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## **Board Agenda Item**

**TO:** Air Pollution Control District Board

**FROM:** Douglas W. Allard, Air Pollution Control Officer

**CONTACT:** Kathy Patton (961-8852), Tom Murphy (961-8857), Ray McCaffrey (961-8826)

**SUBJECT:** Update on Marine Shipping Activities

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### **RECOMMENDATION:**

Receive a briefing on the agency's activities to pursue ways to reduce emissions from the Marine Shipping sector.

### **DISCUSSION:**

In November 2001, your Board adopted the 2001 Clean Air Plan. The plan identified marine shipping as a major contributor to our existing emissions and as an emission source that is anticipated to grow substantially in future years. Your Board directed staff to "take aggressive actions to influence the United States Environmental Protection Agency to reduce the air quality impacts of emissions from marine shipping."

Since November, we have taken opportunities to get educated about marine shipping, have met with agencies and lawmakers to inform them of Santa Barbara County's concern with marine shipping emissions, and are building coalitions of interested parties to begin fleshing out an approach to reduce emissions from marine shipping. We found that much of the efforts being discussed to date focuses on new ships and on emissions at the ports. While these efforts will bear fruit in the future, existing ship emissions will continue for years to come.

Therefore, we have begun to explore the possibility of retrofit technologies that can be applied to existing vessels through a voluntary or incentive program. While our thinking is still in its infancy (we still have much to learn), we wanted to brief you on where the program may be headed and the opportunities Santa Barbara County Air Pollution Control District has to take a leadership role in achieving emission reductions.

Attached is a concept paper that outlines the steps that we are working on with the U.S. Environmental Protection Agency, the California Air Resources Board, the Port of Los Angeles, the Maritime Administration, other coastal districts, the shipping industry and others. If successful, the marine shipping retrofit program has the potential to prove that retrofit technologies are available and achievable. With this information in hand, a broader program may be developed that can operate much like the Carl Moyer program does. The potential is exciting.

The purpose of this briefing is to apprise you of our progress. Since we have not yet identified viable control technologies, participating ships, or potential tons of emissions to be reduced, it is unknown what the full scope of a retrofit program will be and what our agency's contribution will be. We will return to your Board with any funding proposals that arise out of our work with our partners.

## **MARINE SHIPPING RETROFIT PROGRAM (MSRP) - CONCEPT PAPER**

### **GOALS**

**Near-term:** Reduce NOx emissions of one or two existing ships passing Santa Barbara County using cost-effective reduction technologies easily applicable or adaptable to other ships passing Santa Barbara. Focus on ships emitting the highest amounts of NOx offshore Santa Barbara County and on emissions reduction technologies or methods that are attractive to ship owner-operators (e.g., it saves them money, improves operations, it brings them into compliance early with future regulations, or it improves public relations).

**Long-term:** Document the emissions reduction technologies and other information gained from the near-term steps and make available to others interested in reducing ship emissions; assist other partners in applying the emissions reduction technologies to as many ships as possible passing Santa Barbara and other partner coastlines.

### **OBJECTIVES**

#### **1. Understand Vessel Activities and Emissions**

Develop understanding of economics of shipping industry, including fairway and harbor fees.  
Determine potential incentives and disincentives to program participation.

Identify ships with a consistent long-term historical record of highest number of trips offshore Santa Barbara and other partner areas (mostly offshore Santa Barbara and the California coast – but could consider other areas depending on partnerships). Understand shipping routes, fueling points, trip times.

Research ship details including name, owner, flag, make, model, date built, DWT and other specs, hull design, engines (2- or 4- stroke?) and transmissions, trip types and frequency, fuel use per trip and per year.

Identify ship owner-operators most responsive to emission reductions options. Begin with USA owned and operated ships (could consider foreign owner-operators if shortage of high-emitting USA ships.)

Review existing source test data for ship engines. Evaluate fuel use at different loads and speeds. Quantify emissions (NOx, PM, ROC, SOx) of “frequent flyers” passing Santa Barbara on a ship-by-ship basis based on engine types and sizes, fuel types, in-place controls and emissions characteristics.

#### **2. Evaluate Control Technologies**

Identify the most feasible emissions reduction technologies and related cost effectiveness. Examples: new propulsion or auxiliary engines, retrofit controls (e.g., EGR, water injection or misting or humidifiers, fuel additives), and alternate fuels (e.g., low sulfur bunker fuel, or diesel fuel).

Learn what fuel types are generally used, and what other fuels or technologies the existing engines and fueling systems can and can't handle. Learn what fuel might be available and how the introduction of alternative fuel might be achieved.

Research emissions reduction strategies and make owner-operators aware of available options. Identify both benefits, such as improved fuel efficiency, early compliance with future regulations, reduced or more convenient engine maintenance, and good public relations, and disincentives, such as fuel penalties.

### **3. Develop Partnerships and Funding Mechanisms**

Create partnerships with potential funders (shipping owner-operator companies and associations, policy makers, environmental groups, researchers, authors of other shipping emissions or emissions reduction studies, and ship engine and control device manufacturers). Possible partners: United States Environmental Protection Agency, California Air Resources Board, California Air Pollution Control Officers Association, South Coast Air Quality Management District, Maritime Administration, maritime academies, environmental groups (both US and international), Carnegie Mellon University, state- and national-level departments of environment, European Union, engine manufacturers (e.g., Wartsila, MAN), retrofit device manufacturers (e.g., Johnson-Matthey, Engelhard), and others.

Work with partners to identify ship owner-operators most interested in emissions reduction programs.

Work with partners to identify funding sources and secure retrofit or other control technology funding.

### **4. Retrofit Vessel(s)**

Identify cost effective and proven retrofit control technologies for high emissions ships offshore Santa Barbara belonging to interested ship owner-operators.

Develop appropriate contract structure to ensure that emission reductions are realized and ongoing, with prorated fund reimbursement requirements for breached contracts.

Enter into contracts with suppliers, installers, ship owner-operators, others.

Before retrofit installation, source test existing engines to develop baseline emissions.

Install retrofit devices or other control technology on one or two ships.

Post-installation, source test controlled engines to document emissions reductions.

### **5. Summary and Conclusions**

Document all information gained during the program and make it available to others interested in reducing ship emissions.