



# Maritime Developments Advisory

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## EPA Finalizes Emissions Standards for Category 3 Marine Diesel Engines and Implements North American ECA

### New Development

On December 22, 2009, the Environmental Protection Agency (EPA) announced that it finalized regulations implementing emission reductions from large marine diesel engines—so-called Category 3 marine diesel engines—for U.S.-flag vessels. Category 3 engines are marine diesels with per cylinder displacements at or above 30 liters and are mainly used as propulsion engines on large oceangoing vessels such as bulk carriers, cruise ships, tankers, and container ships. In addition, EPA announced that these regulations will implement MARPOL Annex VI, which was signed into law in the United States on July 21, 2008 and which will apply to both U.S. and foreign-flag vessels. Once the Emission Control Area (ECA) proposed by Canada and the United States goes into effect, both U.S. and foreign-flag vessels will have to meet these new standards up to 200 nautical miles off U.S. coasts. EPA's final rule is expected to be published in the near future and will be effective 60 days after publication.

### Background

EPA's final regulations will require significant reductions in nitrogen oxide (NO<sub>x</sub>) emissions and, with certain exceptions, the use of low sulfur fuel. This rule will affect companies that manufacture, sell, or import Category 3 marine diesel engines, and parties that build, repair, or operate U.S.-flag and foreign-flag vessels. Because the rule

restricts the sale and use of high sulfur marine fuels, petroleum refiners and entities involved in the distribution and sale of marine fuels are also impacted.

EPA is authorized to regulate mobile sources of air pollution under the Clean Air Act. Pursuant to the National Clean Diesel Campaign, EPA regulates mobile source diesel engine emissions through in-engine controls, add-on controls, and diesel fuel regulations. Moreover, EPA has coordinated its marine diesel engine and fuel regulations with the MARPOL Annex VI regulations. The current Category 3 engine EPA Tier 1 emission standard is the Annex VI Tier I NO<sub>x</sub> emission standard, which applied to U.S.-flag vessels beginning with engines built in 2004.

The 2004 Category 3 engine Tier 1 emission standards, relatively speaking, are not very stringent and the emission control technology is equivalent to technologies first required on nonroad diesel engines in the early 1990s. The fuel used in these engines can have a sulfur content of 30,000 parts per million (ppm) or higher.

EPA estimates that emissions from Category 3 marine diesel engines account for 913,000 tons (about 10%) of mobile source NO<sub>x</sub> emissions, 71,000 tons (about 24%) of mobile source diesel fine PM emissions, and 597,000 tons (about 80%) of mobile source sulfur oxides (SO<sub>x</sub>) emissions. Without further emission reductions, the percentage of mobile source NO<sub>x</sub>, PM, and SO<sub>x</sub> emissions attributable to oceangoing vessels is estimated to

grow to 40%, 48%, and 95%, respectively, by 2030. EPA estimates that the final rule will reduce annual NOx emissions by 1.2 million tons and PM emissions by 143,000 tons by 2030. According to EPA, the emission reductions are estimated to annually prevent between 12,000 and 32,000 PM-related premature deaths; between 210 and 920 ozone-related premature deaths; 1,400,000 work days lost; and 9,600,000 minor restricted-activity days. For 2030, EPA estimates the annual monetized health benefits at between \$110 and \$270 billion, while the annual compliance costs were estimated to be \$3.1 billion.

In October 2008, IMO amended Annex VI to include more stringent Tier II and III NOx emission standards and to reduce the global cap on fuel sulfur content to 3.50% (from the current 4.50%), effective from January 1, 2012; then progressively to 0.50 %, effective from January 1, 2020. The cap on fuel sulfur content in ECAs will be reduced to 1.00%, beginning on July 1, 2010 (from the current 1.50 %), and further reduced to 0.10 %, effective from January 1, 2015. These amendments will enter into force on July 1, 2010.

The United States and Canada jointly proposed the designation of the North American ECA in March 2009, which was approved in principle by IMO in July 2009. The earliest possible adoption date is at MEPC 60, which will take place in March 2010 with entry into force as early as August 2012. Additional background can be found in our previous advisories on this topic. See (1) “EPA Proposed Emissions Standards for Category 3 Marine Diesel Engines on Oceangoing Vessels” <http://www.blankrome.com/index.cfm?contentID=37&itemID=2060>; (2) “EPA Proposes More Stringent Emission Standards for Marine Diesel Engines on Ocean-going Vessels” <http://www.blankrome.com/index.cfm?contentID=37&itemID=1410>; and (3) “United States and Canada Propose 200 Nautical Mile ‘Emission Control Area’ under MARPOL Annex VI” <http://www.blankrome.com/index.cfm?contentID=37&itemID=1965>.

