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## *EPA Proposes More Stringent Emission Standards for Marine Diesel Engines on Oceangoing Vessels*

### *New Development*

On December 7, 2007, the U.S. Environmental Protection Agency (EPA) published an Advanced Notice of Proposed Rulemaking (ANPRM), proposing to establish new limits on emissions of nitrogen oxides (NO<sub>x</sub>), sulfur oxides (SO<sub>x</sub>), and particulate matter (PM) from Category 3 marine compression-ignition (diesel) engines with cylinder displacements of 30 liters or more. These Category 3 marine engines are primarily used for propulsion in oceangoing vessels and range in size from 3,000 to 100,000 horsepower. EPA is considering application of these requirements on both U.S.-flag and foreign-flag vessels. Comments are due on March 6, 2008: <http://a257.g.akamaitech.net/7/257/2422/01jan20071800/edocket.access.gpo.gov/2007/pdf/E7-23556.pdf>

### *Background*

Highway, locomotive, land-based nonroad (e.g., stationary generators and farm equipment), and marine diesel engines emit significant quantities of NO<sub>x</sub>, SO<sub>x</sub>, and PM. Diesel emissions contribute to the nonattainment of the health-based National Ambient Air Quality Standards for fine particulate matter (PM<sub>2.5</sub>) and ozone. Oceangoing vessels are a large source of these emissions, particularly in port and coastal areas. EPA projects that, without further emission controls, oceangoing vessels will account for 34% of the mobile-source NO<sub>x</sub>, 45% of the mobile-source PM<sub>2.5</sub>, and 94% of the mobile-source SO<sub>x</sub> by 2030.

In 2003, EPA adopted a Tier 1 standard for Category 3 engines. The Tier 1 standard is the NO<sub>x</sub> limit contained in Annex VI of

the International Convention for the Prevention of Pollution from Ships (MARPOL), which varies from 9.8 to 17.0 grams per kilowatt-hour (g/kW-hr), depending on an engine's maximum RPM. The Tier 1 standard for Category 3 engines applied to U.S.-flag vessels beginning with engines built in 2004. In April 2007, the United States proposed amendments to MARPOL Annex VI that would significantly reduce NO<sub>x</sub>, SO<sub>x</sub>, and PM emissions limits. This EPA ANPRM mirrors the proposed MARPOL Annex VI amendments.

### *Proposed Rule*

The standards, applicable to both new and existing Category 3 engines, would apply to: (1) persons that manufacture, sell, or import new Category 3 engines for use on U.S.-flag vessels, (2) persons that build vessels that will be U.S.-flag and that use such

engines, (3) owners or operators of such U.S.-flag vessels, and (4) persons that rebuild or maintain these engines. EPA is also considering the development of standards in this rulemaking applicable to gas-turbine engines.

**NOx.** EPA is proposing to phase in NOx controls in two steps. The Tier 2 NOx limits, effective 2011, would require a 15 to 25 % reduction from the Tier 1 standard through in-cylinder controls such as turbocharger optimization and compression-ratio changes, or water-based technologies such as water injection or intake-air humidification. The Tier 3 NOx limits, effective in 2016, would reduce emissions another 80% below the Tier 2 limits through the use of selective catalytic reduction (SCR) or other after-treatment technology. Because the Tier 3 limits utilize after-treatment technologies, EPA is considering applying Tier 3 only in designated ports and coastal

areas, allowing the emission controls to be turned off outside of those designated areas.

EPA is also considering requiring engines built before the MARPOL Annex VI NOx standard became effective on January 1, 2000, to reduce NOx emissions by 20%.

**SOx and PM.** PM and SOx emissions from Category 3 engines are primarily the result of the sulfur in residual fuel, commonly known as bunker fuel. EPA proposes to establish a PM standard on the order of 0.5 g/kW-hr and a SOx standard on the order of 0.4 g/kW-hr. These emission limits would be achieved through switching to low sulfur residual fuel or distillate fuel, or employing exhaust gas cleaning technology such as seawater scrubbing, or both. These standards would be effective in 2011.

Current EPA marine diesel engine emission standards do not apply to foreign-flag vessels.

However, in this rulemaking, EPA stated that it will continue to coordinate its national standards for Category 3 emission limits with its activities at the International Maritime Organization and consider the applicability of the proposed Category 3 standards to foreign-flag vessels that enter U.S. ports. EPA is targeting completion of this rulemaking for December 17, 2009.

### **Conclusion and Recommendation**

This rulemaking could substantially alter the emissions standards on large propulsion engines used on oceangoing vessels. All companies involved in the construction, repair, or operation of U.S.-flag and foreign-flag vessels operating in U.S. waters should review and consider commenting on the proposed rule. ■



#### **For Additional Information**

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