

be found in Chapter 1 of the Final Regulatory Support Document.

2. What Is the Inventory Contribution From the Marine Diesel Engines That Are Subject to This Rule?

Category 3 marine diesel engines contribute to the health and welfare effects described above through their NO_x, PM, HC, and CO emissions. These emissions are summarized in this section. To estimate these inventory impacts, we used baseline estimates developed under contract with E. H. Pechan and Associates, Inc.¹⁹ Inventory estimates were developed separately for vessel traffic within 25 nautical miles of port areas and vessel traffic outside of port areas but within 175 nautical miles of the coastline. The inventories include all Category 3 traffic, including that on the Great Lakes. Different techniques were used to develop the port and non-port inventories. For port areas we developed detailed emissions estimates for nine specific ports using port activity data including port calls, vessel types and typical times in different operating modes. Emission estimates for all other ports were developed by matching each of those ports to one of the nine specific ports already analyzed based on characteristics of port activity, such as predominant vessel types, harbor draft and region of the country. The detailed port emissions were then scaled to the other ports based on relative port activity. We developed non-port emission inventories using cargo movements and waterways data, vessel speeds, average dead weight tonnage per ship, and assumed cargo capacity factors. More detailed information regarding the development of the baseline emission inventories can be found in Chapter 6 of the Final Regulatory Support Document.

In our inventory estimates work for the proposal we included all Category 3 vessel emissions within 175 nautical miles of the U.S. coastline on the assumption that emission transport would bring these emissions on to shore and affect U.S. ambient air quality. We requested comment on the transport issue, including whether 175 nautical miles was the appropriate distance from shore to consider or whether we should consider a range different from 175 nautical miles as our primary scenario, and whether we should consider different distances from the coast for different areas of the country. We also asked if there was additional

information available to help us assess the emission transport issue. In general, the comments received were supportive of including all emissions within 175 nautical miles of the coast in the national emission inventory. While some commenters questioned this distance, we received no substantial new data or information suggesting that a different distance would be more appropriate or that would help us determine what distance from shore we should use in our inventory analysis.

For the purpose of this final rule, we are including all Category 3 vessel emissions within 175 nautical miles of the U.S. coast in our emission inventory estimates. However, we acknowledge that this emission transport issue is complex and requires further investigation. For example, as we noted in the proposal for this rule, the U.S. Department of Defense (DoD) has presented some information to us that suggests a different, shorter (offshore distance) limit be established rather than the proposed 175 nautical miles as the appropriate location where emissions from marine vessels would affect on-shore air quality. DoD's modeling work on the marine vessels issue in Southern California led them to conclude that emissions within 60 nautical miles of shore could make it back to the coast due to eddies and the nature of the sea-breeze effects. They note that this distance seems to be confirmed by satellite data showing a distinct tendency for a curved line of demarcation separating the offshore (unobstructed) or parallel ocean wind flow from a region of more turbulent, recirculated air that would impact on-shore areas. That curved line of demarcation was close to San Nicolas Island, which is about 60 nautical miles offshore. Studies and published information on other coastal areas in California indicates that they experience somewhat a narrower (perhaps 30 nautical miles) region of "coastal influence." Nevertheless, commenters from California support a 175 nautical-mile boundary.

Because of the continued data and modeling uncertainties surrounding this issue, we intend to investigate this issue as part of our future rule. As part of this investigation, we will consider the special characteristics of emission transport in separate parts of the country. For example, we expect that the Gulf Coast and East Coast areas of the United States would have their own

unique meteorological conditions that might call for different lines of demarcation between on-shore and off-shore effects due to different prevailing winds in those parts of the country.

We also requested comment on both our future growth estimates and our analysis of emissions from U.S. versus foreign vessels. Commenters suggested that the overall growth that we projected was fine, but that the U.S. vessel contribution to future inventories would likely not change and that all of the future growth would be due to increased foreign vessel traffic. We have modified the future U.S. and foreign vessel emissions split accordingly. Further, in response to comments received and new port calls data we have modified our overall estimates of the relative contributions of U.S. and foreign vessels to be more heavily weighted toward foreign vessels. A complete discussion of these changes to the inventories can be found in the Regulatory Support Document and the Summary and Analysis of Comments.

Baseline emission inventory estimates for Category 3 marine diesel engines in 2000 are summarized in Table I.D-1 in the context of other emission sources. This table shows the contributions of the different mobile-source categories to the overall national mobile-source inventory. Of the total emissions from mobile sources, Category 3 marine diesel engines contributed about 1.6 percent of NO_x and 2.8 percent of PM emissions in the year 2000.

Our emission projections for Category 3 marine diesel engines in 2030 show how emissions from these engines are expected to increase over time after implementation of Tier 1/MARPOL Annex VI NO_x limits. The projections for 2030 are summarized in Table I.D-2 and indicate that Category 3 marine diesel engines are expected to contribute 8.9 percent NO_x and 7.3 percent of PM emissions in the year 2030. Population growth and the effects of other regulatory control programs are factored into these projections. The relative contribution of Category 3 marine diesel engines increases between 2000 and 2030 largely because we have adopted requirements that will substantially reduce emissions from most other categories of nonroad engines. Note that the effectiveness of all control programs is offset by the anticipated growth in engine populations.

¹⁹ "Commercial Marine Emission Inventory Development." E. H. Pechan and Associates, Inc.

and ENVIRON International Corporation. April 2002. Air Docket A-2001-11, item II-A-67.