**Final Rule**

*Overview*

The final rule implements new engine and fuel regulations pursuant to the Clean Air Act, which are applicable to U.S.-flag vessels. The rule also implements the new engine emission and fuel sulfur limits of MARPOL Annex VI pursuant to the Act to Prevent Pollution from Ships (APPS), which are applicable to all vessels regard-

less of flag. The Annex VI regulations will be implemented in conjunction with the proposed ECA in which all vessels, regardless of flag, would be required to meet the most stringent engine emissions and marine fuel sulfur requirements in Annex VI. This combination of the Clean Air Act regulations, MARPOL Annex VI, and the APPS implementation of Annex VI will help ensure that comparable emission standards apply to the all regulated vessels entering U.S. ports or operating in U.S. waters, regardless of flag.

The final rule significantly revises 40 C.F.R. Part 80, *Regulation of Fuels and Fuel Additives*, and Part 1042, *Control of Emissions from New and In-Use Marine Compression-Ignition Engines*, and creates a new Part 1043, *Control of NOx, SOx, and PM Emissions from Marine Engines and Vessels Subject to the MARPOL Protocol*. Furthermore, the rule makes technical changes to 14 more parts of Title 40 of the Code of Federal Regulations that deal with diesel engine emissions and fuel regulation.

*Category 3 Engine Standards*

EPA is issuing the new Category 3 marine diesel engine emission NOx limits pursuant to its authority under section 213(a)(3) of the Clean Air Act, which directs EPA to set standards regulating emissions of NOx, volatile organic compounds (VOCs), and carbon monoxide (CO) for categories of engines. These new NOx limits also match the limits in Annex VI.

The new near-term Tier 2 NOx standards will apply beginning with new engines manufactured in 2011 and generally require the use of more effective in-engine emission reduction technologies. The long-term Tier 3 NOx standards apply beginning in 2016 and generally require the use of aftertreatment technology, such as selective catalytic reduction (SCR). The NOx emission standard varies with engine RPMs.

	Less than 130 RPM NOx g/kWh	130-2000 RPM NOx g/kWh	Over 2000 RPM NOx g/kWh
Tier 2	14.4	44.0 x RPM <sup>(-0.23)</sup>	7.7
Tier 3	3.4	9.0 x RPM <sup>(-0.20)</sup>	2.0

EPA also established a CO emission standard of 5.0 g/kWh and a hydrocarbon (HC) emission standard of 2.0 g/kWh. According to EPA, these emission standards are necessary to prevent increases in CO and HC that might otherwise occur from the application of certain technologies to reduce NOx.

### *Gas Turbines*

The final rule treats new gas turbine engines as compression-ignition engines and applies the standards for new Category 1 and Category 2 engines to gas turbine engines. Gas turbines will not be considered as a Category 3 engine. The largest gas turbine engines would be considered to be Category 2 engines, even those that have rated power more typical of Category 3 diesel engines.

### *ECA and Fuel Sulfur Limits*

As noted above, Annex VI limits fuel sulfur content in ECAs to 0.10 %, which is equivalent to 1,000 ppm. In the proposed rule, EPA proposed two changes to its diesel fuel regulatory program. First, under the current program, the sulfur limit for diesel fuel is 15 ppm, which will be fully phased-in by December 1, 2014, for non-road, locomotive, and marine engines. This diesel fuel is also known as NRLM diesel fuel produced for distribution and use in the United States. The 15 ppm limit is inconsistent with the Annex VI ECA limit of 1,000 ppm. EPA has revised 40 C.F.R. Part 80 to allow for the production and sale of 1,000 ppm sulfur fuel for use in Category 3 marine vessels only. The change will allow production and distribution of fuel consistent with the sulfur limits that will become applicable in ECAs beginning in 2015.

The second EPA proposed change was to prohibit the production and sale of fuel oil with sulfur content greater than 1,000 ppm for use in the waters within the proposed ECA. EPA received many comments that the proposed regulation would prevent ships already equipped with SOx scrubbers, which reduce emissions to the same or lower levels as switching to low sulfur fuel, from buying high sulfur fuel. The proposal also would have precluded vessel owners and operators from electing to install scrubbers or to implement other alternative compliance methods in lieu of fuel switching when the 1,000 ppm ECA limit becomes effective in 2015.

