct and we suggest deleting it:

"The agreement does not provide for SOx reductions to be obtained by means other than setting limits on the percentage of sulfur contained in fuel. In contrast, the U.S. proposed a performance-based approach for reducing sulfur emissions. Under this approach, in addition to proposed sulfur limits, the U.S. proposal contained a specific SOx standard (0.4g/kW-hr) which might be met by different compliance methods, such as exhaust gas cleaning technology. "

We believe the confusion comes from the way Regulation 14 is organized. In the past, section 14(4)(b) specifically stated a SOx limit of 6.0 g/kW-hr as an alternative to the 1.5% fuel sulfur standard for SECAs. The alternative SOx standard is no longer discussed in Regulation 14, but still exists.

Regulation 4 of the amended Annex VI states: "The Administration of a Party may allow any fitting, material, appliance or apparatus to be fitted in a ship or other procedures, alternative fuel oils, or compliance methods used as an alternative to that required by this Annex..." It later states that "the Administration or Party should take into account any relevant guidelines developed by the Organization pertaining to the equivalents..."

Under the new structure of the regulations in Annex VI, an exhaust gas cleaning system (EGCS or "scrubber") may still be used as an alternative to low sulfur fuel.

See Appendix J
Note 16 for OIG Response

p. 24: 2nd paragraph, 2nd sentence, beginning with, "These voluntary..." after "..because.." suggest inserting the following new text, " and because EPA regulations generally apply to newly built engines and only to existing locomotives. There are two exception to this which impact port emissions: first, EPA requirements that marine diesel engines above 600kW meet more stringent emission limits when they are remanufactured beginning in 2008 (73 FR 25098) and second, the Annex VI amendments which also contain a remanufacturing program for engines that will begin to apply as soon as kits are certified, which could be as soon as 2010."

See Appendix J
Note 17 for OIG Response

p. 25: 3rd paragraph: The DrayFleet Model is now complete.

See Appendix J
Note 18 for OIG Response

p. 25: "In its Strategy for Sustainable Ports, EPA committed to work with the 75 largest ports to develop baseline emissions inventories." EPA is providing inventory guidance so that port authorities or state agencies can develop their own inventories consistent with that guidance. The Current Methodologies and Best Practices for Port Emissions Inventories guidance document is being updated under contract.

See Appendix J
Note 19 for OIG Response

p. 26: "*Voluntary Initiatives have not been implemented at many U.S. port*." We believe this is an inaccurate statement and the title of the section should be changed. We believe that many more ports are addressing air issues through our voluntary efforts than what is reflected in this report. We have provided examples of some of these omissions in our comments on Appendix G (below) and many examples are provided in the attachment from Regions 1 and 4.

Whether a port authority is an official member of its regional diesel collaborative is not necessarily indicative of whether that port is addressing air pollution through voluntary actions or whether they actively engaged with our voluntary programs. The National Clean Diesel Campaign (NCDC) Clean Ports USA Program has held terminal operators workshops in Duluth, New York and Philadelphia, Puget Sound, and Houston as well as workshops in Corpus Christi and an international Clean Ships conference in San Diego.

In addition, EPA supports Faster Freight- Cleaner Air conferences around the country (Long Beach, Puget Sound, and New York City). The Clean Ports USA Program works directly with the American Association of Port Authorities to reach out to their members, which include the largest 88 port authorities in the U.S. In addition, Clean Ports USA works directly other stakeholder groups such as state and local air agencies, transportation agencies, environmental and community groups, and the maritime industry.

See Appendix J
Note 20 for OIG Response

Appendix G:
Of the port authorities listed as not participating in the Regional Collaboratives, several have reduced their diesel emissions or are in the process of developing projects and working with EPA. It would be helpful to indicate what constitutes "participation" in Regional Collaboratives. We believe there are at least an additional 6 port authorities that are participating, which would be two thirds of the ports in nonattainment areas.

Bridgeport, CT is participating in the Northeast Diesel Collaborative (NEDC). They participate in the NEDC working group calls and emails and the port authority applied for an EPA competitive grant but did not score high enough to be selected.

Cleveland's tenant FMC has retrofitted cargo handling equipment (CHE) as part of an EPA consent decree with Caterpillar and was recognized by the EPA Deputy Administrator and their US Senator for their efforts to reduce diesel emissions. FMT have had several discussions with EPA about technologies to reduce emissions from their vessels as well.

Port of Detroit has hosted EPA on tours and has met with EPA to discuss possible projects. Lack of funding has precluded their participation so far.

