

TABLE I.D-2.—MODELED ANNUAL EMISSION LEVELS FOR MOBILE-SOURCE CATEGORIES IN 2030—Continued  
[Thousand short tons]

Category	NO <sub>x</sub>		HC		CO		PM	
	Tons	Percent of mobile source	Tons	Percent of mobile source	Tons	Percent of mobile source	Tons	Percent of mobile source
Mobile Source percent of Total Man-Made Sources .....	37	.....	32	.....	80	.....	22	.....

<sup>a</sup> These inventories are the same as for 2000 because, based on comments received, we assumed no future increase in U.S. domestic trade.

Further analysis suggests that Category 3 marine diesel engines contribute more significantly in individual port areas. For example, we estimate that these engines contribute about 7 percent of mobile-source NO<sub>x</sub> in the Metropolitan Statistical Areas (MSA) of Baton Rouge/New Orleans and Wilmington NC, about 5 percent of mobile-source NO<sub>x</sub> in the Miami/ Fort Lauderdale and Corpus Christi MSAs, and about 4 percent in the Seattle/ Tacoma/Bremerton/Bellingham MSA.

In addition, these ships can have a significant impact on inventories even in areas without large commercial ports. For example, Santa Barbara estimates that engines on ocean-going marine vessels currently contribute about 37 percent of total NO<sub>x</sub> in their area. These emissions are from ships that transit the area, and “are comparable to (even slightly larger than) the amount of NO<sub>x</sub> produced onshore by cars and truck.”<sup>20</sup> By 2015 these emissions are expected to increase 67 percent, contributing 61 percent of Santa Barbara’s total NO<sub>x</sub> emissions. This mix of emission sources led Santa Barbara to point out that they will be unable to meet air quality standards for ozone without significant emission reductions from these vessels, even if they completely eliminate all other sources of pollution.

#### *E. What Are the Internationally Negotiated Standards and What Is the Status of the U.S. Ratification of Annex VI?*

In response to growing international concern about air pollution and in recognition of the highly international nature of maritime transportation, the IMO initiated development of international standards for NO<sub>x</sub>, SO<sub>x</sub>, and a variety of other air emissions arising from marine vessel operations.<sup>21,22</sup> As a result of these

discussions, Annex VI was drafted between 1992 and 1997. The Annex VI engine emission standards cover only NO<sub>x</sub> emissions; there are no restrictions on PM, HC, or CO emissions. They are based on engine speed and apply to engines above 130 kW. These standards are set out in Table III.A-1. Originally, these standards were expected to reduce NO<sub>x</sub> emissions by 30 percent when fully phased in. More recent analysis by EPA, based on newly estimated emission factors for these engines, indicates an expected reduction on the order of only 20 percent when compared to uncontrolled emissions by 2030 when the standards are fully phased-in. The EPA inventory analysis is described in more detail in the Final Regulatory Support Document.

The Annex VI NO<sub>x</sub> standards apply to each diesel engine with a power output of more than 130 kW installed on a ship constructed on or after January 1, 2000, or that undergoes a major conversion on or after January 1, 2000. The Annex does not distinguish between marine diesel engines installed on recreational or commercial vessels; all marine diesel engines above 130 kW are subject to the standards regardless of the type of vessel they are used on, and the standards apply to engines installed on vessels only in domestic service as well as to engines on vessels engaged in international voyages. The test procedures to demonstrate compliance are set out in the Annex VI NO<sub>x</sub> Technical Code.<sup>23</sup> They are based on ISO 8178 and are performed using distillate fuel. Engines can be pre-certified or certified after they are installed on a vessel. After demonstrating compliance, pre-certified engines would receive an Engine International Air Pollution Prevention (EIAPP) certificate. This document, to

be issued by the Administration of the flag country, is needed by the ship owner as part of the process of demonstrating compliance with all the provisions of Annex VI and obtaining an International Air Pollution Prevention (IAPP) certificate for the vessel once the Annex goes into force. The Annex also contains engine compliance provisions based on a survey approach. These survey requirements would apply after the Annex goes into force. An engine is surveyed right after it is installed, every five years after installation, and at least once between five-year surveys. Engines are not required to be tested as part of a survey, however. The surveys can be done by a parameter check, which can be as simple as reviewing the Record Book of Engine Parameters that must be maintained for each engine and verifying that current engine settings are within allowable standards.

After several years of negotiation, the Parties to MARPOL adopted a final version of Annex VI at a Diplomatic Conference on September 26, 1997. However, it will not enter into force until twelve months after the date on which not less than fifteen member states, the combined merchant fleets of which constitute not less than 50 percent of the gross tonnage of the world’s merchant shipping, have ratified the agreement. To date, more than four years after it was adopted, the Annex has been ratified by only 6 countries representing about 26 percent of the world’s merchant shipping.<sup>24</sup>

The Annex requires that engines installed on a ship constructed on or after January 1, 2000 must comply with the specifications set forth in Regulation 13 of the Annex and the NO<sub>x</sub> Technical Code. In addition, ship owners must bring existing engines into compliance if the engines undergo a major conversion on or after that date.<sup>25</sup>

<sup>20</sup> Memorandum to Docket A-2001-11 from Jean Marie Revelt, *Santa Barbara County Air Quality News*, Issue 62, July-August 2001 and other materials provided to EPA by Santa Barbara County,” March 14, 2002. Air Docket A-2001-11, Document No. II-A-47.

<sup>21</sup> The Annex covers several aspects air emissions from marine vessels: ozone-depleting substances,

NO<sub>x</sub>, SO<sub>x</sub>, VOCs from tanker operations, incineration, fuel oil quality. There are also requirements for reception facilities and platforms and drilling rigs.

<sup>22</sup> To obtain copies of this document, see Footnote 5, above.

<sup>23</sup> To obtain copies of this document, see Footnote 5, above.

<sup>24</sup> The countries that have ratified Annex VI are Sweden, Norway, Bahamas, Singapore, Marshall Islands, and Liberia. Information about Annex VI ratification can be found at <http://www.imo.org> (look under Conventions, Status of Conventions—Complete List).

<sup>25</sup> As defined in Regulation 13 of Annex VI, a major conversion means either (i) the engine is