AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

S. HRG. 110–1239

A HEARING ON THE MARINE VESSEL EMISSIONS REDUCTION ACT OF 2007

HEARING

BEFORE THE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS UNITED STATES SENATE

ONE HUNDRED TENTH CONGRESS

SECOND SESSION

FEBRUARY 14, 2008

Printed for the use of the Committee on Environment and Public Works

Available via the World Wide Web: http://www.access.gpo.gov/congress.senate

U.S. GOVERNMENT PRINTING OFFICE

85–521 PDF WASHINGTON : 2014

For sale by the Superintendent of Documents, U.S. Government Printing Office
Internet: bookstore.gpo.gov Phone: toll free (866) 512–1800; DC area (202) 512–1800
Fax: (202) 512–2104 Mail: Stop IDCC, Washington, DC 20402–0001

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

ONE HUNDRED TENTH CONGRESS
FIRST SESSION

BARBARA BOXER, California, *Chairman*

MAX BAUCUS, Montana
JOSEPH I. LIEBERMAN, Connecticut
THOMAS R. CARPER, Delaware
HILLARY RODHAM CLINTON, New York
FRANK R. LAUTENBERG, New Jersey
BENJAMIN L. CARDIN, Maryland
BERNARD SANDERS, Vermont
AMY KLOBUCHAR, Minnesota
SHELDON WHITEHOUSE, Rhode Island

JAMES M. INHOFE, Oklahoma
JOHN W. WARNER, Virginia
GEORGE V. VOINOVICH, Ohio
JOHNNY ISAKSON, Georgia
DAVID VITTER, Louisiana
JOHN BARRASSO, Wyoming
LARRY E. CRAIG, Idaho
LAMAR ALEXANDER, Tennessee
CHRISTOPHER S. BOND, Missouri

BETTINA POIRIER, *Majority Staff Director and Chief Counsel*
ANDREW WHEELER, *Minority Staff Director*

C O N T E N T S

Page

FEBRUARY 14, 2008

OPENING STATEMENTS

Boxer, Hon. Barbara, U.S. Senator from the State of California 1
Vitter, David, U.S. Senator from the State of Louisiana 85
Lautenberg, Frank R., U.S. Senator from the State of New Jersey 91
Cardin, Benjamin L., U.S. Senator from the State of Maryland 92

WITNESSES

Wood-Thomas, Bryan, Associate Director, Office Of Transportation And Air Quality, Environmental Protection Agency 13
Prepared statement 16
Ramirez, Jonah, Clean Air Ambassador For Children With Respiratory Disease 27
Prepared statement 29
Miller, John G., M.D., Fellow of The American College of Emergency Physicians 32
Prepared statement 34
Responses to additional questions from Senator Boxer 39
Kassel, Richard, Senior Attorney, Director, Clean Fuels And Vehicles Project, Natural Resources Defense Council 41
Prepared statement 44
Responses to additional questions from Senator Boxer 53
Wells, Ken, President, Offshore Marine Services Association 56
Prepared statement 58
Responses to additional questions from Senator Boxer 60
Chaisson, Joel, Executive Director, Port of South Louisiana 61
Prepared statement 63
Accardo, Joe, Executive Director, Ports Association of Louisiana 65
Prepared statement 67
Responses to additional questions from Senator Boxer 72
Wallerstein, Barry R., Executive Officer, South Coast Air Quality Management District 96
Prepared statement 99
Responses to additional questions from Senator Boxer 101
Jackson, Lisa P., Commissioner, New Jersey Department of Environmental Protection 107
Prepared statement 109
Responses to additional questions from Senator Boxer 114
Mouton, Jennifer J., Administrator, Air Quality Assessment Division, Louisiana Office of Environmental Assessment 115
Prepared statement 117
Responses to additional questions from Senator Boxer 124

A HEARING ON THE MARINE VESSEL EMISSIONS REDUCTION ACT OF 2007

THURSDAY, FEBRUARY 14, 2008

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
Washington, DC.

The full committee met, pursuant to notice, at 10:30 a.m. in room 406, Dirksen Senate Office Building, Hon. Barbara Boxer (chairman of the full committee) presiding.

Present: Senators Boxer, Lautenberg, Vitter and Cardin.

OPENING STATEMENT OF HON. BARBARA BOXER, U.S. SENATOR FROM THE STATE OF CALIFORNIA

Senator BOXER. Good morning, everybody. I am very happy. I got a Valentine from Jonah, so I am exceedingly happy.

[Laughter.]

Senator BOXER. When you meet Jonah, you will see why I am so happy to have a Valentine from him.

What we are going to do today, because we have a lot of panels and we want to get through everything is first I want to say I apologize for setting this a little later today. We had the memorial service for Congressman Lantos, and I really wanted to pay my respects at the beginning of that service.

I am going to place into the record my opening statement.

[The prepared statement of Senator Boxer follows:]

STATEMENT OF HON. BARBARA BOXER, U.S. SENATOR FROM THE STATE OF CALIFORNIA

Today we will hear about the serious health threats to children and families from air pollution that pours into our port communities from large ships. This is a legislative hearing to review a bill that would substantially cut air pollution from these ships. We cannot afford to wait for a solution to this problem.

Large ocean going vessels—container ships, tankers, and cruise ships—are among the largest contributors to deadly diesel air pollution in our port communities. And with international trade projected to grow significantly, the problem will only get worse, unless something is done soon.

I am especially concerned about the effects of air pollution on the health of those who are most vulnerable: our children, our elderly, and people with asthma or other diseases.

I will never forget when I first saw a filter taken from an air monitor near the ports of Los Angeles-Long Beach, next to a school where children play. When the filter went in, it was pure white. Twenty-four hours later, it was totally black. That's how much pollution a child's lungs at that elementary school would receive in 3 and one half months.

We all know that ports are powerful economic engines for states and the Nation as a whole. They spur business development and create jobs.

My own state's Ports of Los Angeles and Long Beach illustrate that point. They handle nearly 45 percent of the containerized cargo imported into the U.S., and they help sustain the region's economic vitality.

But ports are also a significant source of pollution from ships, harbor equipment, and trucks and trains that move the cargo to and from the docks.

In Southern California, port activities are major contributors to smog and soot pollution that are responsible for 5,400 premature deaths, 2,400 hospitalizations, 140,000 incidences of asthma and respiratory problems, and nearly one million lost work days each year.

The diesel engines so prevalent at ports also emit toxic air pollutants that can cause cancer and other life-threatening diseases. And these harmful effects are disproportionately felt by low income families.

For example, one mother named Martha from the Alliance for Children with Asthma recalls one of many frightening visits to the emergency room when her son Jose, then only 4 years old, struggled to breathe:

"We were rushing him to the hospital by car and it is really sad to see your son almost die because he cannot breathe. His lips and all of his body turned purple. If people and the politicians knew how it feels, they would cry with the mothers of children with asthma."

"They have to miss school when they are sick and I have to miss work to be in the emergency room," she says. "It's very difficult. It has affected me in every way."

The good news is that we are beginning to see signs of progress in reducing port pollution. Citizens, state, and local officials are pushing for improvements, and some in industry like Maersk are taking voluntary action to reduce their emissions.

But much more progress is needed. Shipping is expected to double and even triple in the next two decades as the result of global trade agreements.

Oceangoing ships are subject to international standards, but these standards require virtually no control. And our own Federal Government has yet to step up to the task of requiring these large polluters to make significant emission reductions.

The Federal Government should strictly regulate these ships. Most oceangoing vessels are foreign-owned, and foreign-flagged ships emit almost 90 percent of the vessel pollution in the U.S.

The Bush administration has been waiting for international negotiations to produce tighter standards for big ships. Unfortunately, those negotiations have been slow and have not yet borne fruit. This has triggered a lawsuit by environmental groups over the delays.

Because of the ongoing health threats and the slow government response, I introduced the Marine Vessel Emission Reduction Act. Senators Feinstein and Whitehouse have joined me in this effort. Our bill requires oceangoing vessels visiting U.S. ports to use cleaner fuel and cleaner engines, whether they are flagged in the U.S. or elsewhere.

Our bill would require oceangoing vessels to dramatically lower the sulfur content of the fuel they use as they travel to and from our ports. Fuel sulfur content would drop from an average level of 27,000 parts per million to 1,000 parts per million, making a huge difference for our air quality.

It would also significantly reduce emissions from both new and existing engines beginning in 2012 by requiring the use of the most advanced technologies.

Local air officials estimate that our legislation would save 700 lives a year in Southern California, and many more lives nationally each year.

We must work hard together to do everything we can to make progress on this issue.

I believe that it is our moral duty to protect the health of our children, people with asthma, and all the people of ship air pollution. We cannot afford to wait any longer. We must protect the health of families in port communities across the Nation.

Senator BOXER. We are going to waive all of them. I am going to insert into the record Friends of the Earth testimony, which is very strong and positive for us. We greatly appreciate that.

[The referenced document follows:]

WRITTEN TESTIMONY
PREPARED BY THE STAFF OF FRIENDS OF THE EARTH U.S. AND CLEAN AIR TASK FORCE

LEGISLATIVE HEARING ON THE MARINE VESSEL EMISSIONS REDUCTION ACT OF 2007, S. 1499

BEFORE THE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE

FEBRUARY 14, 2008

INTRODUCTION

Chairman Boxer, Ranking Member Inhofe, thank you for the opportunity to submit written testimony to the record.

THE PROBLEM

Historically, large vessels such as container ships, tankers, bulk carriers, and cruise ships have operated virtually unregulated, with few or modest standards to regulate their emissions, and very little oversight even of those. This may be the last genuine Wild West industry on the planet.

In the vast majority of cases, the enormous engines that power large vessels burn residual fuel oil or "bunker fuel".[1] Bunker fuel contains far higher pollutant levels than other fuels, including higher levels of particulate matter, ash, sulfur, and nitrogen, as well as more heavy metals and other toxic substances such as aldehydes, benzene, and polycyclic aromatic hydrocarbons ("PAHs").[2] Bunker fuel, the bottom of the barrel in the refining process, has the consistency of mud and must be heated so that it can flow through engine fuel lines.

Bunker fuel causes a wide array of harmful human health impacts. For instance, combustion of this fuel in a diesel engine produces fine particulate matter that leads to increased cancer risk and adverse health effects such as respiratory illness, impaired lung and heart function, and premature mortality. The negative health impacts of bunker fuel are magnified because large

---

[1] In 2007, 84 percent of fuel consumed by vessels above 400 gross tons was bunker fuel. *IMO panel gives new bunker consumption estimate*, SUSTAINABLESHIPPING.COM, Jan. 30, 2008, available at http://www.sustainableshipping.com/news/2008/01/70558?gsid=f1f40e4c818411cfb42c353fad22bac1&asi=1

[2] US EPA (2002), *Health Assessment Document for Diesel Engine Exhaust*, U.S. EPA, Office of Research and Development, National Center for Environmental Assessment, Washington Office, Washington D.C., EPA/600/8-90/057F (2002), at 1-1, available at http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=29060.

vessel emissions are concentrated in port areas where ships transit and dock, disproportionately impacting disadvantaged communities and communities of color,[3] while also impacting coastal cities and towns along busy shipping corridors.[4]

Today, shipping accounts for about a quarter of the world's nitrogen oxide emissions, which causes smog,[5] and shipping emissions are growing significantly (at a rate of 4.1 percent per year through 2040)[6] as marine transportation increases.[7] Smog causes harmful respiratory effects including shortness of breath, coughing, decreased lung function, inflammation of the lung tissue, aggravation of existing respiratory diseases, and may impair the body's immune system.[8] Children and the elderly are most severely affected by these health effects. Exposure to smog leads to increased hospital admissions and emergency room visits and increases the use of medications.[9]

Ozone and $PM_{2.5}$ emitted by large ocean-going vessels can also have severe public welfare effects. Exposure to fine particles can lead to aggravation of the respiratory system, cardiovascular disease, increased asthma, difficulty breathing, chronic bronchitis, and premature death.[10] Particulate matter also causes soiling and erosion damage to materials, including culturally important objects, increases the corrosion of metals, degrades paints, and deteriorates building materials.[11] Emissions from large marine diesel engines also harm the environment by impairing visibility, contributing to haze, acid rain, eutrophication, and nitrophication, and reducing crop yields and productivity of forest ecosystems.[12]

---

[3] While the impacts from marine diesel emissions can affect all people, those most likely to live and work near pollution sources such as ports and their transportation corridors also confront the challenges of poverty, limited access to medical care, low rates of insurance coverage, and virtual exclusion from the public policy decisions that most affect them. Environmental justice communities often suffer from disproportionately high cancer, disease, and mortality rates as they are exposed to the highest levels of carcinogenic, toxic, and hazardous chemicals. Friends of the Earth International, "Air Pollution from Shipping Emissions – Environmental Justice: Public Health and Community Impacts," submitted to the IMO's Marine Environment Protection Committee, May 12, 2005 ("FOEI Environmental Justice Report").

[4] The Santa Barbara Air Quality Management District has determined that, if Category 3 marine engines are not regulated, by 2020 marine vessel pollution will constitute 75 percent of the District's nitrogen oxide inventory and may cause the District to be classified as in nonattainment for the federal ozone standard. Complaint for Declaratory and Injunctive Relief, Santa Barbara Country Air Pollution Control District, U.S. District Court for the District of Columbia, Filed Dec. 26, 2007, at 4.

[5] A reaction of NOx and volatile organic compounds in the presence of heat and sunlight forms ground-level ozone, or smog.

[6] Friends of the Earth International, "New Global and Regional Inventories of Air Pollution from International Shipping," submitted to the IMO subcommittee on Bulk Liquids and Gases, Jan. 12, 2007, BLG 11/5/5, BLG 11/INF.3.

[7] Corbett, J.J., and Koehler, H. 2003. Updated Emissions from Ocean Shipping. Journal of Geophysical Research, Vol. 108 (as cited in the United States' proposal entitled "Development of Standards for NOx, PM, and SOx" submitted to the International Maritime Organization subcommittee on Bulk Liquids and Gases, Feb. 9, 2007)("U.S. NOx, PM, and SOx Standards Proposal").

[8] 68 Fed. Reg. 9751 (February 28, 2003).

[9] *Id.*

[10] *Id.*, at 9752 (February 28, 2003).

[11] *Id.*

[12] 72 Fed. Reg. 69534-69536 (December 7, 2007).

Marine engine emissions contribute to pollution in coastal areas throughout the country, many of which are not currently in attainment with National Ambient Air Quality Standards (NAAQS).[13] Currently, more than 40 major U.S. coastal ports are located in nonattainment areas for ozone and/or $PM_{2.5}$.[14] Currently, air pollution from vessel emissions represent more than 8 percent of U.S. mobile source NOx and 15 percent of U.S. mobile source $PM_{2.5}$ emissions. These numbers are projected to rise significantly by 2030 because of increased movement of international goods. EPA estimates that by 2030 emissions from Category 3 engines will represent 34 percent of NOx, 45 percent of $PM_{2.5}$, and 94 percent of SOx mobile source emissions in the U.S.[15]

Globally, the scope of the problem from ship air pollution is staggering. In 2002, marine vessel emissions resulted in 60,000 premature deaths, primarily due to the use of high sulfur bunker fuel.[16] This peer-reviewed, published scientific study, supported in part by Clean Air Task Force, estimated that without new regulations, premature deaths from shipping-related emissions will increase by 2012, along with the projected growth in shipping traffic.

Proactive action can change this outcome, however. A new study has found that if shippers switch to marine distillate with a sulfur standard of 1,000 ppm within 200 miles of the world's coastlines, premature mortality could be cut in half, to 42,200 per year.[17]

For these reasons, we are pleased to see that S. 1499 is a top priority for federal policymakers.

THE SOLUTION

One of the primary methods of complying with S. 1499 would be switching from bunker fuel to marine distillate fuel. This is a highly cost-effective, technically feasible way of lessening health impacts without causing economic harm to the shipping sector. The benefits in switching to marine distillate, when one considers environmental and public health factors, far exceed the

---

[13] While marine vessel emissions have a significant effect on communities near ports, many areas of the country are affected by pollution dispersion and regional haze. Studies have shown that emissions from marine vessels can substantially contribute to pollution from 400 to 1,200 kilometers inland, and that transport of secondary products such as ozone and fine aerosol particles can travel thousands of kilometers in the atmosphere. FOEI Environmental Justice Report; 72 Fed. Reg. 69530 (December 7, 2007); *See e.g.*, Qinbin Li et al., (2002) "Transatlantic transport of pollution and its effects on surface ozone in Europe and North America," Journal of Geophysical Research Vol. 107, NO. D13, 10.1029/2001JD001422.

[14] 72 Fed. Reg. 69526 (December 7, 2007).

[15] 72 Fed. Reg. 69526 (December 7, 2007).

[16] Corbett et al., "Mortality from Ship Emissions: A Global Assessment," *Environmental Sci. Technol*, American Chemical Society, 42(24), p. 8512-8518, Dec. 15, 2007.

[17] Corbett et al., "Mitigating Health Impacts of Ship Pollution through Low Sulfur Fuel Options: Initial Comparison of Scenarios," Jan. 23, 2008, annex to Friends of the Earth International, "Avoided Global Premature Mortality Resulting from Reduction of Sulphur in Marine Fuel," submitted to the IMO's Marine Environment Protection Committee, Jan. 25, 2008. Almost 70 percent of global shipping emissions occur within 250 miles of shore, where a majority of the world's population lives. Corbett, J.J., P. Fischbeck, and S. Pandis, (1999), "Global nitrogen and sulphur inventories for oceangoing ships," Journal of Geophysical Research, Vol. 104, No. D3 (Feb. 20, 1999), at 3465, 3469.

costs. Although low sulfur fuel can cost from 50-72 percent more than bunker fuel,[18] the cleaner fuel standard of S. 1499 applies only to ocean-going vessels within a 200-mile distance from the U.S. west coast and from an as-yet undetermined distance from other U.S. coasts. Thus, vessel operators will only be required to use marine distillate for a small portion of their trip. As calculated by the South Coast Air Quality Management District (AQMD), a ship traveling from Hong Kong to Los Angeles would need to switch from bunker fuel to distillate fuel for only about 3 percent of its trip, resulting in a fuel increase of just 2.1 percent.

The reductions in fuel sulfur content achieved by switching from bunker fuel can dramatically reduce vessel emissions. The California Air Resources Board (CARB) expects that moving from bunker fuel (approximately 25,000 ppm sulfur content) to 1,000 ppm marine gas oil will reduce PM, SOx, and NOx by 83 percent, 96 percent, and 6 percent, respectively.[19] Similarly, recent modeling of a container ship switch using 22,900 ppm bunker fuel (the average U.S. west coast sulfur content level) to 1,000 ppm marine gas oil found that PM, SOx, and NOx would decrease by 78 percent, 94 percent, and 6 percent, respectively.[20] Finally, the U.S. proposal to the IMO, which would include coastal use of 1,000 ppm distillate, is estimated to reduce PM by 65 percent and SO_2 by 78 percent by 2020.[21]

The 2005 CARB auxiliary engine rule (which requires all ships visiting ports in California to use low-sulphur distillate fuel in their auxiliary engines while at berth and within 24 nautical miles of the California coastline), provides some frame of reference for the cost-effectiveness of reduced fuel sulfur measures. CARB staff found that its auxiliary engine rule would increase fuel costs by $38 million in 2010 when the lower sulfur fuel standard of 1,000 ppm was scheduled to be implemented. Staff also estimated total capital costs of about $11 to $18 million for vessel modifications. CARB staff determined that this regulation was cost-effective and compared favorably with the cost-effectiveness of other air quality regulations adopted by the Board.[22] The attendant health benefits of using marine distillate in lieu of bunker fuel are immense. The Clean Air Task Force study indicates that societal benefits of approximately $225 billion per year will be realized from globally instituting a 1,000 ppm coastline standard, with annual mortalities reduced by approximately 40,000 [Corbett and Winebrake, 2008].[23]

---

[18] Note by Secretary-General, "Report on the outcome of the Informal Cross Government/Industry Scientific Group of Experts established to evaluate the effects of the different fuel options proposed under the revision of MARPOL Annex VI," submitted to IMO subcommittee on Bulk Liquids and Gases, Dec. 20, 2007, at 15.
[19] Winebrake, J.J., and Corbett, J.J. Technical Memorandum – Total Fuel Cycle Analysis for Container Ships: A Comparison of Residual Oil, Marine Gas Oil and Marine Diesel Oil, prepared for Friends of the Earth, June 6, 2007, at 3-4.
[20] *Id.*, at 6.
[21] Note by Secretary-General, "Report on the outcome of the Informal Cross Government/Industry Scientific Group of Experts established to evaluate the effects of the different fuel options proposed under the revision of MARPOL Annex VI," submitted to IMO subcommittee on Bulk Liquids and Gases, Dec. 20, 2007, at 35.
[22] California Air Resources Board, Staff Report: Initial Statement of Reasons for Proposed Rulemaking: Proposed Regulation for Auxiliary Diesel Engines and Diesel-Electric Engines Operated on Ocean-Going Vessels within California Waters and 24 Nautical Miles of the California Baseline, at ES-15-16 ("CARB Auxiliary Rule").
[23] Friends of the Earth International, "Avoided Global Premature Mortality Resulting from Reduction of Sulphur in Marine Fuel," submitted to IMO committee on Marine Environment Protection, Jan. 25, 2008.

EUROPEAN UNION AND THE INTERNATIONAL MARITIME ORGANIZATION

Several governmental entities, including the United States, have called for the use of low sulfur distillate. Executive officials representing the U.S. at IMO negotiations, including the U.S. EPA and Coast Guard, have as a central feature of their proposal a 1,000 ppm U.S. sulfur coastal zone.[24] In addition, the European Union (E.U.) has a marine gas oil limit of 2,000 ppm for vessels in port and, by January 2010, will reduce the fuel standard to 1,000 ppm[25] for inland vessels and ocean-going vessels at berth in its ports.[26] As discussed above, CARB also has set its auxiliary engine fuel limit at 1,000 ppm by January 2010. CARB believes that "[b]y harmonizing with the 2010 EU requirements for low sulfur marine distillates, the staff's proposal promotes international consistency and increases the availability of cleaner marine distillates at ports that refuel Pacific Rim vessels."[27] These developments indicate the recognized benefits and feasibility of switching to low sulfur distillate in the near term.

Some contend that pressing for strong U.S. emission standards will interfere with IMO negotiations. However, it is important to understand, first, that the IMO has *never* adopted strong pollution controls. The IMO NOx standards currently in place simply codify emission levels that had already been achieved by industry, and its current fuel standard allows the extraordinarily high level of 45,000 ppm sulfur. Second, it is commonly understood that the IMO is currently considering adoption of new emission standards primarily due to the proliferation of legislative and regulatory actions and proposals at the national and sub-national levels. Without sufficient impetus, the international process could easily fracture and become bogged down, reverting back to a glacial pace. History suggests that U.S. action can precipitate strong international standards. For example, after Congress adopted the Oil Pollution Act of 1990 – requiring all new tankers operating in U.S. waters to be equipped with double hulls – the international community quickly adopted the same requirement.

While some may seek to defer and wait for an international consensus to develop around an uncertain level of pollution protection, we believe that the most effective way of resolving the health harms associated with dirty bunker fuels is for Congress to act now and demonstrate leadership by enacting stringent standards that the International community can follow.

TECHNICAL FEASIBILITY

Previously, some in the shipping industry have raised concerns about the technical feasibility of switching from bunker fuel to marine distillate. Those concerns have been allayed. At least one major shipping company, Maersk, has demonstrated the feasibility of this switch. It voluntarily switched from bunker fuel to distillate fuel (2,000 ppm) for ships operating within 24 nautical miles of certain California ports.[28] In addition, since the early-1990s, USS-POSCO has been

---

[24] PM and SOx standards in coastal zones would also be achievable through the use of seawater SOx scrubbers. U.S. NOx, PM, and SOx Standards Proposal.

[25] Several U.S. and foreign fuel producers have already begun production on grades of marine distillate with this level of sulfur. *See e.g., Polish player already offering 0.1% sulphur fuel,* SUSTAINABLESHIPPING.COM, Jan. 7, 2008, available at http://www.sustainableshipping.com/news/2008/01/70274.

[26] Directive 2005/33/EC of the European Parliament and of the Council, July 6, 2005.

[27] CARB Auxiliary Rule, VI-10.

[28] 72 Fed. Reg. 69525 (December 7, 2007).

making fuel switches from heavy fuel oil to ultra-low (less than 500 ppm) sulfur distillate prior to entering the Bay Area AQMD boundary on the regular routes between South Korea and Pittsburg, California. Ultra-low sulfur distillate was used to facilitate the use of on-board selective catalytic reduction (SCR) systems to further minimize air pollution.[29] Furthermore, cruise ships within 24 nautical miles of the California coastline have had to use distillate fuel since January 1, 2007.[30] No significant incidents have been reported.

U.S. EPA asserts that "properly designed ships would be able to operate on distillate fuel either under a fuel-switching strategy or for extended use." CARB has also addressed several technical issues relating to the use of low sulfur distillate. For example, in response to concerns from industry that low sulfur fuels with lower lubricity could cause damage to fuel pumps, CARB stated that those concerns were associated with landside diesel fuels having very low sulfur levels, lower than the proposed 1,000 ppm standard.[31] In addition, CARB summarized that concerns related to the low viscosity of distillate affecting pump leakage and engine performance could be resolved by minimum viscosity requirements or modifications such as the use of a fuel cooler, thereby lowering fuel temperature and increasing viscosity.[32] In sum, actual experience and agency opinion demonstrate that marine distillate switching, when performed by competent professionals according to recommended procedures,[33] is feasible.

THE PUBLIC SUPPORTS A MOVE TO CLEANER FUELS

Broad public support exists for a switch from bunker fuel to marine distillate fuel. This past November, the Cosco Busan ran into the Bay Bridge and spilled of 58,000 gallons of toxic bunker fuel into San Francisco Bay, demonstrating the risk that bunker fuel poses to marine life. In response to this accident, Friends of the Earth circulated a petition calling on Congress to require a complete phase-out of bunker fuel use. Over 7,400 individuals from across the country signed on to this petition to ban bunker fuel, a copy of which is attached to this testimony.

CONCLUSION

The Marine Vessel Emissions Reduction Act is urgently needed. A recent study indicates that by 2012 nearly 84,000 people could die prematurely from global vessel emissions. Other health and quality of life impacts on communities in the U.S., especially port communities, are acute. Congress is the appropriate body to deal with this issue; the U.S. EPA still has not agreed to regulate foreign-flagged vessels – a fatal flaw in any regulation of ocean-going ships, since foreign-flagged ships are responsible for about 90 percent of vessel emissions in US waters.[34] In addition, EPA has not assured implementation of emission controls or fuel standards by a certain date or level of stringency. Congress should act now to ensure that significant emission reductions are achieved thereby improving health and facilitating efforts to attain federal air quality standards for impaired areas. S. 1499 will also send a firm and timely message to the

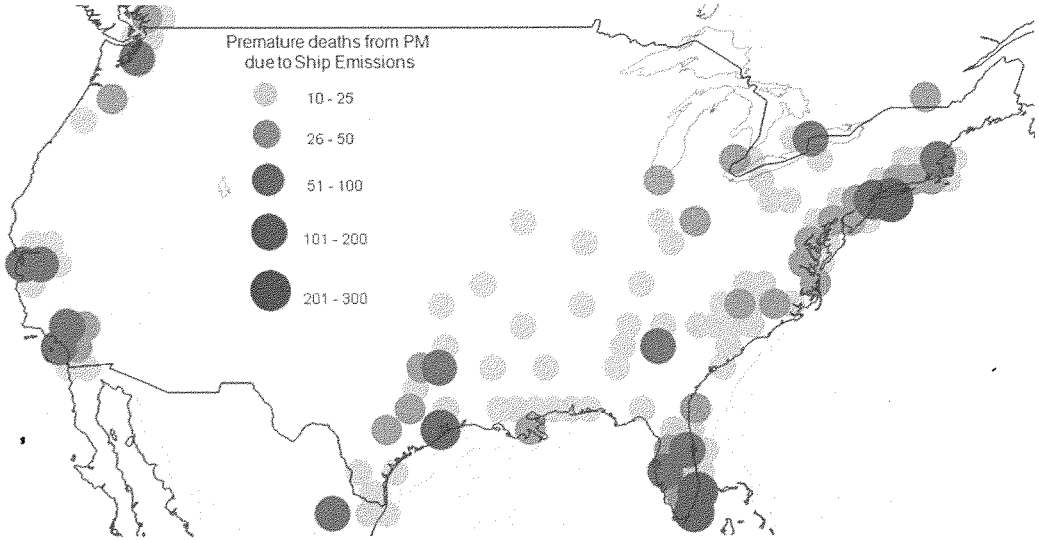
---

[29] CARB Auxiliary rule, VI-12.
[30] CARB Auxiliary Rule, ES-4.
[31] CARB auxiliary rule, VI-16.
[32] *Id.*
[33] Engine manufacturers and marine equipment suppliers publish guidance for vessel operators that set forth recommended procedures. CARB Auxiliary Rule, VI-13.
[34] 72 Fed. Reg. 69536 (December 7, 2007).

IMO that the U.S. Congress is serious about dealing with air emissions from vessels in the furthest reach of its waters, and will likely finally spur the international body into action.

Health Impacts from Ships are a Nationwide Problem

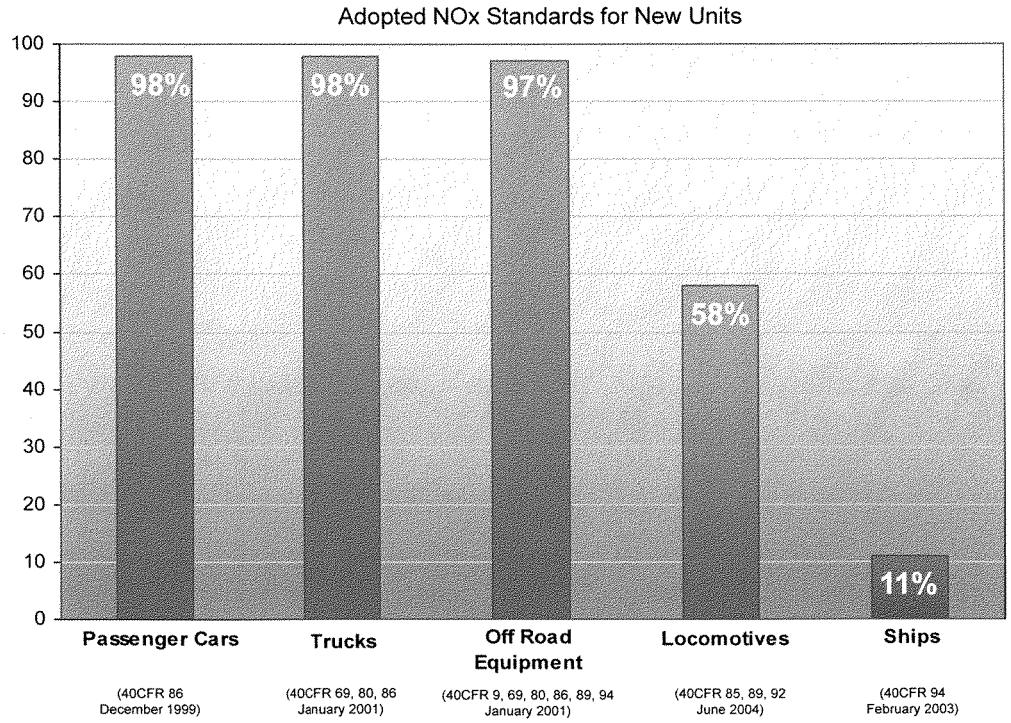
At least 2,000 to 5,000 Premature Deaths Per Year in the Continental U.S. are Caused by Particulate Pollution from Oceangoing Vessels



Cleaner marine fuels would reduce nationwide ship health impacts by ~ 60 %

Source: Corbett, J. J.; Winebrake, J. J.; Green, E. H.; Kasibhatla, P.; Eyring, V.; Lauer, A., Mortality from Ship Emissions: A Global Assessment. *Environmental Science & Technology* 2007, *41*, (24), 8512–8518

Vessel Pollution is Largely Unregulated
Percentage of Pollution Control



Cost of Low Sulfur Fuel is Reasonable And is Greatly Exceeded by Benefits

- Increase in container shipping cost: 0.2% - 0.5%
- Cost per 60" plasma TV: 43 ¢ - 96 ¢
- Cost per pair of shoes: 0.2 ¢ - 0.4 ¢

- U.S. deaths avoided: 1,200 – 3,000 per year (min)
- Monetized benefit: $7.2 – $18 billion per year*

- Benefit to Cost Ratio:** 4:1 – 11:1

* assuming value of statistical life consistent with USEPA, *see* http://www.epa.gov/oms/regs/nonroad/420d07001.pdf p 6-54
**assuming 200 mile low sulfur fuel zone

Sources: Marine Vessel Inventory report, Dr. James Corbett, for ARB, 2007; Dr. James Corbett, University of Delaware, 2-6-08 communication with AQMD; Dr. James Corbett, 2-6-08 communication to SCAQMD; Dr. James Corbett, data provided 2-6-08 to AQMD; ARB, Goods Movement Plan, Jan., 2007; ICCT report on Air Pollution & Greenhouse Impacts of Shipping, March 2007, POLA / POLB Container Diversion Study, Sept. 27, 2007; 20 x 8 x 10 feet TEU; assumed shoe box size = 1" x 9" x 6"

Senator BOXER. I just say that we are really taking a look at a bill that I authored along with Senator Feinstein, the Clean Ports Act, because people are suffering from dirty filthy air, frankly, around ports. We have waited long enough to get this resolved. We keep waiting for the Administration to sign an international treaty. That day has not come.

In the meantime, people are getting sick, and we have quantified the number of cancers and cases of asthma. So this isn't a question of some ideological discussion. It is a question of health.

So we really do welcome everybody here, and we will begin after I place my testimony in the record, with Bryan Wood-Thomas, Associate Director, Office of Transportation and Air Quality at the Environmental Protection Agency.

Welcome, sir.

STATEMENT OF BRYAN WOOD-THOMAS, ASSOCIATE DIRECTOR, OFFICE OF TRANSPORTATION AND AIR QUALITY, ENVIRONMENTAL PROTECTION AGENCY

Mr. WOOD-THOMAS. Madam Chairman, thank you. It is a pleasure to be here today. I very much appreciate the opportunity to testify on this important issue.

In addition to my role as Associate Director of EPA's Office of Transportation and Air Quality, I also lead our negotiation efforts at the International Maritime Organization and chair the work group currently responsible for those negotiations.

I would like to first set some context for this important issue that we are here today to discuss. In the mid–1990's, few parties considered air emissions from ships as a significant source of pollution. Indeed, most players reasoned that ships must constitute a minor source since the absolute number of ships is relatively modest and the common perception was that these ships spent most of their time far out to sea.

This perception was made easier by the fact that very little data existed regarding the specific emissions generated by vessels. It should come as no surprise to members of this Committee that this perception is changing and changing dramatically. Marine vessels already are a significant source of air pollution in the U.S. and their relative contribution is growing rapidly.

If we consider emissions within our exclusive economic zone, marine vessels accounted for approximately 13 percent of NO_x, 17 percent of $PM_{2.5}$ and 50 percent of SO_x emissions in 2001. By 2030, we expect that vessels will contribute about 46 percent of oxides of nitrogen, 52 percent of particulate matter, and 95 percent of sulfur oxides.

This is a function of two principal trends. First, other sources are becoming dramatically cleaner. Second, the growth of international trade is driving an increase in marine traffic that is impressive by any yardstick. Annual growth rates across the world fleet average more than 3 percent, and container traffic is growing at roughly 10 percent per annum.

If we look at this from the U.S. perspective, we have currently more than 40 U.S. ports that are located in non-attainment areas for ozone or fine particulates or both. We are working closely with

the Coast Guard, MARAD, other stakeholders to see how we can advance admissions standards for these sources.

In April, 2007, EPA proposed a rule to adopt two new tiers of exhaust emission standards for smaller and medium-speed engines. The proposal when implemented will result in PM reductions of about 90 percent and NO_x reductions of about 80 percent. We expect this rule to be finalized in the very near future, indeed measured in weeks.

Slow-speed category three engines are those that are most commonly used on ships engaged in international trade. These engines are massive in scale and they represent a significant source of NO_x emissions, with studies estimating 18 percent or more of total NO_x emissions worldwide.

As you are aware, the U.S. is currently engaged in negotiations at the IMO, and in February of last year the U.S. submitted a proposal to the IMO for establishing new tighter standards. The proposal represents the most comprehensive approach ever taken to address air pollution from ships, and it has gained considerable support from governments across the globe and from numerous non-government organizations.

Last week in London, the IMO subcommittee agreed to tier two and tier three NO_x standards for new ships. Beginning in 2011, we would see a reduction of approximately 20 percent in NO_x beyond the existing standards, but more importantly the tier three standards, beginning in 2016, would require NO_x reductions more than 80 percent from tier one, bringing us to a cumulative reduction in excess of 90 percent from pre-2000 levels.

Like the proposed legislation before us today, the U.S. proposal also includes stringent new SO_x and PM reductions. We are advocating the use of low-sulfur distillate fuels at 1000 ppm applicable to ships operating in specific areas near the coast. If we are successful in this adoption, we will see 95 percent reduction in SO_x and significant PM reductions as well, beginning in the 2011–2012 timeframe.

As evidenced by last week's agreement, we are seeing a broadening base of support for the U.S. proposal. Given developments last week, we will now focus our negotiating efforts on existing engines and agreement on sulfur and PM standards that should address the serious air quality needs we face here in the United States.

While there has been considerable movement at the IMO in support of more stringent standards, and specifically what the United States has advocated, it is important that I note we are not yet a party to Annex VI, and indeed our success in the current negotiations will be threatened if we fail to submit our instrument of ratification.

As you know, the House has passed H.R. 802 last March. This bill would amend the Act to prevent pollution from ships. The Senate has not yet acted on this bill. Please understand that failure to act on the MARPOL implementing legislation will weaken our position in London and mean that we will not have a vote in the upcoming final debate.

Senator BOXER. Could you wrap in a minute please?

Mr. WOOD-THOMAS. Certainly.

Senator BOXER. OK.