Port of Indiana has met with EPA on several occasions. The Indiana Department of Environmental Management (DEM) has applied on the port's behalf for competitive grant funding but the application did not score high enough to receive an award.

The Port of Stockton participates in West Coast Collaborative (WCC) events and has indicated a willingness to reduce its diesel emissions. The port executive director has met with EPA about what the port might do to reduce its diesel emissions.

Port of Wilmington has investigated using biodiesel in their CHE and has had discussions with EPA. Port of Wilmington representatives have attended Clean Port USA workshops in Philadelphia.

See Appendix J
Note 21 for OIG Response

p. 28: We agree that the Environmental Technology Verification (ETV) program was a good compliment to OTAQ's own verification program and that it enhanced our program when it was fully funded.

See Appendix J
Note 22 for OIG Response

p. 29: 2nd paragraph. It was not until FY08 that we had substantial funding dedicated to diesel emissions reductions. With the exception of funding for school bus retrofits, all projects were funded either out of general EPA money under CAA Section 103 or regional discretionary funds. These funds were limited, in fact in some years OTAQ had no funds for diesel reduction programs and were only able to fund any port related projects because the Office of International Activities (OIA) did have money to contribute to our efforts. Furthermore, EPA's voluntary Clean Ports USA began in 2005. Given the resource constraints, we believe it is significant that EPA was able to spend $5.3M over the period of 2002 – 2007 for air quality projects at ports, however, we agree that lack of funding has hampered the program. The FY08 Diesel Emissions Reduction money was received late in FY08, but we believe that when all of they FY08 grants are awarded, we will see the amount of money awarded for port related projects increase substantially.

See Appendix J
Note 23 for OIG Response

p. 31: EPA's Strategy for Sustainable Ports, as stated earlier, was not intended to be a plan with measurable results. It was intended as a cross program coordination tool and as a means to have dialogue with outside stakeholders. The elements of the plan are embedded in ongoing agency programs that have management controls and are consistently reviewed and revised within the offices and regions. It was explicitly decided by the plan's authors, who were political appointees under the previous administration that no additional management controls or reporting requirements were to be associated with this plan.

See Appendix J
Note 24 for OIG Response

Attachment 2
EPA Region 1 Comments on Draft OIG Evaluation Report
"EPA Needs to Improve Its Efforts to Reduce Air Emissions At U.S. Ports"
(No. 2007-00296, January 12, 2009)

Re pp. 26-27: Opportunities Exist to Improve Participation in Regional Diesel Collaboratives

Many Northeast ports have participated in the Northeast Diesel Collaborative ports work group over the three-plus years since it was formed. Most Northeast states also participate. See the current roster of participants appended below; others (academics, state agency staff, SmartWay partners, etc) participate informally in some calls and receive information distributed to the work group.

The Northeast ports are extremely diverse, ranging from huge container and bulk shipping facilities to small fishing ports. Many New England (EPA Region 1) ports are small, cramped, low-volume ports. Most ports own very little land and so have few tenant businesses, let alone operations of their own, minimizing their leverage. Some are primarily fishing ports or bulk liquid import ports, or have evolved substantially more land-oriented uses (e.g., processing seafood trucked in and out by land) than water-dependent activity. Some ports would like to reinvigorate maritime business but face significant challenges due to harbor siltation, property contamination and/or community opposition. Meeting needs this diverse is challenging. Over the years we have learned more about what topics, opportunities and incentives engage our ports, and have focused our bi-monthly NEDC ports work group calls and other outreach on those levers. Likewise, not all New England states focus on ports because emissions attributed to vessels and cargo-handling equipment do not represent a significant portion of statewide air emissions. (Port-oriented truck traffic has been difficult to quantify because access to most port businesses is diffuse rather than centralized and controlled. DrayFLEET may help with this.)

We respect the scarce resources and diverse interests of our ports by holding all NEDC ports work group meetings (except for our kickoff workshop three years ago) by conference call. Each call is organized around a topic that the group has expressed interest in (port trucking efficiencies, approaches to controlling vessel sulfur emissions, etc), and features one or more presentations by expert speakers, followed by discussion of how to apply the lessons heard to Northeast operations. Several of our ports have attended special events that EPA has helped stage, such as the Short Sea Shipping Symposium (www.umassd.edu/sustainability/shortsea.cfm) and Faster Freight Cleaner Air East Coast (www.ffcaeastcoast.com/index.html).