In addition, several trade associations representing Great Lakes vessel owners and operators commented

about economic and safety concerns of applying the ECA engine and fuel requirements to vessels that operate on the Great Lakes. These commenters pointed out that because Great Lakes steamships operate in fresh water they have very long lives and that these vessels typically have boilers that were manufactured in the 1940s and 1950s and were designed specifically to operate on heavy fuel oils. The conversion of these boilers to use distillate fuel would present technical and safety issues.

Congress listened to the Great Lakes operators and also weighed in on the issue. In the Department of Interior, Environment, & Related Agencies Appropriations Act of 2010, Congress enacted an economic hardship provision that allows Great Lakes vessel operators to petition EPA for a temporary exemption from the 2015 fuel sulfur standards. Moreover, Congress placed a prohibition on EPA's use of funds to issue a final rule that includes fuel sulfur standards applicable to existing Great Lake steamships, effectively excluding those vessels from the ECA sulfur limits.

As a result of these comments and Congressional action, EPA states in the preamble to the final rule that "we are generally forbidding the production and sale of fuel oil with a sulfur content above 1,000 ppm for use in the waters within the proposed ECA." That said, EPA has incorporated several exceptions to the prohibition in the new 40 C.F.R. Part 1043.

One exception incorporates the provisions of Regulation 4 of Annex VI that allows the use of fuels not meeting the requirements of ECAs, provided that the vessel applies a method that results in equivalent emission reductions. The use of higher sulfur fuel can be approved if the vessel uses alternative devices, procedures, or compliance methods that achieve equivalent emission control as operating on 1,000 ppm sulfur fuel. Part 1043 includes regulations that allow vessel owners and operators to request EPA approval of such equivalent methods for controlling emissions on U.S.-flag vessels by submitting an application for certification. EPA is working with the U.S. Coast Guard to develop the process for approving equivalents. The equivalency exception also applies to vessels equipped with controls certified by the Administration of a foreign flag state. Higher sulfur fuels may be used on such vessels consistent with the provisions of the Engine International Air Pollution Prevention (EIAPP) certificate, APPS and Annex VI.

Two other exceptions apply to Great Lakes vessels. Existing steamships operating exclusively on the Great Lakes are not subject to the 1,000 ppm sulfur requirement and Great lakes vessels that have been granted interim relief on the basis of serious economic hardship are also not subject to the standard.

For purposes of the steamship exception, “Great Lakes steamships” means vessels operating exclusively on the Great Lakes and Saint Lawrence Seaway, whose primary propulsion is a steam turbine or steam reciprocating engine. These steamships must have been in service on the Great Lakes prior to October 30, 2009 to qualify for the exception. This exception does not apply to diesel propulsion Category 3 vessels with auxiliary boilers. Vessels meeting the requirements are exempted from meeting the requirement of Part 1043.

Part 1043 also includes the economic hardship provision that allows Great Lakes operators to petition EPA for a temporary exemption from the 2015 fuel sulfur standards. The exemption applies while EPA conducts a Congressionally mandated study evaluating the economic impact of the final rule on Great Lakes carriers and considers revising the final rule. Vessel owners/operators must show that despite taking all reasonable business, technical, and economic steps to comply with

the fuel sulfur requirements, the burden of compliance costs would create a serious economic hardship for the company. EPA will evaluate each application on a case-by-case basis. Applications for an economic hardship exemption must be submitted to EPA by January 1, 2014.

EPA also revised the proposed regulations to clarify that the Annex VI ECA requirements apply to internal waters of the United States. The proposed North American ECA does not include internal waters of the United States. EPA has defined “ECA associated areas” as U.S. internal waters shoreward of an ECA, which can be accessed by oceangoing vessels. The final rule provides that the ECA engine and fuel requirement apply to both the ECA and ECA associated areas.

### Conclusion and Recommendations

This final rule will become effective 60 days after publication in the Federal Register, which is anticipated to occur in February. Companies that manufacture, sell, or import Category 3 engines, and parties that build, repair, or operate U.S.-flag and foreign-flag vessels should review the rule and continue to monitor IMO developments to assure compliance as the new emission standards become applicable to their activities and operations. ■

#### For Additional Information

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