Mr. WOOD-THOMAS. Given these developments, we are hopeful for a satisfactory outcome in London. If not, we will move to rely on our domestic authorities. Turning specifically to S. 1499, let me note that the Administration does not have an official position on the bill, but I should also note that the bill is generally consistent with the framework of the U.S. proposal to the IMO and introduction of the bill has helped demonstrate commitment in the U.S. to addressing this issue.

Thank you for the opportunity to testify here this morning. I would be happy to address any questions that you or members of the committee may have.

[The prepared statement of Mr. Wood-Thomas follows:]

STATEMENT OF
BRYAN WOOD-THOMAS
ASSOCIATE DIRECTOR
OFFICE OF TRANSPORTATION AND AIR QUALITY
OFFICE OF AIR AND RADIATION
U.S. ENVIRONMENTAL PROTECTION AGENCY

BEFORE THE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
U.S. SENATE
FEBRUARY 14, 2008

Madame Chairman and members of the Committee, I appreciate the opportunity to discuss the Environmental Protection Agency's efforts to reduce emissions from marine vessels and the Marine Vessel Emission Reduction Act currently being considered by this Committee. I am the Associate Director of EPA's Office of Transportation and Air Quality, and I am leading the United States' negotiating efforts at the International Maritime Organization (IMO). I also serve as the Chairman of the IMO workgroup responsible for negotiation of new marine emission standards under MARPOL Annex VI.

Marine vessels are already a significant source of air pollution in the United States and their relative contribution is rapidly growing. If we consider emissions within the Exclusive Economic Zone of the United States, marine vessels account for approximately 13 percent of NOx emissions, 17 percent of PM2.5 emissions, and 50 percent of SOx emissions. Without further action to regulate engine emissions and fuel quality, we expect that the relative contribution of emissions from marine vessels will grow rapidly as emissions from other sources are subjected to increasingly stringent controls. By 2030, we expect that engines on commercial marine vessels will contribute about 46 percent of mobile source emissions of nitrogen oxides (NOx), 52 percent of mobile source emissions of particulate matter (PM), and 95 percent of

mobile source emissions of sulfur oxides (SOx) in the United States (see attachment). The contribution of ship emissions is most significant in U.S. ports and coastal areas that are subject to heavy maritime traffic. Currently more than 40 U.S. ports are located in non-attainment areas for ozone or fine particulates or both. However, the problem is not limited to port areas alone. Santa Barbara County, which has no commercial ports, estimates that by 2020, 67 percent of its NOx inventory will come from shipping traffic transiting the California coast, although the extent to which these emissions reach land depends on wind and weather patterns.

EPA, in coordination with the U.S. Coast Guard, the U.S. Maritime Administration, and other stakeholders, is working intently to achieve additional emission reductions from marine vessels. For these efforts, we distinguish between very large engines used for propulsion on ocean-going vessels and smaller engines used for auxiliary power or for propulsion on smaller vessels. These large engines -- those with a displacement at or above 30 liters per cylinder -- are referred to as Category 3 engines, while smaller marine engines are referred to as either Category 1 or Category 2.

In April of 2007, EPA proposed a rule to adopt two new tiers of exhaust emission standards for smaller vessels that operate with high and medium speed engines (Category 1 and 2 marine engines). The proposal includes near-term emission standards, referred to as Tier 3 standards, and longer-term Tier 4 standards that reflect the application of high-efficiency exhaust aftertreatment technology. The proposal, when implemented, would result in PM reductions of about 90 percent, and NOx reductions of about 80 percent. We expect this rule to be completed in the near future.

Category 3 engines are most commonly used on ships engaged in international trade and cruise ships. These engines are massive in scale and they represent a significant source of NOx emissions with studies estimating emissions as 18 percent or higher of total NOx emissions worldwide.

As you are aware, the United States is engaged in negotiations currently underway at the IMO to amend the international standards applicable to ship emissions. In February of last year, the United States Government submitted a proposal to the IMO for establishing new, tighter emission standards for ships. This proposal represents the most comprehensive approach ever taken to reducing air pollution from ocean-going ships, and it has gained considerable support from governments across the globe and from numerous non-government organizations. The U.S. proposal is based on performance-based standards that reflect the use of cleaner fuels and advanced emission control technology, including exhaust aftertreatment.

Our current national Tier 1 NOx standards for Category 3 engines are consistent with the existing international standards developed through the IMO for these large engines. The U.S. proposal to the IMO includes two additional tiers of NOx emission standards. The Tier 2 NOx limits would begin as early as 2011 and would result in a reduction of approximately 20 percent beyond the existing Tier 1 standard. Tier 3 standards, beginning in 2016, would require NOx emission reductions of more than 80 percent from Tier 1 levels. These cumulative reductions, if adopted, will result in NOx emission reductions well in excess of 90 percent.

The U.S. proposal to the IMO also includes stringent new SOx and PM reductions to be achieved through the use of cleaner, distillate fuel with a sulfur level not exceeding 1,000 ppm when ships are operated in specified areas near the coast. These standards would achieve SOx reductions as high as 95 percent and significant PM reductions as well, beginning in the 2011 / 2012 time frame.

The most recent negotiating session at the IMO occurred just last week, and it produced considerable progress in reaching an agreement (consistent with the U.S. proposal submitted in February 2007). We are seeing the fruits of our efforts pay off in broadening support for the reductions in ship emissions of NOx, PM, and SOx advocated by the United States. We are also seeing increasing support for a framework that allows for the application of more stringent standards in areas that are subject to severe air quality problems.

While there has been considerable movement at the IMO in support of the U.S. proposals, I should point out that the United States is not yet a party to Annex VI. Indeed, our success in the current negotiations underway at the IMO will be threatened if we fail to submit our instrument of ratification for MARPOL Annex VI, thereby undermining our credibility in the negotiation of the Annex. As you know, the House of Representatives passed the Maritime Pollution Prevention Act of 2007 (H.R. 802) last March. This bill would amend the Act to Prevent Pollution from Ships to provide for the adoption of Annex VI of the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78). The Senate has not yet acted on this bill. Failure to act will mean that the U.S. government will not be able to vote on amendments that we have taken the lead in negotiating at the IMO.

As part of our comprehensive strategy to address emissions from transoceanic ships, EPA Administrator Stephen Johnson signed an Advance Notice of Proposed Rulemaking in November 2007 to establish rigorous exhaust emission standards consistent with our proposal before the IMO. In this notice, we provided an inventory of emissions from ocean-going vessels in the U.S. Exclusive Economic Zone (200 nautical miles off the coast of the United States), describe the proposal submitted to the IMO, and requested public comment on these standards. Comments on the Advance Notice are due by March 6 of this year.

In addition, we are performing extensive technical analysis and modeling to assess the possibility of designating emission control areas along the coasts of North America. Under the proposal being considered by the IMO, ships would be required to meet the most stringent standards in designated emissions controls areas. Our analyses include vessel traffic studies, fate and transport of ship emissions on the West, Gulf, and East coasts, environment and human health impacts, as well as studies concerning the global fuels market and how requirements in North America would affect the market both in terms of price and supply. Any decision on the matter will need to await completion of the analytic studies noted above.

We are also engaged in cooperative programs with stakeholders to address marine emissions through a series of collaborative partnerships. As part of the National Clean Diesel Campaign, EPA's Clean Ports USA has been at the forefront of encouraging innovative diesel emissions reduction strategies at ports across the country. In the past three years, we have funded multiple port-related projects with $1.9 million in federal dollars and $2.5 million in

matching funds provided by our partners. As a result, leading port authorities are reducing air pollution now.

The Marine Vessel Emission Reduction Act of 2007 would amend the Clean Air Act to add a new set of requirements for establishing clean fuel and engine exhaust standards for ocean-going vessels. While the bill is generally consistent with the framework of the U.S. proposal to the IMO, the Administration is continuing to review the bill and does not have an official position at this time.

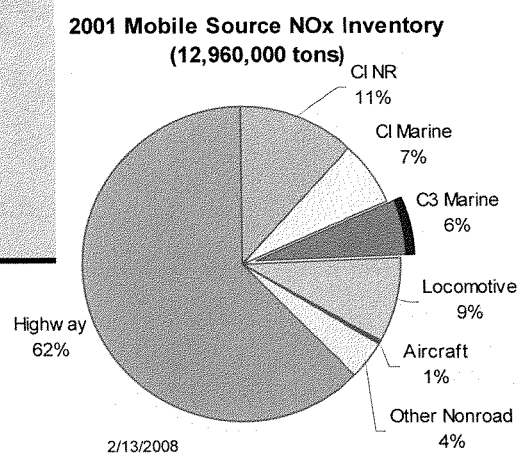
Thank you for the opportunity to testify before the Committee and we look forward to working with you on this important issue.

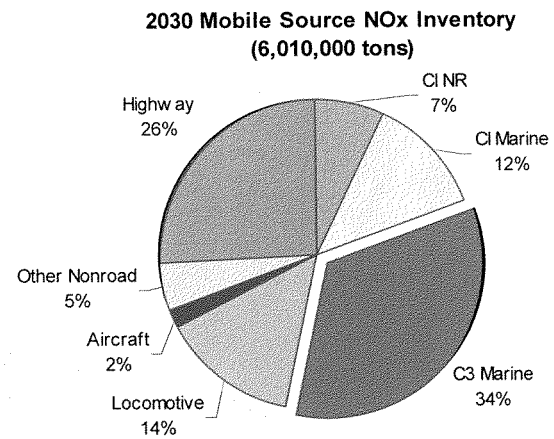
I would be happy to address any questions that you or members of the Committee may have.

Attachment A:

U.S. Marine Emissions Inventory

- Marine diesel engines contribute significantly to mobile source pollution in the U.S.





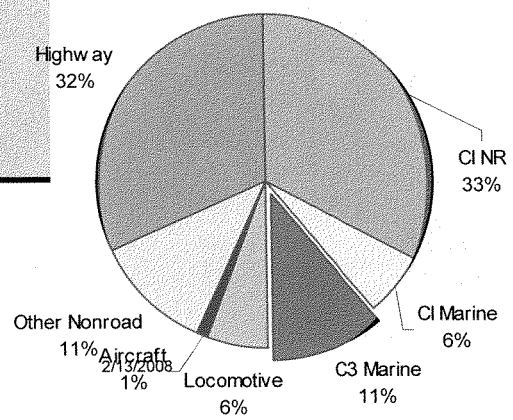
2/13/2008

Source of inventory estimates: C3 Marine ANPRM, 72 FR 69522 (Dec 7, 2007)

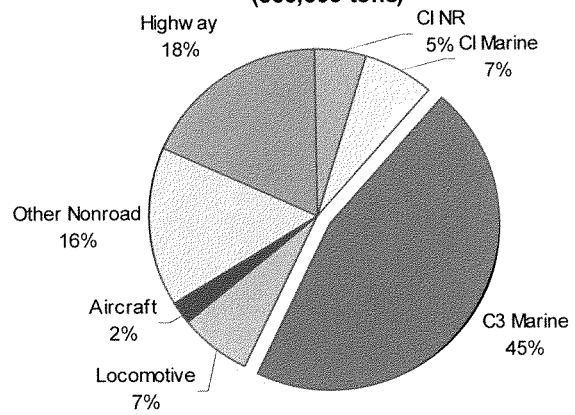
PM 2.5

- The marine contribution is expected to grow as emissions from other sources decrease

2001 Mobile Source PM2.5 Inventory (500,400 tons)

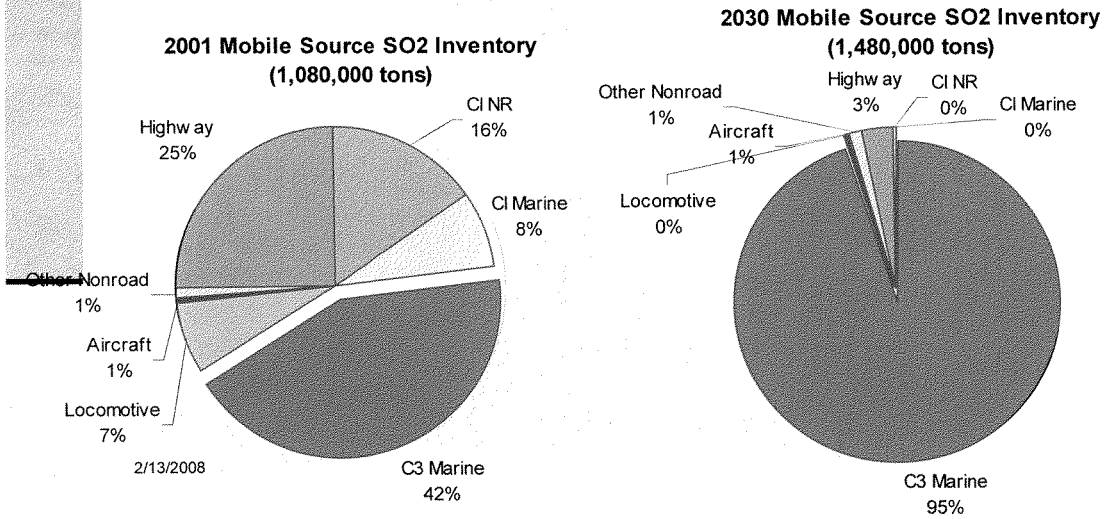


2030 Mobile Source PM2.5 Inventory (366,300 tons)



SOx Emissions

- SOx emissions are high due to the sulfur content of residual fuel used in C3 engines



Senator BOXER. OK.

I guess the frustrating thing to me is that we started negotiating for this international agreement in 2003, and it is 2008. Kids are getting asthma. People are getting cancer. The ports are growing and I thought your testimony was solid testimony. Your clear testimony is that this is only going to get worse, and you show us the great increases, that we are going to 46 percent of nitrogen oxides will come from the commercial marine vessels by 2030, and 52 percent of soot, and 95 percent of sulfur oxides from all mobile sources.

So I think your testimony is strong, but the actions of the EPA, I just don't get it. Our people are suffering because foreign flags are coming in and they are filthy and they are polluting. And we are sitting back saying, well, we just can't do anything until we get this international agreement. I don't get it.

Do you support the bill that the House sent over? And do you support my bill and Senator Feinstein's bill that would say you just can't come into a port until you change the fuel?

Mr. WOOD-THOMAS. Thank you, Senator.

Senator BOXER. Yes.

Mr. WOOD-THOMAS. The Administration does not have an official position on the bill before us, but as noted, certainly the approach outlined in the legislation is largely consistent with the approach we are advocating. Indeed, we are arguing for 1,000 parts per million to be applied as is contained in the draft legislation.

Senator BOXER. OK. Well, I am very heartened that you said that, but it doesn't change the fact that nothing is happening for 5 years. And so I am going to just ask you to take this back to Mr. Johnson, and to, if you can get the ear of the President and his people, that it would be a tremendous legacy if this Administration said we are ready to move right here.

Why should our people suffer because the foreign flags are using the filthiest bunker fuel? It is bunker fuel, isn't it? Why? When all they have to do is when they get to a certain point, just change over to a clean fuel. It is a fairly simple point.

So the fact is, I love that we are in agreement on the eventual level that should be allowed in terms of the pollution. I am glad we are in agreement, but it doesn't give my people great solace to know that it has gone on for 5 years of international negotiation to no end. Do you have any idea of an end-date here? What are you looking for? What are you working toward?

Mr. WOOD-THOMAS. We are expecting completion of the negotiation in October.

Senator BOXER. OK. Well, then we will call you back in September to get a report, and we hope that you will sit there with a great big smile on your face, because I know you want to get this done. But I will tell you, we have to get it done because people are suffering.

And then the other question that we are concerned about is that our understanding is that the options that are before the international organization do not match what we want. Are you concerned about that?

Mr. WOOD-THOMAS. With respect to the options before the committee in London, we reached agreement last week on the NO_x

standards for new builds, fully consistent with what we have argued for as the United States.

Senator BOXER. Good.

Mr. WOOD-THOMAS. With respect to the sulfur and PM-related issues, we narrowed those options to three last week. The second option is essentially the United States proposal.

Senator BOXER. Are we talking about new ships?

Mr. WOOD-THOMAS. This would apply to all ships with respect to sulfur and PM.

Senator BOXER. OK, good.

Mr. WOOD-THOMAS. With respect to NO_x, the agreement last week is with respect to new ships, new builds.

Senator BOXER. So NO_x does not go back?

Mr. WOOD-THOMAS. We have agreement in the subcommittee with no square brackets, and we intend to the best of our efforts to maintain that agreement.

Senator BOXER. Well, so you are saying that what you are negotiating does not go as far as my bill in terms of NO_x.

Mr. WOOD-THOMAS. With respect to the agreement on NO_x for new builds, yes.

Senator BOXER. I am not talking about new builds.

Mr. WOOD-THOMAS. On existing engines, that will be a further point of debate in the first week of April. We are pressing to try and reach agreement on retrofit standards applicable to existing ships.

Senator BOXER. That is extremely important, because these ships hang around. I would hope, if there is a chance, and I don't know what your schedule is, if you could just hear our next panel, our little boy on the next panel who is now turning into a big boy, actually, I think it would be wonderful, so that you could take back the urgency of this matter. This is so not ideological. This is so real. This is hurting people.

Do you have a chance, Mr. Wood-Thomas, to stay just for that little boy's testimony?

Mr. WOOD-THOMAS. Certainly.

Senator BOXER. It would be meaningful to me. Thank you very much.

OK. We are going to take our third panel now. So Dr. John Miller, Jonah Ramirez, Richard Kassel, Joe Accardo, Joel Chaisson, and Ken Wells.

I say to our second panel, you will come right after that. So if you would take your seats as quickly as possible.

And Mr. Wood-Thomas, if you could tell your friends in the international community that the way things are going with November and changes, that I said, not you said, that stronger regulations are coming one way or the other. We are going to make sure those foreign flags do the right thing in our ports. So if you could tell them they ought to act now, rather than have to be subjected to American law that is different, because that is what is coming down the pike. I thank you so much, and I thank you for your strong testimony and for staying to hear our panel.

And you know what? Jonah, do you mind going first? Do you mind? Because I wanted so much to have Mr. Wood-Thomas hear

you, and he may have a busy schedule. So Jonah, you are on with your testimony.

STATEMENT OF JONAH RAMIREZ, CLEAN AIR AMBASSADOR FOR CHILDREN WITH RESPIRATORY DISEASE

Mr. RAMIREZ. OK. Well, good morning.

First of all, I would like to thank Senator Boxer for inviting me here to speak to you today. Anytime the Senator invites you to speak at her hearing, it is quite an honor, but it is even more so when you are a sixth-grader.

Today, I am here to testify not as a 12-year-old boy, but as a victim—a victim of pollution, a victim of the air I breathe, a young boy who has been forced to grow up way too fast. I have asthma. I wasn't born with it. I developed it. I developed asthma by breathing dirty air. You see, the place I call home, the place where I have always felt safe, felt free to run around, play and be myself received failing grades last year in almost all categories in the American Lung Association's State of the Air Report.

With this said, I believe it is fair to State the laws we have now, the laws that we believe protect us, are way too lenient. Our current laws permit heavy exhaust, smoke and debris to be considered safe. Safe? If these particles that I breathe every day are safe, then why do I depend on daily medication and the fast relief of my inhaler to do something that everyone has the right to do: breathe.

I live in San Bernardino County, but at the ports, large ships from other countries come in and are the largest unregulated sources of pollutants in Southern California. Why? The high level of sulfur in the marine fuels causes ships to produce over half of the sulfur oxides pollution in Southern California. That is one of the major components of soot and smog. Then it blows across to where I live and I can't breathe.

When I was younger, I played with GI Joes. Most boys do. Well, a boy in New Jersey or Georgia or even here in Washington, DC. will pay about $17 for a GI Joe shipped from China. But the cost to me is much higher. Because of all that soot and smog pollution blowing across Southern California, I pay with my health.

Since I developed asthma, I have learned a lot about the air we all breathe. I have learned that we all need to do something because our air is making us sick. Breathing is a common bond we share, something we all do. It should not be something we have to think about, but the reality is some of us do need to think about it. We need to change the way we see air quality. It is not just a topic on the news. It is affecting all of us. Our dirty air is shortening our lives. It is shortening the lives of our children. Nearly five million Californians suffer from asthma, five million.

Over the past 5 years, I have testified at the AQMD urging lawmakers to change laws regarding air quality. I have testified at an EPA hearing at San Francisco and, more recently, one in Los Angeles asking legislators to make drastic changes in laws regarding air quality. I have spoken to the press on numerous occasions expressing my concern for people, especially children, all over the world who are forced to breathe such polluted air.

I have appeared on TV twice sharing my knowledge of asthma and air quality and the relationships that, unfortunately, they

share. Last April, I introduced our Governor at the Small World Asthma Conference at Disneyland, California. Now today, I speak to you at the same hearing as Senator Boxer.

Look at me. I am the face of asthma, but not just asthma. I have become the fact of the asthma-air quality relationship. I am the face of our future, our future if our laws remain unchanged. I am a direct product of our environment, an environment that we helped create and we need to repair with your help.

Every one of us needs to take steps to reduce air pollution. I have and I am 12. Together, let's make my dream of breathing clean, pollution-free air a reality. Please support us by approving the Marine Vessel bill by Senator Boxer.

I thank you from the bottom of my lungs.

[The prepared statement of Mr. Ramirez follows:]

Testimony of Jonah Ramirez

Youth Community Member from Southern California
In Support of S.1499 - *Marine Vessel Emissions Reduction Act of 2007*
Presented to the Senate Environment and Public Works Committee
February 14, 2008 - Washington D.C.

Good morning. First of all, I would like to thank Senator Boxer for inviting me here to speak to you today. Anytime the Senator invites you to speak at her Hearing, it is quite an honor, but it is even more so when you're a sixth grader!!

Today I am here to testify not as a twelve-year-old boy but as a victim; a victim of pollution. A victim of the air I breathe. A young boy who has been forced to grow up way too fast. I have asthma. I wasn't born with it; I developed it. I developed asthma by breathing dirty air. You see, the place I call home, the place where I have always felt safe, felt free to run around, play and be myself, received failing grades last year in almost all categories in the American Lung Association's State of the Air Report. With this said, I believe it is fair to state the laws we have now, the laws that we believe protect us, are way too lenient. Our current laws permit heavy exhaust, smoke and debris to be considered "safe." Safe? If these particles that I breathe every day are safe, then why do I depend on daily medication and the fast relief of my inhaler to do something that everyone has the right to do? **Breathe**.

I live in San Bernardino County, but at the ports, large ships from other countries come in and are the largest unregulated sources of pollutants in

southern California. Why? The high level of sulfur in the marine fuels causes ships to produce over half of the sulfur oxides pollution in Southern California – that's one of the major components of soot and smog. Then it blows across to where I live and **I can't breathe**.

When I was younger, I played with G.I. Joes. Most boys do. Well, a boy in New Jersey or Georgia or even here in Washington D. C. will pay about $17 for a G.I. Joe shipped from China. But the cost to me is much higher. Because of all of the soot and smog pollution blowing across Southern California, I pay with my health.

Since I developed asthma, I have learned a lot about the air we all breathe. I have learned that we **all** need to do something because our air is making us sick. Breathing is a common bond we share; something we all do. It should not be something we have to think about, but the reality is, some of us do need to think about it. We need to change the way we see air quality. It is not just a topic on the news. It is affecting all of us. Our dirty air is shortening our lives. It is shortening the lives of our children. Nearly 5 million Californians suffer from asthma. **5 million.**

Over the past 5 years, I have testified at the AQMD urging lawmakers to change laws regarding air quality. I have testified at an EPA Hearing in San Francisco and, more recently, one in Los Angeles asking legislators to make drastic changes in the laws regarding air quality. I have spoken to the press on numerous occasions expressing my concern for people, especially children, all over the world who are forced to breathe such polluted air. I have appeared on TV twice sharing my knowledge of asthma and air quality

and the relationship that, **unfortunately**, they share. Last April, I introduced our Governor at the Small World Asthma Conference at Disneyland, California. Now today, I speak to you at the same hearing as Senator Barbara Boxer.

Look at me. I am a face of asthma….. But not just asthma. I have become the face of the asthma/ air quality relationship. I am the face of our future. Our future **if** our laws remain unchanged. I am a direct product of our environment. An environment that we helped create and now we need to repair – with your help.

Everyone of us needs to take steps to reduce air pollution. I have and I am twelve. **Together, let's make my dream of breathing clean, pollution-free air a reality. Please support us by approving the Marine Vessel bill by Senator Boxer.**

I thank you, from the bottom of my lungs.

Senator BOXER. Jonah, thank you.

I wanted to mention that a couple of colleagues came in. Senator Lautenberg, Jonah, you should know, is so passionate on cleaning the air because he has a lot of kids and grandkids, and one of his grandchildren has asthma. And so he is so strong on it, and I can see why. You really make us think about the consequences of our actions or inactions. I just want to thank you so much for being here.

I also want to say to Mr. Wood-Thomas, thank you so much for staying because I could try to explain this, but I can't. This is what we need. And you ought to note that Jonah is the Clean Air Ambassador for children with respiratory disease, and we are so glad you are here. So stay there, Jonah.

And now we are going to call on Dr. Miller next.

Senator LAUTENBERG. May I interrupt for 1 second, Madam Chairman?

Senator BOXER. Yes, you may, certainly.

Senator LAUTENBERG. Jonah, thank you for speaking for my grandson, Alexander. Your delivery of your message, I hate to say this in front of the older folks here, but it was one of the best that I have ever heard. I congratulate you and I urge you to keep on fighting until the day when you take your seat here. Thank you.

Mr. RAMIREZ. Thank you.

[Laughter.]

Senator BOXER. Thank you very much.

Dr. Miller.

STATEMENT OF JOHN G. MILLER, M.D., FELLOW OF THE AMERICAN COLLEGE OF EMERGENCY PHYSICIANS

Dr. MILLER. Good morning. I am honored to be able to speak after Jonah here.

I am Dr. John G. Miller. I am an emergency room physician. I live in the diesel death zone in the Los Angeles port town of San Pedro. I have practiced in various emergency departments on the South Coast air basin for more than 30 years. Thank you for this opportunity to testify. I am speaking in support of this bill, but I will give a clinician's perspective on why it should be enacted.

The bill addresses a serious problem we have in Souther California. The twin ports of Los Angeles and Long Beach have been identified as contributing 25 percent of the total air pollution in the region, with the majority of this attributable to ships. Large foreign-owned or flagged ships have had a free ride. They are allowed to use our air as their toxic dumping site, yet local land-based businesses have been heavily regulated to prevent this.

International standards for pollution from ship engines written mostly by the shipping industry itself are so lax as to be meaningless. In the diesel death zone that I live in, we have a broad swath of severe air pollution that extends from the ports inland across the air basin that adversely affects the lives and health of over 14 million citizens. This ugly swath of pollution disproportionately affects lower-income and predominantly minority communities in places such as Wilmington, Compton, Carson, South Central and East Los Angeles. This is clear documentation of a serious environmental justice issue.

The medical literature on the harmful effects of air pollution is vast and growing. Many important studies were done in L.A. at USC and UCLA Schools of Medicine. Cancer, heart attacks, strokes, chronic obstructive pulmonary disease, and asthma are major killers, as are sudden infant death syndrome, low birth weight infants, and serious perinatal congenital anomalies. These killers are related to air pollution in a largely simple linear fashion with no known lower threshold of safe exposure. More pollution means more disease, death and costs to our society.

The first person I saw die from asthma was when I was a medicine intern at L.A. County General Hospital. On a smoggy day, a 22 year old woman came in with a severe asthma attack. She died before we could save her. It turned out that she was the sister of one of our respiratory therapists at the hospital. I will never forget having to tell her sister.

It keeps happening. I have certainly treated cases, seen fatalities, that appear to be pollution-related. Recently on a routine busy night in the ER, we got a sudden call from the paramedics. They were bringing in a 14 year old boy in full cardiopulmonary arrest due to a severe asthma attack. Two minutes away, we got as prepared as we could in 120 seconds, and soon we were in the hand-to-hand struggle with death and destruction that we often fight.

This child survived despite the severity of his condition. But in many cases, the person does not survive. When that happens, I am the person who must walk down the long hallway, sit down with the family, and tell them that their loved one didn't make it. This is a very tough job. It is still as hard as it was the first time. I would like not to have to do it so often.

Eighteen months ago, the 48 year old wife of one of my colleagues developed a nagging dry cough. Debbie was a fit, non-smoking, no risk factor person. Her workup revealed lung cancer. As 90 to 95 percent of lung cancer victims do, she died after a lot of suffering. It was my sad duty to prescribe morphine tablets when she ran out of them in her last week of life. Her funeral was attended by hundreds of mourners. I was one of them. She left behind a devastated family, including one 12 year old child with special needs, who still really needs his mother. Air pollution from living in the diesel death zone was the most likely cause of her death.

The point here is that we are not just talking about numbers. Real people are sick and dying. Physicians are seeing increasing numbers of cases like these where the only risk factor seems to be living in this diesel death zone, this area of high diesel pollution, and we have these areas all over this Country.

In studying this, I came to realize that if I were able to reduce the air pollution by a few micrograms per cubic meter, I would save more lives than I ever did working in the ER. Enactment of this bill will prevent many needless premature deaths and the enormous related costs in America. It is wrong to allow the needless deaths of Americans so corporations, often foreign-owned, can make bigger profits.

Thank you for your kind attention to my testimony.

[The prepared statement of Dr. Miller follows:]

Testimony of Dr. John G. Miller, M.D., FACEP

In Support of S.1499 - *Marine Vessel Emissions Reduction Act of 2007*
Presented to the Senate Environment and Public Works Committee
February 14, 2008 - Washington D.C.

Good Morning. I am Dr John G. Miller, an Emergency Physician. I live in the Southern California Diesel Death Zone in the "Port Town" of San Pedro. I have practiced in various Emergency Departments in the South Coast Air Basin for more than 30 years. I am certified by the American Board of Emergency Medicine and I am a Lifetime Fellow of the American College of Emergency Physicians. I was originally trained in Radiation Oncology at USC Medical Center. Medical School-Baylor College of Medicine, Houston TX, Professional Societies: Society of Orange County Emergency Physicians, Society for Scientific Exploration, Board of Directors: Coalition for a Safe Environment, Wilmington, CA. I was the only medical doctor on Mayor Hahn's *No Net Increase Task Force*.

Thank you for this opportunity to testify.

HEALTH. I am speaking in support of this bill. I will give a clinician's perspective on why it should be enacted. The bill addresses the ship pollution problem in a way that is workable and provides a level playing field for all American ports and shippers.

The bill addresses a serious problem we have in Southern California. The twin ports (LA and Long Beach) have been identified as the single largest unregulated source of air pollution in the South Coast Air Basin. Port related activity (ships, trucks, trains and cargo handling equipment) contributes a total of roughly 25% of the mass of air pollutants in the South Coast Air Basin. Angelenos breathe the most unhealthy air in America. In a study done by the Port of Los Angeles, ship operations were shown to contribute 55% of port related air pollution. Thus ships are the largest source of port related air pollution. (From: Port Wide Baseline Air Emissions Inventory, Final Draft, page 26, June 2004, Port of Los Angeles, Starcrest Consulting Group)

Large foreign owned or flagged ships have had a free ride. They are allowed to use our air as their toxic dumping site. Yet local land based businesses have been heavily regulated to prevent this. International standards for pollution from ship engines, written mostly by the shipping industry, are so lax as to be meaningless.

This is the "Diesel Death Zone". (See Attachment A) As demonstrated in the MATES II and Mates III studies, (Multiple Air Toxics Exposure Study II, March 2000, and Multiple Air Toxics Exposure Study III, Jan 2008, www.aqmd.gov) we have a broad swath of severe air pollution that extends from the ports inland across the Air Basin that adversely affects the lives

and health of over 14 million citizens.). This area has come to be known as the Diesel Death Zone. (I show the map of cancer risks due to air pollution from MATES II. Darkest areas-near the ports- show risks of cancer from breathing air of 5000 to 6000 cases per million (I show the map of cancer risks due to air pollution from MATES II. Darkest areas-near the ports- show risks of cancer from breathing air of 5000 to 6000 cases per million population. MATES III map shows the same structure with somewhat different numbers. Federal Standard for this risk from one project should be less than 1 per million population, from all sources in an area should be less than 300 cases per million population. AQMD Rules require a risk of less than 10 per million for any new facility.

Attachments A: "Cancer Risks from Breathing Air-Mates II, and MATES III" maps of our region showing risk stratified areas. First map was done from data supporting figure 5-3a page 5-10 in MATES II. This black and white figure (5-3a) is also attached but this figure merely shows the high risk areas as large black spots due to printer inadequacy. Note that risks of up to 5,800 cases per million are demonstrated.

Attachment B: "Heart Disease Deaths -1996 Communities in Los Angeles County" (Source L.A. County Dept of Health Services). This map illustrates areas with highest numbers of heart disease deaths in darker colors. It looks very similar to the Cancer risks map I just showed. I assert that some of these heart disease deaths are being caused by air pollution from the ports.

This ugly swath disproportionately affects lower income communities and people of color in places such as Wilmington, Compton, Carson, South Central and East L.A. This map provides clear documentation of a serious environmental justice issue.

The medical literature on the effects of air pollution on human health is vast and growing. Many important studies were done at USC and UCLA Schools of Medicine. It would take longer than my 5 minutes to read through even a partial list of all the adverse effects related to diesel air pollution. Cancer, heart attacks, strokes, chronic obstructive pulmonary disease and asthma are major killers. Additionally Sudden Infant Death Syndrome, premature birth, low birth weight, major cardiovascular birth defects and elevated miscarriage rates have all been linked to air pollution. These constitute tragic and expensive burdens to our society.(Attachment C: "Health Effects of Diesel Exhaust Air Pollution", August 28, 2003, Port of Los Angeles Port Community Advisory Committee Air Quality Group, with references from the medical/scientific literature attached). These killers are related to air pollution in a largely simple, linear fashion with no known lower threshold of safe exposure. More pollution means more disease, death, and cost to our society.

COST. Industry spokespersons have asserted that the costs of this are "unknown and unknowable". However it is possible to estimate societal costs due to ship related air pollution. The Union of Concerned Scientists estimated that the cost of "Health Incidences from diesel

exhaust in 2004 in the South Coast" was $ 10.2 Billion! This was for only the one year they studied. (Source: Sick of Soot, Reducing the Health Impacts of Diesel Pollution in California , Union of Concerned Scientists, June 2004. available at www.ucsusa.org) Knowing that the Ports contribute 25% of the total pollution causing this, we get the Ports total share of the cost as $2.55 Billion. (0.25 x $10.2 Billion= $2.55 Billion) . Then, knowing from the Emissions Inventory that ships contribute 55% of the total Port related air pollution (DPM), we find that *the total health care cost from ship exhaust alone is $ 1.4 Billion! (0.55 x $2.55 Billion= $1.4 Billion)*

That is $1,400,000,000 in health care costs to be born by our citizens!

We further crunched these numbers, comparing total port related health costs and number of ship calls. We obtained the astonishing result that it appears that each large ship call at the Ports is generating a cost to society of $315,000 to $455,000! California is massively subsidizing this industry when externalized costs are considered.

More on this can be found in Paying With Our Health, The Real Cost of Freight Transport in California. The Pacific Institute, June 2006 available at www.pacinst.org.

Another way to look at this is to use the US EPA's "value of one premature death in 2004 dollars". The value set by EPA was $6 Million per avoidable premature death. Union of Concerned Scientists estimated 1400 premature deaths from air pollution in the South Coast Air Basin in 2004. The twin Port's share of these would be 246 deaths. (0.25 of total pollution x 1400 deaths from pollution = 246 deaths) The value of these would be $1,476,000,000. (246 deaths x $6million per death= $1.476 Billion!)

The California Air Resources Board (CARB) has estimated that there are more than 5000 deaths per year in the South Coast Air Basin due to air pollution. CARB also estimated 1200 premature deaths per year in the Air Basin from emissions due to goods movement. (Cost in 2004 dollars would be 7.2 Billion Dollars) AQMD Staff estimate there are more than 700 premature deaths per year from ship emissions in the South Coast Air Basin. (Cost in 2004 dollars would be 4.2 Billion Dollars)

Whichever estimates we choose to use they are all huge!

These are disturbing numbers. However my point is that real people are getting sick and dying. Yet, large often foreign owned corporations get to make maximum profits unhindered by concerns about the health of Americans. The medical costs are externalized and born by our citizens.

MEDICAL. Often we cannot absolutely say that air pollution caused an individual heart attack, stroke, cancer case, sudden death etc. (The tobacco industry used this dodge for decades!) However the epidemiologists have shown, in aggregate, air pollution is responsible for a significant fraction of the total of these cases.

I have treated cases, seen fatalities that appear to be pollution related.

In my years as an Emergency Medicine physician I have of course seen hundreds of fatal or near fatal cases of the illnesses we associate with air pollution. Some stand out in my mind. In my brief time to testify, I can share only a few cases with you.

On a routine busy night in the ER we got a sudden call from the paramedics. They were bringing in a 14 year old boy in **full cardiopulmonary arrest** due to an asthma attack. Two minutes away. We got as prepared as we could in 120 seconds and soon we were in the hand-to -hand struggle with death and destruction we often fight.

This child survived despite the severity of his condition.

But in many cases, the person does not survive. When that happens, *I am the person who must walk down the long hallway, sit down with the family and tell them their loved one didn't make it.* This is a very tough job. I would like not to have to do it so often. Enactment of this bill will prevent many needless premature deaths and enormous related costs in America.

More cases from my own experience:

At 1:30 one July morning three years ago, in the ER, I saw a 55 year old woman complaining of left chest pain. She feared she was having a heart attack. My initial evaluation ruled out a myocardial infarction (heart attack) but unfortunately I found something far more ominous than a "mere" heart attack. Her chest x-ray showed a large tumor mass in her left chest. I feared cancer, but this lady had no risk factors for cancer other than having breathed the air here all her life (no history of smoking, radon gas exposure, asbestos exposure, second hand smoke at work). Unfortunately, my fears were proven correct by further evaluation. It was lung cancer and it had spread to the area around her heart and her brain. She died 6 months later. In my opinion she died from air pollution.

Eighteen months ago, the 48 year old wife of one of my colleagues developed a nagging dry cough. Debbie was a fit nonsmoking, "no risk factor" person. Her workup revealed lung cancer. As 90-95% of lung cancer victims do, she died after a lot of suffering. It was my sad duty to prescribe morphine tablets when she ran out in her last week of life. Her funeral was attended by hundreds of mourners. I was one of them. She left behind a devastated family

including one 12 year old child with special needs who still really needs his mother. Air pollution was the most likely cause of her death.