Because gatherings and conference calls alone cannot fully engage our ports, EPA Region 1 and 2 staff have visited many Northeast ports to promote Clean Ports USA and NEDC efforts, raise interest in seeking clean diesel funding, and urge ports to work with us to assess their emissions and fuel-efficiency and develop "green port" strategies. Thus far Region 1 staff have visited the ports of Boston, Gloucester, Salem, New Bedford, Fall River, Fairhaven, Bridgeport, and New Haven. We have met with most of these ports several times, and almost always in the company of state agency counterparts, for

smoothest coordination among levels of government. We sent each New England port our Options for the Marine Ports Sector: Green Strategies for Sustainable Ports document (see www.epa.gov/region1/eco/diesel/ports.html) with an invitation to ask Region 1 staff for help in developing individual port strategies based on these suggestions. We plan to visit other New England ports in 2009.

Two of our ports, with assistance from Region 1 staff, have drafted "sustainable port" strategies modeled on our "Options" document and tailored to their operations and resources. In addition, Massport is working a comprehensive portwide sustainability strategy, informed by an emissions inventory underway. Massport has solicited Region 1's input on both efforts and we have been able to bring regional and state expertise and Clean Ports USA tools to the table. With these three examples now in hand, we hope to inspire other ports to undertake similar self-examination and planning. (For more information on these individual efforts, scroll down to "Current Sustainable Port Strategies in New England" at www.epa.gov/region1/eco/diesel/ports.html).

See Appendix J
Note 25 for OIG Response

Re pp. 28-29: Limited Resources for Implementing EPA's Efforts to Reduce Port Emissions

Until the Diesel Emissions Reduction Act received appropriations, EPA Regions could offer little or no seed funding to inspire ports to think about making capital investments in emission-reduction technology. Financial incentives are especially important in the ports sector because few fuel-saving (cost-effective) technologies pertain to operations owned by ports, and many of these are currently expensive and relatively unproven (e.g., hybrid CHE). (Recognizing that many New England ports of necessity need to focus on easy, low-cost emissions reduction projects first, we "tiered" our Options document to present these suggestions first.) EPA Regions 1 and 2 heavily advertised 2008 Clean Diesel grant funds to our ports, and we received more worthwhile applications than we could fund. We are about to announce two such grants to ports, and hope to fund additional port-based projects with 2009 Clean Diesel funds.

See Appendix J
Note 26 for OIG Response

Re p. 25: Limited Data to Verify Results of Voluntary Actions

Anticipating the need to demonstrate conformity with air quality standards for future dredging projects, Massport began working on an emission inventory in 2008. EPA Region 1 hosted a kickoff meeting comprising Massport staff, their consultant, EPA and state air modeling staff, and EPA and state NEDC participants; Clean Ports USA staff participated by phone. Later in 2008, Region 1 recruited NEDC ports work group participants (and New England -based SmartWay partners) to listen in on a presentation

on DrayFLEET given by SmartWay staff to the Mid-Atlantic Diesel Collaborative's goods movement workgroup. By openly offering support as convener, sounding board, and provider of agency tools and expertise, EPA can facilitate ports' own efforts to assess their emissions and track improvements.

See Appendix J
Note 27 for OIG Response

Re pp. 30-31: EPA's New Strategy for Sustainable Ports Lacks a Transformation Plan

Like other regions and offices, EPA Region 1, provides semi-annual informational updates through the Agency-wide Ports Team giving great detail on how we are fulfilling our commitments under the national Strategy for Sustainable Ports. Region 1 appreciates the flexibility granted by the RAs and AAs attending the September 2007 meeting, in choosing which aspects of the Strategy to address in these first few years of its existence, given the needs of our ports, our existing expertise, available funding, and the advisability of growing our efforts in cooperation with our ports in order to insure maximum buy-in and results. It appears that the draft OIG report may under-represent EPA involvement with ports, which should be corrected before the agency is asked to "transform" its work and institute new management controls.

See Appendix J
Note 28 for OIG Response

Re p. 48: Appendix G

Correction: Bridgeport CT is one of the most active participants in the Northeast Diesel Collaborative.

See Appendix J
Note 29 for OIG Response

Note: Region 1 also provided the OIG with a list of names of Northeast Diesel Collaborative workgroup participants as of February 4, 2009. These names have been excerpted from the Agency response.

Attachment 3

Region 2 Comments on Draft OIG Evaluation Report
"EPA Needs to Improve Its Efforts to Reduce Air Emissions At U.S. Ports"
(No. 2007-00296, January 12, 2009)

Thank you for the opportunity to comment on the draft report. We appreciate the importance of this report on the Ports Sector to ensure that the air is protected and healthy to breathe.

