

on appropriate standards for marine diesel engines by April 27, 2007, and to issue a proposal no later than approximately one year before. This future rulemaking will allow us to exercise the discretionary authority under Clean Air Act section 213(a)(3), which directs EPA to "from time to time revise" regulations under that provision.

This schedule for our future rule will allow us to coordinate with future actions of the U.S. government with respect to negotiations for a future tier of standards under MARPOL. As described in Section IV.A.4 below, in 2000 the United States requested the Marine Environment Protection Committee to consider more stringent emission controls for marine diesel engines. We are hopeful that the committee will begin these discussions in the next year or so. At the same time, while harmonizing with future, more stringent MARPOL emission limits is desirable, the standards contained in our future rule will be promulgated pursuant to the Clean Air Act, as described in the next section.

EPA considers this time as necessary and appropriate to properly take into consideration additional information expected to become available about emerging technologies, as well as any developments in the international negotiations for more stringent emission limits.

2. What Standards Will EPA Consider in the Future Rule?

a. Standards for Category 3 Marine Diesel Engines. For the future rule, we intend to set more stringent standards for Category 3 marine diesel engines based on the greatest degree of emission control achievable from technologies that will be available with appropriate lead time. In our proposal, we considered a 30-percent reduction below Annex VI levels to be the primary option for adopting long-term standards for Category 3 marine diesel engines. At the time we believed this could be achieved through the use of in-cylinder controls. However, further review of information on this technological approach shows that these technologies are already being used to meet the internationally negotiated standards. At this point we are not confident that in-cylinder controls alone would reduce emissions much more than 10 or 15 percent below the Tier 1 levels.

We are concerned that, if we were to implement standards based on traditional in-cylinder controls to reduce emissions beyond Annex VI levels, either in this or a future rule, manufacturers would need to divert resources from their advanced

technology development programs. In addition, manufacturers would need to optimize their use of in-cylinder controls again when incorporating the advanced emission-control technologies. As a result, the readiness of this technology could be delayed in return for a standard based on traditional in-cylinder controls alone, which may not be capable of reducing NO_x emissions by an additional 30 percent.

We are therefore now considering Tier 2 standards that would focus on optimizing in-cylinder controls with the advanced technologies presented in the proposal, which together are projected to reduce NO_x emissions by significantly more than 30 percent. This approach was supported by commenters representing environmental and state interests, who strongly objected to emission standards that rely on engine-based technologies because of the expectation that these other advanced technologies are available and appear to be cost-effective.

We are, however, not finalizing such Tier 2 standards in this final rule because we believe there are substantial outstanding issues associated with water technologies and selective catalytic reduction. These issues, which include fuel compatibility, low-load effectiveness, and PM impacts, are discussed below in Section IV.A.3.

During the next few years we will have the opportunity to develop a better understanding of the issues that prevent us from adopting standards based on advanced technologies now. For example, several vessels have been equipped recently with selective catalytic reduction, as described in Chapter 5 of the Final Regulatory Support Document. Observing these installations will allow us to gain insight into the effectiveness and durability of these systems, while highlighting any potential technical constraints or problems. We would also have opportunity to learn with engine manufacturers and other industry contacts who are actively pursuing development and implementation of the advanced technologies.

In the future rulemaking, we will also consider the need to adopt emission standards for HC and CO emissions. Although HC and CO emissions are generally low from diesel engines, HC emissions nevertheless combine with NO_x emissions to form ozone; HC and CO can also have direct health impacts. Setting standards for HC and CO may achieve modest emission reductions, but more importantly, may be necessary to prevent HC and CO emission

increases that might otherwise result from controlling NO_x emissions alone.

Regarding PM from Category 3 marine engines, the majority of emissions comes directly from the high concentration of sulfur in the residual fuel used by these engines. Short of changing in-use fuel quality, emission-control technologies only address the remaining portion of PM, because engine technologies are ineffective at reducing sulfur-related PM emissions. Furthermore, no acceptable procedure exists for measuring PM from Category 3 marine engines, because currently established PM test methods show unacceptable variability when sulfur levels exceed 0.8 weight percent. Both distillate and residual marine fuels used in these engines commonly exceed that level. No PM test method or calculation methodology has yet been developed to correct that variability. However, the additional time available to prepare the future rulemaking will allow us to take into account any developments related to regulation of in-use fuel quality and PM measurement equipment and procedures as we consider the appropriateness of adopting a PM standard for Category 3 marine diesel engines.

We also intend to revisit various other issues raised in the proposal. For example, we continue to be concerned about controlling emissions at low-power test modes and at operating points between test modes. As described in the proposal, we would like to take steps to ensure that engines meet emission standards when operating on residual fuel, including an appropriate means to correct for the nitrogen content of the test fuel. We also believe that basing emission standards on engine displacement instead of rated speed warrants further consideration. We will also revisit several compliance issues such as onboard NO_x monitoring, adjustable parameters, deterioration factors with advanced technologies, post-certification testing (PLT), broader test conditions, defect reporting, and test fuel. These compliance issues are discussed in Section V.

b. Standards for Category 1 and Category 2 Marine Diesel Engines. For Category 1 and Category 2 marine diesel engines, we have already established Tier 2 emission standards based on in-cylinder controls. However, there are several differences between these engines and Category 3 engines, which made this possible. First, for Category 1 and Category 2 marine diesel engines, manufacturers are able to transfer emission-control technology already developed for the land-based counterparts to these engines. Second,