The point here is that we are not just talking about "numbers". Real people are sick and dying. Physicians are seeing increasing numbers of cases like these where the only risk factor seems to be living in the Diesel Death Zone.

"But enactment of this bill will send the freight to other ports and destroy many jobs here!" This is one standard response from industry to any proposals that would seek to limit their ability to burn the cheapest, dirtiest fuel in their ships.

The best response to this was actually provided by the Port of Los Angeles. In a recent Draft Environmental Impact Report for a major terminal expansion/increased throughput project, the options of diversion of cargo to other West Coast ports inside and outside Southern California was considered and studied. The Port concluded that this is simply not possible because the facilities to do this simply do not exist and "are not being contemplated" by other major West Coast ports. In Southern California sufficient capacity outside Port of LA/Port of Long Beach "does not exist and cannot be constructed". According to POLA's own studies, *the freight must come through these 2 ports.* Put bluntly the shippers need to be able to use these two ports more than the ports need the freight from the shippers.
(See Attachment D: Sections 2.5.2.1 and 2.5.2.2 from "Berths 136-147 Container Terminal Draft Environmental Impact Statement (EIE) Environmental Impact Report EIR", June 2007. Prepared by Port of Los Angeles, US Army Corps of Engineers and SAIC)

" But it will cost way too much. Consumers costs will go way up!" We are indebted to the Maersk Corporation for proactively adopting the use of low Sulfur diesel fuel in ships serving their Pier 400 facility, demonstrating that the cost of this is not prohibitive. Additionally, Mr. Jesse Marquez with Coalition for a Safe Environment calculated that even if costs went up $100 per container (an increase of $200.000 in a 2000 container ship) the net increase in cost to consumers for, say a pair of sneakers, would be 0.25 cents!

Thus measures such as this legislation that may increase some costs to shippers but protect the health of Americans should be acceptable, enacted, and enforced.

Thank you for your kind attention to my testimony.

RESPONSES BY JOHN G. MILLER TO ADDITIONAL QUESTION FROM SENATOR BOXER

Question 1. Based on your experience with, air pollution, health impacts, what do you believe are the most significant adverse health effects from air emissions from marine vessels? Please describe both the types of effects that you have observed, and the effects discussed in the medical and scientific literature that are of the greatest concern to you?

Response. I believe that the most significant impacts from ship emissions are those that are happening to our children for they are America's future. Childhood asthma is a huge and growing burden on our society. It is now associated at the level of "causation", according to many researchers, with the sort of air pollution produced by marine vessel emissions. The finding by researchers at USC that air pollution is causing stunted lung growth or loss of growth in children's lung function that is non-recoverable seems particularly ominous. As these children progress into adult life they face a future clouded by likely premature death due to the damage they sustained.

The UCLA Medical Center at Los Angeles County Harbor General Hospital completed a Wilmington Children's Asthma Study in 2007, but the report has not been released yet. They have disclosed that their results showed that 24 percent of all children in Wilmington, California have asthma. Wilmington, like my hometown of San Pedro, is immediately adjacent to the Port.

We do not have the right to allow our children to be poisoned so various corporations can make fatter profits. I am concerned that in the case of ship emissions we are doing exactly that.

The non-cancer adverse health effects such as deaths from heart attacks, strokest chronic obstructive pulmonary diseaset accelerated atherosclerosist and elevated "all cause mortalityU have been estimated to be at least 10 times greater than the well known cancer effects. Thus, numerically they are of great concern to me.

Lung cancer remains almost uniformly (90–95 percent!) fatal. Of course it remains a major concern.

The overall magnitude of the effect of breathing the air in an area with levels as high as we have in most of America's major port regions has been compared to the effect of passive smoking by some experts in this field. As a physician I find this very alarming.

Unlike the situation with asbestos and mesothelioma, there is no single "signature diseaseUassociated with marine vessel emissions. This may make it easier for the polluters to try to say that one can't blame a personts illness on ship emissions. However we know that in the overall picture many cases of the illnesses mentioned above are being caused by ship emissions. The epidemiologists have made a good case that ship emissions are causing a significant fraction of the death and destruction of lives that I have seen in my 3 decades of practice as an Emergency Physician in the South Coast Air Basin.

Every doctor is concerned when he or she sees preventable death or disability. The air pollution impacts mentioned above are preventable. Statistically, ship emissions are causing part of this problem. I applaud your Committee's efforts to reduce this avoidable burden to our society.

Question 2. You mentioned in your written testimony a few patients that you believe were likely to have been affected by air pollution. Please describe additional specific instances of health effects that were likely caused by air pollution that you or your colleagues at local hospitals have observed in patients from areas where marine vessel air pollution is a problem.

It would be difficult to say with 100 percent certainty that any individual case of the myriad illnesses that have been associated with diesel exhaust air pollution is due specifically to ship exhaust. The tobacco industry hid behind this lack of absolute certainty in individual cases for decades. However, given that ship exhaust is a major contributor to the total regional air pollution on all U.S. coasts, marine vessel emissions are major contributors to the total morbidity and mortality this air pollution brings to American citizens.

That being said, I will describe some cases I am aware of in which air emissions from marine vessels were the most likely culprit or at least a possible major contributing factor.

We know from the epidemiological literature that persons occupationally exposed have about 150 percent higher risk for the diseases associated with air pollution than the general population in the same area. Thus some cases from the Ports:

—A 40-year-old ILWU member (longshoreman) who died of "a massive asthma attack" according to the Union's benefit coordinator. He had worked on the docks since he was in his 20's

—"R", a friend of mine who was a 50-year-old nonsmoking longshoreman who suffered a myocardial infarction.

—"P" A nonsmoker who grew up in San Pedro, worked for the Port and recently retired from that job, diagnosed at age 60 with chronic obstructive pulmonary disease.

—"V" a member of the pile drivers union, and one of my neighbors who died of sudden cardiac arrest in his early 50's.

—"B" a Port crane operator who could no longer work because of the asthma and repeated precancerous polyps he keeps getting on his vocal cords. (Crane operators sit in a cab at about smokestack height as they perform the highly skilled mechanical ballet that gets the 35-ton boxes off or on the ships.) His doctors have told him he can no longer work at his high daylight skill job, indeed they told him he shouldn't work in or near the Port.

—Recently one of the cancer surgeons at our local hospital saw 3 cases of young men (30's to 40's) with unusual malignancies. All were dockworkers referred via the ILWU. He thought this was "strange".

As I was writing this, I found some notes my wife wrote last Fall. She is a Registered Nurse who works as one of the hospital Nursing Supervisors at the local hospital (Little Company of Mary San Pedro Hospital), a small community hospital located near the Port of LA. As a nursing supervisor she has to stay on top of what is going on throughout the hospital and knows most of the personnel who work there. One day she was suddenly struck by how many staff members were sick or had died. She decided to list the ones she could remember.

From her notes: (using person's sex and job title only to avoid HIPPA violations)
Female CCT—GYN.Cancer
Female RN—Thoracic Cancer
Female RN—Breast Cancer
Female RN—Lung Cancer
Female. RN—Cancer
Female RN—Sudden Death, cause unknown
Female MD—Cancer, expired
Female RN—Cancer, expired
Female RN—Cancer
Female secretary, Multiple. Sclerosis
Female. RN—suicide
Female RN—Cardiomyopathy, expired
Female RN—immune response disorder
Female. US-Lung Cancer, expired
Female RN—Breast Cancer, expired
Female. PBX-Systemic Lupus Erythematosis, expired
Female US—Sudden Death unexplained
Female LVN—Ovarian Cancer, expired Male MD—Cardiac Arrest-penn. Disabled
Female., CCT-Brain Cancer-expired
Male priest—Lymphoma—Cancer expired
Female. RN,—Thyroid Cancer
Female manager,—Pancreatic Cancer
Female RN Lung cancer-expired
Female RN—Breast Cancer
Female—Brain tumor
NEIGHBORS we know in the community surrounding the Port of LA:

My friend G, a fit, nonsmoking Brit who has developed severe asthma since he moved here.

K.L. neighbor—Cancer—expired
K.D. husband—Cancer-expired
P.T.husbandtlongshoreman-LungCancer
A.M. husband—Cancer—expired
L.M. neighbor—Cancer—expired
S.E. neighbor—Breast cancer-expired
M.M. neighbor—Brain Tumor—expired
M. from MOW—Breast Cancer
M.T. son-Cancer
C.O. son-Leukemia
T.O. neighbor—melanoma
J.M. friend at ILWU—throat Cancer

Are all these folks victims of our local air pollution? I doubt it but I believe some are. They all lived and worked here in the Diesel Death Zone. For example some

of the many carcinogenic compounds that are found in diesel exhaust/ship emissions have been implicated in breast cancer.

In the nearby town of Wilmington mentioned in my response to question I.Ot a health survey was conducted by Communities for a Safe Environment (CFASE) of which I am proud to be a Board member. Three hundred 20 nine residents living within 5 blocks of the waterfront were interviewed in a door to door face to face survey using an extensive standardized list of health and demographic questions. 26 percent reported respiratory diseases including 3 lung cancers. The results of this grassroots effort await further analysis.

Once again the simple point is that real people friends neighbors are getting sick and dying.

Whenever I see a person who have lived in a high air pollution area such as ours who develop a heart attack, stroke, or sudden death respiratory arrest or chronic obstructive pulmonary disease I think they may be a victim of air pollution. I know that a fraction of all the cases I see are undoubtedly the effects of air pollution. The fact that we are not yet absolutely able to say which death was due to air pollution does not relieve us of the responsibility to reduce the causes of these aggregate deaths.

When I hear about a child in one of the local high schools with leukemi? I list air pollution as one likely cause or contributing factor. I have seen the high school students doing a car wash to raise money for a classmate ill with leukemiat one of the myriad illnesses associated with ship emission type air pollution. My heart goes out to them.

Indeed many things are wrong with this picture.

Thank you for your attention to one physician's perspective on this problem.

Senator BOXER. Thank you very much, Doctor.

Our next speaker is Richard Kassel, Senior Attorney, Director, Clean Fuels and Vehicles Project, Natural Resources Defense Council.

STATEMENT OF RICHARD KASSEL, SENIOR ATTORNEY, DIRECTOR, CLEAN FUELS AND VEHICLES PROJECT, NATURAL RESOURCES DEFENSE COUNCIL

Mr. KASSEL. Thank you, Madam Chairman, members of the Committee. My name is Richard Kassel. I am here representing the 1.2 million members and online activists of the Natural Resources Defense Council, NRDC, a national non-profit environmental organization.

I thank you for the opportunity to testify today in support of S. 1499. Frankly, I think that Jonah and Dr. Miller have already said just about everything that needs to be said. I hope I can add something meaningful to their incredibly strong words.

You know, all of us can agree. We all rely on ocean-going ships to bring us what we want, what we need, and when and where we want it. But as Jonah has told us, as Dr. Miller has told us, these ships also bring us staggering levels of pollution that trigger asthma attacks, bronchitis, cancer, emphysema and even premature death.

Ocean-going ships really are the last bastion of dirty diesels in our Country. If we were to look at a map of the health impacts from these ships, and I understand that you may have one. It is in my written testimony and everybody can see it there. You would see that it covers not just the obvious big ports that we hear about every day, but it covers areas that include more than half the people who live in the Country. It would dovetail nicely, unfortunately, with a map of the most serious ozone and particulate matter nonattainment areas of the Country. All of these places overlap, and of course they overlap because the problem is real and ships are a big part of it.

Senator BOXER. Let me interrupt without taking time away.

Mr. KASSEL. Please.

Senator BOXER. Freeze his time for a second.

I just want to make sure people understand this. At least 2,000 to 5,000 premature deaths per year in the continental U.S. are caused by particulate pollution from ocean-going vessels.

Mr. KASSEL. That is right.

Senator BOXER. This is a fact. And if we do nothing, shame on us. We are complicit in this.

OK. Continue.

Mr. KASSEL. Yes, thank you.

I absolutely agree. And of course, if no action is taken, the problem will get worse. Business as usual projections suggest that global shipping will roughly double by 2020 and roughly triple by 2030. From an environmental and a public health perspective, the emissions from that business as usual are unacceptable.

But luckily, we have learned over the last decade that diesel pollution is a solvable problem. As Mr. Wood-Thomas has noted, EPA has gone through several rulemakings that have shown that if you reduce the sulfur levels and you bring in technology at the end of the tailpipe that reduces the particulates and the nitrogen oxides, you can reduce 90 percent or more of these harmful emissions. And of course, your bill will adapt that model to these ocean-going vessels.

Consider a few comparisons. The Metro bus outside operates on 15 parts per million sulfur fuel. The Amtrak that I will take to get home to New York tonight will run on 500 parts per million sulfur. But the ship that carried the coffee that I had this morning runs on average on 27,000 parts per million and has no meaningful emission controls whatsoever.

So passing S. 1499 is critical for several reasons. First, it goes to the heart of the problem. A recent study commissioned by the Clean Air Task Force showed that reducing sulfur to the levels in your bill within 200 nautical miles of the North American coast would reduce shipping-related premature mortalities by more than 50 percent by 2012. Doing so would result in health benefits to society that could be valued at roughly $250 million per year, which is higher by order of magnitude of any implementation cost estimates that have been presented.

Further, sticking to 200 miles makes sense because that is where most of the impacts are. Recently, the International Council on Clean Transportation reported that roughly three-quarters of all ship emissions are happening within 400 kilometers, or roughly 250 miles, of the coasts. It was a global study.

So what that says is that if you want to tackle the problem, as they are doing at the IMO level, and you were to consider a very, very strict regime in the coastal zones, or a weaker but global regime, you would do more good for public health with the approach that you are taking in this bill, and that EPA is taking at IMO. But of course, what is at IMO is a selection of options, which include the less effective approach.

So your bill is important not just for what it will do, but also for the leverage and the message it sends to IMO. We think that passing your bill adds to the likelihood that the best outcome happens

at the international level. We were just as happy as anybody else about last week's news. It is promising. But do put it in perspective, what happened last week was a strong breakthrough on NO_x and a suite of options on sulfur out of a subcommittee.

To analogize to this building, we all know that if a subcommittee puts out a bill, that is a long way from a President's signature. That is where we are in the process. And yes, historically the IMO has tended to rubber stamp as it goes through the process, but historically the IMO takes the lowest common denominator approach. The committee and the full IMO has never had this situation before it where it is being asked to actually push technology the way we do in our EPA rules all the time.

Senator BOXER. Mr. Kassel, just if you could finish up.

Mr. KASSEL. I am happy to wrap up and to say that we support your bill strongly.

Senator BOXER. Well, I like that.

Mr. KASSEL. I want to thank you for bringing it, and I hope that we can work together toward its passage. And thank you for the opportunity to testify.

[The prepared statement of Mr. Kassel follows:]

NATURAL RESOURCES DEFENSE COUNCIL

Testimony of the
Natural Resources Defense Council
In Support Of
S. 1499,
The Marine Vessel Emissions Reduction Act of 2007

U.S. Senate
Committee on Environment and Public Works
February 14, 2008

By Richard Kassel
Senior Attorney

www.nrdc.org

1200 New York Avenue, NW, Suite 400
Washington, DC 20005
TEL 202 289-6868 FAX 202 289-1060

100% Postconsumer Recycled Paper

NEW YORK • LOS ANGELES • SAN FRANCISCO

My name is Richard Kassel, and I am pleased to testify in support of S. 1499, the Marine Vessel Emissions Reduction Act of 2007, on behalf of the Natural Resources Defense Council (NRDC). NRDC is a national, non-profit environmental organization dedicated to protecting human health and the environment. On behalf of our more than 1.2 million members and online activists in all fifty states, I thank you for the opportunity to testify today.

The Continuing—and Chronic—Problem of Ocean-Going Ship Pollution

As the Committee knows, the nation's marine ports are major hubs of economic activity for our nation. Every year, more than 2.5 billion tons of cargo enter the U.S. through out ports,[1] including roughly three-quarters (by weight) of all goods shipped in and out of the nation.[2]

All of us rely on the goods that arrive on our shores from distant ports. It is highly likely that that the coffee that started our day, the car or subway that we took to this hearing, and the clothes we are wearing first entered the United States on a large, ocean-going ship. Much of the nation's economic growth of the past decade has been inextricably linked to the globalization of trade, and the growth of ocean-going cargo traffic to and from our shores.

But these ships come with a price: they are also major sources of the diesel pollution that threatens the health of nearby residents and communities that are miles away. The engines on these ships emit huge amounts of particulate matter (PM) and nitrogen oxides (NOx), as well as dozens of other toxic air contaminants that can cause or exacerbate an array of environmental impacts that seriously affect millions of Americans. These impacts include increased asthma attacks and emergencies, chronic bronchitis, emphysema, heart disease, and premature death, among others. The California Air Resources Board (CARB) has estimated that, in 2005, port-related activities (i.e., the ships and related trucks, trains and equipment servicing the ports) were linked with a long laundry list of health and economic impacts, including more than 2,400 premature deaths, 360,000 lost work days, more than 1.1 million school absences and other health impacts that collectively cost their state roughly $19 billion dollars[3]

Moreover, these dirty diesel engines hamper state and local efforts to attain and maintain EPA's National Ambient Air Quality Standards (NAAQS) for PM and ozone. Indeed, the map below, which illustrates the most serious health

---

[1] US ports handled 2,631,429,240 tons of cargo in 2005 according to the US Army Corps of Engineers Waterborne Commerce Statistics Center. http://www.iwr.usace.army.mil/ndc/wcsc/portname05.htm

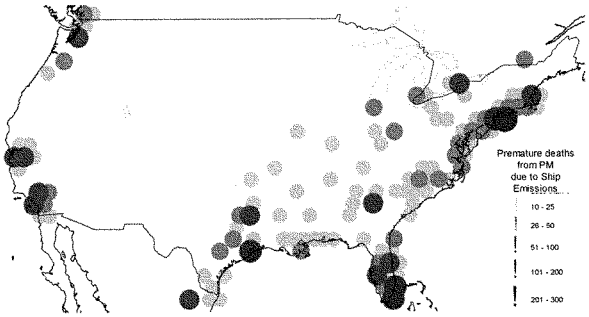
[2] US Department of Transportation. Research and Innovative Technology Administration. Bureau of Transportation Statistics. *Freight in America,* January 2006. Washington, DC: 2006. Pg 44

[3] California Air Resources Board, *Emission Reduction Plan for Ports and Goods Movement.* March 22, 2006. Appendix A, pp. 71, 79.

impacts from ships, would dovetail well with a map of the nation's most serious ozone and soot nonattainment areas—and would include the homes of tens of millions of Americans, including much of Southern California, the Pacific Northwest, Houston and east Texas, New Orleans, most of Florida, Atlanta, Chicago, Detroit, and the entire east coast from Virginia to Boston and beyond.

Health Impacts from Ships are a Nationwide Problem

Pollution from oceangoing vessels causes at least 2,000 to 5,000 premature deaths in the U.S. every year

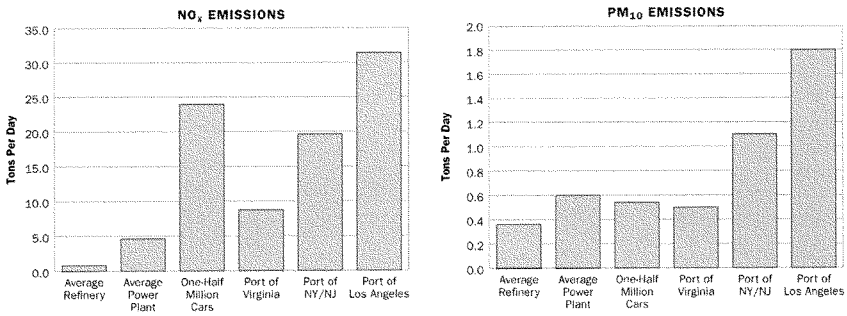


Cleaner marine fuels would reduce nationwide ship health impacts by ~ 60 %.

Source: Corbett, J. J.; Winebrake, J. J.; Green, E. H.; Kasibhatla, P.; Eyring, V.; Lauer, A., Mortality from Ship Emissions: A Global Assessment. *Environmental Science & Technology* **2007**, *41*, (24), 8512–8518

In March 2004, NRDC analyzed the ten largest marine ports in the nation. In its report, *Harboring Pollution: The Dirty Truth About U.S. Ports*, NRDC compared the aggregate PM and NOx emissions from several large ports to the average refinery, power plant and cars (each of which is subject to significant emissions regulations and/or permit requirements, unlike ocean-going ships). We found that marine terminals at the Port of Seattle, for example, emit more NOx than the average power plant and more PM than the average refinery, and marine vessels account for roughly half of those emissions—and those are the emissions at the marine terminals, not even counting the emissions of the ships going out 200 miles from shore. Additional findings are shown in the figure below. These findings underscore the critical need to close the regulatory loopholes that the shipping trade currently enjoys.

Nitrogen Oxide (NOx) and Particulate Matter (PM_{10}) Pollution from Ports Compared to Refineries, Power Plants, and Cars



Sources:
Seaports of the Americas, American Association of Port Authorities Directory, p. 127, 2002; www.aapa-ports.org/industryinfo/statistics/htm.
U.S. EPA, National Emission Trends, Average Annual Emissions, All Criteria Pollutants, 1970–2001, August 13, 2003; www.epa.gov/ttn/chief/trends/index.html.
Energy Information Administration, Petroleum Supply Annual 1982, Volume 1, DOE/EIA-0340(82)/1 (June 1983, Washington, DC), pp. 97-103 and Petroleum Supply Annual 2000, Volume 1, DOE/EIA-0340(2000)/1 (Washington, DC, June 2001), Table 40; and company press releases; as posted at www.eia.doe.gov/emeu/finance/mergers/fefcap_tab2.html.
Energy Information Administration, Form EIA-861, "Annual Electric Utility Report." As posted at www.eia.doe.gov/cneaf/electricity/public/t01p01.txt.
US Dept of Transportation, Federal Highway Administration, 2000 Highway Statistics, State Motor-Vehicle Registrations, www.fhwa.dot.gov/ohim/hs00/xls/mv1.xls

Unless strong action is taken, the heavy toll of shipping-related pollution will only get worse. EPA estimates that by 2030, marine diesel engines on ocean-going vessels will emit 12% of all mobile source NOx emissions, 21% of mobile source direct PM emissions, and approximately 83% of mobile source SOx emissions, nationwide.[4] According to these projections, PM2.5 emissions from ocean-going ships in the U.S. will exceed those from all of the engines covered by EPA's current locomotive and marine diesel engine proposal.[5]

A recent study of global shipping emissions commissioned by the Clean Air Task Force, and conducted by Dr. James Corbett and his team, projects that global shipping emissions, under business-as-usual conditions, will roughly

---

[4] U.S. EPA Activities Related to Marine Air Pollution at 7-10. See also U.S. Sub-committee on Bulk Liquids and Gases, "Review of Marpol Annex VI and the NOx Technical Code," 11th Session, 2 (February 9, 2007), *available at* http://www.sname.org/committees/tech_ops/O44/imo/blg/11-5-15.pdf (stating that EPA predicts ocean going vessels to claim an even higher percentage of NOx emissions—28% rather than 12%).
[5] 72 Fed. Reg. 15,964.

double by 2020 and triple by 2030.[6] The chart below summarizes projected SOx emissions for various scenarios:

Projected SOx emissions (millions of metric tons) under several BAU and global sulfur-control scenarios.

	2002	2010	2015	2020	2025	2030
BAU: 4.1% Growth	4.72	6.51	7.96	9.73	11.89	14.54
1.5% Fuel-sulfur at 4.1% Growth	4.72	3.62	4.42	5.40	6.61	8.08
1.0% Fuel-sulfur at 4.1% Growth	4.72	2.41	2.95	3.60	4.40	5.39
0.5% Fuel-sulfur at 4.1% Growth	4.72	1.21	1.47	1.80	2.20	2.69
BAU: IMO GHG-study growth (3%)	4.72	5.98	6.93	8.04	9.32	10.80
1.5% Fuel-sulfur at 3% Growth	4.72	3.32	3.85	4.46	5.18	6.00

Obviously, given the growth rate of international shipping, "business-as-usual" emissions are unacceptable. And, it may be that the future shipping off our shores may grow even faster—in another study, Dr. Corbett and his colleagues projects even higher rates of emissions growth (5.9% compounded annually) for shipping in North American waters.[7]

There are significant health impacts from this rate of emissions growth. In Dr. Corbett's most recent publication, he compared a "No-Action" scenario with a global adoption of a 1000 ppm sulfur cap within 200 nautical miles of the coast ("Coastal_0.1"), and estimated the impacts of these two scenarios in 2012. They found that switching to the lower sulfur fuel in coastal areas can reduce premature mortalities by 50-60 percent from the "No-Action" case. They estimated that adopting the Coastal_0.1 scenario would eliminate more than 40,000 premature deaths annually around the world. They further estimated that such a change would reduce North American premature mortality from ships by more than 50 percent.[8] Avoiding these deaths and other related health impacts would result in benefits to society that the Clean Air Task Force, using EPA methodologies, estimates at $225 – 275 billion per year.[9]

---

[6] Corbett, J., Wang, C, Winebrake, J and Green, E., "Allocation and Forecasting of Global Shipping Emissions," (January 11, 2007).
[7] Corbett, J. and Wang, C, "Estimation, Validation and Forecasts of Regional Commercial Marine Vessel Inventories," (2006), available on the Internet at: http://www.arb.ca.gov/research/seca/jctask12.pdf and http://www.arb.ca.gov/research/seca/jctask34.pdf.
[8] Corbett, et al., *Mitigating Health Impacts of Ship Pollution through Low Sulfur Fuel Options: Initial Comparison of Scenarios*, January 23, 2008, submitted to IMO MEPC on January 25, 2008.
[9] News report in SSustainableShippingNews.com, February 4, 2008.

Diesel Pollution is a Solvable Problem

Over the past decade, diesel fuels and emission control technologies have progressed dramatically, thanks to a series of EPA regulations that have been implemented over the course of the past eight years. Today, ultra-low sulfur diesel (ULSD) fuel, capped at 15 parts-per-million (ppm), is now the norm for all highway diesel trucks and buses. This ULSD will be standard for all farm, construction, industrial and other so-called "non-road" diesel engines by June 2010, and for domestic locomotive and marine diesel engines by June 2012.

Again, thanks to EPA's regulatory programs for diesel engines, tailpipe emissions from these engines will be dramatically cut—in most cases, by more than 90 percent, as advanced emission-cutting catalysts and filters become standard equipment. (The last of the EPA diesel rule-makings, covering locomotives and marine diesel engines less than 30 liters/cylinder, is under review at the White House Office of Management and Budget, and is expected to be finalized shortly). When all of today's dirty diesels have been replaced by new, cleaner engines that meet these new standards, EPA estimates that more than 20,000 premature deaths and more than $150 billion in health costs will be eliminated, nationwide, every year.

The key first step in each of EPA's diesel programs—or in any other meaningful diesel clean-up program in the world—is to reduce sulfur levels in the fuel. Just as lead had to be removed from gasoline to reduce car emissions in the 1970s and 1980s, sulfur has to be removed from diesel fuel to enable the use of effective pollution-cutting devices for diesel engines.

As with removing lead, reducing sulfur in diesel fuel has two emissions-cutting benefits. First, removing sulfur reduces the emissions of sulfur-based pollutants (e.g., sulfur dioxides and sulfate-based PM) from all diesel engines, immediately. Second, removing sulfur to ultra-low levels (e.g., below 50 ppm, but preferably as close to zero as possible) enables the use of sulfur-sensitive catalysts and filters that remove almost all of the smog-forming and particulate soot emissions.

It is worth noting that reducing sulfur levels to the S. 1499 levels should not pose a meaningful cost to the shippers or consumers who might bear any cost. Estimates for the incremental cost of 1000 ppm fuel are only a few pennies a gallon. Indeed, Maersk, Inc., which operates the largest container terminal in the Port of Los Angeles, voluntarily switched all 37 of its cargo ships to low-sulfur fuel in 2006. Certainly, this step helps prove the feasibility of fuel-switching close to shore. More important, given the intense competition in the shipping industry, this move demonstrates that switching to a cleaner fuel doesn't impair a shipper's ability to compete in an intensely-competitive marketplace. And, indeed, that seems to be the case: in the February 4, 2008 edition of *The Journal of Commerce*, the chairman and CEO of Trailer Bridge, a U.S.-flagged company,

said his company would also use lower sulfur distillate fuels. He was convinced by the argument that, in California, there is one premature death per 20,888 TEUs handled.[10] The bottom line: if Maersk and Trailer Bridge can switch fuels in LA without economic impact, so can any other shipper.

Why S. 1499 Can Bring Significant Benefits to the Nation

With EPA soon to finalize its current locomotive and marine diesel engine rule, ocean-going vessels will soon be the last bastion of dirty diesel engines. S. 1499 can help speed up their clean-up in several ways.

First, NRDC believes that S. 1499 adds leverage and momentum to the growing calls for an international resolution to the global problem of ship pollution. Earlier this week, we read about the progress on efforts to reduce sulfur levels at the most recent International Maritime Organization (IMO) meeting. In sum, the IMO subcommittee on bulk liquids and gases announced that it would present three proposals for consideration by the IMO's Marine Environment Protection Committee (MEPC). Of the three,[11] one foresees a 1000 ppm sulfur cap in the Sox Emission Control Areas (SECAs) that already exist in Europe or that may be added later,[12] starting in 2012. Another envisions a similar sulfur cap for "micro-emission control areas" in 2015. The bottom line: 1000 ppm is clearly feasible, especially in the dense shipping corridors off the U.S. and European coasts.

The IMO news may include some promising components, but should not be mistaken for the promise of actual action. Here's why: many steps remain between this week's news and an IMO agreement that has been ratified by its member countries. First, the IMO subcommittee on bulk liquids and gases will present its three new options to the IMO's marine environment protection committee (MEPC) in April. Then, if an acceptable option (of the three) passes the MEPC, it would go to the full IMO for consideration in October. Then, assuming that one of these three proposals is actually approved by the IMO in October, the IMO's member countries would have to ratify the IMO's action before it is implemented globally. In other words, there has been some progress this week, but implementing a global agreement still seems to be a long way off.

---

[10] John McCown, Chairman and CEO of Trailer Bridge, writing in *The Journal of Commerce*, February 4, 2008, page 42.

[11] One of the three proposals that will be reviewed by the IMO MEPC in April foresees a sulfur cap similar to S. 1499. Another calls for a 5000 ppm cap worldwide, in 2015, and a third calls for a global cap of 30,000 ppm (more than today's average global sulfur level in ocean-going shipping vessels, which is roughly 27,000 ppm) and more localized sulfur caps in the 1000-5000 ppm range.

[12] Currently, SECAs are in place in the Baltic Sea, the North Sea, and the English Channel. SECAs are being considered for the west coast of the U.S. and other locations around the world. In addition, California state law requires 1000 ppm sulfur fuel to be used in its coastal waters and ports by 2010, and European law requires this fuel to be used in European ports and inland waterways by 2010.

Moreover, the IMO has a long history of adopting final standards that merely reflect the lowest common denominator of the international community. Through that lens, it seems as likely that the option that includes the 30,000 ppm global cap will be adopted as that our preferred option will be chosen, unless the substantial threat of national action (whether via S. 1499, by European nations, or by other key government stakeholders) alters the pattern of the IMO's past decisions. In sum, notwithstanding the positive efforts of the U.S. EPA and others to convince the IMO to adopt stronger global standards for marine fuels, NRDC believes strongly that legislation like S. 1499 adds to the leverage and political pressure that is necessary to eventually adopt a global standard.

Second, a coastal sulfur reduction brings most of the benefits of reduced sulfur levels to the communities that are most affected by ship pollution. From the perspective of reducing the public health impacts of port communities, lowering sulfur standards within a coastal zone of 200 miles makes a lot of sense. Recently, the International Council on Clean Transportation, an organization that represents leading regulators and experts around the world, reported that 70-80 percent of all ship emissions occur within 400 kilometers (248 miles of land).[13] So, in fact, the sulfur limitations in S. 1499 will not only make sense to coastal communities that are home to the nation's ports, but would effectively target roughly three-quarters of the overall ship pollution problem if applied globally. Plus, many of the communities that neighbor the nation's ports are low-income communities and/or communities of color, and already bear a disproportionate impact of the truck, rail, and terminal emissions at these ports. Reducing ship emissions would bring a well-deserved relief to these communities. For these reasons, NRDC recommends that the 200 mile coastal zone be applied off the east and Gulf coasts of the U.S., in addition to the Pacific coast.

Third, reducing sulfur opens the door to adding emission control technologies that can reduce NOx and other pollutants further. This model, first used on a large scale by New York City's transit buses (where diesel transit buses are now 97 percent cleaner than they were in the mid-1990s) and adapted by EPA for use in its recent rulemakings, would be feasible for the ocean-going vessels also. At 1000 ppm, selective catalytic reduction (SCR), a time-tested pollution-control technology used in stationary and mobile applications around the world, would be feasible.

The IMO information supports this notion that SCR or other technologies could provide dramatic emission reductions once 1000 ppm sulfur levels were in place. In one of the IMO scenarios, NOx emissions would be cut by as much as 80 percent by 2016 in the sulfur control areas that were capped at 1000 ppm. In other words, if S. 1499 were adopted, similar NOx reductions could be considered for ocean-going vessels serving American ports. Consequently, NRDC strongly supports the requirement in S. 1499 that directs EPA to

---

[13] International Council on Clean Transportation, *Air Pollution and Greenhouse Gas Emissions from Ocean-Going Ships*, Executive Summary, p. 5 (March 2007).

promulgate new emission standards for newly-manufactured and in-use main and auxiliary engines in ocean-going vessels that enter or leave a port or offshore terminal in the U.S.

Conclusion

NRDC strongly supports S. 1499, the Marine Vessels Emissions Reduction Act of 2007. We look forward to working with the Senate Environment and Public Works Committee towards its passage, and towards cleaner ships in our ports in the future.

Thank you very much for the opportunity to testify today.

RESPONSES BY RICHARD KASSEL TO ADDITIONAL QUESTIONS FORM SENATOR BOXER

Question 1. Would moving forward toward enactment of S. 1499 assist the U.S. in its current negotiations before the IMO?

Response. Yes.

NRDC believes that S. 1499 adds significant leverage and momentum to the growing calls for an international resolution to the global problem of ship pollution. In February, we were pleased to read about the progress on efforts to reduce sulfur levels at the then most recent International Maritime Organization (IMO) meeting. In sum, the IMO subcommittee on bulk liquids and gases announced that it would present three proposals for consideration by the IMO's Marine Environment Protection Committee (MEPC). Of the three,[1] one foresees a 1000 ppm sulfur cap in the Sox Emission Control Areas (SECAs) that already exist in Europe or that may be added later,[2] starting in 2012.

Another envisions a similar sulfur cap for "micro-emission control areas" in 2015. The bottom line: 1000 ppm is clearly feasible, especially in the dense shipping corridors off the U.S. and European coasts.

The IMO news may include some promising components, but should not be mistaken for the promise of actual action. Here's why: many steps remain between an IMO Subcommittee proposal and a final IMO agreement that has been ratified by its member countries. First, the IMO subcommittee on bulk liquids and gases will present its three new options to the IMO's marine environment protection committee (MEPC) in April. Then, if an acceptable option (of the three) passes the MEPC, it would go to the fulliMO for consideration in October. Then, assuming that one of these three proposals is actually approved by the IMO in October, the IMO's member countries would have to ratify the IMO's action before it is implemented globally. In other words, there has been some progress, but implementing a global agreement still seems to be a long way off.

Moreover, the IMO has a long history of adopting final standards that merely reflect the lowest common denominator of the international community. Through that lens, it seems as likely that the option that includes the 30,000 ppm global cap will be adopted as that our preferred option will be chosen, unless the substantial threat of national action (Whether via S. 1499, by European nations, or by other key government stakeholders) alters the pattern of the IMO's past decisions. In sum, notwithstanding the positive efforts of the U.S. EPA and others to convince the IMO to adopt stronger global standards for marine fuels, NRDC believes strongly that legislation like S. 1499 adds to the leverage and political pressure that is necessary to eventually adopt a global standard.

It is worth noting that a coastal sulfur reduction brings most of the benefits of reduced sulfur levels to the communities that are most affected by ship pollution. From the perspective of reducing the public health impacts of port communities, lowering sulfur standards within a coastal zone of 200 miles makes a lot of sense. Recently, the International Council on Clean Transportation, an organization that represents leading regUlators and experts around the world, reported that 70–80 percent of all ship emissions occur within 400 kilometers (248 miles of land).[3] So, in fact, the sulfur limitations in S. 1499 will not only make sense to coastal communities that are home to the nation's ports, but would effectively target roughly three-quarters of the overall ship pollution problem if applied globally. Plus, many of the communities that neighbor the nation's ports are low-income communities and/or communities of color, and already bear a disproportionate impact of the truck, rail, and terminal emissions at these ports. Reducing ship emissions would bring a well-deserved respite to these communities.

Third, reducing sulfur opens the door to adding emission control technologies that can reduce NO_x and other pollutants further. This model, first used on a large scale by New York City's transit buses (where diesel transit buses are now 97 percent

[1]One of the three proposals that will be reviewed by the IMO MEPC in April foresees a sulfur cap similar to S. 1499. Another calls for a 5000 ppm cap worldwide, in 2015, and a third calls for a global cap of 30,000 ppm (more than today's average global sulfur level in ocean-going shipping vessels, which is roughly 27,000 ppm) and more localized sulfur caps in the 1000–5000 ppm range.

[2]Currently, SECAs are in place in the Baltic Sea, the North Sea, and the English Channel. SECAs are being considered for the west coast of the U.S. and other locations around the world. In addition, California State law requires 1000 ppm sulfur fuel to be used in its coastal waters and ports by 2010, and European law requires this fuel to be used in European ports and inland waterways by 2010.

[3] International Council on Clean Transportation, Air Pollution and Greenhouse Gas Emissions from Ocean-Going Ships, Executive Summary, p. 5 (March 2007).

cleaner than they were in the mid–1990's) and adapted by EPA for use in its recent locomotive and marine diesel rule, would be feasible for the ocean-going vessels also. At 1000 ppm, selective catalytic reduction (SCR), a time-tested pollution-control technology in used in stationary and mobile applications around the world, would be feasible.