The ratification of MARPOL Annex VI significantly enhances emission control potential on foreign-flagged ocean going vessels. Also, the Agency's work with the U.S. State Department, U.S. Coast Guard and the Government of Canada to develop an application to establish an emission control area along the North American coasts will provide greater controls on ship emissions farther from the shore.

Region 2 believes that voluntary initiatives have been successfully implemented at ports throughout the U.S. Region 2 and our ports have partnered well on various clean diesel projects and the ports have made an effort to voluntarily reduce their environmental footprint. In 2008, the Puerto Rico Ports Authority joined the Northeast Diesel Collaborative Ports Workgroup in an effort to learn emission reduction strategies to employ at their ports.

We would like the voluntary efforts of Region 2 ports to be reflected in the Noteworthy Achievements section of the report. For example,

- Region 2, OTAQ, New Jersey Department of Environmental Protection and Port of New York and New Jersey are working with industry to develop and test hydraulic hybrid yard tractor project that is expected to reduce diesel emissions by 70%.
- In addition to the use of ultra low sulfur diesel in cargo handling equipment, port terminals in the Port of New York and New Jersey have been purchasing terminal equipment with cleaner on-road engines.
- The Ports of Philadelphia, Delaware and South Jersey have formed a Green Ports Initiative to develop short term and long term strategies for making port operations more environmentally friendly. A few examples of greening solutions that may be explored include energy/water conservation, electric or alternative fuel vehicles and equipment,, renewable sources of energy (solar and wind installations), new technologies and innovations in logistics processes (traffic management controls, congestion mitigation) and green buildings/facilities.

See Appendix J
Note 30 for OIG Response

Attachment 4
Region 4 Response to OIG Report titled
"EPA Needs to Improve Its Efforts to Reduce Air Emissions at U.S. Ports"

The report is generally accurate in the representation of EPA Region 4 efforts at inland and marine ports. Due to resource limitations and statutory requirements relating to the National Ambient Air Quality Standards (NAAQS), Region 4 focused its resources on ozone and PM 2.5 nonattainment areas. This decision to maximize the impacts of limited resource has reaped significant gains in air quality in the Southeast. Due to these focused efforts, air quality has improved at many ports, and EPA redesignated the South Florida, Tampa and Jacksonville ozone nonattainment area to attainment to attainment for the NAAQS. Four major ports are located in these regions and the citizens and local community benefited from this approach (Miami, Everglades, Tampa and Jacksonville ports). This air quality improvement was accomplished by coordinating efforts with state and local agencies and leveraging non-EPA resources to achieve emission reductions.

Furthermore, Region 4 made the determination that the statutory requirements related to the 8-hour ozone standard predicated focusing limited resources on those areas that could potentially attain the 8-hour standard through early voluntary reductions. This Early Action Compact (EAC) program was successful and Region 4 achieved significant air quality reductions in those areas up to 5 years before the statuary deadlines and millions of people are breathing cleaner air because of this decision. Both of these efforts should be mentioned in the report to demonstrate that while efforts were not focused on the ports, EPA Region wisely managed its limited resources. The appropriate page for these insertions is Page 29.

See Appendix J
Note 31 for OIG Response

The report mentions the port of Wilmington and the Port of Charleston as examples cited in the 2003 marine rule for why regulations were necessary and implies that EPA Region 4 has not worked with these ports on air quality efforts. It is factual that EPA Region 4 did not target for air quality improvements at these ports during the evaluation period, but Region 4 has had conversations with both the NC Port Authority and the SC Port Authority about air quality improvements at ports. In NC, EPA is part of a Green Port effort looking at how expansions at the port of Wilmington and a smaller port can grow "green." These discussions have been intermittent since 2006.

Since the Southeast Diesel Collaborative (SEDC) began, EPA Region 4 has been involved with many of the major ports in the southeast (Charleston, Savannah, Tampa, Everglades, Jacksonville, Miami, and Louisville) through the partnerships developed through the SEDC. A major philosophy of the EPA Region 4 efforts and the SEDC is that one agency can't do it all and that we should leverage partner resources to achieve faster and more significant reductions in all aspects of the diesel reduction strategies. In this manner, EPA Region 4 is able to obtain broader and larger engagement (and

corresponding emission reductions that GAO did not attribute to EPA efforts) by creating ownership of the outcome at all levels of participation including government, non-government and private organizations. Projects that are ongoing in these areas that are affiliated with the SEDC are:

