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AND GASES
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Agenda item 14

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REVIEW OF MARPOL ANNEX VI AND THE NO_x TECHNICAL CODE

Unified Interpretations to MARPOL Annex VI and Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines

Submitted by IACS

SUMMARY

Executive summary: This document contains at Annex IACS's explanation and basis for possible amendments to MARPOL Annex VI and the NO_x Technical Code which have been developed from IACS Unified Interpretations.

Action to be taken: Paragraph 5

Related documents: Annex VI to MARPOL 73/78, Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines, DE 48/25 (paragraphs 21.4 to 21.11), DE 48/WP.6, MEPC 52/4/7, BLG 10/14

Background

1 IACS has completed an in-depth review of those Unified Interpretations submitted with document MEPC 52/4/7 which were not considered by the DE Sub-Committee at its forty-eighth session due to a lack of time or were not agreed because the DE Sub-Committee deemed that the Unified Interpretations amended, rather than interpreted, MARPOL Annex VI and the NO_x Technical Code.

2 IACS wish to recall that the above referenced Unified Interpretations were developed in order to deal with the many requests being received by the IACS Members from the industry and to provide some consistency in application of MARPOL Annex VI and the NO_x Technical Code where there is a lack of clarity or completeness.

IACS viewpoint

3 In order to be proactive on this issue and based on the result of the review reported in 1, IACS is providing at annex the basis for, and the text of, possible amendments to MARPOL Annex VI and the NO_x Technical Code. The annex was developed on the basis of the following IACS Unified Interpretations:

MPC 20
MPC 61

MPC 24
MPC 65

MPC 32
MPC 67

MPC 34
MPC 68

MPC 56

4 IACS wish to remind the Sub-Committee that there remains a lack of instruction from most Administrations and until some clarity on these matters becomes available, the Unified Interpretations mentioned in 3 will continue to be applied by IACS Members.

Action requested of the Sub-Committee

5 The Sub-Committee is invited to consider the content of the Annex to the present document when reviewing MARPOL Annex VI and the NOx Technical Code, and take action as appropriate.

ANNEX

**POSSIBLE AMENDMENTS TO MARPOL ANNEX VI AND
THE NO_x TECHNICAL CODE**

Amendment derived from MPC 20 regarding regulation 13(2)(a)(i) of Annex VI

In order to also clearly cover the case of ‘additional’ rather than only the more restrictive situation of ‘replacement’ engines (as at present) within the major conversion clause and to provide a more definite date as to ‘engine build’ date the existing text of reg. 13(2)(a)(i) should be amended as follows:

- (i) *an engine, which first left the engine builder’s works on or after 1 January 2000, is installed onboard.*

Amendment derived from MPC 24 regarding regulation 14(6) of Annex VI

The regulation refers to ‘any change-over’ but then goes on to give that as ‘on completion’, which of course is correct prior to entry into a SECA, but after exit it is the commencement rather than the completion of the changeover process which is of importance. To cover this point the existing text of reg. 14(6), last sentence should be amended as follows:

‘.....any fuel-changeover operation is completed (prior to entry into a SO_x emission control area) or commenced (after exit from a SO_x emission control area), shall be’

Amendment derived from MPC 32 regarding NO_x Technical Code 1.3.2.2

The text currently only mentions emissions characteristics. Since this could be inferred to be also HC, CO or other emission species the text is clarified.

However the main point of this proposed amendment is to cover the case of options which may have been available to an engine for which different operating arrangements would cause to be changed – even on a voyage by voyage basis. That reverting to one of those other options after 1 January 2000 would be considered as a ‘substantial modification’ would be very difficult to establish since pre 1 January 2000 engines will have none of the Technical File etc documentation available to define them. Therefore the existing text of NO_x Technical Code 1.3.2.2 should be amended as follows:

First sentence:

‘.....which increases its existing NO_x emission characteristics’

Additional sentence added at end of existing text:

These changes do not include alternative duty cycles, rating, components or settings that were available for that engine, but were not applied, prior to 1 January 2000.

Amendment derived from MPC 34 regarding NOx Technical Code 2.2.4

An after treatment device may be fitted by intention and not only following failure at a pre-certification test and this should be allowed for in the text.

Additionally the subsequent onboard certification by use of the simplified test measurement method must not be allowed to result in a bypass to the standard test requirements, the significance of which is stressed in NOx Technical Code 2.2.4 concerning other situations.