The IMO information supports this notion that SCR or other technologies could provide dramatic emission reductions once 1000 ppm sulfur levels were in place. In one of the IMO scenarios, NO_x emissions would be cut by as much as 80 percent by 2016 in the sulfur control areas that were capped at 1000 ppm. In other words, if S. 1499 were adopted, similar NO_x reductions could be considered for ocean-going vessels serving American ports. Consequently, NRDC strongly supports the requirement in S. 1499 that directs EPA to promulgate new emission standards for newly manufactured and in-use main and auxiliary engines in ocean.going vessels that enter or leave a port or offshore terminal in the U.S.

In sum, passing S. 1499 would provide significant leverage on the IMO negotiations, as well as significant health and environmental benefits to communities near our ports.

Question 2. Some have argued that reducing the levels of air pollutants like PM, SOX, and NO_x emitted from large marine vessels would have the effect of increasing overall global greenhouse gas emissions, while other experts have concluded that global warming would actually be reduced when these pollutants are addressed. Would you please provide your views on this issue.

Response. Pollution from large marine vessels contributes significantly to global greenhouse gas emissions, in addition to air pollution and public health impacts in the United States.[4] Ocean-going vessels account for an estimated 2.7–5 percent of the world's greenhouse gases, roughly equivalent to the carbon dioxide emissions of all U.S. cars and trucks, combined. According to the Intergovernmental Panel on Climate Change (IPCC), these emissions are estimated to be between 600–900 million metric tons/year.[5] Only six countries in the world emit more carbon dioxide than the world's fleet of large marine vessels.[6] Moreover, emissions from these vessels are likely to grow by 75 percent over the next two decades and may double by 2050.

Ships are also a major source of nitrogen oxide emissions. These emissions are a principal component of ground-level ozone, or smog. But they are also a greenhouse gas that acts similarly to carbon dioxide, by trapping heat in the atmosphere for decades at a time. Ships contribute as much as 30 percent of global NO_x emissions, an estimated 27.8 million tons/year. Without significant policy intervention, the contribution of ships to global NO_x emissions will grow substantially in coming decades, keeping pace with the growth in overall shipping rates and other aggregate emissions from ships. Thus, marine NO_x emissions are expected to nearly double by 2050.[7]

Ships are also a major source of "black carbon," also known as soot. These microscopic particles result from incomplete fuel combustion-and have well-known health impacts, as well as global warming impacts. These impacts include, among others, increased asthma emergencies, bronchitis, cancer, emphysema, heart attacks and premature deaths-with no known threshold of exposure required to trigger these impacts.

At sea, black carbon is a potent global warming pollutant. As soot particles absorb heat from sunlight, they warm the air, water, and ice nearby. Consequently, black carbon is increasingly viewed as a major contributor to Arctic ice melting.[8] And, shipping is, of course, the source of much of the black carbon released over the oceans.

Switching to lower-sulfur fuels would reduce each of these global warming pollutants, and enable the use of emissions control technologies that could lower emissions even further-technologies that are impossible to use with the current bunker

---

[4] In responding to this question, NRDC is deeply indebted to our colleagues at Oceana, Friends of the Earth, the Center for Biological Diversity, and Earth justice. Their expert analysis of this issue, discussed in detail in their October 3, 2007 petition October 2007 Petition") to the EPA for a Clean Air Act rulemaking 10 reduce emissions from ocean-going vessels, was invaluable to NRDC's preparation of our response 10 Senator Boxer on this question.

[5] IPCC, Climate Change 2007, The Physical Science Basis, Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change ("IPCC Summary for Policymakers"), Feb. 2007, at 2.

[6] United Nations, Department of Economic and Social Affairs, Carbon Dioxide Emissions, Thousands o(Metric Tons, available at hltp:/Imdgs.un.orgJunsd/mdg/SenesDetail.aspx?srid=749 (August 1, 2007).

[7] October 2007 Petition, at 11.

[8] Id. At 13.

fuel. For example, NO_x-reducing selective catalytic reduction (SCR) systems can effectively reduce NO_x by 80 percent or more, assuming that sulfur levels are no more than 1,000 parts-per-million (ppm). SWitching from heavy fuel oil to marine diesel oil would reduce C02 by almost 3 percent by 2020, as well as reduce NO_x by nearly 5 percent and particulate soot by 63 percent.[9] Beyond the global warming benefits, this fuel switch would reduce the public health impacts of today's ships that operate on bunker or residual fuel.

Admittedly, the switch to low sulfur fuels could increase refinery C02 emissions slightly, e.g., by 2–5 percent. However, mitigating these emissions would be more easily addressed at a stationary source location than onboard a ship. And, to the extent marine-based mitigation was desired, they could be easily offset by time-tested, successful marine-based strategies, such as reducing ship speeds near ports, as is done at the Ports of Los Angeles and Long Beach.

Real-world experience tells the best story, as always. Maersk Line ships voluntarily switch to lower-sulfur fuels within 24 nautical miles of California ports. This switch has reduced overall emissions by approximately 400 tons annually, including an 80 percent reduction in particulate soot emissions and a 17 percent reduction in NO_x emissions.[10]

In sum, NRDC believes that the net global warming and health benefits of reduced sulfur levels in the fuel that powers the global shipping industry would far outweigh the minimal increases in C02 emissions at oil refineries that result from the enhanced refining required to produce lower-sulfur fuels.

Question 3. Are emissions from marine vessels arriving in ports in Louisiana likely to affect the health of citizens of Louisiana or other states, and if so, how?

Response. Every year, thousands of Louisiana residents are harmed by diesel soot pollution,

According to the Clean Air Task Force, there were 324 premature deaths, 339 non-fatal heart attacks, 7,131 asthma attacks, 188 cases of chronic bronchitis, 40,740 lost work days, and other health impacts in Louisiana that were attributable to diesel soot pollution in 1999. Furthermore, there were 468 cancers per million person in Louisiana, thanks to diesel soot pollution, in 1999, compared to only a risk of 28 cancers per million due to all other inhaled toxic chemicals.[11] Clearly, diesel pollution is a serious problem for the Louisiana's citizens, residents and visitors.

Shipping plays a major role in this pollution and its resultant health impacts. The aggregate emissions from the ships operating in the Lower Mississippi are roughly equivalent to the emissions of almost 600,000 cars, trucks and urban buses, according to the Environmental Defense Fund.[12]

Ocean-going marine vessels are an especially significant component of this pollution. These vessels contribute 14 percent of the NO_x emissions in New Orleans, as well as 24 percent of the fine particulate soot ($PM_{2.5}$) and 59 percent of the sulfur oxides. Incredibly, these vessels contribute a larger share of the regional NO_x and $PM_{2.5}$ emissions than more publicized ports such as Los Angeles and Long Beach, California (5 percent of the NO_x and 10 percent of the $PM_{2.5}$), the port of New York and New Jersey (4 percent of the NO_x and 10 percent of the $PM_{2.5}$), and Galveston, Texas (5 percent of the NO_x and 12 percent of the $PM_{2.5}$).[13]

In sum, people who breathe air in Louisiana are no different than people who breathe air in California and other heavily polluted states of our county: they breathe huge amounts of diesel pollution that harms their hearts, lungs, and health-and much of this pollution comes from shipping activities.

CONCLUSION

I hope that these responses are helpful to you and the Committee. Because I am currently in China, I am transmitting this letter electronically. If you wish to discuss them in greater detail, please do not hesitate to contact me.

Senator BOXER. Thank you very much.

---

[9] Winebrake and Corbett, Technical Memorandum: Total Fuel Cycle Analysis for Container Ships: A Comparison of Residual Oil, Marine Gas Oil and Marine Diesel Oil (2007) at 6.

[10] Sustainableshipping.com, July 10, 2007, available at http /lwww.suslainableshipping.com/news/2007/07/68418

[11] See Clean Air Task Force, Diesel & Health in America, available at http://www.catf.uslprojectsldieselldieselheathfState php?slte-O&s–22

[12] EDF, Fact Sheet: "Air Quality and Health: Smog Alert How Commercial Shipping is Polluting Our Air," available at htlp:ffwww.environmenlaldefense.orgfgo/cmv

[13] International Council on Clean Transportation, Overview of Current and Proposed Policies in the United States (2007).

And now we are pleased to turn to Ken Wells, President of the Offshore Marine Services Association.

STATEMENT OF KEN WELLS, PRESIDENT, OFFSHORE MARINE SERVICES ASSOCIATION

Mr. WELLS. Madam Chair, members of the Committee, good morning. My name is Ken Wells. I am President of the Offshore Marine Services Association. Our association represents the owners and operators of U.S.-flag vessels that work to support the offshore oil and gas industry. So our work boats carry all of the components, the equipment, and many of the industrial workers that make it possible for our Country to access its offshore energy resources.

We appreciate the opportunity to testify today on the Marine Vessel Emissions Reduction Act of 2007. Madam Chair, we share your goal of reducing air emissions from all sources in the United States.

We do have a unique perspective on this bill and this issue. We don't represent companies that run large ocean-going ships. The vessels in our fleet are smaller than ships. They run on medium and high speed diesel engines. So our industry is already covered by the current EPA rulemaking process reducing emissions from category one and two diesel engines.

We already use low-sulfur fuel. We are already trying to come into compliance for engines and after-treatment in the rulemaking. Frankly, we don't know if we are going to make it by the deadline. We don't know if the engines with the new technology can be built and installed in time, and we don't know if the after-treatment equipment will fit within our smaller, more compact engine rooms. I can only tell you that we are trying, and we intend to meet the deadline.

Looking specifically at the bill, frankly we agree with the key purpose, to require foreign vessels to meet the same requirements as U.S. vessels. We are already on record calling for that in our sector. But within the caveat that unlike most of the ships you may be more familiar with, foreign work boats in the offshore industry don't just come to a U.S. port, drop their cargo, and leave again. They come to offshore projects. They stay for months at a time.

They compete with U.S. boats for construction work, seismic testing and dive operations. And yet we face difficult clean air mandates, and they are currently exempt. It is a little like forcing Ford to meet auto emissions standards for cars running on our highways, and then giving Toyota a free pass.

We would like for them to play by the rules. However, as we look at the larger issue, we have to recognize that it is a double-edged sword for us. When our vessels try to go to work overseas with all that expensive mandated equipment, it may make them unable to compete with the foreign boats that don't ever come to the U.S. We have to look at how we would deal with that. The U.S. owners of these vessels, if they can't get relief for the vessels at home, and then they can't compete overseas, they may be forced to re-flag those vessels, leave the U.S., and simply not work in our market.

Enough about our industry. We have to look at the Country's international competitiveness. If we as a Country move unilaterally to create a requirement that doesn't exist anywhere else in the

world, the ships will simply not call on our ports unless the rates rise so much that it would justify the expense. Now, different parts of the Country will feel that shock in different ways. In some areas, it may not be felt by the consumers. In others, it will.

I am from Louisiana, where one-third of the grain is exported through the Mississippi River. Our grain exports can rise or fall based on slight fluctuations in currency, fuel costs, or a good soaking rain on the plains of Argentina. Cargo like steel and coal also moves or doesn't move through our ports based on extremely narrow margins.

So our State's maritime industry, and it is a large part of our State's industry, would need for you to consider the impact of this bill on our local economy before you took action. We do feel that there is a better option. It has been talked about today, an option that solves your needs, gives our industry a chance to compete, and improves the air quality worldwide, which should be our goal.

Rather than forcing through this narrow bill, we would urge you to push hard for the International Maritime Organization to set standards for all of the world's vessels, push the U.S. delegation to take the leading role in achieving the goal, and give them the legislation they need to accomplish that. The U.S. should not, in our opinion, go this one alone, especially when a global solution appears to be so close at hand.

We thank you for giving us the opportunity today.

[The prepared statement of Mr. Wells follows:]

Testimony of Ken Wells
President, Offshore Marine Service Association
Concerning the Marine Vessel Emissions Reduction Act of 2007, S.1499
Before The
Full Committee on Environment and Public Works
United States Senate

Thursday, February 14, 2008

Madam Chair. Members of the Committee. Good morning. My name is Ken Wells and I am President of the Offshore Marine Service Association. Our association represents the owners and operators of U.S. flag vessels that work to support the offshore oil and gas industry. Our workboats carry all of the components and equipment and many of the industrial workers that make it possible for our country to access its offshore energy resources.

We appreciate having the opportunity to testify today on the Marine Vessel Emissions Reduction Act of 2007, S.1499. Madam Chair, we share your goal of reducing air emissions from all sources in the United States. As we understand it, the bill would take the Clean Air mandates that are currently envisioned for domestic vessels and would extend them to foreign vessels that come to America for trade or other purposes.

Our association is already on record calling for similar requirements for foreign flag vessels that work in offshore oil and gas areas. Offshore workboats operate very differently from the types of vessels that call on your ports and the ones that you are probably most familiar with. Rather than carry cargo from some foreign location to the U.S. and then leaving again, offshore vessels may come here to work in one area for months at a time. They compete directly with U.S. flag vessels for construction jobs, seismic work or in supporting dive operations. Under the current EPA emission reduction rules, these foreign vessels are not required to meet the same standards as U.S. vessels. This puts our U.S. companies at a distinct disadvantage. They must bear the expense of equipment and other restrictions while their foreign competitors largely avoid those costs. Because these foreign vessels work in our waters and gain revenue from our resources for weeks, months or even years at a time without having to play by the same rules as U.S. operators, it is a little like forcing Ford to meet auto emission standards for cars running on our highways and then giving Toyota a free pass. So yes, we would like the competition to play on an even playing field and not enjoy this unfair competitive advantage. Let me point out that the foreign vessels that work in the offshore oil business enter our Exclusive Economic Zone, but may not ever enter a U.S. port, and so the bill as written may not address the problem I just described. We would be willing of course to work with your staff to address this issue.

However, taken as a whole, the bill and the ongoing EPA rulemaking area a real double-edged sword for our industry. What would help us compete in domestic waters could prevent us from competing internationally. Our vessels work all over the world. Our business model is based on having the ability to relocate vessels overseas when activity in U.S. waters slows down. To force our members to install expensive equipment or replace engines would put them at a real cost disadvantage to foreign vessels. The end result is that they may be forced to reflag the vessels foreign and avoid the restrictions.

The other concern goes beyond the offshore industry and addresses our country's international competitiveness. While our industry has a number of foreign vessels that come to work in our waters for extended periods, most of the foreign vessels that call on U.S. ports carry cargo on international voyages as a part of a world trade. That world is too big for one player to set a standard that is out of sync with the other trade partners. The predictable result of that kind of unilateral action is that fewer vessels choose to meet the standard, demand for vessels outstrips the supply of qualified vessels and rates skyrocket.

Now you may justifiably ask, is this a real concern? I come from Louisiana where roughly a third of the nation's export grain is loaded and shipped out. Grain exports shift dramatically over fluctuations in currency, transportation fuel costs or a bountiful rainfall in Argentina. So yes, the concern that unilateral action by the U.S. could increase rates enough to hurt the Mississippi River's main export is real and must be considered.

Finally, we are still unsure whether the requirements for advanced emissions controls in this legislation and in the ongoing EPA rulemaking are achievable for our types of vessels. Our early analysis is that the mandated aftertreatment equipment may not fit in the confined spaces in the engine rooms of our smaller boats.

All of this leads us to one conclusion – The U.S. should not go this one alone. We are talking about international trade. The solution needs to be international in scope. The International Maritime Organization sets the standards for world maritime trade and the United States is a recognized leader in that forum. Push IMO to address this issue around the globe. That will solve your problems in California's non-attainment areas. It will force our competitors in the Gulf of Mexico to meet universal standards and it will allow us to move freely between domestic and overseas projects without being put at a cost disadvantage.

We thank you for giving us the opportunity to testify. I would be happy to answer any questions.

RESPONSES BY KEN WELLS TO ADDITIONAL QUESTIONS FROM SENATOR BOXER

Question 1. Data from a study of mortality resulting from marine vessel emissions, Corbett and Winebrake 2007, indicate that there are between 100 and 1SO premature deaths in Louisiana caused by pollution emitted from marine vessels each year. If enacted, S. 1499 would substantially reduce the emissions causing these deaths by requiring international shippers to use low sulfur fuel in proximity to U.S. ports. Do you agree that these effects should be addressed?

Response. Operators ofU:S. flag offshore support vessels are addressing vessel engine emissions by working to implement recent changes to Environmental Protection Agency regulations. These include switching to low sulfur fuel and working with engine manufacturers to develop improvements in the design of engines used on offshore vessels. Therefore we hope that the offshore sector will be seen as living up to its responsibilities as a U.S. citizen that is working diligently to reduce emission from its vessels.

On a related point, the bill may not address emissions from many of the foreign vessels that come into U.S. waters for offshore oil and gas work. These large construction vessels come into the exclusive economic zone (EEl) and stay for several months at a time, but may not actually enter a U.S. port, thus triggering the emission requirements contained in the bill. The legislation would need to be changed to include vessels working on the EEl if it is to include those vessels.

We do need to point out that the question asked here may not be entirely correct. The Corbett and Winebrake study does not make the statement or draw the conclusion that vessel emissions cause 100 to 150 deaths in Louisiana. The focus of the study is global emissions, not localized emissions. Attempts to extrapolate localized data from this sort of study risks being inaccurate. The conclusions may also conflict with other statistical studies. For example, the study predicts mortality in statistical probabilistic terms, yet the actual total rate of mortality in Louisiana from all respiratory disease from all causes is in reality lower than the national average, which includes both coastal states and states that are well outside the reach of vessel emissions. That is not to question the major theme and finding of the study, but rather to point out the dangers of focusing on minute slices of data taken from probabilistic analysis to derive conclusions about limited geographic areas.

The study also does not take into account the tradeoffs that could result from unilateral action. Given the much higher emissions per ton mile from other modes of transportation, this is a real consideration. Under one very likely scenario, higher shipping costs could keep some low margin cargoes such as grain from moving down the Mississippi River for export, resulting in that cargo shifting to trucks and trains for domestic transportation. Under a second scenario, cargo could be unloaded at Mexican ports and trucked into the U.S. through the California and Texas corridors. Either scenario would represent a net increase in air emissions, not to mention a statistically significant increase in traffic injuries.

Most importantly, this focus on one region detracts from the larger point of the study

that vessel emissions is a worldwide issue and one that requires an international approach. That means recognizing international economics and trade relationships, leveraging international technological solutions and negotiating on the international stage.

Question 2. Do you believe that in light of the substantial evidence that diesel emissions harm human health, that we should wait indefinitely for the IMO process to be completed and for IMO to adopi stringent standards?

Response. On behalf of our sector of the maritime industry, we again emphasize that vessels belonging to OMSA members are working to meet EPA regulations governing emissions. The question does not apply to the offshore oil and gas sector, with the exception of foreign offshore vessels that may not be covered by either EPA regulations or the Senate bill, as mentioned in question 1.

Further, the IMO process is very far along. In fact, recommendations were completed last week and await action in the fall. As was seen in the implementation of the International Ship and Port Security Code with strong and vigorous leadership from the

U.S. IMO can make significant changes in a single year. The United States should take an active and aggressive role in leading the IMO to developing appropriate international standards. The referenced study from Corbett and Winebrake indicate the international effect of vessel emissions is significant in Europe and Asia. This may present the opportunity for the U.S. to positively impact international standards in a fashion that will benefit all of the world's citizens.

Question 3. Are you aware that as of the date of the hearing the IMO negotiations included no proposals to require installation of NO_x pollution control equipment on existing large marine engines? How can we be assured that pollution and health effects of such pollution will be reduced?

Response. The Congress should request that the United States expand the scope of the treaty negotiations to include NO_x pollution control equipment on large marine engines. The installation of NO_x pollution control equipment will involve substantial research and development by international engine manufacturers, which will have to comply with international standards as will be estimated by the IMO treaty. This will require considerable cost to the maritime industry to transition and retrofit vessels with those engines.

Question 4. Is it acceptable that citizens ofLouisiana, California, New Jersey, Texas and other states affected by marine vessel pollution should be forced to suffer debilitating illnesses such as asthma and bronchitis, and thousands of premature deaths due to cancer and heart disease, while the United States waits for the international shipping interests to do something about this problem?

Response. In every instance when illness or death is caused by individual or commercial activity it should be incumbent upon government, and each of us to mitigate the effects of that activity, and including international shipping. However, we must be cognizant of broad consequences of acting unilaterally to the detriment of the maritime industry which provides economic security for millions of our citizens. Therefore, we again urge that the Congress allow the IMO treaty process to be concluded.

Senator BOXER. Thank you so much, Mr. Wells.

We are not so sure that my bill affects any of the ships you are talking about, so we are going to in the meantime hold off, but we will get into that in a minute. But at first blush, we don't think that you will be impacted, but let's wait until the questions, and go to Mr. Joel Chaisson, Executive Director of the Port of South Louisiana. We welcome you, sir.

STATEMENT OF JOEL CHAISSON, EXECUTIVE DIRECTOR, PORT OF SOUTH LOUISIANA

Mr. CHAISSON. Thank you, Madam Chairwoman Boxer, Senator Vitter, other members of the Committee. Thank you for this opportunity to testify here today.

It certainly is a very difficult act to follow this young man, with which we all sympathize.

I am Joel Chaisson, the Executive Director of the Port of South Louisiana. The Port of South Louisiana is the largest tonnage port in the Western Hemisphere. The port occupied 54 miles of the Lower Mississippi River and is located between the Port of New Orleans and the Port of Baton Rouge. Our jurisdiction comprises three Louisiana parishes, the parishes of St. Charles, St. John the Baptist, and St. James.

Besides our port being the largest tonnage port in the Western Hemisphere, the port also handles 50 percent of all of the import and export cargo in the State of Louisiana. Within our port district, we have 4 major oil refineries, 12 chemical plants, 8 grain elevators, and numerous other industrial facilities. The Port of South Louisiana receives over 4,000 deep draft vessels called in each year, as well as 55,000 barge movements within the port.

The parishes surrounding the Port of South Louisiana, not to mention the entire State of Louisiana, are considered entertainment for particulate matter and NO_x . The bill you are considering here today which seeks to address an air quality problem certainly is a problem and certainly I recognize the problem in California. It

appears at this time it is more of a problem for California in certain areas than it is in South Louisiana.

In the port, we are very concerned that without this being handled internationally, this legislation would place our ports in Louisiana, including our port, at a disadvantage cost-wise and could cause us to lose the market share of trade that comes into our ports. The Lower Mississippi River, including our district, is responsible for 15 to 20 percent of our Nation's refining of gasoline, jet fuel, diesel, heating fuel, which we ship through pipelines to all parts of this Country, and which America so desperately needs.

Therefore, by placing the Louisiana ports at an economic disadvantage, this legislation will truly affect not only the Port of South Louisiana, but also the State of Louisiana and the United States of America.

The Port of South Louisiana has been willing and continues to support legislation for hydrocarbons and oil and gas production in the Gulf of Mexico. Without the Gulf of Mexico, and the products its produces, the United States would find itself in a very difficult position. Additionally, our ports have many exports and imports to and from and across the world, including Mexico, Venezuela, the North Sea, and from Africa. A great deal of the imports of all of our oil comes from these areas abroad to be refined at the refineries in our port district in Louisiana.

Therefore, the United States should not put our ports at an economic disadvantage to the rest of the world, and instead address this from an international level, not unilaterally. While we don't oppose cleaner air, and in fact we support cleaner air, we fear that this legislation would truly affect Louisiana and the United States without an international approach. Negotiations are being worked out, and hopefully they will solve this problem where we will all be playing on a level field.

Thank you for the opportunity to testify before this Committee today, and I will attempt to answer any questions if you have any.

[The prepared statement of Mr. Chaisson follows:]

Statement of Joel T. Chaisson

Executive Director

Port of South Louisiana

Senate Committee on Environment and Public Works

"Legislative Hearing on the Marine Vessel Emissions Reduction Act of 2007", S. 1499

February 14, 2008

Thank you, Madam Chairwoman Boxer, Ranking Member Inhofe, and Senator Vitter and other Members of the Committee for the opportunity to testify today. I am Joel Chaisson, the Executive Director of the Port of South Louisiana.

The Port of South Louisiana is the largest tonnage port in the Western Hemisphere. The Port occupies 54 miles of the Lower Mississippi River and is located between the Port of New Orleans and Port of Baton Rouge. Our jurisdiction comprises the three Parishes of St. Charles, St. John The Baptist, and St. James.

Besides our Port of South Louisiana being the largest tonnage port in the Western Hemisphere, the port also handles 50% of all of the import and export cargo in the State of Louisiana. Within our port district, we have four major oil refineries, twelve chemical plants, eight grain elevators, and numerous other industrial facilities. The Port of South Louisiana receives over 4,000 deep draft vessel calls in our port each year, as well as 55,000 large movements within the port.

The parishes surrounding the Port of South Louisiana, not to mention the entire State of Louisiana, are considered in attainment for Particulate Matter and NOx. S. 1499, the "Marine Vessel Emissions Reduction Act of 2007", which seeks to address an air quality problem, appears to be more of a California problem than for those of us in Louisiana on

the lower Mississippi River. In the Port of South Louisiana, we are very concerned that without this being handled internationally, this legislation would place our ports in Louisiana including the Port of South Louisiana, at a disadvantage cost-wise and could cost us to lose the market share of trade that comes into our ports.

The lower Mississippi River including the district of our ports are responsible for 15-20% of our nation's refining of gasoline, jet fuel, diesel, and heating fuel which we ship these through pipelines across the United States is so desperately needed by Americans. Therefore, by placing our Louisiana ports at an economic disadvantage, this legislation would truly affect not only the Port of South Louisiana, but also the State of Louisiana and the United States.

The Port of South Louisiana has been willing and continues to support exploration for hydrocarbons, and oil and gas in the Gulf of Mexico. Without the Gulf of Mexico and the hydrocarbons it produces, the United States would find itself in a very difficult position. Additionally, our Port has many exports and imports to and from across the world including Mexico, Venezuela, the North Sea, and from Africa. A great deal of the imports of all of our oil comes from these areas abroad to be refined at the refineries in our port district in Louisiana. Therefore, the United States should not put our ports at an economic disadvantage to the rest of the world and instead address this from an international level, not unilaterally. While I don't oppose cleaner air, I fear this legislation would truly affect Louisiana and the United States without being approached internationally and while negotiations are being worked out internationally to address this issue.

Thank you for the opportunity to testify before this committee today. I look forward to answering any questions.

Senator BOXER. Thank you very much, sir.

And last on our panel, but certainly not least, is Joe Accardo, Executive Director, Ports Association of Louisiana. Lots of Louisianans here today. We certainly do welcome you.

STATEMENT OF JOE ACCARDO, EXECUTIVE DIRECTOR, PORTS ASSOCIATION OF LOUISIANA

Mr. ACCARDO. Thank you, Senator Boxer, Senator Vitter, Senator Lautenberg, Senator Cardin.

I am Joe Accardo, Executive Director of the Ports Association of Louisiana.

Jonah, I, too, have a grandson who has asthma and I have assisted in giving him breathing treatment, so I know the problem.

One of the most difficult problems you have as a legislator is to try to balance the public health needs of our citizens with the commercial needs of the Country and the citizens whose jobs depend upon that commercial activity. The Ports Association of Louisiana is a non-profit trade association which represents the six deepwater ports of the State, working inland ports, and ten coastal offshore oil and gas supply ports. The association was formed to promote and advance Louisiana ports.

As has been pointed out here by Joel Chaisson and Ken Wells, Louisiana is a leader in the maritime trade. Twenty percent of the Nation's waterborne commerce occurs in the ports of our State, with 485 million tons of cargo each year, with 83 percent of that commerce occurring in the six deepwater ports of our State—the Ports of New Orleans, South Louisiana, Baton Rouge, Plaquemine, St. Bernard, and Lake Charles on the Calcasieu Ship Channel.

More than 200 million tons of that cargo is transported annually in 6,500 ships. Twenty percent of the Nation's import and export of petroleum products come through our ports, and 53 percent of the Nation's exports of grain occur at our ports. And as Ken Wells pointed out, sometimes a few pennies difference in shipping costs may shift that grain trade to Argentina or Canada or Australia.

The maritime industry is an extremely important part of our economy. Dr. Tim Ryan of the University of New Orleans has found that the ports of the maritime industry provide $33 billion of impact to our State's economy, with 23 percent of our gross State product, supporting 270,000 jobs in our State.

Madam Chairman, the facts demonstrate that the ports of the maritime industry and the people of our State have an important economic stake in the legislation you are sponsoring. Maritime trade affects our deepwater ports and it also provides tremendous economic benefits to our people, but we recognize that it also has an impact on the air quality of the communities which surround our ports.

We recognize that sometimes this air quality can be detrimental to the health of our citizens. But you have heard this statement before: the most detrimental effect you can have on our citizens is to have that family lose its jobs and not have health insurance. We caution Congress. We suggest that Congress should proceed cautiously.

The emissions from ships impact our air quality. We understand that. In Louisiana, the five parishes which surround the Port of Greater Baton Rouge do not meet the ambient air quality standard for ozone. We recognize the earlier statement that 40 ports in the U.S. operate in areas that are in non-attainment areas. If the ozone standard is further reduced by EPA, as has been suggested, there will be 28 parishes in our State which will be out of attainment and it will affect the four deepwater ports along the entire 250 miles of the Lower Mississippi River. This will make it increasingly more difficult to secure permits for ports to expand its maritime operations, as well as manufacturing and other transportation-related operations.

The Ports Association recognizes that some definitive action must be taken to clean the air around our ports. The members of our organization recognize that deteriorating air quality is a great concern on the West Coast and other parts of our Country and it contributes to the lower air quality in some parts of our Country. We support the American Association of Ports' position that ports should voluntarily reduce air emissions by retrofitting cargo-handling equipment, using cleaner fuels, and reducing truck idling, but however Federal support is needed for the voluntary port efforts.

If S. 1499 is enacted into law, significantly increased air quality requirements would be imposed on the vessels utilizing America's ports, while our neighbors in Canada and Mexico will most likely not have adopted similarly restrictive requirements. It is our understanding that Canada, too, is trying to rely on the adoption of the standards that the IMO would ultimately agree to.

Senator BOXER. Can you finish up, sir?

Mr. ACCARDO. Yes.

Senator BOXER. Thank you.

Mr. ACCARDO. In the alternative, we recommend that Congress support the Administration's efforts to try to secure amendments to the MARPOL Treaty and to amend Annex VI so that way it has the same standards that you are proposing in your legislation. We believe that is the best way to approach this. We recommend that this is the best way to achieve clean air quality, while at the same time allying the U.S. ports and the ports of Louisiana to play on a level playing field. This will ensure that the ports of the United States are competitive with the ports of most of its international trading partners.

[The prepared statement of Mr. Accardo follows:]

STATEMENT OF JOE ACCARDO, JR.
EXECUTIVE DIRECTOR
PORTS ASSOCIATION OF LOUISIANA

ON BEHALF OF THE PORTS ASSOCIATION OF LOUISIANA

SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

"LEGISLATIVE HEARING ON THE MARINE VESSEL EMISSIONS REDUCTION ACT OF 2007, S. 1499"

FEBRUARY 14, 2008

Madam Chairwoman and Members of the Committee, I am Joe Accardo, Jr., Executive Director of the Ports Association of Louisiana (PAL).

In behalf of our members, I would like to express our appreciation for the opportunity to appear before your committee today to speak about this important issue of Marine Vessel Emissions Reduction, and we commend the committee for bringing attention to this subject.

The Ports Association of Louisiana is a non-profit trade association consisting of 6 deep water ports, 14 inland river ports, and 10 coastal oil/gas service ports. The Association was formed to promote and advance Louisiana ports, maritime support industry and services.

Louisiana is a national leader in the maritime industry, and its expansive waterway system and multiple public and private docks and terminals accounts for 20% of the nation's total waterborne commerce, or approximately 485 million tons of cargo a year. The vast majority of this activity, 83%, occurs at the deep water ports along the Lower Mississippi River in the Ports of New Orleans, South Louisiana, Baton Rouge, St.Bernard

and Plaquemine and in the Port of Lake Charles on the Calcasieu Ship Channel. More than 200 million tons of this cargo are foreign trade, transported on more than 6500 ships annually and include 20% of the nation's import and export of petroleum and petroleum related products, 53% of the nation's export of grains, and one of the Nation's three Liquid Natural Gas terminals.

The maritime industry is extremely important to the economy of Louisiana. Recent studies by Dr. Timothy Ryan of the University of New Orleans found that the ports and maritime industry have a $33 billion impact on the state's economy, or approximately 23% of the gross state product, and that industry directly and indirectly supports 270,000 jobs.

Madam Chairwoman, the facts discussed above demonstrate that the ports and maritime industry and the people of our state have an important economic stake in how this legislation will affect the vessels which call at the deep water ports of our state. While maritime trade yields tremendous economic benefits for the port community, as well as for the local, state and federal governments, it can impact air quality in and around the community which surrounds our ports and affects the public health and environment of our citizens. We support efforts to remove emissions and improve air quality, but we suggest that the greatest detriment to the health of our citizens would be to take actions which may unnecessarily cause the loss of jobs in the maritime industry. Therefore, we suggest that the Congress proceed cautiously.

Because of incomplete data, it is uncertain at this time as to the extent that emissions from ships impact the air quality in the communities in and around many of our ports. However, in Louisiana, the five parishes in and around the Port of Greater Baton Rouge do not meet the National Ambient Air Quality Standards for Ozone (NAAQS). The American Associations of Port Authorities (AAPA) survey shows that 30 ports in the U. S. are now located in non-attainment areas. If the ozone standard is further reduced by EPA as is proposed, it appears that 28 parishes in southeast Louisiana will be classified as "out of attainment", which will include the remaining 4 deep water ports along the entire

250 miles of the lower Mississippi River. If this should occur, it would become increasingly more difficult to secure permits for new or expanded port and maritime operations as well as other manufacturing or transportation related operations. For many of the foregoing reasons, PAL recognizes that some definitive actions must be taken in the near future as discussed below...

The members of the Ports Association of Louisiana recognized that in many areas of the United States deteriorating air quality is of great concern, and particularly on the West Coast where the emissions from vessels and port operations may contribute to the lower air quality. We support the (AAPA) position that ports voluntarily reduce air emissions by retrofitting cargo-handling equipment, using cleaner fuels, and making operational changes to reduce truck idling and improve efficiency. However, federal support is needed for these voluntary port efforts.

If S.1499 is enacted into law as now proposed, significantly increased air quality requirements would be imposed on the vessels utilizing American ports while our neighbors in Canada and Mexico most likely will not have adopted similarly restrictive requirements. In the alternative, we suggest that Congress should support efforts by the United States to address the problems of emissions from oceangoing vessels in consort with the international trading community.

The United States has signed the International Convention for the Prevention of Pollution from Ships of 1973, as modified in 1978 (MARPOL 73/78). The IMO has issued air pollution standards under MARPOL Annex VI-Regulations for the Prevention of Air Pollutions from Ships. Those regulations became effective on May 18, 2004. Today 46 countries representing 55%of world shipping tonnage have ratified Annex VI. In addition to setting standards for oxides of sulfur (SOx) and nitrogen (NOx) emissions, Annex VI contains provisions allowing for special Sulfur Emissions Control Areas (SECAs) to be established with more stringent controls on sulfur emissions, requiring ships to use fuel oil not to exceed 1.5% sulfur content. The Baltic Sea Area is designated as a SECA in the Protocol, and a proposal to establish a SECA in the North Sea has also

been adopted, with pending proposals for SECA in several other areas desiring more restrictive standards.

The United States has not yet ratified Annex VI: however the United States has in February of 2007 proposed amendments to Annex VI, which would dramatically reduce air pollution from ships by establishing a new tier of performance-based standards for marine diesel engines on all vessels and by establishing stringent emission requirements for ships that operate in coastal areas where air-quality problems are acute. Amendments proposed to Annex VI by the International Association of Independent Tanker Owners (INTERTANKO) representing 2500 ships comprising 210 million deadweight tons, proposes that IMO mandate the use of Marine Diesel Oil which would reduce sulfur content of fuel to 0.50% and in their view removing the need for SECA. Additionally, Maersk Lines recently established a policy of utilizing .20% or 2000ppm fuel on its West Coast U. S. ports voyages. The Intertanko proposal and Maersk policy demonstrates that the shipping industry which will bear the capital cost of compliance is active in seeking solutions to the emissions issues. The information we have received is that U. S. negotiations for amending Annex VI are continuing and are expected to be completed in 2008.

If Congress enacts S. 1499, the strict standards have the potential to put United States ports at a disadvantage when compared to international ports which follow the IMO Annex VI standard. The requirement in S 1499 for use of fuel with not more than 1000 parts per million (.10%) of sulfur is significantly more restrictive than required in the SECA under Annex VI. However, if the ultimate goal of Congress is to achieve the more restrictive standards proposed in S. 1499, we recommend that this be achieved through amendments to Annex VI. The alternative is for Congress to amend S. 1499 to include the provisions of Annex VI with amendments proposed by the U. S. This would result in unilateral and less acceptable action by the U. S. unless the Annex VI is amended and adopted by the United States. Reports to the maritime industry indicated that IMO has demonstrated an impressive record of monitoring air pollution emissions as well as sulfur content of marine fuel oil which has resulted in reducing the sulfur content for all vessels

in 2006 to an average of 2.59 % and it continues to make adjustments to regulatory standards to achieve further reductions. Further the IMO has demonstrated by its granting of SECA to multiple countries and regions that it will respond to the demonstrated requirements for more restrictive emission standards.

The Ports Association of Louisiana supports the AAPA policy which recommends that the United States continues to pursue the adoption of amendments to the Annex VI with the goal of ratifying Annex VI, thereby aligning the U. S standards for emissions with most of its trading partners. The Ports Association of Louisiana also supports and urges the IMO to adopt the amendments to Annex VI proposed by the United States. The Annex VI standards with the U. S. amendments, and with the provisions for SECA will allow the global shipping companies to have an achievable standard to which it can engineer vessels engines. Once the U. S. has ratified Annex VI, areas of the country which have experienced NAAQS non-attainment status, such as the areas in which the West Coast ports operate, can apply for a Sulfur Oxides Emissions Control Area (SECA) to further restrict emissions if they desire. The adoption of Annex VI with the U. S. proposed amendments levels the field and will ensure that the ports of the United States are competitive with the ports of most of its international trading partners.