1. Charleston "partnership for Growth"-This program involves developing and comprehensive strategy to address environmental issues (air, water and land) associated with port operations. Region 4 was a key partner in the development of a state MOA which committed the port to reducing diesel emissions. A key part of this was the development of a comprehensive emissions inventory to identify emission sources. This $100,000 project was recently completed and is currently in review. In addition, the SEDC is providing $750,000 as part of a $1.8 million effort to reduce diesel emissions through retrofits, electrification and other land side emission reduction strategies. Region 4 expects to award the grant by the end of January.
2. Savannah-"Green CHE project"-Through the SEDC assistance agreement competition, EPA Region 4 selected the port of Savannah to retrofit a significant portion of its cargo handling equipment. This award should be funded by the end of January 2009. As part of this effort, the port also switched to ULSD 1 year in advance of the regulatory mandates.
3. Port Everglades-EPA partners and Port Everglades have worked on several environmental initiatives related to air quality. Port Everglades has used biodiesel in the past and is looking for a reliable high-quality supply.
4. Port of Jacksonville-EPA Region 4 and local partners are working to ensure that the expansion of the port of Jacksonville will limit the environmental impact. Local leaders are looking at logistics and other creative measures to decrease idling times and delays associated with the new container portion of the port.
5. Port of Louisville-SEDC partners worked with port to institute a biodiesel program.
6. Port of Memphis-EPA Region 4 and Region 6 have worked in the Port of Memphis to evaluate Tug and Barge emissions.
7. Port of Memphis- The Memphis-Shelby County (TN) Health Department will begin monitoring of volatile organic compounds (vocs) that are emitted from barges traveling along the Mississippi River that enter and dock at ports in Memphis. The monitoring will involve the use of optical remote sensing technology and will begin in June 2009.
8. Savannah-EPA Region 4 is working with a local community through the CARE grant program to evaluate and develop a strategy to reduce emissions in the area. Region 4 is facilitating discussions with the port regarding truck travel patterns and emissions associated with nearby warehousing activities.
9. Charleston-EPA Region 4 is working with the Charleston community on another CARE grant. This program will focus on education and outreach related to heavy duty diesel idling.

In addition to these projects, EPA Region 4 has specifically targeted the inclusion of ports in the SEDC. Representatives of several ports have been key speakers on SEDC monthly calls and at the annual SEDC Partners meeting.

There is a port representative on the influential SEDC Strategic Planning Committee and on the SEDC Leadership Council. The Leadership Council consists of key leaders in the Southeast, and EPA Region 4 is an ex-officio member of this group.

Finally, the SEDC Strategic Plan for 2009 prioritizes the development and implementation of a Green Corridors strategy for freight movement. Ports are a critical part of this effort and the starting point of the freight chain. Over the next 3 years, EPA Region 4 anticipates that this effort will focus on distribution centers associated with Ports, port specific emissions and logistic decision related to rail and land transport of freight from ports.

See Appendix J
Note 32 for OIG Response

Appendix J

OIG Evaluation of Agency Response

While we agree that progress has been made because of the October 2008 international agreement to control emissions, EPA still needs to do more to assure that air emissions at ports are sufficiently addressed. We agree with EPA's commitment in its response to address emission limits for CO, HC and air toxics in its rule for Category 3 marine engines scheduled to be finalized in December 2009. We are encouraged by EPA's commitment to work with the U.S. State Department, U.S. Coast Guard, and the Government of Canada to develop a comprehensive application to establish ECAs along all U.S. and Canadian coasts.

Note 1 - We do not believe that our report is incomplete in our description of EPA's efforts under the National Clean Diesel Campaign. Our report states that EPA has provided multiple ways for ports and stakeholders to participate in EPA's voluntary programs. However, we focused on participation in regional diesel collaboratives and technology verification, because these partnership programs were identified by OTAQ and EPA region personnel as significant components of the NCDC. We have updated some of the information in our report to more accurately reflect participation from certain stakeholders. However, EPA has not provided convincing evidence to support the idea that our findings are no longer accurate (see Note 20 for further details).

EPA presented its Strategy for Sustainable Ports as its strategy for reducing pollution at U.S. ports. As we point out in Note 24, the Strategy for Sustainable Ports remains a public document on EPA's Website with its stated purpose to "… support existing and new EPA programs and projects that will produce measurable results within the next 18 months…" As written, the Strategy for Sustainable Ports lacks the management controls to assure that its stated purpose is achieved. If the Agency intends for its efforts to reduce air emissions from U.S. ports to remain outside of the Strategy for Sustainable Ports, then an appropriate framework to oversee these activities should be in place. The OIG has concluded that such a framework is not in place. We continue to believe that because of the significance of port emissions and because of the projected increases in air emissions from port activities, EPA needs to develop a plan to address the major sources of air emissions at ports that EPA plans to reduce. The plan should include appropriate designation of authorities and responsibilities, milestones, performance measures, other management controls, and an assessment of resources to transform the Agency's port-related efforts under the NCDC into successful implementation. We consider this recommendation open and unresolved.