Thank you for the opportunity to appear before this committee today . I would be pleased to answer any questions or submit additional information you may request.

RESPONSES BY JOE ACCARDO TO ADDITIONAL QUESTIONS FROM SENATOR BOXER

Question 1. Data from a study of mortality resulting from marine vessel emissions, Corbett and Winebrake 2007, indicate that there are between 100 and 150 premature deaths in Louisiana caused by pollution emitted from marine vessel each year. If enacted, S1499 would substantially reduce the emissions causing these deaths by requiring international shippers to use low sulfur fuel in proximity to U. S. ports. Do you agree that these effects should be addressed?

Response. The member ports of the Ports Association of Louisiana agree that the effects of sulfur emissions from marine vessels should be addressed. In my statement to the Committee on Environment and Public Works on February 14,2008 our association supported the efforts of the United States to amend the pertinent IMO treaties to substantially encompass the standards for emissions as provided in S1499. We support the joint efforts between the United States and our trading partners to amend the IMO treaty to address the issue of sulfur emissions.

Question 2. Do you believe that in light of the substantial evidence that diesel emissions harm human health, that we should wait indefinitely for the IMO process to be completed and for IMO to adopt stringent standards?

Response. We do not believe that the United States should wait indefinitely for the IMO treaty to be amended. However, the Congress should monitor the progress of the negotiations and if reports of progress are forth coming, the Congress should allow a reasonable period for the treaty to be concluded.

Question 3. Are you aware that as of the date of the hearing the IMO negotiations include no proposals to require installation of NO_x pollution control equipment on existing large marine engines? How can we be assured that pollution and health effects of such pollution will be reduced?

Response. The Congress should request that the United States expand the scope of the treaty negotiations to include NO_x pollution control equipment on large marine engines. The installation of NO_x pollution control equipment will involve substantial research and development by international engine manufacturers, which will have to comply with international standards as will be established by the IMO treaty. This will require considerable cost to the maritime industry to transition and retrofit vessels with those engines.

Question 4. Is it acceptable that citizens of Louisiana, California, New Jersey, Texas and other states affected by marine vessel pollution should be forced to suffer debilitating illnesses such as asthma and bronchitis, and thousands of premature deaths due to cancer and heart disease, while the United States waits for the international shipping interest to do something about this problem?

Response. In every instance when illness or death is caused by individual or commercial activity it should be incumbent upon government, and each of us to mitigate the effects of that activity, and including international shipping. However, we must be cognizant of broad consequences of acting unilaterally to the detriment of the maritime industry which provides economic security for millions of our citizens. Therefore, we again urge that the Congress allow the IMO treaty process to be concluded.

Senator BOXER. Thank you, sir.

Before I start my questioning, and we will each have 5 minutes to question, I would like to place in the record a summary of a new study just last month that found that if 1,000 parts per million sulfur standard is adopted within 200 miles of the world's coastlines, premature mortality would be cut in half, saving more than 40,000 lives every single year. And the second thing I want to place in the record is a letter coming from the National Association of Clean Air Agencies, this is national and not just about California by any stretch, supporting the legislation. So we will put those in the record.

[The referenced documents follow:]

NACAA
national association of clean air agencies

BOARD OF DIRECTORS

Co-Presidents
Andrew Ginsburg
Oregon
Ursula Kramer
Tucson, AZ

Co-Vice Presidents
Colleen Cripps
Nevada
Arturo J. Blanco
Houston, TX

Co-Treasurers
G. Vinson Hellwig
Michigan
Larry Greene
Sacramento, CA

Past Co-Presidents
John Paul
Dayton, OH
Shelley Kaderly
Nebraska

Directors
Robert D. Elliott
Vancouver, WA
Joyce E. Epps
Pennsylvania
Anne Gobin
Connecticut
James Hodina
Cedar Rapids, IA
Lynne A. Liddington
Knoxville, TN
Keith Overcash
North Carolina
David J. Shaw
New York
Paul Tourangeau
Colorado
Mary Uhl
New Mexico

Executive Director
S. William Becker

February 8, 2008

The Honorable Barbara Boxer
Chair
Committee on Environment and Public Works
U.S. Senate
410 Senate Dirksen Office Building
Washington, DC 20510

RE: Support for *Marine Vessel Emissions Reduction Act of 2007* (S. 1499/H.R. 2548) and U.S. Proposal to International Maritime Organization for Marine Fuel and Engine Standards

Dear Senator Boxer:

We write to you on behalf of the National Association of Clean Air Agencies (NACAA) – the national association of air pollution control agencies in 53 states and territories and over 165 metropolitan areas across the country – to express our association's support for federal legislative action and international action to curb emissions from domestic and foreign-flagged Category 3 (ocean-going) marine vessels.

Category 3 marine engines emit large quantities of oxides of nitrogen (NO_x) and sulfur oxides (SO_x) – which are precursors to the formation of ambient particulate matter and ozone – as well as toxic particulates. All of these adversely affect the air quality in port cities across the nation, as well as areas downwind of those cities. Studies confirm that exposure to these pollutants causes increased mortality, cancer risks and respiratory illnesses, and substantially increases health costs. For example, in the South Coast Air Basin of California, emissions from Category 3 vessels are responsible for more than half of the region's SO_x and will soon become the area's single largest source of NO_x. The South Coast Air Quality Management District has estimated that marine vessel pollution causes hundreds of premature deaths each year and, further, contributes to cancer risks near ports that are well over 2,000 in a million. Notwithstanding such impacts, emissions from Category 3 marine vessels, such as container ships, are virtually uncontrolled. Moreover, Category 3 vessel emissions are expected to grow since cargo throughput is projected to increase substantially in the coming years.

For these reasons, NACAA supports adoption of the *Marine Vessel Emissions Reduction Act of 2007* (S. 1499/H.R. 2548), which would require domestic and foreign-flagged ships to use cleaner-burning, low-sulfur fuels that reduce health-threatening particulate emissions. The Act will also impose tougher emissions standards for marine vessel engines that will reduce exposure to ambient particulate matter and ozone.

444 North Capitol Street, NW • Suite 307 • Washington, DC 20001 • phone 202.624.7864 • fax 202.624.7863 • www.4cleanair.org

Likewise, NACAA supports the February 9, 2007 U.S. proposal to the International Maritime Organization (IMO) regarding marine fuel and engine standards. If adopted by the IMO, this proposal – which is based on the same substantive fuel and emission standards as S. 1499 and H.R. 2548 – will substantially reduce ship emissions on an international scale.

Meaningful controls on vessel emission – such as those established in S. 1499/H.R. 2548 and proposed by the U.S. to the IMO – will contribute significantly to state and local efforts to attain health-based clean air standards by rapidly approaching federal deadlines. And these controls can be achieved at relatively low cost. Although international action on the regulation of Category 3 marine engines would yield farther-reaching benefits than domestic action alone, history has shown that with the many nations involved in the IMO process, there is no assurance that the IMO will achieve consensus regarding international standards that are sufficient, and timely, to meet the air quality needs of the United States. Therefore, prompt action on S. 1499/H.R. 2548 will send an important message to the IMO that the U.S. is serious about controlling vessel emissions, thus helping to spur IMO action. In addition, it will ensure that, in the event that the IMO does not take sufficient and/or timely action, the U.S. is prepared to move ahead quickly to adopt standards to protect the health and welfare of its citizens.

Action to decisively address the air quality and public health threats posed by emissions from Category 3 marine engines is long overdue. As we continue to observe the IMO process with hopes that it will yield rigorous standards in line with those proposed by the U.S., NACAA is pleased that you and Representative Hilda Solis have proposed legislation to ensure that rules limiting the sulfur content of fuel used by domestic and foreign-flagged ships entering U.S. ports and establishing maximum achievable NO_x, SO_x and particulate emission standards for marine vessel engines will be adopted in the U.S. in the event the IMO does not achieve timely success.

On behalf of NACAA, thank you for your leadership on this important issue. Our association stands ready to work with you and your staff, as well as other stakeholders, to support adoption of this important bill.

Sincerely,

Andrew Ginsburg

Andrew Ginsburg (Oregon)
NACAA Co-President

Ursula Kramer

Ursula Kramer (Tucson, AZ)
NACAA Co-President

Senator BOXER. And now if you could start my time.

You know, in the history of our Country, every time we pass a bill to protect the health of our citizens and cleanup the environment, there are always people who say it is going to take away jobs. From the State and the Nation that has been in the vanguard here, the opposite has been proven true. We can do it. This is America. We can work and be safe at the same time. And as a matter of fact, I want to praise some in the industry. Maersk Shipping Company is doing this without a regulation. They get it.

So for people to say this is the worst thing that could happen, I just think talk to some of the people in your own shipping business. I just feel this is something we ought to be on the same page on. Now, let me be clear. I favor the international treaty and moving forward.

Again, I want to thank Mr. Wood-Thomas. And by the way, if you have to leave, I understand. I am so appreciative of your being here.

We would much prefer to do it that way, but we are not going to sit around and see people die. Would you put up that chart again? We are not talking about California, sir. We are talking about the Gulf Coast. We are talking about the Texas Coast. We are talking about the Florida, New Jersey, New York, all the way up the West Coast. This is a national problem, so let's be very clear about it. That is why we have a lot of folks from different port areas on this bill.

Jonah, I want to ask you because I do have one person in my family with asthma, but I am not familiar with a child having asthma. In other words, my kids didn't have asthma. So could you just give us a sense of what it feels like when you have an asthma attack? And what do you do when you have one? And what effect does asthma have on you and your family?

Mr. RAMIREZ. Well, when you have an asthma attack, it feels like as if a grown man was sitting on your chest. It hurts really bad and then you start wheezing and you start coughing a lot and trying to get air in and out. And so you are supposed to try and take it easy and get your inhaler and take a puff of that, and then wait and take another one. And then once you start feeling better, you will feel your chest start to clear up.

But it affects me because like if I am playing a sport, and all of a sudden I will just start having the asthma attack, only to go back and sit down and get my inhaler and it would be better. Because if I didn't have asthma, then I could just play out there without coming in and worrying about do I have my inhaler or do I not.

Senator BOXER. Do you have to take your inhaler all the time?

Mr. RAMIREZ. Yes.

Senator BOXER. Everywhere you go?

Mr. RAMIREZ. Yes, I can't leave it at home.

Senator BOXER. Right. Do you know a lot of other kids in school or in your neighborhood who have asthma or other breathing problems? Is it common?

Mr. RAMIREZ. Yes, like just recently a bunch of my friends started coming up with asthma, my cousins.

Senator BOXER. Do they live in the neighborhood around where you live?

Mr. RAMIREZ. Yes. They all live in California.

Senator BOXER. Yes. Well, we are going to do everything we can to clear up the air.

I would ask Dr. Miller, because we all feel bad about this, regardless. Can you explain how reducing port pollution could have immediate benefits, or would they not? In other words, if a kid is resilient, would they come back?

Dr. MILLER. Well, there is evidence that if you take a child out of a high-polluted environment, if the family moved, and this is from the children's study done at USC, if a child moves from a high-polluted environment to a less-polluted environment, they do better. So clearly if you can make the entire environment better, we would have a lot of children doing a lot better with that particular disease process, sure.

Senator BOXER. So it is a direct relationship.

Dr. MILLER. This would have immediate benefit.

Senator BOXER. Good.

Dr. MILLER. Get the poison out of the air and help the children live better. It is that simple.

Senator BOXER. I hear you.

Mr. Accardo, you said in your written testimony submitted to the Committee that the IMO has demonstrated an impressive record of monitoring air pollution emissions, as well as sulfur content of marine fuel. Given that the industry averages about 27,000 parts per million sulfur, more than 1,000 times the level we impose for our own trucks and buses, and given the fact that between 2,000 and 5,000 people die per year as a result of ship emissions, how do you call what they are doing "impressive"?

Mr. ACCARDO. Well, in 1 year they have reduced the average from 2.7 to 2.59. Now, in the scheme of things, you are right. It is not a great deal of reduction. Senator Boxer, I would like to make it clear that we support the reduction of pollutants as far as it is economically possible. We support the concept you have in your bill.

The differences are we support taking action on an international basis with our trading partners. We commend you for your efforts on this bill, but we suggest that if we can do this through the IMO with the negotiations that are going on now and achieve exactly the same kind of standards you have in your bill, we support that. As I said, we are personally involved. We all have children and even adults who have asthma.

Senator BOXER. I know.

Mr. ACCARDO. And we don't want to see one person die because of a pollutant coming from anywhere, ships or any other place.

Senator BOXER. Well, my time is running out. I do understand that. I do. I just feel that we have waited since 2003. It is 2008. How long does Jonah have to wait? That is the issue. I mean, October, if we are going to get it done, will we get it done? Or will we just stand still.

So I want to place in the record that according to a report by Dr. James Corbett, there are 100 to 150 premature deaths per year in Louisiana due to these ship emissions. So it is a major health issue, as I said, all over the Country, in my State and in Louisiana

as well, and I am sure in Maryland, New Jersey, wherever you look where there is a port.

[The referenced document follows:]

Environ. Sci. Technol. **2007**, *41*, 8512–8518

Mortality from Ship Emissions: A Global Assessment

JAMES J. CORBETT,*,† JAMES J. WINEBRAKE,‡ ERIN H. GREEN,§ PRASAD KASIBHATLA,‖ VERONIKA EYRING,⊥ AND AXEL LAUER⊥

College of Marine and Earth Studies, University of Delaware, 305 Robinson Hall, Newark, Delaware 19716, Department of STS/Public Policy, Rochester Institute of Technology, 1356 Eastman, Rochester, New York 14623, Nicholas School of the Environment, Duke University, Box 90328, Durham, North Carolina 22708, and Deutches Zentrum fuer Luft- und Raumfahrt (DLR) DLR-Institute fuer Physik der Atmosphaere, Oberpfaffenhofen, Wessling, Germany

Received July 09, 2007. Revised manuscript received September 28, 2007. Accepted October 04, 2007.

Epidemiological studies consistently link ambient concentrations of particulate matter (PM) to negative health impacts, including asthma, heart attacks, hospital admissions, and premature mortality. We model ambient PM concentrations from oceangoing ships using two geospatial emissions inventories and two global aerosol models. We estimate global and regional mortalities by applying ambient PM increases due to ships to cardiopulmonary and lung cancer concentration-risk functions and population models. Our results indicate that shipping-related PM emissions are responsible for approximately 60,000 cardiopulmonary and lung cancer deaths annually, with most deaths occurring near coastlines in Europe, East Asia, and South Asia. Under current regulation and with the expected growth in shipping activity, we estimate that annual mortalities could increase by 40% by 2012.

Introduction

The marine transport sector contributes significantly to air pollution, particularly in coastal areas (*1–8*). Annually, oceangoing ships are estimated to emit 1.2–1.6 million metric tons (Tg) of particulate matter (PM) with aerodynamic diameters of 10 μm or less (PM_{10}), 4.7–6.5 Tg of sulfur oxides (SO_x as S), and 5–6.9 Tg of nitrogen oxides (NO_x as N) (*9–12*). Recent studies have estimated around 15% of global NO_x and 5–8% of global SO_x emissions are attributable to oceangoing ships (*10, 11*). Given nearly 70% of ship emissions occur within 400 km of land (*2, 11, 12*), ships have the potential to contribute significant pollution in coastal communities—especially for SO_x. For instance, Capaldo et al. (*1*) estimate that ship emissions contribute between 5 and 20% of non-sea-salt sulfate concentrations and 5–30% of SO_2 concentrations in coastal regions.

Numerous studies in recent years have consistently linked air pollution to negative health effects for exposed populations (*13, 14*). Ambient concentrations of PM have been associated with a wide range of health impacts including asthma, heart attacks, and hospital admissions. An important PM-related health effect is premature mortality; in particular, increases in concentrations of PM with aerodynamic diameters of 2.5 μm or less ($PM_{2.5}$) have been closely associated with increases in cardiopulmonary and lung cancer mortalities in exposed populations (*15*). Cohen et al. estimated approximately 0.8 million deaths per year worldwide from outdoor urban $PM_{2.5}$ air pollution, 1.2% of global premature mortalities each year (*16*).

Emissions from international ships are increasingly a focus for proposed regulation in local, national, and international arenas (*8, 17, 18*). Yet, in many ways regulatory deliberations have not been fully informed, as the extent of shipping emissions health impacts has been unknown. Previous assessments of regional shipping-related health impacts focused on European or Western United States regions, and ignore long-range and hemispheric pollutant transport (*8, 19*). This undercounts international shipping impacts within local and regional jurisdictions, and does not properly inform international policy decision making.

Assessing Mortality from Atmospheric Modeling of Ship Emissions

Our approach is similar to that of other studies (*15, 16, 20, 21*): (1) determine pollutant emissions from ships; (2) apply atmospheric transportation and chemistry models to estimate the increased concentrations due to ships; (3) estimate increased risk to exposed population due to these additional concentrations; and (4) calculate additional mortalities due to that increased risk.

We use two different geospatial ship data sets to help us construct geospatial emission inventories: the International Comprehensive Ocean-Atmosphere Data Set (ICOADS) by Corbett et al. (*10*), and the Automated Mutual-assistance Vessel Rescue system (AMVER) by Endresen et al. (*12*). These two data sets combine detailed information about vessel characteristics with vessel traffic densities to determine emissions geospatially. However, each data set allocates ship-traffic intensities differently. For example, while all oceangoing commercial ship types are included in these data sets, ICOADS oversamples container ship traffic and refrigerated cargo ship (i.e., reefer) traffic, and AMVER oversamples bulk carrier and tanker traffic. Ship inventory differences affect regional atmospheric pollution concentrations, potentially influencing health effects estimates. Both inventories provide emissions data on a monthly time-resolution; for atmospheric modeling, we assume emissions occur uniformly throughout each month.

We generated three emissions inventory data sets for comparison. First, we used monthly resolved ICOADS 2002 emissions estimates of NO_x, SO_x, black carbon (BC), and particulate organic matter (POM) at a 0.1° × 0.1° global grid resolution (*Inventory A*). Second, we used AMVER 2001 emissions estimates of NO_x, SO_x, BC, and POM at a 1° × 1° global grid resolution from Eyring et al. (*Inventory B*) (*11*). Because of recent attention on the growth in commercial shipping activity, we also produced ICOADS-based ship inventories for 2012 (*Inventory C*) forecast using a uniform global average growth rate of 4.1% (*3, 10*). Both inventories represent shipping routes for most cargo shipping, and some oceangoing passenger shipping activity, but neither adequately represents typical fishing fleets and passenger ferry service; therefore, we adjust global inventories to represent only cargo and passenger ships. Table 1 shows total annual shipping-attributable emissions for each inventory.

* Corresponding author phone: (302) 831-0768; e-mail: jcorbett@udel.edu.
† University of Delaware.
‡ Rochester Institute of Technology.
‖ Duke University.
⊥ DLR-Institute fuer Physik der Atmosphaere.

10.1021/es071686z CCC: $37.00 © 2007 American Chemical Society
Published on Web 11/05/2007

TABLE 1. Annual Emission Totals of Particulate Matter and Trace Gases from Shipping in Tg/yr for the Three Different Inventories Considered in This Study

	Inventory A for 2002 (Corbett et al., 2007 (*4*))	Inventory B for 2001 (Eyring et al., 2005 (*11*))	Inventory C for 2012 (this study)
spatial ship traffic proxy	ICOADS	AMVER	ICOADS
fuel consumption in million tonnes	200 (cargo and passengers only)	280 (world fleet including auxiliary engines)	299 (cargo and passengers only)
NO_x	16.4	21.3	24.5
SO_x	9.2	11.7	13.7
primary SO_4	0.35	0.77	0.50
CO	1.08	1.28	1.61
BC	0.07	0.05	0.10
POM	0.71	0.13	1.06

Global-scale models may model differently the $PM_{2.5}$ concentrations used in health-effects estimates. We compare increased ambient $PM_{2.5}$ concentrations from marine shipping using two atmospheric models. The first, GEOS-Chem (*22*), is a global 3-D atmospheric composition model driven by assimilated meteorological observations from the Goddard Earth Observing System (GEOS). GEOS-Chem output provided us with ambient dry concentrations of BC, POM, and sulfates from ocean-going ships separately from total $PM_{2.5}$ attributed to all other sources. The second model, ECHAM5/MESSy1-MADE (referred to as E5/M1-MADE), is an aerosol microphysics module (MADE) coupled to a general circulation model (ECHAM5), within the framework of the Modular Earth Submodel System MESSy (*23*). Along with global $PM_{2.5}$ concentrations attributed to nonship sources, the E5/M1-MADE model provided ambient concentrations of BC, POM, and sulfates for direct comparison with GEOS-Chem results; separately the model produced concentrations of total $PM_{2.5}$ constituents related to shipping (including nitrates and ammonium ions). The Supporting Information includes additional detail for both models.

Comparing results of each model with and without ship inventories of $PM_{2.5}$ components, we quantify ambient concentrations of $PM_{2.5}$ due to marine shipping. Worldwide concerns about SO_x emissions from ships are motivating the replacement of marine residual oil (RO) with cleaner fuels, such as marine gas oil (MGO) and marine diesel oil (MDO), which will directly impact BC, POM, and sulfates attributed to ships; therefore, we model total PM and the subset of PM from ships most commonly associated with current marine fuels. We defined the following cases to investigate robustness of mortality estimates under different inventory and modeling choices:

Case 1 compares $PM_{2.5}$ concentrations with and without ship emissions from model simulations with Inventory A. This was done three times: Case 1a examines BC, POM, and sulfates only, using the GEOS-Chem model; Case 1b uses the E5/M1-MADE model to examine BC, POM, and sulfates for direct comparison with GEOS-CHEM; Case 1c uses the E5/M1-MADE model to examine total PM from ships.

Case 2 compares $PM_{2.5}$ concentrations with and without ship emissions from model simulations with Inventory B in the E5/M1-MADE model. This was done twice: Case 2a for BC, POM, and sulfates only; and Case 2b for all PM constituents.

Case 3 compares $PM_{2.5}$ concentrations with and without ship emissions from model simulations with Inventory C representing estimated 2012 emissions from increased shipping activity. The case examines BC, POM, and sulfates only, using the GEOS-Chem model. Note that Case 3 estimates ignore potential emissions growth (or reduction) from other sources between 2002 to 2012; however, we use Case 3 only to estimate the additional mortality from oceangoing trade growth, not to estimate total change in mortality due to all sources of $PM_{2.5}$.

Figure 1 depicts an annual aggregation of one of our two midrange estimated contributions of $PM_{2.5}$ concentrations due to shipping in 2002 (Case 2a). Concentration increases from ships range up to 2 μg per cubic meter ($\mu g/m^3$) and occur primarily over oceans and coastal regions.

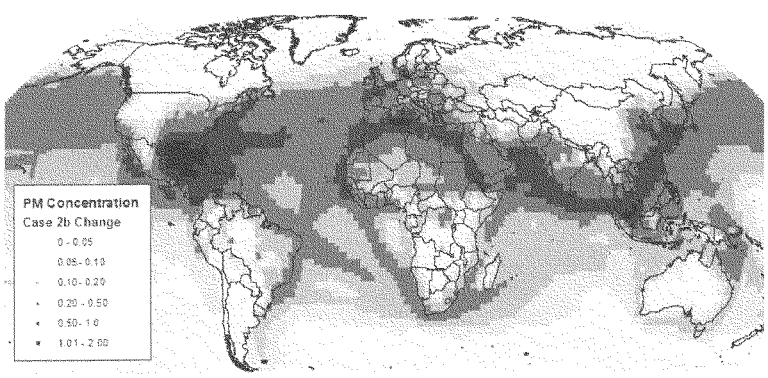


FIGURE 1. Annual average contribution of shipping to $PM_{2.5}$ concentrations for Case 2b (in $\mu g/m^3$)

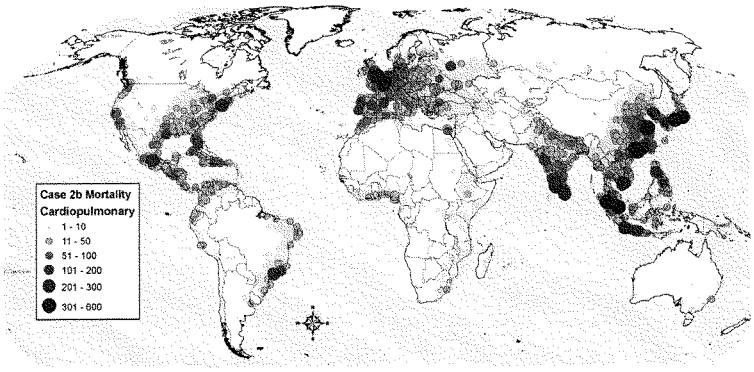


FIGURE 2. Cardiopulmonary mortality attributable to ship $PM_{2.5}$ emissions worldwide, Case 2b.

Annual $PM_{2.5}$ concentrations were used to assess annual mortality due to long-term PM exposure, consistent with Pope et al. (*15*). This requires an estimate of exposed population. We used 2005 global population estimates (obtained in a 1° × 1° format) from the Socioeconomic Data and Applications Center (SEDAC) at Columbia University (*24*). To conform to the population data resolution, we interpolated to a 1° × 1° resolution the atmospheric concentration output for each of our cases (provided at 2° latitude × 2.5° longitude in GEOS-Chem and at 2.8° × 2.8° longitude by latitude in E5/M1-MADE). We note that for most areas (with population growth) the use of 2005 population estimates will slightly overestimate our 2002 mortalities and slightly underestimate our 2012 mortalities.

Our mortality estimates are based on cardiopulmonary and lung cancer causes of death for adults over 30 years of age. Therefore, we applied U.S. Census Bureau International Database estimates to derive, by continent, the percentage of each grid cell's population over 30 years old (*25*).

We also required background incidence rates of mortality due to the health effects under study. Incidence rates were estimated using World Health Organization (WHO) 2002 data aggregated to the WHO region level (*26*). WHO cause of death by age estimates were used to derive incidence rates for the 30–99 age group for each of the six WHO regions. Similar to another assessment of global mortality from outdoor pollution, lung, tracheal, and bronchial cancers were considered "lung cancers" for our purposes (*20*); these cancers are aggregated and nondistinguishable in WHO burden of disease estimates. United States cardiopulmonary incidence values obtained from the U.S. EPA (*27*) were used for North America.

In calculating mortality effects we used C-R functions derived from an American Cancer Society cohort study that examined the relationship between $PM_{2.5}$ and lung cancer and cardiopulmonary mortality in the United States (*15*). We apply these U.S.-derived C-R functions to our entire spatial data set, recognizing that transferring U.S.-derived functions to the global population introduces uncertainty to the analysis, because socioeconomic factors have been associated with effects of PM exposure on mortality and relative risks (*28, 29*). However, other researchers have demonstrated that the relationship between short-term PM exposure and mortality is relatively consistent across several countries and continents (*21, 30, 31*). We employ a log-linear exposure function using Pope (*15*) to estimate long-term mortality effects of $PM_{2.5}$, as recommended and described by Ostro (*21*). These equations reduce to an effects equation as follows:

$$E = \left[1 - \frac{(X_0 + 1)}{(X_1 + 1)}\right]^{\beta} \cdot B \cdot P \qquad (1)$$

where E represents total effects (deaths/year); X_1 is the pollutant concentration for the case under study in $\mu g/m^3$; X_0 is the pollutant background concentration in $\mu g/m^3$; β is an estimated parameter based on the health effect under study; B represents the general incidence of the given health effect (e.g., cardiopulmonary deaths/person/year), and P represents the relevant exposed population (detailed equations are derived in the Supporting Information).

Ship PM-Induced Global and Regional Premature Mortality

Exposure to shipping-related $PM_{2.5}$ emissions in 2002 resulted in 19,000 (Case 1a) to 64,000 (Case 1c) cardiopulmonary and lung cancer mortalities globally, depending on the emission inventory and on the particles considered. Approximately 92% of the estimated premature mortalities are from cardiopulmonary illnesses. Mortalities increase by approximately 40% in 2012 due to trade-driven growth in shipping emissions.

Figure 2 reveals that mortalities are concentrated in distinct regions. We estimate regional impacts separately in Table 2 for North America (NA); Europe/Mediterranean (EUM); East Asia (EA), including China and Japan; South Asia (SA), including India and Indonesia; and Eastern South America (ESA). Regional burden of mortality varies, with the greatest effects seen in the EUM (20–40% of global mortalities), EA (20–30%), and SA (15–30%) regions.

Figures 2, 3, and 4 depict our cardiopulmonary mortality estimates by grid cell for Case 2a for the entire globe, the EUM region, and the EA/SA regions, respectively. Mortality estimates of less than 1 per grid cell are excluded to facilitate readability.

As expected, regions with the greatest mortality effects are also those where shipping-related $PM_{2.5}$ concentrations

TABLE 2. Annual Cardiopulmonary and Lung Cancer Mortality Attributable to Ship $PM_{2.5}$ Emissions by Region and by Case (Best Estimate from C-R function[a] (95% confidence interval[b]))

Region	Case 1a Inventory A Model: GEOS-Chem PM: BC, POM, SO_4	Case 1b Inventory A Model: E5/M1-MADE PM: BC, POM, SO_4	Case 1c Inventory A Model: E5/M1-MADE PM: All	Case 2a Inventory B Model: E5/M1-MADE PM: BC, POM, SO_4	Case 2b Inventory B Model: E5/M1-MADE PM: All	Case 3 (2012 Forecast) Inventory C Model: GEOS-Chem PM: BC, POM, SO_4
North America (NA) Region						
cardiopulmonary	1,860 (680–3,050)	2,820 (1,020 – 4,610)	4,590 (1,660 – 7,510)	>5,470 (1,980 – 8,950)	7,910 (2,870 – 12,940)	2,770 (1,010 – 4,540)
lung cancer	210 (80 – 350)	320 (120 – 520)	520 (190 – 850)	620 (230 – 1,020)	900 (330 – 1,470)	320 (120 – 520)
NA Total	**2,070 (760 – 3,400)**	**3,140 (1,140 – 5,130)**	**5,110 (1,850 – 8,360)**	**6,090 (2,210 – 9,970)**	**8,810 (3,200 – 14,410)**	**3,090 (1,130 – 5,060)**
Europe/Mediterranean (EUM) Region						
cardiopulmonary	6,770 (2,450 – 11,070)	11,830 (4,290 – 19,350)	24,350 (8,840 – 39,810)	7,250 (2,630 – 11,860)	15,100 (5,480 – 24,690)	8,990 (3,260 – 14,700)
lung cancer	670 (250 – 1,090)	1,100 (410 – 1,800)	2,360 (870 – 3,840)	650 (240 – 1,060)	1,430 (530 – 2,320)	880 (330 – 1,440)
EUM Total	**7,440 (2,700 – 12,160)**	**12,930 (4,700 – 21,150)**	**26,710 (9,710 – 43,650)**	**7,900 (2,870 – 12,920)**	**16,530 (6,010 – 27,010)**	**9,870 (3,590 – 16,140)**
East Asia (EA) Region						
cardiopulmonary	3,490 (1,270 – 5,710)	11,970 (4,340 – 19,590)	17,920 (6,500 – 29,300)	9,640 (3,500 – 15,780)	13,800 (5,010 – 22,570)	5,170 (1,880 – 8,460)
lung cancer	370 (140 – 610)	1,300 (480 – 2,110)	1,950 (720 – 3,170)	1,030 (380 – 1,680)	1,480 (550 – 2,410)	550 (200 – 900)
EA Total	**3,860 (1,410 – 6,320)**	**13,270 (4,820 – 21,700)**	**19,870 (7,220 – 32,470)**	**10,670 (3,880 – 17,460)**	**15,280 (5,560 – 24,980)**	**5,720 (2,080 – 9,360)**
South Asia (SA) Region						
cardiopulmonary	4,050 (1,470 – 6,630)	7,250 (2,630 – 11,870)	9,440 (3,420 – 15,450)	11,240 (4,080 – 18,390)	15,460 (5,610 – 25,260)	6,090 (2,210 – 9,970)
lung cancer	230 (90 – 380)	390 (150 – 640)	510 (190 – 830)	600 (220 – 970)	820 (300 – 1,340)	350 (130 – 570)
SA Total	**4,280 (1,560 – 7,010)**	**7,640 (2,780 – 12,510)**	**9,950 (3,610 – 16,280)**	**11,840 (4,300 – 19,360)**	**16,280 (5,910 – 26,600)**	**6,440 (2,340 – 10,540)**
East South America (ESA) Region						
cardiopulmonary	380 (140 – 620)	520 (190 – 850)	690 (250 – 1,130)	1,120 (410 – 1,840)	1,540 (560 – 2,520)	570 (210 – 930)
lung cancer	50 (20 – 90)	70 (30 – 120)	100 (40 – 160)	160 (60 – 260)	220 (80 – 350)	80 (30 – 130)
ESA Total	**430 (160 – 710)**	**590 (220 – 970)**	**790 (290 – 1,290)**	**1,280 (470 – 2,100)**	**1,760 (640 – 2,870)**	**650 (240 – 1,060)**
Global						
cardiopulmonary	17,340 (6,290 – 28,390)	35,610 (12,910 – 58,260)	58,640 (21,270 – 95,900)	36,970 (13,410 – 60,490)	56,790 (20,600 – 92,870)	24,780 (8,980 – 40,540)
lung cancer	1,580 (580 – 2,570)	3,260 (1,200 – 5,310)	5,540 (2,050 – 9,020	3,220 (1,190 – 5,240)	5,050 (1,870 – 8230)	2,240 (830 – 3,650)
Global Total	**18,920** (6,870 – 30,960)	**38,870** (14,110 – 63,570)	**64,180** (23,320 – 104,920)	**40,190** (14,600 – 65,730)	**61,840** (22,470 – 101,100)	**27,020** (9,810 – 44,190)

[a] Values are rounded to the nearest 10. [b] Confidence interval range is based on uncertainty in the concentration–response function coefficients.

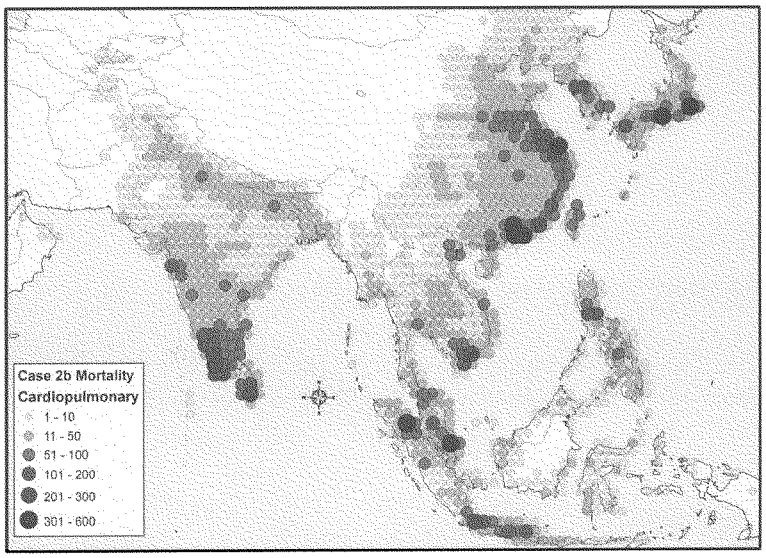


FIGURE 3. Case 2b annual cardiopulmonary mortality attributable to ship $PM_{2.5}$ emissions for Asia.

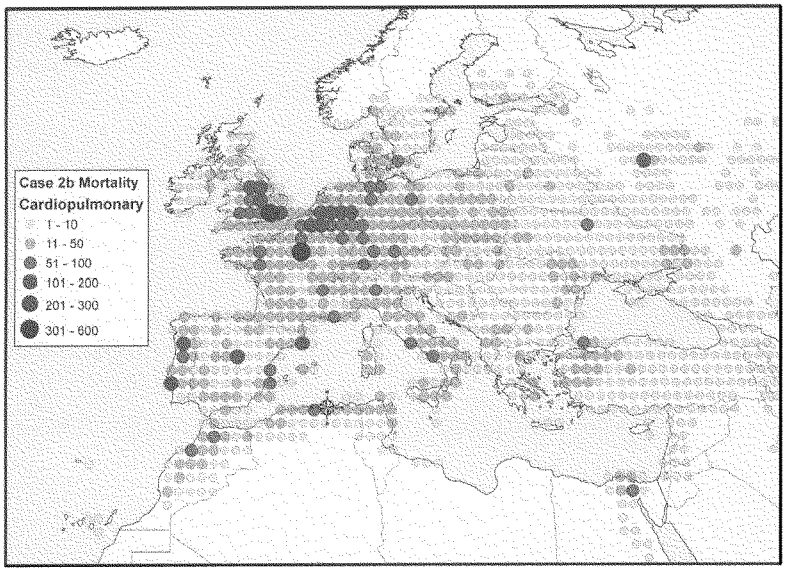


FIGURE 4. Case 2b annual cardiopulmonary mortality attributable to ship $PM_{2.5}$ emissions for Europe/Mediterranean.

are high (compare Figures 1 and 2)—near coastal regions, major waterways, and in highly populated areas. For Case 2a we estimate annual cardiopulmonary mortalities from shipping reaching densities greater than 300 per grid cell in

regions of Asia, and between 100 and 200 in the EUM region, as shown in Figures 3 and 4; coastal health-impact densities are thousands of times greater than those seen in inland regions.

Multiscale Cross-Comparisons

We compare our findings with other studies of $PM_{2.5}$ related mortality that employed alternative modeling or inventories to estimate $PM_{2.5}$ concentrations and health effects on three scales: global, national/continental, and state/regional.

Concentration–response functions are used to estimate global mortality for $PM_{2.5}$ from anthropogenic sources including shipping. These are compared to an analysis of global mortality associated with long-term exposure to $PM_{2.5}$ pollution (*16, 20*). Cohen et al. estimated that approximately 712,000 cardiopulmonary deaths are attributable to urban outdoor $PM_{2.5}$ pollution annually. With adjusting assumptions, our Case 1a estimate of 737,000 is within 4% of Cohen's (*20*) findings, and our Case 2b estimate is within 25% (see table in Supporting Information).

We evaluate potential bias of using WHO region-level incidence rates and continent-level age demographic estimates in predicting mortalities at the national scale (*24–26*)]. We compare Case 1a mortality results over the United States with mortality estimates from a similar analysis using the U.S. Environmental Protection Agency's Benefit Mapping and Analysis Program (BenMAP). BenMAP is a geographic information systems program which combines U.S. Census-level population and incidence data at county-level resolution with user-supplied air quality data to estimate heath effects. We input our $1° \times 1°$ $PM_{2.5}$ concentration data in BenMAP for the United States, and applied the C-R functions within BenMAP. We obtain Case 1a mortality estimates within 6% of BenMAP estimates, as detailed in the Supporting Information. The close agreement indicates that our population demographics and incidence rate approximations produce suitably accurate results when examining large regions, recognizing that our confidence in this statement is based on a U.S.-based analysis.

Direct comparison of our mortality estimates with recent work estimating PM health effects in Europe by Cofala et al. (*8*) is not possible because that study used an approach that estimates loss of life expectancy in months rather than total number of premature deaths. However, our patterns of health impacts for Europe among our cases appear consistent with patterns reported for their health-effects analysis (see Figure 6.1 of Cofala et al.).

Lastly, we compare our California global grid results for Case 1a and Case 2c with results from a report by the California Air Resources Board (*18*). As described in the Supporting Information, our Case 1a estimate is about 186% of the ARB estimate, and our Case 2b estimate is about 242% of the ARB estimate. In addition to differences in population and incidence at local scale, reasons to expect larger California mortality estimates in our assessment include the following. First, ARB excluded sulfates from its source-specific analyses. We include sulfates in our $PM_{2.5}$ concentrations, which on average comprise 24% of ambient PM concentrations; ARB includes nitrates, which on average may comprise some 13% of ambient PM concentrations (*32*). Second, ARB only included $PM_{2.5}$ emissions from ocean-going ships within 24 nautical miles from shore in its analysis; all other emissions were allocated to the outer continental shelf air basin (*19*). ARB also assumed that between 10% and 25% of ship emissions reached populated areas. In contrast, our modeling directly estimates land-exposure from worldwide ocean-going ship inventories, considering atmospheric transport of ship emissions to California from unbounded distances as attributed by atmospheric chemical transport functions in GEOS-Chem and E5/M1-MADE. Third, our "California" case is made up of $1° \times 1°$ grid cells that overlap small parts of Nevada, Utah, and Mexico and could lead to slightly higher estimates than a strict California-only comparison. On the other hand, ARB used smaller (more resolved) grid cells; all else equal, we would have expected this to yield larger not smaller health impacts in the CARB report because CARB would more accurately capture near-source population density.

Discussion

Our results indicate that shipping-related PM emissions from marine shipping contribute approximately 60,000 deaths annually at a global scale, with impacts concentrated in coastal regions on major trade routes. Most mortality effects are seen in Asia and Europe where high populations and high shipping-related PM concentrations coincide. Based on previous estimates of global $PM_{2.5}$-related mortalities (*16*), our estimates indicate that 3% to 8% of these mortalities are attributable to marine shipping. We identify three categories of uncertainty, ranked by their importance to estimates in this work: (i) ship inventory and PM constituent uncertainties most influence our best estimates across all Cases; (ii) the 95% confidence intervals on the health effects C-R functions represent significant uncertainty (capturing toxicity and response effects) that similarly affects each case; (iii) atmospheric modeling uncertainties vary where emissions offshore expose coastal and inland populations. Uncertainties are discussed in the Supporting Information; results may be more uncertain at local scales, given the lack of detailed localized data pertaining to incidence, demographics, $PM_{2.5}$ concentrations, and other factors.

The absence of localized C-R functions and incidence rates prevents precise quantification of all anticipated PM-related health effects, such as asthma and hospital admissions, etc. Though we only examine cardiopulmonary and lung cancer mortalities, we expect that regions where ships contribute most to mortality effects (concentrated population areas with high shipping-related PM levels) will also suffer other related health impacts. We anticipate future work to investigate variation and uncertainty in these inputs further. Higher resolved atmospheric models could provide more accurate or precise results on a regional level by targeting regions of interest where better localized data for ship emissions, incidence rates, and population demographics are available.

Our work demonstrates that mortality and health benefits in multiple regions globally could be realized from policy action to mitigate ship emissions of primary $PM_{2.5}$ formed during engine combustion and secondary $PM_{2.5}$ aerosols formed from gaseous exhaust pollutants. These results support regional assessments of health impacts from ship $PM_{2.5}$ emissions, and identify other regions where similar impacts may be expected. Current policy discussions aimed at reducing ship emissions are focused on two concerns: (i) the geospatial aspects of policy implementation and compliance (e.g., uniform global standards versus requirements for designated control areas); and (ii) the benefits and costs of various emission-reduction strategies (e.g., fuel switching versus aftertreatment technologies or operational changes). Our work quantifies the baseline estimates of mortality due to ship emissions from which future work would estimate mitigation benefits.

Acknowledgments

This work was partly supported by the Oak Foundation (J.J.C., J.J.W., E.H.G., P.K.), and the German Helmholtz-Gemeinschaft Deutscher Forschungszentren (HGF) and by the German Aerospace Center (DLR) within the Young Investigators Group

SeaKLIM (V.E. and A.L.). We acknowledge Chengfeng Wang, currently with the California Air Resources Board, for his efforts in constructing some of the emissions inventory data.

Supporting Information Available

Description of atmospheric aerosol model parameters, calculations for cardiopulmonary mortality estimates, discussion of uncertainty in our analysis, and additional discussion of our results. This material is available free of charge via the Internet at http://pubs.acs.org.

Literature Cited

(1) Capaldo, K. P.; Corbett, J. J.; Kasibhatla, P.; Fischbeck, P.; Pandis, S. N. Effects of Ship Emissions on Sulphur Cycling and Radiative Climate Forcing Over the Ocean. *Nature* **1999**, *400*, 743–746.

(2) Corbett, J. J.; Fischbeck, P. S.; Pandis, S. N. Global Nitrogen and Sulfur Emissions Inventories for Oceangoing Ships. *J. Geophys. Res.* **1999**, *104* (D3), 3457–3470.

(3) Corbett, J. J.; Fischbeck, P. S. Emissions from Waterborne Commerce in United States Continental and Inland Waters. *Environ. Sci. Technol.* **2000**, *34* (15), 3254–3260.

(4) Wang, C.; Corbett, J. J.; Firestone, J. Modeling Energy Use and Emissions from North American Shipping: Application of the Ship Traffic, Energy, and Environment Model. *Environ. Sci. Technol.* **2007**, *41* (9), 3226–3232.

(5) Streets, D. G.; Guttikunda, S. K.; Carmichael, G. R. The Growing Contribution of Sulfur Emissions from Ships in Asian Waters 1988–1995. *Atmos. Environ.* **2000**, *34* (26), 4425–4439.

(6) Streets, D. G.; Bond, T. C.; Carmichael, G. R.; Fernandes, S. D.; Fu, Q.; He, D.; Klimont, Z.; Nelson, S. M.; Tsai, N. Y.; Wang, M. Q.; Woo, J. H.; Yarber, K. F., An inventory of gaseous and primary aerosol emissions in Asia in the year 2000. *J. Geophys. Res.* **2003**, *108*, (D21).

(7) European Commission; ENTEC UK Limited. *Quantification of emissions from ships associated with ship movements between ports in the European Community*; FS 13881; European Commission: Brussels, Belgium, 2002.

(8) Cofala, J.; Amann, M.; Chris Heyes; Klimont, Z.; Posch, M.; Schöpp, W.; Tarasson, L.; Jonson, J. E.; Whall, C.; Stavrakaki, A. *Final Report: Analysis of Policy Measures to Reduce Ship Emissions in the Context of the Revision of the National Emissions Ceilings Directive*; International Institute for Applied Systems Analysis: Laxenburg, Austria, 2007; p 74.

(9) Corbett, J. J.; Koehler, H. W. Updated Emissions from Ocean Shipping. *J. Geophys. Res., D: Atmos.* **2003**, *108* (D20), 4650–4666.

(10) Corbett, J. J.; Wang, C.; Winebrake, J. J.; Green, E. Allocation and Forecasting of Global Ship Emissions; Clean Air Task Force and Friends of the Earth International: Boston, MA, January, 11, 2007; 26.

(11) Eyring, V.; Köhler, H. W.; van Aardenne, J.; Lauer, A. Emissions from international shipping: 1. The last 50 years. *J. Geophys. Res., D: Atmos.* **2005**, *110* (D17), D17305.

(12) Endresen, O.; Soergaard, E.; Sundet, J. K.; Dalsoeren, S. B.; Isaksen, I. S. A.; Berglen, T. F.; Gravir, G., Emission from international sea transportation and environmental impact. *J. Geophys. Res., D: Atmos.* **2003**, *108*, (D17.)

(13) Nel, A. ATMOSPHERE: Enhanced: Air Pollution-Related Illness: Effects of Particles. *Science* **2005**, *308* (5723), 804–806.

(14) Kaiser, J. EPIDEMIOLOGY: Mounting Evidence Indicts Fine-Particle Pollution. *Science* **2005**, *307* (5717), 1858a–1861.

(15) Pope, C. A.; Burnett, R. T.; Thun, M. J.; Calle, E. E.; Krewski, D.; Ito, K.; Thurston, G. D. Lung cancer, cardiopulmonary mortality, and long-term exposure to fine particulate air pollution. *JAMA* **2002**, *287* (9), 1132–1141.

(16) Cohen, A. J.; Anderson, H. R.; Ostro, B.; Pandey, K. D.; Krzyzanowski, M.; Künzli, N.; Gutschmidt, K.; Pope, A.; Romieu, I.; Samet, J. M.; Smith, K. The global burden of disease due to outdoor air pollution. *J. Toxicol. Environ. Health, Part A* **2005**, *68*, 1301–1307.

(17) Bailey, D.; Solomo, G. Pollution prevention at ports: clearing the air. *Environ. Impact Assess. Rev.* **2004**, *24*, 749–774.

(18) California Air Resources Board. *Proposed Emission Reduction Plan for Ports and Goods Movement in CA*; CA Air Resources Board: Sacramento, CA, March 22, 2006.

(19) California Air Resources Board. *Appendix A: Quantification of the Health Impacts and Economic Valuation of Air Pollution from Ports and Goods Movement in CA*; CA Air Resources Board: Sacramento, CA, March 22, 2006.

(20) Cohen, A. J.; Anderson, H. R.; Ostro, B.; Pandey, K. D.; Krzyzanowski, M.; Kunzli, N.; Gutschmidt, K.; Pope, C. A.; Romieu, I.; Samet, J. M.; Smith, K. R., Mortality impacts of urban air pollution. In *Comparative Quantification of Health Risks: Global and Regional Burden of Disease Due To Selected Major Risk Factors*; Ezzati, M., Lopez, A. D., Rodgers, A., Murray, C. J. L., Eds.; World Health Organization: Geneva, 2004; Vol. 2, pp 1353–1394.

(21) Ostro, B. *Outdoor air pollution: Assessing the environmental burden of disease at national and local levels*; World Health Organization: Geneva, 2004.

(22) Bey, I.; Jacob, D. J.; Yantosca, R. M.; Logan, J. A.; Field, B. D.; Fiore, A. M.; Li, Q.; Liu, H. Y.; Mickley, L. J.; Schultz, M. G. Global modeling of tropospheric chemistry with assimilated meteorology: Model description and evaluation. *J. Geophys. Res.* **2001**, *106* (D19), 23073–23096.

(23) Lauer, A.; Eyring, V.; Hendricks, J.; Jöckel, P.; Lohmann, U. Global model simulations of the impact of ocean-going ships on aerosols, clouds, and the radiation budget. *Atmos. Chem. Phys.* **2007**, *7* (19), 5061–5079.

(24) SEDAC (Socioeconomic Data and Applications Center). *Gridded Population of the World*; Columbia University, 2007.

(25) U.S. Census Bureau. *International Data Base, IDB Data -IDB Aggregation - Table 94 Midyear Population, by Age and Sex*; Washington, DC, 2006.

(26) World Health Organization (WHO). *Revised Global Burden of Disease (GBD) 2002 Estimates: Mortality Data, GBD 2002: Deaths by age, sex and cause for the year 2002*; Geneva, 2004.

(27) Abt Associates. *BenMap: Environmental Benefits Mapping and Analysis Program, Technical Appendices*; Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency: Research Triangle Park, NC, May, 2005; p 275.

(28) O'Neill, M.; Jerrett, M.; Kawachi, I. Health, wealth, and air pollution. *Environ. Health Perspect.* **2003**, *111*, 1861–1870.

(29) Krewski, D.; Burnett, R. T.; Goldberg, M. S. *Reanalysis of the Harvard Six Cities Study and the American Cancer Society Study of particulate air pollution and mortality. A special report of the institute's particle epidemiology reanalysis project*; Health Effects Institute: Cambridge, MA, 2000.

(30) Davis, D. L.; Kjellstrom, T.; Sloof, R.; McGartland, A.; Atkinson, D.; Barbour, W.; Hohenstein, W.; Nalgelhout, P.; Woodruff, T.; Divita, F.; Wilson, J.; Deck, L.; Schwartz, J. Short term improvements in public health from global-climate policies on fossil-fuel combustion: an interim report. *The Lancet* **1997**, *350*, 1341–1349.

(31) Anderson, H. R.; Atkinson, R. W.; Peacock, J. L.; Marston, L.; Konstantinou, K. *Meta-analysis of time-series studies and panel studies of Particulate Matter (PM) and Ozone (O3); 5042688*; World Health Organization: Copenhagen, 2004.

(32) Hodan, W. M.; Barnard, W. R. In *Evaluating the Contribution of PM2.5 Precursor Gases and Re-entrained Road Emissions to Mobile Source PM2.5 Particulate Matter Emissions*; 13th annual emission inventory conference, Clearwater, FL, 8–10 June, 2004; Administration, M. F. P. U. C. t. t. F. H., Ed.; Emission Factors and Inventory Group Emission Inventory Improvement Program, Emissions, Monitoring and Analysis Division, Office of Air Quality Planning & Standards, U.S. Environmental Protection Agency: Clearwater, FL, 2004.

ES071686Z

Senator BOXER. Thank you.
Senator Vitter.

STATEMENT OF HON. DAVID VITTER, U.S. SENATOR FROM THE STATE OF LOUISIANA

Senator VITTER. Thank you, Madam Chair.

Before my time begins, I would just like to ask unanimous consent to put my written opening statement in the record.

Senator BOXER. Without objection.

[The prepared statement of Senator Vitter follows:]

STATEMENT OF HON. DAVID VITTER, U.S. SENATOR FROM THE STATE OF LOUISIANA

Thank you, Chairwoman Boxer and Ranking Member Inhofe, for holding this hearing on the Marine Vessel Emissions Reduction Act of 2007. It is legislation that I think we need to further examine and I look forward to discussing today in Committee.

I would like to welcome all the witnesses, and also introduce several witnesses from Louisiana who are testifying today. We are joined by:

- Ms. Jennifer Mouton, of the Louisiana Department on Environmental Quality, Administrator of the Air Quality Assessment Division of the Louisiana Office of Environmental Assessment;
- Mr. Joe Accardo, Executive Director of the Ports Association of Louisiana;
- Mr. Joel Chaisson, Executive Director of the Port of South Louisiana; and
- Mr. Ken Wells, President, Offshore Marine Service Association.

I respect that California is struggling to meet their air quality standards, especially with regards to particulate matter and NO_x. While this legislation appears straightforward, addressing sulfur in marine diesel fuel to lessen particulate matter, I believe that this bill may have unintended and severe economic consequences for other states like Louisiana, who are in attainment with particulate matter and NO_x.

The maritime industry is essential to Louisiana's economy. Louisiana's ports contribute 33 billion dollars to our State economy, and support over a quarter million jobs. Two of the nation's top ports are located within Louisiana. In fact, the Port of South Louisiana, represented at this hearing by Mr. Joel Chaisson, is the nation's #1 port in total tonnage.

This bill seeks to impress stringent regulations on both domestic and foreign flagged vessels. For Louisiana ports, this could negatively affect us in several ways. First, we are concerned about the impacts this legislation would have on business at Louisiana ports. Foreign vessels could take their business elsewhere if they are not wishing to comply with the regulations proposed in S. 1499 and could simply dock in Mexico instead and truck their cargo across the U.S. border.

These same foreign vessels are part of the U.S. export trade, so this bill could lessen our export capability. Rate-sensitive Mississippi River exports, like grain, could be severely impacted. This would not affect just Louisiana, but all states that depend on the Mississippi River for transport of their goods.

A second concern is this legislation would place U.S. vessels in the Gulf of Mexico at a worldwide economic disadvantage. Engine upgrades and control technology required by this legislation are costly. Domestic vessels working overseas would have to absorb these costs, lessening their international competitiveness against foreign flagged vessels.

Marine vessel emissions are a global issue, and should be addressed from a global perspective. The U.S. has already submitted a proposal for stronger emissions standards to the International Maritime Organization, and they are currently examining it as an option. Supporting S. 1499 would push the U.S. toward unilateral action, rather than global cooperation.

I understand that the international marine emissions agreement (MARPOL Annex VI) prohibits unilateral action on the part of a signatory state. As a signatory to this Treaty, the U.S. would be required to abide by the Treaty's various obligations, including aligning domestic legislation to conform to the Treaty.

I am interested in hearing more about the progress made with the IMO negotiations. Rather thank create a blanket, one-size fits all approach for both areas in attainment and non-attainment, I am interested to hear more about proposals that have come up through the IMO negotiations that create specific Sulfur Emission Control Areas (SECA) to address air quality problem areas such as California that

really have an air quality problem and are in non-attainment for particulate matter and NO_x.

We should also be cautious of unintended environmental impacts. According to the IMO Secretary General's report on the outcome of the Informal Cross Government/Industry Scientific Group of Experts, "in countries that are subject to the Kyoto Protocol, the addition of major new refinery equipment resulting in an increase in CO_2 emissions may be a concern". Low sulfur marine diesel fuel requires additional refining, which may increase greenhouse gases like CO_2. This legislation should not have the world exchange one set of air quality problems for another.

I would like to ask UC to include a letter in the record from the Engine Manufacturers Association opposing passage of S1499. The EMA is actively involved and working with the U.S. EPA, other nations and international regulatory organizations to reduce exhaust emissions from ocean going vessels.

We all agree that improving air quality is important. However, I don't think nationalizing California's standard is a good precedent. Unlike California, Louisiana is in attainment for both particulate matter and NO_x. This bill seeks to force a "one size fits all" ruling on all ports in all states, when the factors are certainly not the same across the board.

We need to consider not just the benefits of this legislation, but how this impacts our economy, so that we can work toward the best interest of all states, and also in the best interest of the U.S. compared to the rest of the world. Thank you, and I look forward to hearing from our witnesses.

Senator VITTER. And also to put in the record a letter of opposition to the bill from the Engine Manufacturers Association.

Senator BOXER. Without objection, so ordered.

Senator VITTER. Thank you.

[The referenced document follows:]

Engine Manufacturers Association®
Celebrating 40 Years of Progress

Two North LaSalle Street, Suite 2200, Chicago, IL 60602
Tel: (312) 827-8700 | Fax: (312) 827-8737 | www.enginemanufacturers.org

February 12, 2008

The Honorable Barbara Boxer, Chair
The Honorable James Inhofe, Ranking Member
Environment and Public Works Committee
United States Senate
Washington, DC 20501

RE: Position of the Engine Manufacturers Association on Senate Bill 1499, the Marine Vessel Emissions Reduction Act of 2007

Dear Senators Boxer and Inhofe:

The Engine Manufacturers Association (EMA) is the trade association representing the major manufacturers of internal combustion engines, including those engines used to power marine vessels. EMA represents the engine industry on issues related to emissions with the US EPA, other international regulatory bodies and federal and state legislative bodies.

EMA is actively involved and working with the US EPA, other nations and international regulatory organizations to reduce exhaust emissions from ocean going vessels. EMA supports the transition to lower sulfur fuels and use of advanced engine technologies to further reduce emissions from this regulated source category.

EMA believes that the current regulatory process is the most appropriate and effective venue to develop and adopt the best available and most cost-effective emissions control technologies for marine engines and vessels. The designated regulatory authorities from the United States, including the US Coast Guard and US Environmental Protection Agency, are already participating in an ongoing regulatory process. In fact, the US EPA is under a judicially enforced consent decree to promulgate additional regulations affecting the marine vessels addressed in S1499 by 2009.

Although supportive of the overall goals to reduce the sulfur content of marine fuels and to further reduce emissions from marine vessels, EMA opposes passage of S1499 for the following reasons:

- Technical emissions and fuel standards should be developed through a thorough, open and complete regulatory process as opposed to federal legislation. In developing standards and regulations, there are numerous technical, feasibility, and economic issues that must be addressed and incorporated during a rulemaking process. Such decisions are best identified, discussed, and addressed through the regulatory process as opposed to a legislative one.

- S1499 establishes deadlines for the promulgation of regulations. The US EPA already is developing such regulations and is under a consent decree to promulgate regulations by the end of 2009. As such, there is no need for the added legislation. Given the complexity of the issues and international concerns, it is not reasonable or feasible for EPA to develop regulations at a faster pace, and certainly not by S1499's proposed December 15, 2008 date.

- The legislation also proposes to establish an effective date of January 1, 2012 for new emissions standards. Regulatory implementation dates must account for the ability of the marine engine and shipbuilding industry to develop any engine and emissions control technologies necessary to meet final regulatory programs, and should not be established in legislation. Technically feasible emissions reductions and their appropriate implementation dates should be established through fact finding within the regulatory process and should not be arbitrarily set as January 2012 as proposed in the bill.

- Similarly, the ability of fuel producers to supply sufficient quantities of 1000 ppm sulfur fuel and the feasibility of ship owners and operators to make the needed physical changes to ships to use such a fuel by the December 2010 date have not been analyzed or demonstrated (and certainly appears unlikely). The transition to 1000 ppm fuel is dependent on worldwide refining capacity and supplies, and the refining industry has identified capacity and supply concerns that need to be addressed. Moreover, it is not clear that 1000 ppm sulfur fuel is the appropriate limit necessary to achieve the maximum emissions reduction feasible.

For the above reasons, EMA opposes passage of S1499 and urges the Senate to support current US efforts to reduce marine emissions through the ongoing regulatory development process.

Very truly yours,

Jed R. Mandel

Jed R. Mandel
President

Senator VITTER. Thank you all for being here.

And Jonah, thank you especially. You are a very impressive and poised young man.

Mr. RAMIREZ. Thank you.

Senator VITTER. I say that with real appreciation, having two 11 year olds at home. You are really impressive. Thanks for being here.

And I thank all of you for being here.

Dr. Miller, I want to ask you, as I understand and read your testimony, it comes out of great personal experience in Southern California, with what you call a diesel death zone there. Do you have personal work experience or personal study work with regard to Louisiana?

Dr. MILLER. Well, Senator, no, although I did go to medical school in Houston, at Baylor down the way. When I was in medical school in Houston, we had a bad air problem in Houston. Houston also has a port, but I have never practiced in Louisiana.

Senator VITTER. Right. OK. And Dr. Miller, this California diesel death zone that you talked about so compellingly, it is out of compliance, in non-compliance for particulate matter and NO_x. Correct?

Dr. MILLER. That is my understanding, yes. And I assume if it got in compliance——

Senator VITTER. For particulate matter and NO_x, the issues, the problems you are talking about, the problem that Jonah so eloquently talked about from personal experience, that would be a lot better, I assume. Correct?

Dr. MILLER. That is what we would think, yes, sir.

Senator VITTER. OK. You are aware, I assume, that these similar port areas in Louisiana are in compliance for particulate matter.

Dr. MILLER. That is what the gentlemen over here were saying, yes.

Senator VITTER. OK. I think that is a pretty significant difference. I can understand why Senator Boxer has this bill. There is a big problem in your area in California. That area is out of compliance, and so why not penalize and hurt the competitiveness of every U.S. port so they can get in compliance and not lose ground competitively to other U.S. ports. I understand that from the distinguished Chair's perspective. I obviously disagree with it from the Louisiana perspective because Southern California is out of compliance and Louisiana is in compliance.

I would just ask why isn't it a much more straightforward approach, at least as an initial step, to say to those areas out of compliance in particulate matter and NO_x, get in compliance. Do something about it. Do whatever it takes. And if it means you have to put a seal on the traffic coming into your ports or you have to reduce it, then do that. Why wouldn't that be a reasonable first approach?

Dr. MILLER. With all due respect, Senator, I do see that this is a nationwide problem. We just heard of a number of pollution-related deaths in Louisiana, whether or not you are in compliance there. But this bill would provide a level playing field all across the Nation.

As I hear this testimony, it sounds just like the old usual job blackmail that comes up every time change is presented to an in-

dustry. You know, when the automobile industry was told that we had to use unleaded gasoline, they all said the sky was going to fall, we are all going to lose our jobs, we are all going to be poor, et cetera, et cetera. It didn't happen.

This is just knee-jerk opposition to change that is needed. This is needed on a nationwide basis to establish a nationwide level playing field. These shippers need our ports more than we need these shippers, in China, for example.

Senator VITTER. Let me just clarify, because I don't think I am stating that sort of knee-jerk opposition. What I am saying is, there is a problem in Southern California under current law. You are out of compliance. Don't drag us down to fix it.

There is current law. Southern California is out of compliance. Why doesn't that area do something about it, including putting restriction on the port if that is necessary? But why are we being dragged down the same amount? I would suggest it is so that those ports aren't hurt competitively.

Dr. MILLER. Sir, I can't answer that question because I am a medical doctor. I am not a policymaker. I am here to try to save people's lives. I am here to try to speak for people like Jonah, people who have had cancer, heart attacks, strokes. From my perspective, America would save an awful lot of money if we started cutting into this enormous health burden that this industry has gotten off scot-free on for so long. The testimony has been very clear. This industry gets off scot-free. American companies are heavily regulated on the ground to try to fix this. It is not that we haven't tried to fix this in Southern California.

Senator VITTER. Well, it is that you haven't succeeded. Again, the comparable areas in Louisiana are in compliance.

Senator BOXER. This will be your last question because you are over time.

Senator VITTER. Thanks.

The other obvious approach besides what I outlined in terms of let's do something about those areas that are not in compliance is, as you suggested, to do something internationally, which is being worked on. Now, the argument is, well this would affect all U.S. ports equally, no competitive disadvantage there, but I think that sort of ignores the international nature of all the commerce we are talking about. Can you comment on that?

Mr. ACCARDO. Yes. That is our position, that we should approach this with our international trading partners. That way, the same standard should apply across the board to every port. We in Louisiana particularly are fearful of the fact that the huge amount of grain we export could easily shift to another country—Brazil, Argentina, or Canada—if those ports aren't similarly required to follow the same standard that we follow.

Now, as I said earlier, we agree that there needs to be similar standards as you propose in your bill imposed upon the international community. We disagree on the approach. We say the way to do that is through the IMO Annex VI amendments, which the U.S. is trying to put into effect. That is what we advise and ask you to do, rather than doing this on a unilateral basis as this bill might do.

Senator VITTER. OK. Thank you all very, very much.

Senator BOXER. Thank you.

I want to place in the record testimony from a Republican witness saying that Louisiana does not have ozone attainment. So that is an important point, I think.

All right, Senator Lautenberg.

OPENING STATEMENT OF HON. FRANK R. LAUTENBERG, U.S. SENATOR FROM THE STATE OF NEW JERSEY

Senator LAUTENBERG. Thank you, Madam Chairman, for holding today's hearing and identifying a source of difficulty with asthma in particular, but other respiratory diseases as well that come from ships, as well as from cars, trucks and factories. We have to get to work on it.

I am going to take a moment to tell you about my sister, who is named Marian. She was a member of the school board in Rye, New York, and she had asthma. She used to carry a little respirator-type machine in her car that she could plug into the cigarette lighter. She was at the school board one night and she began to feel a little queasy, and she started out for her car, and she collapsed in the parking lot, never to recover. Three days later, she perished. So we have seen it up front and personal.

And Jonah, you sounded just like my grandson, because when he goes to play sports, he plays baseball and soccer and you name it. My daughter, his mother, first finds out where the nearest emergency clinic is so if he starts to wheeze, she takes him there right away, so it is exactly what you said. We thank you.

I missed my colleagues here, and I heard reference to a geographic problem that ought to be taken care of, and why penalize Louisiana. Well, if we listen to Senator Mary Landrieu, she constantly pleads the case for Louisiana as a result of a national problem that occurred when Hurricane Katrina hit Louisiana. It became a national problem, even though it didn't affect everybody's neighborhood.

So I don't understand that. This is a national problem, and by golly if we worry about stealing from one another, we don't understand what our responsibilities are here as national governmental officials.

I want to put that sign up again. Bring it closer please. Do you see this? This is among the darkest spots on the map. That is New Jersey. We are terribly affected by it. I congratulate once again our Chairwoman. She knows where the problems are and she's out to get them.

We don't have to agree on the process. We do have to agree that there is a plague in the United States, a plague across this world, and we have to start dealing with it. The example we had today from listening to your testimony, and Dr. Miller, yours as well, we touched on the human equation.

Yes, there is an economic side, and I take the second seat to no one in the U.S. Senate. I started a company called ADP. It has 46,000 employees today. So I know something about the corporate world and I know something about economics. So we have to deal with the problems as we see them.

One of the things that I must say, and I ask unanimous consent that my full opening statement be placed in the record.

Senator BOXER. Without objection.

[The prepared statement of Senator Lautenberg was not received at time of print.]

Senator LAUTENBERG. I wanted to ask a question about, we recently learned about the threat that asthma poses, along with other threats to our environment and to the health and well being. I am told that there are 20 million asthma sufferers in the United States, and that includes 9 million children. I have also learned that in the State of Louisiana, there are 200,000 adults suffering from asthma, and one in ten out of the children in that beautiful State has asthma.

But I guess what we have to do is just make sure that the problems when they are in another place, they take care of them and it shouldn't affect what goes on in a State away from the issue.

Forgive me for a moment. Mr. Wells, some opponents of the legislation to lower pollution from ships argue that the technology necessary to do so would cost too much. Won't the market for this technology become more competitive, more products available? We have seen this as we fight for a greener world that there are industries and opportunities creeping up all over the place to search for alternative energy uses for different standards for buildings and so forth. Don't you think that also might happen or would happen in the industry that produces these products?

Mr. WELLS. We certainly hope so. We absolutely agree with you that that should happen. We hope it will happen. Recognize that our industry is already trying to come into compliance with the EPA regulations that will released soon, but our vessel operators are making vessel orders to the year 2010, 2011. So they are having to order equipment now which has never been produced. We are going to find out if the market can deliver.

Senator BOXER.

[Remarks off microphone.]

Senator LAUTENBERG. OK. Thank you very much, Madam Chairman.

Senator BOXER. Senator Cardin.

OPENING STATEMENT OF HON. BENJAMIN L. CARDIN, U.S. SENATOR FROM THE STATE OF MARYLAND

Senator CARDIN. Well, Madam Chair, first let me thank you for your leadership in introducing the Marine Vessel Emissions Reduction Act of 2007. I would ask unanimous consent that my opening statement be made part of the record, along with a letter from the Maryland Department of the Environment in support of the legislation.

Senator BOXER. Without objection, so ordered.

[The referenced documents follow:]

MARYLAND DEPARTMENT OF THE ENVIRONMENT
MDE 1800 Washington Boulevard • Baltimore MD 21230
410-537-3000 • 1-800-633-6101

Martin O'Malley
Governor

Anthony G. Brown
Lieutenant Governor

Shari T. Wilson
Secretary

Robert M. Summers, Ph.D.
Deputy Secretary

February 8, 2008

The Honorable Benjamin L. Cardin
509 Hart Senate Office Building
Washington, DC 20510

RE: Support for Federal Legislation: Marine Vessel Emissions Reduction Act of 2007 - Senate (S 1499) / House (HR 2548)

Dear Senator Cardin:

On behalf of the Maryland Department of the Environment, the environmental agency with jurisdiction over air quality planning issues in the State of Maryland, I am writing to express my agency's support of the Marine Vessel Emissions Reduction Act of 2007 - Senate (S 1499) / House (HR 2548) which will achieve landmark reductions in dangerous emissions caused by the large numbers of marine vessels that use United States ports. Specifically, this important federal legislation will require both domestic and foreign-flagged ships to use cleaner-burning, lower-sulfur fuels that reduce health-threatening soot and smog-producing emissions when the ships are in or near U.S. ports. The Act will also impose tougher emissions standards for marine vessel engines.

This bill is needed because large marine vessels are a mostly unregulated and substantial source of pollutants. Marine vessels burn fuel with extremely high sulfur content known as bunker fuel, which averages approximately 27,000 parts per million (ppm) sulfur. By contrast, most equipment in the U. S. is required, or will be required, to burn fuel with no more than 15 ppm sulfur. Bunker fuel is a black, viscous substance laden with heavy metals, sulfur and other polluting chemicals and is the dirtiest fuel in use anywhere.

The use of bunker fuel by marine vessels in and around U.S. ports has severe health effects. Such vessels cause dangerous emissions which include nitrogen oxides (NOx) and sulfur oxides (SOx), both of which are major components and precursors of smog and particulates, and release cancer-causing diesel particulate matter emissions which are extremely toxic to regions surrounding ports. Studies confirm that exposure to harmful air pollutants, including toxic diesel emissions, increase mortality and hospital, physician and emergency room visits, as well as exacerbate respiratory illnesses including asthma, thus significantly increasing health costs. The marine vessel emission problem is expected to worsen since goods movement and cargo throughput in U.S. ports in the aggregate is projected to substantially increase over the next 10 to 20 years.

A minimum national standard that meets the air quality needs of all areas of the country would help create a level playing field for ports nationwide. Precedence exists that demonstrates that marine vessel standards in the proposed bill are technologically feasible. MAERSK, the largest marine carrier in the world, recently began voluntarily using 2,000 ppm sulfur fuel within 24 miles of ports in California. Additionally, by acting to address the serious pollution caused by both domestic and foreign-flagged ships, it will send a message to the International Maritime Organization (IMO) that the United States is serious about controlling dangerous marine vessel pollution sources, and may spur the IMO to act to address this issue on an international level.

We respectfully request you to initiate and/or support the holding of Congressional hearings regarding this legislation and field hearings in port communities where people are impacted the most. Also, please let my agency know how we can provide additional support to help gain passage of this critical legislation which will provide far-reaching benefits to air quality and to the well-being of citizens throughout the nation. If I may be of further assistance, please contact me or Mr. George (Tad) S. Aburn, Jr. Director of the Air and Radiation Management Administration at 410-537-3255, toll-free at 800-633-6101, by mail at 1800 Washington Boulevard, Baltimore, Maryland 21230, or by email at gaburn@mde.state.md.us.

Sincerely,

Shari T. Wilson
Secretary

cc: George (Tad) Aburn, Jr., Director of Air and Radiation Management Administration
Heather Barthel, MDE Legislative Liaison
Dana Thompson, Director of Federal Relations, Office of Governor Martin O'Malley

Senator CARDIN. At the Port of Baltimore, we have about 2,000 vessel calls. When I take a look at the map that you put up, you are certainly in an area of major concern. I might also point out that where the emissions occur is not always where the problems will center. We do have atmospheric pressures and winds and it affects this entire Country. So I do believe we have a national problem.

To Jonah Ramirez and to Dr. John Miller, I want to thank both of you for putting a face on the problem. I listen to statistics all the time, but I can tell you it is a lot more powerful to see the real people that are affected by what we do here. I know it is an inconvenience to come to our Committee, and we thank you very much for being here.

I want to ask our representatives from the various ports a question. I have been in the legislating business for a long time. I know that your intentions are correct in trying to get stronger standards for dealing with vessels. However, it seems to me that it is easy to say that and go on to the next issue. We have been trying to deal with this problem for some time.

We have had other problems in the history of this Country where we have had to impose or want to impose restrictions on our ports, dealing with commerce, because we don't want to deal with certain countries for whatever reasons as part of our foreign policy. I recall very vividly the same statements being made by the different ports saying, gee, if only this was international, we support it; we don't want to do business with this country, but why would you want to pick on our ports, when we would be at a competitive disadvantage?

I have seen the same thing happen at times when we have done environmental rules. Why do it locally when it just penalizes our economy. And we went ahead and did it. And then I found that for some reason, our leaders were much more effective in convincing their colleagues that we did need an international standard and international support.

So my question to you in dealing with your colleagues on the an international basis, and dealing with the ship lines, which by the way come to more ports than just California ports. I am glad, Madam Chair, that you have been able to have some success with one shipper in California, but some of us would like to see that in our ports, and we don't have it in our ports.

I would just like your view as to whether the passage of this bill might in fact help you get the international standards that are so important here. Because I agree with you, I want to see this internationally. I am worried about what is in the atmosphere, because what happens in Canada affects the United States.

So I think we would be doing you a favor by getting your colleagues much more engaged on the urgency of getting this done, if the Congress showed some leadership, the United States showed some leadership on this very important environmental issue that we all agree is important and we need to get done.

Mr. ACCARDO. We suggest that the better way to approach it is through the IMO and the Annex VI amendments that the United States is trying to achieve. One of the alternatives we suggest is that if you are going to adopt this S. 1499 that it should perhaps

contain the exact proposals that the United States is offering in its amendments to Annex VI.

Senator CARDIN. Can I ask how much time your members have spent in lobbying the international community to try to get this done? Do you spend time talking to your colleagues around the world about the importance of getting this done?

Mr. ACCARDO. I didn't understand the first part of your question.

Senator CARDIN. I am curious as to how much effort is being made by the port operators in our Country to get these international standards achieved.

Mr. ACCARDO. I can only speak from the prospect of Louisiana Ports, we are relying on the Administration to do that through the IMO.

Senator CARDIN. That is exactly my point. I am sure the Administration is working hard at this. But if you had an invested interest not only for the health of the people of our community, but also because you perceive an economic problem if we don't have an international standard, I would suggest you would get personally involved. The more people who get personally involved, the better chance we have of getting this done. We have been waiting a long time to get these standards improved. I think the United States needs to show leadership. When we do, we find that a lot more people get involved in the political process and we get results.

Thank you, Madam Chair.

Senator BOXER. Thank you very much.

We are going to move to our final panel. Again thank you to all of you, our Louisiana friends for coming, to Jonah and Dr. Miller. We are so happy to have your testimony. Happy Valentine's Day, Jonah.