Note 2 - Although the Agency said that it concurred, with comment, with Recommendation 2-1, it did not state that it would assess its authorities and responsibilities under the CAA to regulate air emissions from foreign-flagged vessel engines in U.S. ports and report any shortfalls in such authorities to Congress. EPA's comments were not responsive and do not satisfy the intent of the recommendation. Due to the length of time (over 14 years) it has taken EPA to get more stringent standards for oceangoing vessel engines by working with the IMO, we believe that EPA should conduct such an assessment and report any shortfalls in its authorities to Congress. The Agency agreed to evaluate the need to regulate pollutants other than those covered by the IMO Treaty as part of EPA's rulemaking for Category 3 marine engines, which will be finalized by December 17, 2009. We consider Recommendation 2-1 to be open and unresolved.

Note 3 - The Agency concurred with comment on Recommendation 2-2. The Agency stated that it is working with other U.S. Government agencies and the Government of Canada to develop a comprehensive application to establish ECAs along all U.S. and Canadian coasts. We view this effort as being essential to any significant reduction of emissions from engines of oceangoing vessels that are approaching or in U.S. ports. The actions the Agency outlined in its response to Recommendation 2-2 satisfy the intent of our recommendation.

Note 4 - We continue to believe that because of the significance of port emissions and because of the projected increases in air emissions from port activities, EPA needs to develop a plan to address the major sources of air emissions at ports that EPA plans to reduce.

EPA's Strategy for Sustainable Ports was the only strategic plan for reducing pollution at U.S. ports that EPA provided to the OIG. If EPA intends for its efforts to reduce air emissions from U.S. ports to remain outside of the Strategy for Sustainable Ports, then an appropriate framework to oversee these activities should be in place. The OIG has concluded that such a framework is not in place.

EPA has not yet produced its annual performance report to Congress detailing the results of NCDC projects in FY 2008. While we believe that such reporting is important, this is only one element of a management plan. These types of efforts have not been incorporated into a focused management plan that specifically targets air quality improvements in port areas. Therefore, we continue to recommend that EPA create a transformation plan with appropriate designation of authorities and responsibilities, milestones, performance measures, other management controls, and an assessment of resources to transform the Agency's port-related efforts under the NCDC into successful implementation. We consider this recommendation open and unresolved.

Note 5 - The OIG does not believe the statement is inaccurate. We acknowledge that EPA has reached out to a number of ports through its voluntary partnership programs; however, we believe that more work needs to be done. Because OTAQ and EPA region staff identified regional diesel collaboratives as a significant component of the NCDC, we emphasized stakeholder participation in these partnerships in the report. Many ports still have not implemented voluntary emission reduction initiatives through regional diesel collaborative efforts. See Note 20, below, for further details.

Note 6 - We have amended our final report to state that the Agency is concerned about the harmful effects of emissions from engines of large oceangoing vessels that are approaching U.S. ports, as well as those that are already in U.S. ports. In addition, we added the following footnote on the first page of our final report when reference is made to "mobile sources operating at U.S. ports."

> According to the Agency, air quality modeling recently conducted by EPA to support its proposed ECA application shows that emissions from as far as 200 nautical miles from ports impact air quality, not only in the immediate port areas, but for 100 miles inland from these ports. When this report refers to vessels "in U.S. ports," it is also referring to vessels that are approaching U.S. ports.

Note 7 - We have clarified the sentence concerning the adoption of new NO_x standards and sulfur content of fuel oil used onboard ships as suggested by the Agency.

Note 8 - In its response to our draft report, the Agency stated that EPA deferred more stringent emissions standards because ". . . it needed additional technical data to determine feasibility of new emission control technologies . . ." However, statements by EPA and CARB before the U.S. 2007 proposal to IMO indicated that the prospect of new technology did not preclude the adoption of more stringent emission standards for Category 3 engines. For example, in its advanced notice of proposed rule making, dated December 7, 2007, the Agency stated that ". . . as early as the 1997 conference, many countries 'already recognized that the NOX emission limits established in Regulation 13 [of Annex VI] were very modest when compared with current technology developments.'" Further, EPA stated in the draft of its 2003 rule that a NO_x emission standard 30 percent below international standards ". . . [could] be met relatively soon using in-cylinder controls." In 2007, CARB stated that technology is available to achieve a 90 percent reduction in NO_x emissions and a 60 percent reduction in PM emissions from Category 3 engines. Further, while EPA's standard allowed the use of fuel with a sulfur content of 45,000 ppm, a large global shipping company had successfully used fuel

with a sulfur content of 3,000 ppm in vessels operating off the coast of California. This practice demonstrated that the technological capability of existing engines allowed the use of fuel with substantially less sulfur. As such, we did not amend our report to include EPA's assertion regarding technology.