[Laughter.]

Senator BOXER. And Richard Kassel, thank you.

So we will move to panel two, which has now become panel three: Dr. Barry Wallerstein, Lisa Jackson, and Jennifer Mouton.

OK. Again, we welcome you and we look forward to your testimony.

We will start with Dr. Wallerstein, Executive Officer, South Coast Air Quality Management District.

STATEMENT OF BARRY R. WALLERSTEIN, EXECUTIVE OFFICER, SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Mr. WALLERSTEIN. Good morning, Madam Chair and members of the Committee. Thank you for this opportunity to appear before you today on this critical air quality issue.

The South Coast Air Quality Management District is tasked with achieving Federal clean air standards in the Greater Los Angeles region. It is home to 16 million Americans, about 4 percent to 5 percent of the Nation's population. We are big supporters of S. 1499 quite simply because it will save lives. It is feasible. It is cost-effective, and the time to act is now.

The legislation is needed because marine vessels are the largest uncontrolled source of air pollution in many areas of the Country, causing at least 2,000 to 5,000 premature deaths every year across the Nation. Marine vessels burn fuel with sulfur content 1,800 times higher than allowed for on-road large trucks or off-road mo-

bile equipment. As a result, in Southern California vessels create 70 percent of our sulfur oxide emissions.

We will not be able to attain the Federal ambient air quality standard for fine particulate by the 2015 deadline unless these emissions are cut by approximately 90 percent. Ocean-going vessels will soon also become our single largest source of nitrogen oxide emissions, emitting more than all of our refineries and power plants combined. We will not attain the Federal ozone standard by mandated deadlines unless those emissions are substantially reduced.

Moreover, particulates emitted by marine vessels create significant cancer risk for millions of people. Let me note that attainment of the Federal particulate standard does not mean an absence of significant carcinogenic risk. In our area, controlling these emissions will prevent over 700 premature deaths annually, and will substantially reduce thousands of deaths occurring nationwide, as you have heard, if the proposed bill is enacted.

It will also reduce asthma, other respiratory diseases, as well as acid rain and regional haze. These emissions reductions are feasible. As you have heard, Maersk, the largest container line in the world, is now switching to low-sulfur fuel in all ships approaching Southern California ports. The United States, as you have heard, recognized the feasibility and need for such actions when it proposed to the IMO a requirement of 1,000 ppm sulfur fuel beginning in 2011, requirements that are consistent with S. 1499. Key shipping industry representatives support this U.S. proposal.

The costs to implement this bill, in our view, are reasonable. Although low-sulfur fuel is more expensive, the added shipping costs would be relatively low because the clean fuels would only be required for a relatively small portion of each voyage.

So let's put this into perspective. The fuel costs would increase per container shipping costs by only one-fifth to one-fourth of 1 percent. From the standpoint of a consumer, the cost of a 60 inch plasma TV would rise due to higher fueling cost, but by only 43 cents to 96 cents. The cost for a pair of shoes would go up by one-fifth to two-fifths of one penny. The thousands of lives that would be saved by these moderate costs make this bill a true environmental bargain.

Now, you have heard that maybe we should wait for the IMO to adopt these standards. We believe you should reject this notion for two reasons. First, there is no assurance that the IMO will adopt standards sufficient for this Country. Indeed, the IMO has never adopted standards even approaching U.S. needs. It is notable that at least since 2003, U.S. EPA has cited its desire to work through IMO as reason to delay deciding whether EPA can and should regulate foreign-flag vessels. After years, we still don't have effective IMO standards or EPA rules.

Second, S. 1499 is entirely consistent with the U.S. proposal to IMO. Moving ahead with this bill should help spur IMO action in a manner that is more appropriate relative to the U.S. needs. It is important to note that U.S. EPA has better authority under the Clean Air Act to restrict emissions. So we really do need Federal action on this item.

In closing, there is a growing coalition of support for S. 1499. The Port and city of Long Beach and the Port and city of Los Angeles are two examples of supporters. They want their ports to grow and they know that clean air is a critical component of economic development.

The National Association of Clean Air Agencies is also in support, as are individual air agencies from States such as California, New York, New Jersey, Rhode Island, Montana, Maryland, Colorado, Pennsylvania, Oregon and Washington State.

We thank you, Madam Chair, for introducing this landmark legislation. We also thank the Committee members for their consideration of this important national issue.

[The prepared statement of Mr. Wallerstein follows:]

Testimony of Barry R. Wallerstein, D. Env.
Executive Officer, South Coast Air Quality Management District
In Support of S.1499 - *Marine Vessel Emissions Reduction Act of 2007*
Presented to the Senate Environment and Public Works Committee
February 14, 2008 - Washington D.C.

Good morning. My name is Dr. Barry Wallerstein, Executive Officer of the South Coast Air Quality Management District (AQMD). The AQMD is tasked with achieving federal clean air standards in the greater Los Angeles area, a region with over 16 million residents including the urban portions of Los Angeles, Orange, Riverside and San Bernardino Counties.

On behalf of the AQMD, I want to commend you, Madame Chair, for your leadership in recognizing a serious national public health problem and introducing S. 1499 to address it. This legislation quite simply will save lives. It is feasible and cost effective . . . and the time to act is now.

Necessity. The legislation is necessary because marine vessels are the largest uncontrolled source of air pollution in many areas of the country, causing at least 2,000 to 5,000 premature deaths every year across the U.S.

Marine vessels burn fuel with sulfur content 1,800 times higher than allowed for on-road and off-road sources in the U.S. As a result, vessels create 70 percent of sulfur oxides emissions in the South Coast region. We cannot attain the ambient standard for particulates by the year 2014 federal deadline unless these emissions are cut by over 90%.

Oceangoing vessels are also on track to become the single largest source of nitrogen oxides in our region, emitting more than all refineries and power plants combined. We cannot attain the national ozone standard unless those emissions are substantially cut.

Moreover, particulates emitted by marine vessels create significant cancer risks for millions of people.

Controlling these emissions, as S. 1499 would, will prevent over 700 premature deaths annually in the South Coast region, and will substantially reduce the thousands of deaths occurring nationwide. It will also reduce asthma and other respiratory diseases, as well as acid rain and regional haze.

Feasibility. The emission reductions required by S. 1499 are feasible. In fact, some vessel operators are already using cleaner fuels. Maersk, the largest container line in the world, is currently switching to low sulfur fuels in all ships approaching California ports. The United States government recognized the feasibility and need for such actions when it proposed that the International Maritime Organization (IMO) require 1,000 ppm sulfur fuel beginning in 2011, a sulfur limit and deadline that is consistent with S. 1499. Key shipping industry representatives support the U.S. proposal.

Cost. The cost to implement the bill is reasonable. Although low sulfur fuels are more expensive, the added shipping costs would be relatively low because clean fuels would only be required for a relatively small portion of each voyage.

The fuel cost would amount to an increase in per-container shipping costs of only one-fifth to one-half *of one percent*. From the standpoint of a consumer, the cost of a 60-inch plasma television would rise due to fuel costs by only 43 to 96 cents. The cost for a pair of shoes would go up by one-fifth to two-fifths of *one penny*.

The thousands of lives that would be saved by these moderate costs make this bill a true environmental bargain.

Wait for IMO? You may hear the suggestion that the U.S. should wait for IMO to adopt standards. You should reject this idea for two key reasons:

- First, there is no assurance that IMO will adopt standards sufficient for this country. Indeed, IMO has never adopted standards even approaching U.S. needs. It is notable that, at least since 2003, EPA has cited its desire to work through IMO as a reason to delay deciding whether EPA can and should regulate foreign flag vessels (which are responsible for 90% of vessel emissions). After years of such delay, we still don't have effective IMO standards, or EPA rules.

- Second, S. 1499 is entirely consistent with the U.S. proposal to IMO. Moving ahead with this bill should help spur IMO to act, and to do so in a manner that satisfies U.S. needs. S. 1499 will place the U.S. in a clear position of leadership.

Support. In closing, there is a growing coalition of support for S. 1499. The Port and City of Long Beach and the Port and City of Los Angeles support the bill. They want their ports to grow, and they know that there is not conflict between clean air and growth; rather, clean air is a critical component of the ports' economic development. The *National Association of Clean Air Agencies* is also in support, as are individual air agencies from states such as California, New York, New Jersey, Rhode Island, Montana, Maryland, Colorado, Pennsylvania, Oregon, and Washington State.

We thank you again Madame Chair for introducing this landmark legislation and we offer our continued assistance. We also thank the Committee members for their consideration of this important national issue.

RESPONSES BY BARRY R. WALLERSTEIN TO ADDITIONAL QUESTIONS FROM SENATOR BOXER

Question 1. The California Air Resources Board has attempted to enforce regulations based on California State laws that would help reduce pollutant emissions from marine vessels, but Federal court rulings have found that they were preempted. Do these court rulings suggest a need and urgency for passing 8.1499? Please explain.

Response. These rulings clearly support the need and urgency for passing S. 1499, for the following reasons:

Background: The Litigation. The court rulings came in a case brought by the Pacific Merchant Shipping Association (PMSA), an industry group made up of marine carriers. The case challenged a rule adopted by the California Air Resources Board (CARB) which sought to reduce sulfur in fuel burned in oceangoing marine vessels' auxiliary engines in order to limit emissions of particulates and sulfur oxides. The district court and the Ninth Circuit Court of Appeals determined that the rule is preempted by the Federal Clean Air Act (CAA). The court stated that California cannot enforce the rule unless it obtains an authorization under CAA § 209(e) from U.S. EPA. This type of authorization is similar to a waiver for

California automobile standards under CAA § 209(b) (such as the waiver that EPA recently refused to grant California for greenhouse gas standards).

Additional Litigation is Likely. PMSA stated additional grounds for challenging the CARB rule. but the court did not decide them since it invalidated the rule on the grounds described above. IfCARB seeks to implement the rule. such as by seeking a waiver, more litigation on these additional claims can be expected. More importantly. litigation can also be expected if CARB adoptc; a main engine fuel sulfur rule. If such litigation similarly results in delay or invalidation of fuel sulfur rules. compliance with Federal attainment deadlines would be jeopardized and public health impacts would be substantial, as is described below.

Question 2. Only a Federal law can assure that rules requiring emission reductions from oceangoing vessels will be implemented without the threat of further legal challenges based on preemption grounds.

Response. Cutting Fuel Sulfur is Essential to Attain National Ambient Air Quality Standards as required by Federal Law. Ship pollution impacts many areas of the country which are designated non attainment for particulates or ozone. or which are affected by toxic diesel particulate emissions. In California, for example, the invalidated CARB auxiliary engine rule is an essential part of the State Implementation Plan (SIP) to attain the Federal "annual" $PM_{2.5}$ ambient air quality standard. Another essential part of this plan is a measure to cut oceangoing vessel main engine fuel sulfur. The SIP assumes that both auxiliary and main engine fuel sulfur will be reduced to .1 percent (1.000 ppm) by 2011 (consistent with S. 1499). Marine vessels create close to 70 percent of regional sulfur oxides emissions, as well as substantial quantities of directly emitted particulates. Sulfur oxides react in the atmosphere to form fine particulates. It will be mathematically impossible for the South Coast Basin to attain the Federal $PM_{2.5}$ ambient air quality standards unless marine fuel sulfur reductions on the order required by the CARB rule or S. 1499 occur.

Urgency to Meet Federal Deadlines. Such fuel sulfur reductions must occur soon in order for the South Coast Air Basin to comply with Federal deadlines. The State must demonstrate attainment of the Federal "annual" $PM_{2.5}$ ambient air quality standard by 2014 in order to comply with the 2015 attainment deadline in the South Coast Air Basin.

Urgency to Prevent Public Health Impacts. The recent study by Dr. James Corbett of the University of Delaware projected that at least 2.000 to 5.000 premature deaths per year in the continental U.S. are caused by particulate pollution from oceangoing vessels. Analysis by the South Coast Air Quality Management District (SCAQMD) concluded that over 700 premature deaths would be prevented every year in the South Coast Basin if the marine vessel controls in the State Implementation Plan were implemented. [1] This accounts for over one third of the health benefits of the entire SIP to attain the annual $PM_{2.5}$ standard in the South Coast Air Basin. The low sulfur fuels that would be required by CARB rules or S. 1499 would provide a large part of this health benefit. Marine vessels also create cancer risks of over 100 in a million for over four million persons in the South Coast Air Basin. with maximum risks exceeding 1,000 in a million. By comparison, stationary sources in the South Coast Air Basin are subject to regulatory risk limits of between 1 and 25 in a million.

[1] http://epa.gov/olaq/regs/nonroadlmarinelcilmvbenefils20071018-b.pdf.

Urgency Due to Large Number ofShips on Order for Construction. There are currently an extraordinary number of oceangoing vessels on order for construction. Once those vessels are built and in the water, the technical and economic challenges to retrofit emission controls will grow tremendously. Some advanced technologies may not be able to be retrofitted into existing vessels at all due to space constraints (e.g. selective catalytic reduction (SCR) of NO_x emissions). There is thus great urgency to establish standards for new-build vessels, as S. 1499 would require.

Application of advanced NO_x control technologies such as SCR to ships is essential. Such controls are needed to attain both Federal particulate and ozone standards. Oceangoing marine vessels will soon be the third largest source of nitrogen oxides in the South Coast Basin and, if not controlled, will by 2023 become the single largest source.

The litigation challenging CARB's auxiliary engine rule is an indication that any State rules seeking to limit nitrogen oxides emissions from oceangoing vessels (which rules would have greater impact on vessel equipment than the auxiliary engine rule) will be similarly challenged. Again, only a Federal law can assure that rules requiring emission reductions from oceangoing vessels will be implemented without the threat of further legal challenges based on preemption grounds.

Question 2. Would moving forward toward enactment of S. 1499 assist the U.S. in its negotiations before the IMO?

Response. Yes. There is a clear tie between our nation's efforts to control vessel pollution—including S. 1499—and action by the International Maritime Organization (IMO). It is the view of many if not most observers that a primary reason IMO is currently discussing the possibility of more stringent standards is a concern by industry that nations, states and ports are moving to adopt vessel standards to address their public health needs. illustrating this motivation, the World Shipping Council, in supporting a U.S. proposal to IMO, stated:

Failure to take decisive and effective action would puttheIMOatrisk of losing its leadership role and its ability to establish international standards that will be adopted and respected. For local, national and regional authorities to defer to the IMO, the organization must produce effective standards that meet the environmental objectives of those authorities, particularly in major urban port areas.[2]

Further, as stated by the U.S. representative to IMO at the February 14, 2008 EPW Committee hearing on S. 1499, "introduction of the bill has helped demonstrate a commitment in the U.S. to addressing this issue."

Moving toward adoption of the Marine Vessel Emissions Reduction Act will thus demonstrate the leadership that will help spur IMO to act effectively; conversely, slowing this legislation will reduce pressure on IMO to act. With the recent meeting of the IMO Marine Environmental Protection Committee. and an upcoming meeting in October. this is clearly the time to maintain pressure on IMO.

Also. continuing to move the legislation will ensure that. if WO once again fails to address critical air quality needs, the residents of this country will be protected.

Question 3. Would you please expand upon what you have described as the reasonable costs of controlling marine vessel air emissions? Please describe in more detail the costs per item consumers are likely to see from these controls and how those costs compare to the benefits of controlling these emissions.

Response. The AQMD estimates that the use of low sulfur marine fuel (LSMF) will result in an increase in fuel costs of $397 per ton, based on a recent assessment provided by the California Air Resources Board (CARB).[3] This estimated fuel cost differential is consistent with the estimate of $400 per ton provided in recent study for the Port of Long Beach and the Port of Los Angeles.[4] CARB estimates that the total annualized cost associated with the use of LSMF within 24 miles of the California coastline to be $272 million, which includes both the annualized fuel cost plus the annualized capital cost where needed to modify certain vessels. On a per container 20 foot equivalent unit (TEU) basis, CARB estimates that the use of LSMF represents an average cost increment of $9.90 per TEll.

The AQMD has extrapolated these estimates to the 200 mile Exclusive Economic Zone (EEZ) using the inventory stud;' performed by Dr. James Corbett of the Uni-

---

[2] http://www.worldshipping.orgIVesseCair—ernissions—WSC—posilion—papecon—USG—proposal.pdf.

[3] Based on CARB 4th Public Workshop to Discuss Development of Regulations for Ocean Going Ship Main Engines and Auxiliary Boilers, Proposed Regulatory Language. March 5, 2008. slides 29–30, h.lp:/Iwww.arb.ca.gov/pons!marinevessipresentatjonsl030508/030S08regpres,pdf.

[4] Low Sulfur Marine Fuel Availability Study, Final Repor,", prepared for the Port of Long Beach and the Port of Los Angeles by Tetra Tech and U1traSystems Environmental Inc., March 10, 2008, pg. 80.

versity of Delaware on behalf of CARB.[5] Based on Dr. Corbett's study, it is estimated that 45 percent of the fuel use within the 200 mile EEZ occurs within 24 miles of shore from the U.S. coastline. For the 200 mile zone, the AQMD estimates that the annualized cost from the use of LSMF will be approximately $576 million. which represents an average incremental cost per TEU of $20.97.

The AQMD has estimated the relative impact these costs represent relative to baseline TEU transportation costs as well as selected consumer goods. The average baseline transportation cost per TEll, including both water and land transport segments, is $1.925, according to a Port of Los Angeles and Port of Long Beach study.[6] Based on this data, the AQMD estimates that the use of LSMF will increase the price of shipping costs by 0.5 percent to 1.1 percent for the 24 mile zone and 200 mile zone, respectively.

The AQMD has chosen two typical consumer goods to estimate the relative impact of the use of LSMF on consumer costs. For a 60" plasma TV, we estimate that the differential cost impact ranges from 55 θ to $1.17 per TV, assuming 18 plasma TVs per TEU, for the 24 mile zone and 200 mile zone respectively. For a pair of shoes, we estimate a differential cost of 1I5th to Vz of one cent per pair of shoes for the 24 mile and 200 mile zones, respectively, assuming 4,160 boxes of shoes per TEU.[7]

These cost impact estimates are based on new data presented by CARB on March 5, 2008 but are very similar to the data based on prior analyses that was presented at the February 14, 2008 EPW Committee hearing regarding S. 1499. For example, the percentage increase in container shipping cost was revised from a range of 0.2—0.5 percent to a range of 0.6 percent—1.1 percent. This small percentage increase likely overstates the relative degree of cost burden, as the baseline transportation cost used in these estimates has likely increased since early 2007 when the baseline cost estimate was derived. The cost per 60" plasma TV increased slightly from a range of 43—96 to a range of 55—$1.55; the cost per pair of shoes increased from a range of 0.2 —0.4 to a range of 0.2—0.5.

The AQMD believes these cost estimates are very realistic and reflect the best available data on this issue. The following table provides the basis of the estimates discussed above.

Cost Impacts of Low Sulfur Fuel Use in Marine Ship Engines		
Parameter	**24 miles**	**200 Miles**
Fuel cost Δ, $ per ton, 2010	**$397**	**$397**
Annualized Fuel Cost	249,000,000	553,300,000
Annualized Capital Cost [8]	22,900,000	22,900,000
Total Annualized Cost:	272,000,000	576,200,000
Cost per TEU	9.90	20.97
Baseline Transport Cost per TEU *(on-water + on-land segments)*	1,925	1,925
% Increase in Container Shipping Cost *(ocean + land segments)*	0.6%	1.1%
Number of 60" Plasma TVs per TEU	*18*	18
Number of pairs of shoes per TEU	*4,160*	4,160
Cost per Plasma TV	0.55	1.17
Cost per pair of shoes	0.002	0.005

[8] CARB. March 5. 2008 Workshop, as referenced in footnote 1.

The cost effectiveness of LSMF use has been estimated by CARB to be $37 per pound of PM, assuming that the entire $272 million annualized cost is allocated solely to the reduction of 3,650 tons of PM per year.[9] This cost effectiveness is com-

[5] Estimation. Validation and Forecasts of Regional Commercial Marine Vessel Inventories", James Corbett. Jeremy Firestone. and Chengfeng Wang, for ARB, AprilS, 2007, Table 4, pg. 19, hllp:llwww.arb.ca.gov/researchlseca/jcfinal.pdf.

[6] Container Diversion and Economic impact StUdy", Port of Long Beach and Port of Los Angeles, September 27. 2007, pg.4. This data is adjusted to TEUs based on a factor of 1.85 TEUs I FEU.

[7] 20 x 8 x 10 feet TEU plus shoe box size of 1 x 9 x 6 inches.

[9] Communication with Mr. Paul Milkey. CARB staff. April 3. 2008. Mr. Milkey indicated that the $47 per pound cost effectiveness estimate on slide 29 in the staff proposal was a typo and is actually $37 per pound.

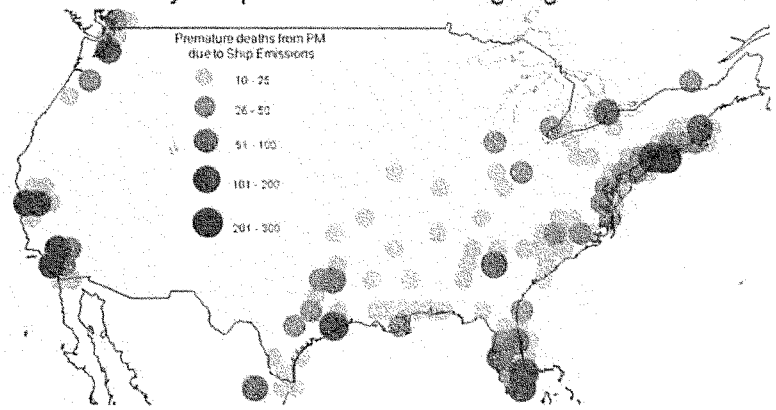
parable to other PM control measures such as the use of retrofit control devices on class 6 & 7 trucks, school buses and off-road trUcks.[10] It should be noted that CARB estimates that LSMF will result in significant reductions in NO_x and SO_x emissions of 2,092 and 29,930 tons per year, in addition to the PM reductions noted above.[11] The cost effectiveness of LSMF use is therefore expected to be far better than $37 per pound if these emission reductions are included in such estimates. The following table provides the cost effectiveness comparison of various PM control strategies.

Control Measure	Cost Effectiveness ($ / pound of PM)
LSMF	≤ 37
School Bus PM Retrofit *(upper bound)*	24.55
Class 6 & 7 Truck PM Retrofit *(upper bound)*	34.95
Off-highway Trucks *(upper bound)*	43.8

Question 4. Please provide any additional information or studies you have on the health effect of marine vessel pollution In other port areas In the United States.

Response. There is limited information on marine vessel pollution health impacts in areas outside of California. A study by Dr. James Corbett estimated the amount of premature mortality from ship emissions on a global level. This analysis included estimates near ports in the United States as well. The figure below gives the estimates calculated. The emissions were derived from ships emissions inventories, and a computer model was used to estimate population exposures to particulate matter derived from ship emissions. The technical details can be found in the published study, which is attached. As shown, premature mortality in the various areas analyzed ranged up to 300 per year.

At least 2,000 to 5,000 premature deaths per year in continental U.S. are caused by PM pollution from oceangoing marine vessels



Source: Corbett, J. J.; Winebrake, J. J.; Green, E. H.; Kasibhatla. P.; Eyring. V.; Lauer, A., Mortality from Ship Emissions: A Global Assessment, Environmental Science & Technology, 41(24):8512–8518,2007

The California Air Resources Board (CARB) has recently released an assessment of cancer risks from diesel emissions in West Oakland, California. This community

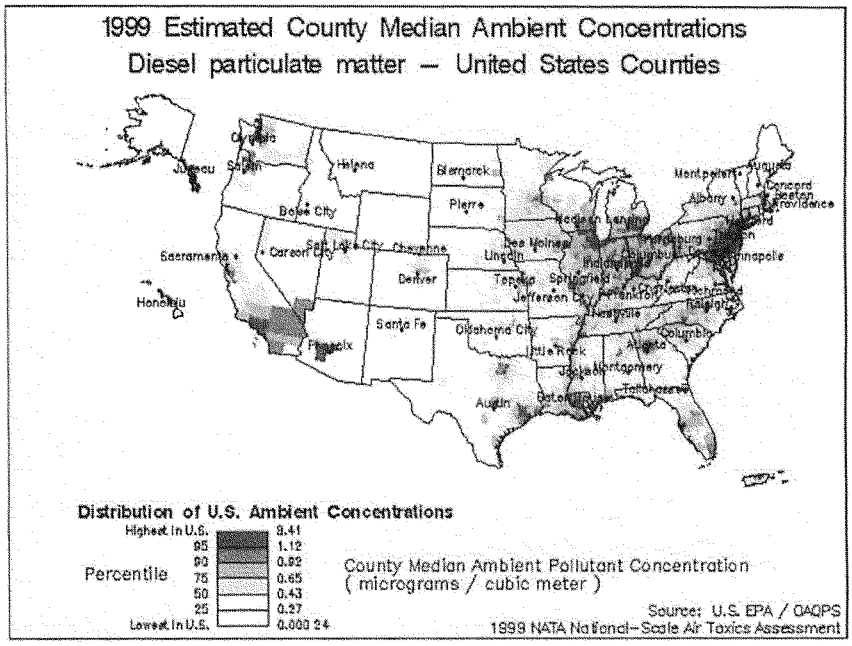
[10] Cost Effectiveness of Heavy Duty Retrofits and other Mobile Source Reduction Projects", U.S. EPA. May 2007, pg. 11–12, http:Uwww.epa.gov/oms/stateresQurceslpolicy/genera1l420b01006.pdf.

[11] Communication with Mr. Paul Milkey, CARB staff. April 3, 2008, regarding the emission reduction estimates underlying the estimated cost effectiveness of LSMF provided in the CARB March S, 2008 staff presentation.

is adjacent to the Port of Oakland and a rail yard. CARB estimated an average cancer risk in the community from diesel exhaust exposure from the ports and other sources of about 1,200 per million over a lifetime exposure. Marine vessels contributed about 20 percent of this risk. The report is available at: http://www.arb.ca.gov/ch/communities/ralwestoaklandlwestoakland.htm.

Also, regulators in Santa Barbara, California have calculated that even though the area bas no commercial ports, passing ships release so much nitrogen oxides (NO_x) emissions in the area that they "will be unable to meet air quality standards for ozone without significant emissions reductions from [ocean-going] vessels, even if they completely eliminate all other sources of pollution:' 72 Fed. Reg. 69,522 at 69,527 (Dec. 7,2007).

Furthermore, the U.S. EPA has conducted an analysis of toxic air pollutant levels throughout the U.S. Emissions inventories were used to model the average level of pollutants on a county level. Although health effects from exposure to diesel particulate were not calculated, the ambient levels estimated are presented in the figure below, and the levels are likely significant contributors to health risk. As can be seen in the figure, high levels of diesel particulate are in areas that are served by ports. Ship emissions likely contribute to these levels.



As shown in the above map the highest range of diesel particulate shown is 1.12—8.41 micrograms/cubic meter. This corresponds to a lifetime cancer risk of 336 per million to 2,523 per million.

To put port emissions into perspective, the table below shows the emissions of NO_{xt} $PM_{2.5}$ and sulfur oxides (SO_x) from ships for several ports in the U.S. (Source: U.S. EPA Commercial Marine Port Inventory Development—Baseline Inventories ICF International, September, 2006) All of these emissions are related to particulate emissions and secondary particulate formation. While the Los Angeles and Long Beach ports show the highest emissions other ports are also associated with substantial emissions.

Marine Vessel Emissions 2002 Tons Per Year			
Port	NOx	PM2.5	SOx
Los Angeles/ Long Beach	10,694	580	6,034
New York/ New Jersey	7,523	467	4,535
Miami	6,312	432	4,550
New Orleans	6,523	408	4,147
Houston	5,186	436	4,601
Baltimore	5,218	301	3,164
Everglades	4,339	306	3,166
Seattle	4,778	285	2,593
Charleston	3,697	224	2,288
Savannah	3,658	212	2,176
Oakland	3,088	160	1,651

AQMD staff estimated the health impacts from ship emissions at the Los Angeles and Long Beach ports, and calculated that about 800 premature deaths per year result from particulate exposures related to ship emissions. In addition, vessel emissions create cancer risks of over 100 in a million for over 4 million residents of Southern California, with maximum risks over 1,000 in a million (AQMD Multiple Air Toxic Exposure Study 3 (2008)). The emissions data above indicates that health effects are likely to occur at other ports as well.

In conclusion, although there are limited analyses of the health impacts available, ship emissions are major contributors to particulate emissions in port areas. These areas are also generally of high population density and the resultant exposures to particle emissions likely create significant adverse health effects.

Senator BOXER. Thank you so much.

And now Senator Lautenberg has asked if he can introduce a very special New Jersey witness. So Senator?

Senator LAUTENBERG. I am so pleased to welcome Commissioner Lisa Jackson, Commissioner of the New Jersey Department of Environmental Protection, back to Washington. She spent some time here, 16 years with EPA. When New Jersey sent out our alarm on environmental problems, we were so fortunate to have Ms. Jackson come and join the Administration.

We have worked on projects important to New Jerseyans, from keeping our water clean, fighting global warming. Even global warming, though it is a national thing, we are still fighting to make sure that we do our share and want to protect our State's strong environmental chemical security laws, reactivating Superfund cleanups, and all those things.

I am so pleased to have her here today. I look forward to her testimony and our continuing to work together to solve lots of problems that we see ahead of us.

Thank you very much.

Senator BOXER. Thank you.
With that, Commissioner Jackson.

STATEMENT OF LISA P. JACKSON, COMMISSIONER, NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

Ms. JACKSON. Thank you, Madam Chair. And thanks to you and your staff for holding this important hearing.

And thanks to my State's Senator for his leadership on this issue and so many that are so important to New Jersey and our Country.

I come as Governor Corzine's representative today to thank you and to implore this Committee and eventually this Congress to pass this very important piece of legislation. I come as a child of a port city, having been born, raised and educated in the great city of New Orleans spoken about earlier, and knowing how important ports are to the life of a community.

I come as the mother of a 12 year old who spent his first Christmas in the hospital with a severe asthma attack, and knowing how that feels to wonder about his next breath at such a young age.

Madam Chair, you said this was a matter of health, and I couldn't agree more. I think it is also a matter of fairness. This is about leveling the playing field in this Country, and we saw and don't need to see again, I think, the map that shows that this is a national problem, with ports all over our Country that suffer to varying degrees, but all suffer. It is about understanding that airsheds are regional and sometimes national in nature, and that in New Jersey, being on the East Coast, know that as the air blows, we are on the tail-end of emissions that affect the health of our residents.

It is about realizing that in heating oil for our residents who have to buy heating oil in times when things are very expensive, we require 500 parts per million of sulfur, not 27,000 parts per million of sulfur. And it is about understanding and realizing that it is only fair that the health costs that are borne by children like we saw earlier, and he was very eloquent, are borne by our society, whether that is employers and benefit plans or Medicaid or Social Security, the costs associated with the impacts on the lives of people become disabled. And I think we need to remember that the costs need to be looked at in that context as well.

It is a matter of environmental justice. New Jersey is the most densely populated State in the Country, and two of our ports, Newark and Camden, are areas that include large numbers of minorities and large numbers of people who can't afford yet to move elsewhere and shouldn't have to move elsewhere in order to have clean air.

It is about the fact that Newark is locked by rail and air and cars and trucks, and that a child in a park in Newark faces air that is two to five times more contaminated than a child in a park somewhere else.

And port vessels aren't the only reason for that, but they are an important part of it, and they are the only unregulated source of SO2 emissions that large that still have no regulation on them.

It is a matter of what I think is unshakable science and taking action based on unshakable science. Wind in this Country blows

from west to east, from southwest to northeast, and we all know that being at the end of those kinds of currents means that we must do all we can to reach attainment for priority pollutants.

I want you to understand that New Jersey has taken action to do just that. With respect to diesel programs, we have a mandatory diesel retrofit program in our State that requires that school buses and garbage trucks and transit buses and Government-owned vehicles are retrofitted to address diesel pollution. We pay for that out of our tax dollars.

We have an idling outreach and education campaign, and we are phasing out a trucker's ability to have sleeper berths that run all night. And we require heavy duty diesels to be inspected. We have a suite of dozens of actions that we take on our own sources in our State to address air pollution. So we agree that we must step up and address it, but air blows across this Country from our own port over to New York and up the Northeast Coast and from areas south and west of us.

Finally, I would just like to implore this Committee to realize that it really is, as Senator Cardin said, a matter of authority and leadership and impetus to force our own EPA and the international community to deal with this issue and to have the resolve and commitment needed to do it in an urgent manner, because every year is affecting people's lives and some lives are lost.

Thank you very much, and I am happy to answer questions.

[The prepared statement of Ms. Jackson follows:]

Statement by
Lisa P. Jackson, Commissioner
New Jersey Department of Environmental Protection
Before the
United States Senate
Committee on Environment And Public Works
On S.1499, the Marine Vessel Emissions Reduction Act of 2007
February 14, 2008

Good morning Madam Chair and members of the Committee. I would like to thank you for inviting me to testify here today on the chair's bill, S.1499, the Marine Vessel Emissions Reduction Act of 2007, which I strongly support.

New Jersey is the most densely populated state in the country and home to two of the busiest ports on the eastern seaboard. Our ports are thriving and are expected to continue to grow at an unprecedented rate. However, this activity and growth has been shown to have adverse health and environmental impacts. The communities where the ports are located are disproportionately impacted by emissions from numerous sources, many of which are associated with the economic activities of the port. We, as a nation, must address this environmental justice issue.

Ships are the last major sulfur dioxide (SO_2) source category that burns high sulfur fuels in New Jersey. However, because of the national and international nature of the shipping industry, the reduction of these emissions are best handled on a national or international basis not on a local basis.

Therefore, I commend you, Madam Chair, for sponsoring this legislation along with Senators Feinstein and Whitehouse. I would call on the Congress to pass this important bill without delay. Legislation such as this not only protects the health of our citizens but it helps to keep our ports competitive with each other.

HEALTH IMPACTS

Ships are powered by diesel engines that use a fuel with a very high sulfur content (about 2.7% sulfur or 27,000 ppm). Emissions from diesel sources are linked to cancer, asthma, premature death, and other adverse effects, including reduced visibility. Health studies have shown that there is no clear threshold below which adverse effects are not experienced by at least certain segments of the population. Based on national air toxics data, mobile sources in New Jersey are estimated to contribute two-thirds of the average cancer risk to the residents of the state.

The emissions from these ships include many different pollutants, including particulates, nitrogen oxides, sulfur oxides, and numerous air toxics. Although fine particulate matter generated from all sources can cause serious health impacts, particulate matter generated from diesel combustion is particularly harmful. This is due to the adsorbed toxics, as well as its very small size that can be inhaled very deep into the lungs (most diesel particles

are in the ultrafine size range). Furthermore, depending on local weather conditions, some of the particles may stay in the local neighborhoods for long periods of time.

The health effects associated with exposure to the fine particles that are formed include increased respiratory disease, aggravated existing heart disease, and temporary breathing difficulty, particularly for people with asthma. The elderly and children are at highest risk of health effects from exposure to SO_2.

The oxides of nitrogen from combustion also contribute to the formation of ozone. Ozone causes health problems because it damages lung tissue, reduces lung function, and sensitizes the lungs to other irritants. Ozone has long been known to increase the incidence of asthma attacks in susceptible individuals. Ozone exposure also makes the lungs more vulnerable to lung diseases such as pneumonia and bronchitis. Ozone not only affects people with impaired respiratory systems, such as asthmatics, but healthy adults and children as well.

New Jersey's ports are located in Newark and Camden – two environmental justice communities. The residents of these cities, along with many other urban residents throughout the State, are disproportionately impacted by diesel exhaust. Newark is a transportation hub with its international port, airport, major highways and rail lines. While Camden is a smaller community, it is also adversely affected by many sources of pollution within its boundaries, including those at the port.

According to a report by the New Jersey Environmental Federation in June 2006, "Diesel Hot Spots: A Snapshot of Newark, New Jersey," the county in which the Newark port is located has the highest asthma related mortality rates in the state, with a doubling of the rates within minority populations. Furthermore, a short-term monitoring study commissioned by the same organization found that levels of diesel exhaust at parks and playgrounds along several busy Newark streets were two to five times higher than a quieter street in that same city. At one location, an average of 250-300 trucks passed by per hour. These are just a few examples of the far-reaching effects that the ports can have on environmental justice communities.

While the effects of ship emissions are especially evident in urban areas in and around port communities, the high levels of sulfates formed from burning 27,000 ppm sulfur fuel can travel great distances northward along the entire marine corridor. The wind on the East Coast frequently blows from the southwest to the northeast, right along the eastern seaboard. Hence, the ports have a cumulative impact on air quality as air masses pass over many ports and urban areas.

SO_2 and oxides of nitrogen (NO_x), and the particles formed from SO_2, and NO_x, as well as direct emissions of fine particles, can be transported over long distances and deposited far from their point of origin, contributing to air quality problems far beyond the areas where they were emitted. Emissions from sources in the New Jersey – New York Metropolitan area are blown by the winds along the coast many miles, impacting Rhode

Island, Massachusetts and beyond. This is not just a local air quality problem for New Jersey; it impacts many states.

INVENTORY

Based on the emission data developed by the Port Authority of New York and New Jersey, emissions from ships calling on the North Jersey port contributed significant amounts of air pollution.

Year	NO_x*	$PM_{2.5}$	SO_2
2000	2170	108	2330
2015	2830	140	3030

*Emissions are expressed as tons per year

These emissions are approximately equivalent to having a small to mid-size power plant in your neighborhood.

There are a number of initiatives to reduce emissions from the other source sectors. As we reduce emissions from power plants, industry, motor vehicles and heating oil, port emissions will be a much bigger portion of the air pollution problem in the future. The relative contribution of our ports to the local pollution burden will continue to grow, especially as the economic activity of the port continues to grow.

NJDEP ACTIONS

I am proud to say that New Jersey has been aggressive in its efforts to reduce diesel emissions. We have:

- Passed a law creating the most comprehensive statewide diesel retrofit program in the nation. We are aggressively moving forward in mandating the retrofit of: school buses, garbage trucks, transit buses and government owned diesel vehicles.
- Implemented an extensive idling outreach and education campaign and stringent idling rules that phase out the truckers' "sleeper berth" exemption in 2010.
- Required heavy diesel trucks to undergo an annual inspection for opacity or smoke, the first state in the nation to impose such a requirement.

New Jersey has been equally aggressive in efforts to reduce NOx, SOx, volatile organic compounds (VOC) and fine particulates ($PM_{2.5}$) in anticipation of the 2010 attainment deadlines for the ozone and fine particulate air quality standards.

At this time, New Jersey does not comply with the current federal health standard for ozone. That standard will only be made more stringent in the future as we increase our understanding of the adverse health effects of ozone. Next month, the USEPA is expected to issue a revised standard for ozone, which we expect will be more stringent than the current health standard.

New Jersey is proposing regulations for the following control measures to assist us in attaining the health standards:

- Consumer products (VOC)
- Asphalt paving (VOC)
- VOC stationary storage tanks (VOC)
- Asphalt production plants (NO_x)
- Industrial/ commercial/institutional boilers (NO_x)
- Electric generating units which operate on high electric demand days (NO_x)
- Glass manufacturing furnaces (NO_x)
- Municipal waste combustors (NO_x)
- Boilers serving electric generating units (NO_x, SO_x, PM)
- Petroleum refineries (VOC, NO_x, PM)

New Jersey is also monitoring air quality that does not meet the annual and new daily fine particulate standard (2006).

Taken together, this means that more needs to be done to protect the health and welfare of our citizens.

SUPPORT FOR S.1499

Lowering the sulfur content of the fuel used by oceangoing vessels is an essential strategy and is an important part of a larger port strategy under development by New Jersey. As I mentioned, ships are the last major source of SO_2 in New Jersey that burns high sulfur fuels but are not yet part of a plan to reduce emissions. Your bill would reduce these emissions but will not place any ports at a competitive disadvantage because it will impose the same requirements on all the US ships/ports. S.1499 will level the playing field and would avoid the need for New Jersey or any other state to independently pursue strategies to reduce emissions from the ships.

S.1499 would enhance the ability of the USEPA and the International Maritime Organization (IMO) to come to an agreement on reducing sulfur levels internationally and provide a necessary backstop if they fail to reach an accord. It is my understanding the US proposal to the IMO is consistent with this legislation and thus there is no inconsistency between moving this legislation and concurrently seeking IMO action.

At least one major shipper, who also operates a terminal in New Jersey, already uses low sulfur fuel in container ships calling on California ports. This bill requires the use of low sulfur fuel near shore only, not for the entire transoceanic voyage, which means only a small portion of a vessel's fuel would be affected by this bill.

Further, this bill is consistent with a memorandum of agreement (MOU) recently negotiated amongst the Northeast and Mid-Atlantic states to reduce sulfur in home heating oil. The agreement would require 500 ppm home heating oil in 2012 for New Jersey, New York, Delaware and Pennsylvania. Therefore, the requirements of this bill (1000 ppm fuel) will coincide with our more stringent home heating oil requirements. I

do note that the end of 2012 would be a logical compliance date for the east coast to enable construction of more desulfurization facilities for both heating oil and ship fuel.

In conclusion, I again thank you for this opportunity and strongly support moving this bill forward. It will help address a disproportionate burden placed on our communities by the ports, address emissions that are best addressed on a national and international level and, most of all, protects the health of our citizens.

I am available to answer any questions you may have.

RESPONSES BY LISA P. JACKSON TO ADDITIONAL QUESTIONS FROM SENATOR BOXER

Question 1. Do you believe the emissions reductions that would be achieved by S. 1499 are important for port communities throughout the United States, and if so, why?

Response. Yes, I believe that the reductions achieved by S. 1499 would benefit all port communities.

• First, by regulating marine fuel on a national level, you will ensure that all ports are kept on a level playing field; legislation such as this not only protects the health of our citizens, but it helps to keep our ports competitive with each other.

• Second, as states continue to control emissions from other sources (e.g., power plants, industry, motor vehicles) and the number of ships picking up and dropping off goods at the ports continue to increase, the relative contribution of port emissions will be much larger. As indicated by U.S. EPA in its recent rulemaking, locomotive and marine diesel engine emissions currently represent approximately 20 percent of mobile source NO_x and 25 percent of mobile source diesel $PM_{2.5}$. By 2030, without additional emissions controls, locomotive and marine diesel engines will emit about 35 percent of the total mobile source oxides of nitrogen emissions and 65 percent of the total mobile source diesel fine particulate matter emissions. Therefore, S. 1499 is important to ensure that the environmental ramifications of increased goods movement are minimized.

• Third, because ports typically are located in close proximity to highways and rail networks, the confluence of mobile sources results in high emissions and high exposure in port areas. By way of example, the Elizabeth, NJ air quality monitor near our north Jersey port has the highest $PM_{2.5}$ readings in the entire State. In addition, the national air toxics assessment shows that mobile source emissions in New Jersey (including those operating at or near the port areas) result in the greatest cancer risk of all air pollution sources in the State.

Question 2. Would moving forward toward enactment of S. 1499 assist the U.S. in its negotiations before the IMO?

Response. Yes, I believe S. 1499 would enhance the ability of the U.S. EPA and the IMO to come to an agreement on reducing sulfur levels internationally and provide a necessary backstop if they fail to reach an accord. It is my understanding the U.S. proposal to the IMO is consistent with this legislation and thus there is no inconsistency between moving this legislation and concurrently seeking IMO action.

I am also encouraged by the reported action by an IMO committee last Friday to propose standards similar to those contained in your bill. Specifically, if U.S. waters are designated as "special protection areas," as set forth by the IMO committee, then a 1000 ppm limit would apply, although not until 2015. I believe S. 1499 may spur the IMO to move quickly to adopt stringent fuel sulfur limits.

Question 3. Would you please elaborate upon the environmental justice issues that you testified upon, and whether such issues could be applicable in other parts of the country? Please explain.

Response. New Jersey's ports are located in Newark/Elizabeth and Camden—two comrilUnities with environmental justice issues. These communities are disproportionately impacted by emissions from numerous sources, many of which are associated with the economic activities of the port. As an example, a report by the New Jersey Environmental Federation in June 2006, "Diesel Hot Spots: A Snapshot ofNewark, New Jersey," stated that the county in which the Newark port is located has the highest asthma related mortality rates in the State, with a doubling of the rates within minority populations.

According to U.S. EPA, recent studies show that populations living near large diesel emission sources, such as major roadways, rail yards, and marine ports, are likely to experience greater diesel exhaust exposure levels than the overall U.S. population, putting them at greater health risk. The recent U.S. EPA rulemaking for marine and locomotive engines analyzed 47 ports and 37 rail yards and found that more than 13 million people living nearby are exposed to diesel PM levels above urban background levels, including a disproportionate number of low-income households, African-Americans, and Hispanics. (Also see: State of California Air Resources Board. Diesel Particulate Matter Exposure Assessment Study for the Ports of Los Angeles and Long Beach, April 2006. http://www.arb.ca.gov/regact/marine2005/portstudy0406.pdf)

While some may contend that emissions from ships are a small portion of total fine particle emissions in a particular non-attainment area, I would emphasize that

the localized impacts of diesel emissions are significant and justify the action envisioned by S. 1499.

Senator BOXER. Thank you so much, Commissioner.

And last, but not least, is Jennifer J. Mouton, Administrator, Air Quality Assessment Division, Louisiana Office of Environmental Assessment. Welcome.

STATEMENT OF JENNIFER J. MOUTON, ADMINISTRATOR, AIR QUALITY ASSESSMENT DIVISION, LOUISIANA OFFICE OF ENVIRONMENTAL ASSESSMENT

Ms. MOUTON. Good morning, Senator Boxer, Senator Vitter and distinguished members.

My name is Jennifer Mouton. I am the Administrator of the Air Quality Assessment Division at the Louisiana Department of Environmental Quality.

Senator Boxer and members of the Environment and Public Works Committee, I would like to thank you for the opportunity to address the Committee today and to provide these comments on S. 1499, the Marine Vessel Emissions Reduction Act of 2007.

Due to Louisiana's geographic situation and natural assets, Louisiana is home to some of the most diverse economic interests in the United States. These interests include pulp and paper, agriculture, synthetic chemical manufacturing, natural gas transportation, processing and storage, power generation and petrochemical and refineries. There are extensive port systems. We serve as a major distribution center for many products that serve a significant portion of the United States.

In fact, according to the U.S. Army Corps of Engineers Navigation Data Center, tonnage for selected ports in the 2006 report, the Port of South Louisiana and Port of New Orleans are ranked No. 1 and No. 8 in the United States in total tonnage. The Ports of Lake Charles, Greater Baton Rouge, and Plaquemine are ranked 11th, 12th, and 13th respectively. Taken together, the ports along the Lower Mississippi River represent one of the busiest areas of marine commerce in the Country.

Louisiana is a recognized leader in the protection of the environment, natural resources, health and quality of life. A spirit of cooperation and trust exists between State government, local government, business, universities and private citizens in seeking solutions to environmental problems. A healthy, beautiful environment, complementary job opportunities, and the unique culture of Louisiana all create an unmatched quality of life.

The State of Louisiana has made significant progress in improving and maintaining air quality. The significant and continued progress in reducing air pollutant levels has resulted in Louisiana achieving attainment for all criteria pollutants, including the recently revised fine particulate standard, with the exception of a five parish area in and around Baton Rouge which is out of attainment for ozone only.

Last year, we celebrated the success of a comprehensive collaborative effort of LDEQ, EPA, local industries, local government and community leaders in bringing the five parish Baton Rouge area into attainment with the previous 1 hour ozone standard. Although the 1-hour standard has been recently replaced by the new 8 hour

standard, attainment of the old standard underscores the commitment of air quality improvement in the Baton Rouge area.

Prevailing thought during earlier planning efforts was that attention for air quality improvement should be focused on major industrial sources and significant progress has been made in reducing industrial emissions. With stationary point sources well controlled, we must now look to additional areas such as mobile sources such as cars, trucks, trains, ships and area sources, such as homes, consumer products, small businesses, for the needed reductions.

Therefore, we believe that it is appropriate to look at port activities, among others, and consider their impacts on air quality. S. 1499 proposes to amend the Clean Air Act to direct the Administrator of the Environmental Protection Agency to promulgate regulations that limit the sulfur content in fuels for specified marine vessels in their main and auxiliary engines. A reduction in diesel particulates and sulfur oxide emissions as envisioned in S. 1499 would obviously benefit the citizens of fine particulate and sulfur oxide non-attainment areas in this regard. Such reductions would provide for improved air quality for all of the coastal and river corridor communities.

However, Louisiana is in attainment with the fine particulate national ambient air quality standard and our efforts are currently aimed toward ozone attainment. Therefore, determining the ports' contribution and impact of ozone precursors, NO_x and volatile organic compounds, particularly highly reactive volatile organic compounds, is our priority. Our needs relate more specifically to ozone precursors. Although this bill would provide some NO_x reductions, it is not primarily aimed at reducing ozone.

Last, in order to fully understand how sources affect air quality, and thus to compose and implement effective regulations, it is necessary to accurately identify and quantify air emissions. As more areas move forward with ozone attainment demonstration modeling, the need to gather air emission inventories for marine traffic and port activities, much like we do for stationary sources, has become evident. If our air quality planning efforts are to be successful.

Emission inventories are critical in assessing air quality impacts and are the starting point for estimating needed emission reductions and possible control strategies. It should be noted that as proposed, S. 1499 has no provisions for ports to prepare or submit air emission inventories, or for funding for States to prepare such inventories. We would respectfully suggest that a requirement for ports to develop and update at specific intervals an air emissions inventory is necessary and requisite in order to ensure that emissions reductions are quantifiable and verifiable.

In closing, we do believe that assessing air emission impacts from ports and marine vessels is important to further improve air quality and to assist the States in reaching Federal and local air quality goals. We commend the Committee for raising this most important subject and we look forward to working with our regulatory and industry partners in addressing this issue.

[The prepared statement of Ms. Mouton follows:]

TESTIMONY

OF

JENNIFER J. MOUTON, ADMINISTRATOR
LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY ASSESSMENT DIVISION

ON THE

MARINE VESSEL EMISSIONS REDUCTION ACT OF 2007

Senate Bill 1499

BEFORE THE
SENATE
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

THE HONORABLE SENATOR BARBARA BOXER
CHAIR

FEBRUARY 14, 2008

Good morning Senator Boxer, Senator Inhofe, Senator Vitter and distinguished committee members. My name is Jennifer Mouton. I am Administrator of the Air Quality Assessment Division at the Louisiana Department of Environmental Quality. Senator Boxer and members of the Environment and Public Works Committee, I would like to thank you for the opportunity to address the committee today and to provide these comments on Senate Bill 1499, the Marine Vessel Emissions Reduction Act of 2007.

Due to Louisiana's geographic situation and natural assets, Louisiana is home to some of the most diverse economic interests in the United States. These interests include pulp and paper, agriculture, synthetic chemical manufacturing, natural gas transportation, processing and storage, power generation, petrochemicals and refineries. Through our extensive port system, we serve as a major distribution center for many products that serve a significant portion of the United States. In fact, according to the US Army Corps of Engineers, Navigation Data Center,

Tonnage for Selected Ports in 2006 report, the Port of South Louisiana and Port of New Orleans are ranked No. 1 and No. 8 in the United States in total tonnage. Ports of Lake Charles, Greater Baton Rouge and Plaquemine are ranked 11th, 12th and 13th, respectively. Taken together, the ports along the lower Mississippi River represent one of the busiest areas of marine commerce in the country.

Louisiana is a recognized leader in the protection of the environment, natural resources, health and the quality of life. A spirit of cooperation and trust exists between state government, local government, business, universities, and private citizens in seeking solutions to environmental problems. The healthy, beautiful environment, complementary job opportunities, and unique culture of Louisiana all create an unmatched quality of life.

The state of Louisiana has made significant progress in improving and maintaining air quality. This significant and continued progress in reducing air pollutant levels has resulted in Louisiana achieving attainment for all criteria pollutants, including

the recently revised fine particulate standard, with the exception of a five-parish area in and around Baton Rouge which is out of attainment for ozone only. Last year we celebrated the success of a comprehensive and collaborative effort of DEQ, EPA, local industries, local governments and community leaders in bringing the five-parish Baton Rouge area into attainment with the previous 1-hour ozone standard. Although the 1-hour ozone standard has been recently replaced by the new 8-hour standard, attainment of the old standard underscores the commitment of air quality improvement in the Baton Rouge area.

Prevailing thought during earlier planning efforts was that attention for air quality improvements should be focused on major industrial sources and significant progress has been made in reducing industrial emissions. With stationary point sources well controlled, we must now look to additional areas such as mobile sources (cars, trucks, planes, trains, ships), and area sources (homes, consumer products, small businesses) for the needed reductions. Therefore, we believe that it is appropriate to look at

port activities, among others, and consider their impacts on air quality.

Senate Bill 1499 proposes to amend the Clean Air Act to direct the Administrator of the Environmental Protection Agency (EPA) to promulgate regulations that limit the sulfur content in fuels for specified marine vessels in their main and auxiliary engines. A reduction in diesel particulates and sulfur oxide emissions as envisioned in Senate Bill 1499 would obviously benefit the citizens of fine particulate and sulfur oxide nonattainment areas in this regard. And such reductions would provide for improved air quality for all of the coastal and river corridor communities.

However, Louisiana is in attainment with the fine particulate national ambient air quality standard and our efforts are currently aimed towards ozone attainment. Therefore, determining the port's contribution and impact of ozone precursors, NOx and volatile organic compounds (particularly highly reactive volatile organic compounds) is our priority. Our needs relate more specifically to

ozone precursors and, although this bill would provide some NOx reductions, it is not aimed at reducing ozone.

Lastly, in order to fully understand how sources affect air quality and thus, to compose and implement effective regulations, it is necessary to accurately identify and quantify air emissions. As more areas move forward with ozone attainment demonstration modeling, the need to gather air emissions inventories for marine traffic and port activities much like we do for stationary sources has become evident if our air quality planning efforts are to be successful. Emission inventories are critical in assessing air quality impacts and are the starting point for estimating needed emission reductions and possible control strategies. It should be noted that, as proposed, Senate Bill 1499 has no provisions for ports to prepare or submit air emission inventories or for funding for states to prepare such inventories. We would respectfully suggest that a requirement for ports to develop and update at specific intervals an air emissions inventory is necessary and

requisite in order to ensure that emissions reductions are quantifiable and verifiable.

In closing, we do believe that assessing air emission impacts from ports and marine vessels is important to further improve air quality and to assist the states in reaching federal and local air quality goals. We commend the Committee for raising this most important subject and look forward to working with our regulatory and industry partners in addressing this issue.

RESPONSES BY JENNIFER J. MOUTON TO ADDITIONAL QUESTIONS FROM SENATOR BOXER

Question 1. In light of these types of health effects, shouldn't efforts be made to limit or reduce such impacts of marine vessel diesel emissions as soon as possible?

Response. The Louisiana Department of Environmental Quality supports the efforts of U.S. EPA to reduce and or limit impacts from emissions from marine vessel diesel engines. We also support EPA's efforts in reducing emissions from ocean going vessels by working toward international agreement through the MARPQL Treaty. EPA's proposal for regulating marine and locomotive diesel engines is a critical step in improving human health by providing much needed emission reductions. Therefore, we support Federal efforts to help states with nonattainment areas achieve compliance with the national ambient air quality standards as expeditiously and practically as possible.

Question 2. Data from a study of mortality resulting from marine vessel emissions, Corbett and Winebrake 2007, indicate that there are between 100 and 150 premature deaths in Louisiana caused by pollution emitted from marine vessels each year. Do you support measures to reduce the impacts of pollution such as those described in that study? If so, please provide the measures that you support.

Response. The Louisiana Department of Environmental Quality (LDEQ) consistently supports measures that serve to reduce the impacts of pollution on human health and the environment. Compliance with the $PM_{2.5}$ standards serves to protect the public from serious health problems ranging from increased symptoms, hospital admissions and emergency room visits for people with heart and lung disease, to premature death in people with heart or lung disease. The concentrations of in $PM_{2.5}$ in Louisiana have historically been in compliance with the Federal $PM_{2.5}$ standards. In addition, based on modeling conducted by the Environmental Protection Agency, Louisiana is projected to continue to comply with the $PM_{2.5}$ standards through the year 2020.

The Corbett and Winebrake 2007 modeling exercise was designed to estimate the potential contribution of oceangoing ship emissions to ambient PM concentrations on a global basis with interpretative focus on various regions of the world. This type of study is very useful for gaining insight into trends in ambient PM concentrations over large regions, as discussed in the study, but does not serve to provide meaningful quantitative results for small, select areas such a a single State within a modeled region. It also important to note that uncertainty is inherent in any modeling exercise and that the interpretation of the modeling results should always take into consideration those uncertainties and the level of confidence that can be placed in quantitative modeling results.

Senator BOXER. Thank you very much.

I want to point out that there is a national call for this legislation. People have a right to say they don't think there should be and they don't agree there should be, but the National Association of Clean Air Agencies, representing the pollution control agencies in 53 States and territories, and over 165 metropolitan areas across the Country, have given us their support. So I think it is very important.

I guess I have some questions for Dr. Wallerstein, and I will save the New Jersey questions for Senator Lautenberg to ask.

You note that the National Association of Clean Air Agencies and many State agencies support this bill. Would you explain why you think there is wide support for this legislation nationwide?

Mr. WALLERSTEIN. It is for the simple reason that ship emissions are a major pollution source throughout the coastal United States, and that the emissions from those ships travel large distances, impacting other communities that are more inland.

We have also learned regarding carcinogenic risk that proximity matters, that even if you attain a Federal ambient air quality standard for a pollutant such as particulates, if you are near the sources of particulate pollution, in this case diesel exhaust, then you are exposed to very high levels of carcinogenic risk.

We have done calculations in Southern California, as an example, where our staff has estimated that more than four million Southern Californians are exposed to a carcinogenic of greater than 100 in a million due to ship emissions alone in out twin ports. While the number is obviously going to be a bit different depending upon which port area one looks at, it is quite clear that you are going to have significant risk in any major port area.

I might last note that if you look at that map on the right and you see the bright pinkish color going down the California coastline, that communities even such as Santa Barbara, California, which most people think of as having clean air, are gravely concerned about ship emissions in the channel and the effect that it has on their citizens. In fact, ship emissions were their No. 1 pollution source.

Senator BOXER. So if you look at this chart showing the nationwide problem, we see people are dying early in really all of these port areas, all of these port areas.

Mr. WALLERSTEIN. That is correct, Madam Chair.

Senator BOXER. And so you think, as I do, and I know it is a national issue. Just because I wrote the bill doesn't mean it is not important to Senators from all over the Country, and we have many Senators on this bill from places pretty far away because people are dying in these other areas. Is that correct?

Mr. WALLERSTEIN. That is correct, Madam Chair. That comes from a study that was published in a highly noted journal, Environmental Science and Technology, and is a peer-reviewed study before publication in that journal.

Senator BOXER. OK. I thought your testimony when it came to showing the cost of how much a TV would go up in cost and how much a pair of shoes, I think you said, would go up. Could you repeat that? Because I think if you ask the people of this Country if they would be willing to pay a little bit more if it meant that we could save 2,000 to 5,000 lives, and I see we have a chart here that shows a plasma TV, 43 cents to 96 cents; a pair of shoes not even a penny more, and U.S. deaths avoided 1,200 to 3,000 per year minimum, and the monetized benefit, $7 billion to $18 billion; the benefit-to-cost ratio of 4.1 to 11, meaning it cost four and you get eleven?

Mr. WALLERSTEIN. It means the health benefits——

Senator BOXER. It goes from four to one to 11 to one.

Mr. WALLERSTEIN. That is correct.

Senator BOXER. Somewhere in there. My long-suffering staff, no, it is OK, Eric. We are fine, Eric. Thank you.

[Laughter.]

Senator BOXER. I appreciate all these charts and what you have done to help prepare for this, Eric, and all the staff. Thank you.

Let me just say, because this will be my concluding remarks in terms of this panel, that I want to thank all three of you for coming here today, and to the panel before, if I didn't thank them as well.

You know, sometimes there are issues that are right in front of you that I call no-brainers. It is really going to be such a benefit. A few special interests are going to say, well, we support the idea, but not so fast, go a little slower. And I appreciate where they are coming from. It is OK.

But I think history has shown us that when we are timid when it comes to the environment, we make a mistake. When we step out there and we are not afraid to act, and here is sort of the last piece. We have dealt with trucks. We have dealt with cars. We are dealing with these others. We are dealing with rail, although I don't think we are doing enough on rail, but we are dealing with rail. And this is the last piece, with 27,000 parts per million when it should be 1,000. Think about it. It is outrageous.

The other fact is we know it is foreign ships. It is foreign ships that are causing the problem. So what we want to do is say when you come within 200 miles of a port, cleanup your act because we love our kids and we love our families and we love our people, and we want to protect them, and we welcome you into our port, but cleanup your act. That is it, and it is very simple.

You know, I am going to push very hard for this, along with other colleagues on the Committee. If we get resistance to it, let the people see who is for it and who is against it. That is what makes our democracy tick, but we will push hard for this.

Thank you for your help.

Senator Vitter.

Senator VITTER. Thank you, Madam Chair.

And thanks to all of you for being here.

I want to pick up on an earlier theme, because I think it is very interesting to see who is for the bill, where they come from, are they in or out of compliance.

Dr. Wallerstein, am I correct that your area is out of compliance for NO_x and particulate matter?

Mr. WALLERSTEIN. Yes, we are out of compliance for particulate and ozone.

Senator VITTER. I am sorry, ozone not NO_x.

Mr. WALLERSTEIN. The oxides of nitrogen, or NO_x , is a building block to ozone formation, as well as particulate formation, Senator.

Senator VITTER. OK. And you believe this maritime traffic is a significant contributor to that?

Mr. WALLERSTEIN. We know it is, as well as causing carcinogenic risks to the population, yes.

Senator VITTER. So in your area, what have you all done about that?

Mr. WALLERSTEIN. We are doing a number of things. We have been working with our ports on requirements that the ports could put into place through leases to tenants.

Senator VITTER. I am sorry. That would restrict traffic or mandate certain air standards?

Mr. WALLERSTEIN. The ports would specify certain provisions like clean equipment on docks as a requirement.

Senator VITTER. Excuse me. I am talking about ships. What have you all done with regard to ships in your area to address this?

Mr. WALLERSTEIN. Well, the principal thing that has been done in Southern California or throughout the State of California is our State Air Resources Board enacted a 1,000 to 2,000 ppm sulfur limit for fuel used in auxiliary engines, which has been challenged in court and is now in litigation where the plaintiffs have said if anyone is to establish such a standard, it should be the U.S. EPA.

Senator VITTER. But certainly, it is beyond question that your port, for instance, could limit activity and traffic if it wanted to.

Mr. WALLERSTEIN. There is no need for it to do such——

Senator VITTER. But you are out of compliance, aren't you?

Mr. WALLERSTEIN. Well, as Maersk has demonstrated, it is not necessary because they are already switching to low-sulfur fuel as they come within 24 miles of our ports.

Senator VITTER. And so you all are now in compliance because of that?

Mr. WALLERSTEIN. No. It is one shipping line demonstrating what we believe everyone else can do, which will provide a piece to the overall puzzle of Federal attainment.

Senator VITTER. I guess what I am suggesting is why don't you all lead and take local action and lead the rest of the Country by mandating that in your port, by mandating a limitation or a decline of traffic or activity so that you get into compliance.

Mr. WALLERSTEIN. Well, Senator, we believe that you can put pollution controls in place and allow for economic development, and that is why the Port of Long Beach and the Port of Los Angeles support this bill and other actions. I want to assure you that if you look across the board at what is being done in Southern California, we are in a leadership role in pollution control for all sources, including those related to maritime operations.

Senator VITTER. Well, again I would beg to differ because there are actions you all could take locally with regard to this traffic, with regard to these ships, and that activity, and you have chosen not to do so. I would suggest the same in New Jersey. You mentioned doing a lot of things, which you are, ground-based.

I believe I am correct, you haven't restricted port activity or capped that or limited that, to have an impact with regard to these emissions, even though you are out of compliance with regard to the relevant particulate matter and NO_x standards.

Ms. JACKSON. Thank you, Senator.

We wouldn't consider that an appropriate public policy response to the air pollution problem when there is such an easy one afforded by this bill. This bill gives us an incredibly important tool to address the source of pollution, rather than stopping the ships in their tracks. We actually believe that our citizens and the folks on the East Coast deserve the goods and services that the ships bring in. Why not simply control the pollution as the ships approach our port?

Senator VITTER. What about an amendment to the bill to limit the applicability to ports with a non-attainment issue?

Ms. JACKSON. In New Jersey, about one-third of our air pollution, Senator, comes from out of State. We have several studies that show that because of the way the wind blows, you can see what the Northeast Corridor looks like. Some of that are our own cars. Some of that are trucks. We perfectly and willingly acknowledge that, and are working on those issues. But we know that no matter we do, one-third of our air pollution comes from sources outside of our attainment area. So I wouldn't agree that that would effectively reduce our problem.

Senator VITTER. OK. Well, I will wrap up, but I just want to point out the strong support on the Committee, with Senator Lau-

tenberg and Senator Cardin, along with Senator Boxer. All of those port areas, all of those coastal areas are in non-attainment. Mine is not.

I don't think that is a coincidence that is unrelated to our approach to this bill because speaking for coastal Louisiana ports, we are not in that non-attainment.

Ms. JACKSON. Thank you, Senator. It sounds like you still have an ozone issue in the area surrounding the Port of New Orleans and Baton Rouge.

Senator VITTER.

[Remarks off microphone] and yet we just met the 1-hour standard. We are working to meet the 8 hour standard, but that is——

[remarks off microphone].

Senator BOXER. OK. Before I call on Senator Lautenberg, you all are not in attainment in ozone. So you all could stop some traffic until you all get in compliance. But let me just say this, because I feel so strongly about it. We are here as national legislators. We are here to work together for the good of the people of the United States of America. OK?

Now, again I just want to make a point. People in Louisiana are dying premature deaths because of this problem, people in California, people in New Jersey, people in Florida and people inland. If we suddenly turn to say to one region, just close down your port; we are happy to take it.

I will tell you why I am against it. Because then the people in Louisiana, who don't seem to want to move such a bill, they will really have a hot spot of death. And I am not interested in saying one State do it and then the other States become the hot spots of death. That is not my purpose here, because I am an American and I think every single family deserves to have clean air, whether they live in Louisiana or they live in San Francisco or Los Angeles, San Diego, Trenton, New Jersey, on and on.

And that is why this is so interesting. What I really find interesting is Senator Vitter's continual repetition that the only people who want this are the people who are not in attainment, when you have a national organization that represents every State in the Union backing this. So the facts simply don't comport with that theory. Again, I would say to my colleague to take a look at this letter, because it represents every State in the Union.

OK. Senator Lautenberg.

Senator LAUTENBERG. Thank you, Madam Chairman.

This is a place where anomalies are not unusual. I think about how our dear colleague, Mary Landrieu, is constantly begging, begging for Federal funds to help Louisiana get back on its feet. By the way, we support it.

So when we look at what the Bush administration has done to demonstrate worldwide leadership to improve air quality at ports by strengthening international standards, I don't think there is any evidence of that. Any of you can answer. Commissioner Jackson or Dr. Wallerstein, would you feel equipped to answer that question?

Ms. JACKSON. Thank you, Senator.

I was heartened to hear the representative from EPA earlier say that they are proceeding with negotiations. I think the issue is time, and I also think that there have been arguments made by

EPA in the past that they didn't have the legal authority to push these reductions. This legislation would take that issue off of the table.

Senator LAUTENBERG. Thanks very much.

And because one of the things that stands out in my mind is kind of let the States take care of themselves, when it just doesn't wash. Otherwise, California with its PAVLE standards, Madam Chairman, would be able to move ahead, instead of having EPA obstruct that decision by California to go ahead with it. But there are times when States would like to do things to improve air quality and environmental conditions, and we don't have the wholehearted support of EPA in many of those occasions, and want to reduce the standards for the number of chemicals, for right to know and things of that nature. So we are fighting an uphill battle we shouldn't have to fight.

Ms. Jackson, you mentioned that our low-income residents in parts of New Jersey pay high health risks from maritime air pollution. Because of the perilous growth and incidence of asthma, I note that more than 150 million Americans, Dr. Wallerstein, over half of the Nation's population live in areas with poor air quality. The prevalence of asthma in the United States has increased more than 75 percent since 1980. Does that kind of approach an epidemic proportion, wouldn't you think?

Mr. WALLERSTEIN. Yes, it does. There are studies that have been conducted in Southern California, for example, that show that children that live in our most air-polluted areas have higher incidence of asthma, and children that play two sports instead of one have an even higher incidence of asthma in those communities. So there is a direct relationship.

Senator LAUTENBERG. So Ms. Jackson, why then isn't there a greater sense of urgency for States to act to reduce the health risks in the absence of strong Federal regulation, and ask for Federal support for these things?

Ms. JACKSON. Thank you, Senator.

States are doing just that with NACA and State support of this bill. As you know, the county that Newark resides in, Essex County, has the highest asthma death rates, mortality rates in our State. Those rates are even higher among the minority population for issues that probably relate to everything from income level to the ability and access to adequate health care.

Again, I just need to remind the Committee that those health care costs are borne by society, just as surely as the ravages of a hurricane are borne by society. This is a national health epidemic and it is a national problem.

Senator LAUTENBERG. You made mention of this I think before, but I just want to focus on it for a minute more. Ships going into ports of neighboring States, they contribute without a shred of doubt to poor air quality in New Jersey. So even if we have strong State law in place regarding pollution from ships, we are not protected.

Ms. JACKSON. Absolutely right, Senator. One-third of our air pollution comes from out of State, one-third.

Senator LAUTENBERG. Thank you.

Thanks very much, Madam Chairman.

Thank you to all the witnesses for your testimony. We appreciate it.

Senator BOXER. Thank you, colleagues.

We thank you very, very much for your presence here today. I would ask consent to place in the record the chart that I keep referring to, which by the way in case anyone wanted to know, it is a global assessment, Environmental Science and Technology 2007. It is a peer-reviewed study. And also a chart that shows, and this is so intriguing to me, the percentage of air pollution that is regulated from mobile source: 98 percent of pollution from passenger cars is subject to regulation; 98 percent of pollution from trucks; 97 percent pollution from off-road equipment; 58 percent of pollution from locomotives; and only 11 percent from ships. So it is just lagging.

[The referenced documents follow:]

TABLE 2. Annual Cardiopulmonary and Lung Cancer Mortality Attributable to Ship $PM_{2.5}$ Emissions by Region and by Case (Best Estimate from C-R function[a] (95% confidence interval[b]))

Region	Case 1a Inventory A Model: GEOS-Chem PM: BC, POM, SO_4	Case 1b Inventory A Model: E5/M1-MADE PM: BC, POM, SO_4	Case 1c Inventory A Model: E5/M1-MADE PM: All	Case 2a Inventory B Model: E5/M1-MADE PM: BC, POM, SO_4	Case 2b Inventory B Model: E5/M1-MADE PM: All	Case 3 (2012 Forecast) Inventory C Model: GEOS-Chem PM: BC, POM, SO_4
North America (NA) Region						
cardiopulmonary	1,860 (680–3,050)	2,820 (1,020 – 4,610)	4,590 (1,660 – 7,510)	>5,470 (1,980 – 8,950)	7,910 (2,870 – 12,940)	2,770 (1,010 – 4,540)
lung cancer	210 (80 – 350)	320 (120 – 520)	520 (190 – 850)	620 (230 – 1,020)	900 (330 – 1,470)	320 (120 – 520)
NA Total	**2,070 (760 – 3,400)**	**3,140 (1,140 – 5,130)**	**5,110 (1,850 – 8,360)**	**6,090 (2,210 – 9,970)**	**8,810 (3,200 – 14,410)**	**3,090 (1,130 – 5,060)**
Europe/Mediterranean (EUM) Region						
cardiopulmonary	6,770 (2,450 – 11,070)	11,830 (4,290 – 19,350)	24,350 (8,840 – 39,810)	7,250 (2,630 – 11,860)	15,100 (5,480 – 24,690)	8,990 (3,260 – 14,700)
lung cancer	670 (250 – 1,090)	1,100 (410 – 1,800)	2,360 (870 – 3,840)	650 (240 – 1,060)	1,430 (530 – 2,320)	880 (330 – 1,440)
EUM Total	**7,440 (2,700 – 12,160)**	**12,930 (4,700 – 21,150)**	**26,710 (9,710 – 43,650)**	**7,900 (2,870 – 12,920)**	**16,530 (6,010 – 27,010)**	**9,870 (3,590 – 16,140)**
East Asia (EA) Region						
cardiopulmonary	3,490 (1,270 – 5,710)	11,970 (4,340 – 19,590)	17,920 (6,500 – 29,300)	9,640 (3,500 – 15,780)	13,800 (5,010 – 22,570)	5,170 (1,880 – 8,460)
lung cancer	370 (140 – 610)	1,300 (480 – 2,110)	1,950 (720 – 3,170)	1,030 (380 – 1,680)	1,480 (550 – 2,410)	550 (200 – 900)
EA Total	**3,860 (1,410 – 6,320)**	**13,270 (4,820 – 21,700)**	**19,870 (7,220 – 32,470)**	**10,670 (3,880 – 17,460)**	**15,280 (5,560 – 24,980)**	**5,720 (2,080 – 9,360)**
South Asia (SA) Region						
cardiopulmonary	4,050 (1,470 – 6,630)	7,250 (2,630 – 11,870)	9,440 (3,420 – 15,450)	11,240 (4,080 – 18,390)	15,460 (5,610 – 25,260)	6,090 (2,210 – 9,970)
lung cancer	230 (90 – 380)	390 (150 – 640)	510 (190 – 830)	600 (220 – 970)	820 (300 – 1,340)	350 (130 – 570)
SA Total	**4,280 (1,560 – 7,010)**	**7,640 (2,780 – 12,510)**	**9,950 (3,610 – 16,280)**	**11,840 (4,300 – 19,360)**	**16,280 (5,910 – 26,600)**	**6,440 (2,340 – 10,540)**
East South America (ESA) Region						
cardiopulmonary	380 (140 – 620)	520 (190 – 850)	690 (250 – 1,130)	1,120 (410 – 1,840)	1,540 (560 – 2,520)	570 (210 – 930)
lung cancer	50 (20 – 90)	70 (30 – 120)	100 (40 – 160)	160 (60 – 260)	220 (80 – 350)	80 (30 – 130)
ESA Total	**430 (160 – 710)**	**590 (220 – 970)**	**790 (290 – 1,290)**	**1,280 (470 – 2,100)**	**1,760 (640 – 2,870)**	**650 (240 – 1,060)**
Global						
cardiopulmonary	17,340 (6,290 – 28,390)	35,610 (12,910 – 58,260)	58,640 (21,270 – 95,900)	36,970 (13,410 – 60,490)	56,790 (20,600 – 92,870)	24,780 (8,980 – 40,540)
lung cancer	1,580 (580 – 2,570)	3,260 (1,200 – 5,310)	5,540 (2,050 – 9,020	3,220 (1,190 – 5,240)	5,050 (1,870 – 8230)	2,240 (830 – 3,650)
Global Total	**18,920** (6,870 – 30,960)	**38,870** (14,110 – 63,570)	**64,180** (23,320 – 104,920)	**40,190** (14,600 – 65,730)	**61,840** (22,470 – 101,100)	**27,020** (9,810 – 44,190)

[a] Values are rounded to the nearest 10. [b] Confidence interval range is based on uncertainty in the concentration–response function coefficients.

Senator BOXER. As I say, it is a place where we can really feel the benefits. Even Ms. Mouton, in your very good testimony, you say there would be benefits. You acknowledge that. We appreciate that.

And then this cost of low-sulfur fuel, the cost of getting to low-sulfur fuel, what it would cost, these really pennies for consumer goods, which I think is also key.

I think it is a win-win. I am really sorry that we don't have, you know, agreement here across the line today, but we will work hard to get something done.

We so appreciate everybody being here today. Again, to our young man who graced us with his testimony, I think everybody felt it was really important and we thank you so much for being here.

We do stand adjourned on this Valentine's Day.

[Whereupon, at 12:35 p.m. the committee was adjourned.]

○