Note 9 - We do not agree with the Agency that reference needs to be made to the international NO_x standard in the cited paragraph. Such a reference would be redundant with the next paragraph where the first sentence states that EPA's NO_x standard is equivalent to the international NO_x standard. Accordingly, we did not change the cited paragraph.

Note 10 - We agree with the Agency's suggestion for revising the cited sentence and have changed the report accordingly.

Note 11 - We agree with the Agency's observation that there is some redundancy between the cited sentence and the footnote, and we have deleted the footnote and revised the text accordingly.

Note 12 - We are pleased that the Agency's position regarding the control of CO, HC, and air toxics has evolved since we completed our field work, and that EPA plans to address emission limits for CO, HC, and air toxics in its December 2009 rule.

Note 13 - We believe that the terminology used in our draft report accurately describes the situation – that EPA said in its 2003 rulemaking that the Agency would address emissions for large oceangoing vessels by April 27, 2007. Nonetheless, we have revised our report to eliminate the phrase that EPA "missed" this date and have added that EPA extended the deadline for addressing such emissions until December 2009.

Note 14 - We clarified the report as suggested by the Agency.

Note 15 - We corrected the footnote as requested by the Agency.

Note 16 - While the IMO allows alternative means to meet the fuel standard for the sulfur content of fuel, it does not establish an emissions limit for SO_x nor for PM. An <u>emissions limit</u> sets a limit on the actual emissions that can be legally emitted from a source (oceangoing vessels). A fuel standard, on the other hand, only limits the amount of sulfur contained in the fuel used by the source. Limiting the amount of sulfur in fuel will reduce a source's emissions, but the amount actually emitted may legally vary with engine age and condition, vessel load, speed, wind, ocean current, and other factors. The fact that Annex VI allows other methods to be used "as an alternative to that required by this Annex . . ." does not change the basic requirement – which is a fuel standard on the sulfur content of fuel, not an emissions limit for SO_x or PM. We have clarified the text in this section

to make it clear that the agreement does not establish an emissions limit for SO_x but does allow alternative means to meet the fuel standard for the limits on the percentage of sulfur contained in fuel.

Note 17 - We have revised the text and added a clarifying footnote that includes the language suggested by the Agency.

Note 18 - We revised the sentence in the final report to read: "According to OTAQ, it completed an additional modeling tool, called DrayFleet, after our draft report was issued."

Note 19 - We believe that issuing effective guidance is a good first step towards establishing consistent baseline emissions inventories. As the draft report pointed out, we believe that creating consistent baseline emissions inventories at the largest 75 U.S. ports may aid EPA in evaluating the effectiveness of future emission reduction activities at these ports.

Note 20 - The OIG does not believe the section title is inaccurate. EPA has provided multiple ways for ports to participate in voluntary emission reduction programs. However, we believe that more work needs to be done. Some of the examples provided in OAR's response to Appendix G below do not constitute implementation of voluntary initiatives to reduce air emissions. For example, the information provided in support of activities at the Port of Detroit (tours and discussions), and the Port of Indiana (meetings and an unawarded grant application) is not convincing evidence that voluntary initiatives have been implemented at these ports. During fieldwork for this evaluation, OTAQ and EPA region personnel identified regional diesel collaboratives as a significant component of EPA's NCDC. The OIG is aware that being a member of one of these collaboratives is not the only indication of a port's efforts to reduce air emissions through voluntary initiatives. However, because OTAQ and EPA region staff identified regional diesel collaboratives as a significant component of the NCDC, we emphasized stakeholder participation in these partnerships in our report. Due to the collaboratives' ability to leverage EPA funding and partner with numerous local and regional stakeholders, the OIG viewed these partnerships as a primary means of EPA oversight and guidance for voluntary emission reduction activities at U.S. ports. Our report acknowledges the presence of EPA's other voluntary partnership programs, e.g., the SmartWay Transport program and Clean Ports USA, as well as alternative means for working with EPA, e.g., working through State agencies, etc.

As we stated in Chapter 3, EPA has not developed a transformation plan to link its desired strategic results with actions that EPA regions and stakeholders need to take. This type of plan would allow EPA to tie together the efforts of its various voluntary programs and allow the

Agency to assign priority, track results, and identify needs within its partnership program as a whole.

Note 21 - The OIG is aware that participating in a diesel collaborative is not the only indication of the extent to which ports are taking voluntary measures to reduce diesel emissions. However, based on the significant role regional diesel collaboratives play in promoting voluntary initiatives through the NCDC, the OIG asked eight EPA regions to identify any ports not participating in their respective regional diesel collaboratives. We believe a reasonable expectation of participation in a diesel collaborative would include a commitment to action by the stakeholder.

We have revised the report to include the Ports of Bridgeport and Stockton as participants in regional diesel collaboratives.

Note 22 - No change needed.

Note 23 - This section of the draft report acknowledged the budget constraints that EPA faced. However, $5.3 million of funding over a 6-year period does not appear to be significant when compared to the magnitude of air quality and human health concerns raised in certain port areas. We do not offer any specific conclusions regarding whether EPA's level of funding was appropriate for reducing emissions from port sources. Instead, the section describes the level of EPA funding since FY 2002, and points out that a general lack of funding has hampered the Agency's ability to implement voluntary initiatives to reduce air emissions at ports.

Note 24 - EPA's Strategy for Sustainable Ports was the strategic plan for reducing pollution at U.S. ports that EPA provided to the OIG. The Strategy for Sustainable Ports remains a public document on EPA's Website with its stated purpose to "… support existing and new EPA programs and projects that will produce measurable results within the next 18 months…"

If OAR intends for its efforts to reduce air emissions from U.S. ports to remain outside of the Strategy for Sustainable Ports, then an appropriate framework to oversee these activities should be in place. The OIG has concluded that such a framework is not in place. Therefore, we recommend that EPA create a transformation plan with appropriate designation of authorities and responsibilities, milestones, performance measures, other management controls, and an assessment of resources to assure the Agency's port-related efforts under the NCDC are successfully implemented.

Note 25 - We are pleased that EPA Region 1 is active with the ports in its Region, and encourage the Region to continue to promote Clean Ports USA and Northeast Diesel Collaborative efforts.

Note 26 - We look forward to EPA Region 1 continuing to promote voluntary diesel emission reduction projects at all ports in the region through its competitive grant process and the Northeast Diesel Collaborative.

Note 27 - We believe that efforts, such as those outlined by EPA Region 1 above, are important steps in measuring progress to reduce air emissions at ports. We agree that EPA has the capacity and, we believe, the responsibility to facilitate efforts to assess emissions at U.S. ports and track improvements. We encourage the Agency to follow through on its commitment in the Strategy for Sustainable Ports to "work with the top 75 ports in the U.S. to develop port specific baseline emissions inventories and emissions reduction targets based on 1) EPA's national port inventory guidance or 2) air emissions inventories completed by the port authorities in accordance with EPA-approved methodologies."

Note 28 - We are pleased that EPA Region 1 has taken an active role in fulfilling its commitments under the national Strategy for Sustainable Ports. We acknowledge in Chapter 3 of our report that "…EPA provides multiple ways for ports to participate in its programs." While EPA may be involved with many different stakeholders, we concluded that the Agency does not have a sufficient management framework in place to transform all of these efforts into measurable results. The action items contained in EPA's Strategy for Sustainable Ports do not contain the necessary milestones and management controls to ensure that the desired strategic results are linked with actions that EPA regions and stakeholders need to take.

Note 29 - We have revised the report to include the Port of Bridgeport as a participant of the Northeast Diesel Collaborative.

Note 30 - We are pleased that EPA Region 2 has expanded its efforts under the Northeast Diesel Collaborative to include the Puerto Rico Ports Authority, and that the Region is promoting voluntary emission reduction activities at ports. We revised the report to add a reference to the Port of New York and New Jersey regarding its use of ultra-low sulfur diesel fuel.

Note 31 - Our report accurately describes the resources that were allocated and spent across EPA, and within Region 4, to address port air emissions from FY 2002 through FY 2007. This description of resources is meant to illustrate that the lack of overall funding has hampered EPA's implementation of voluntary strategies to reduce emissions at U.S. ports. EPA's Office of Air and Radiation agreed with this assessment in its response to our draft report.

Note 32 - We are pleased that EPA Region 4 is targeting the inclusion of ports in the Southeast Diesel Collaborative. As stated in the report, even ports located in attainment areas may cause local air quality impacts. We acknowledge

that EPA Region 4 is working to address these impacts through broader efforts, and encourage the Region to continue expanding its work with port stakeholders in the Southeast Diesel Collaborative.

Appendix K

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