Since an engine and an after treatment device are to be considered a single entity for the purposes of NOx Technical Code certification it is clarified that an after treatment device must not be certified independent of the engine, a situation which could result in an uncertified engine being coupled to a certified device.

Consequently the existing text of NOx Technical Code 2.2.5 should be amended as follows:

A NOx reducing device may be installed by an engine builder as part of the standard arrangement or if the pre-certification test results show that an engine fails to meet the NOx emission limits as required by regulation 13 of Annex VI. This device, when installed on the engine, must be recognised as an essential component of the engine and its presence will be recorded in the engine's technical file. The engine may be tested, or re-tested, at a pre-certification test with the NOx reducing device fitted. In those cases where a NOx reducing device has been fitted due to failure to meet the required emission value at the pre-certification test, in order to receive an EIAPP Certificate for this assembly, the engine, including the reducing device, as installed, must be re-tested to show compliance with the NOx emission limits. However, in this case, the assembly may be retested in accordance with the simplified measurement method addressed in 6.3. Where the effectiveness of the NOx reducing device is verified by use of the simplified measurement method that test report shall be added as an adjunct to the pre-certification test report which demonstrated the failure of the engine alone to meet the required emission value and both test reports shall be included in the engine's technical file. Where the simplified test method is used to demonstrate compliance that shall be accepted for the individual engine on which its effectiveness was demonstrated, but it shall not be accepted for engine family or engine group certification. In no case shall the allowances given in 6.3.11 be granted for the re-test prior to issue of the EIAPP Certificate of an engine which has not demonstrated compliance at the pre-certification test. The NOx-reducing device shall be included on the EIAPP Certificate together with the emission value obtained with the device in operation and all other records requested by the Administration. The engine's technical file shall also contain on-board NOx verification procedures for the device to ensure it is operating correctly. A NOx reducing device shall not be certified independent of the engine to which it is to be fitted.

Amendment derived from MPC 56 regarding NOx Technical Code 4.4.7

With larger marine engines it may not always be possible to adjust such engines to the exact reference conditions on the test bed nor thereafter in service to rigidly maintain specified operating parameters which influence NOx emissions and which themselves will be influenced in part by prevailing ambient conditions. To allow for these practical considerations the existing text of NOx Technical Code 4.4.7 should be amended as follows:

The selection of the parent engine shall be in accordance with the criteria in 4.3.9, as applicable. It is not always possible to select a parent engine from small-volume production engines in the same way as the mass-produced engines (engine family). The first engine ordered may be registered as the parent engine. Furthermore at the pre-certification test where a parent engine is not adjusted to the engine builder defined reference or maximum tolerance operating conditions (which may include, but not limited to, maximum combustion pressure, compression pressure, exhaust back pressure, charge air temperature) for the engine group, the measured NOx emission values shall be corrected to the defined reference and maximum tolerance conditions on the basis of emission sensitivity tests on other representative engines. The resulting corrected average weighted NOx emission value under reference conditions is to be stated under 1.15 of the EIAPP Certificate. In no case is the effect of the reference condition tolerances to result in an emission value which would exceed the NOx emission limit as required by regulation 13 of Annex VI. The method used to select the parent engine to represent the engine group, the reference values and the applied tolerances shall be agreed to and approved by the Administration.

Amendment derived from MPC 61 regarding NOx Technical Code 5.2.5

Since backpressure control may not be readily applied, particularly on test beds configured to accommodate a wide range of engine sizes, the existing text of NOx Technical Code 5.2.5 should be amended as follows:

Additional sentence added at end of existing text:

Where test bed installation prevents adjustment to the exhaust backpressure as required, the effect on the NOx emissions shall be demonstrated by the engine builder and, with the approval of the Administration, the emission value duly corrected as necessary.

Amendment derived from MPC 65 regarding NOx Technical Code 5.9.1.2

In order to cover the case of pressure charged engines (the normal arrangement in marine practice) the existing text of NOx Technical Code 5.9.1.2 should be amended as follows:

Additional sentence added at end of existing text:

In the case of a pressure charged engine, the inlet restriction condition shall be taken as the condition with a clean air inlet filter and the pressure charging system working within the bounds as declared, or to be established, for the Engine Family or Engine Group to be represented by the Parent Engine test result.

Amendments derived from MPC 67 & 68 regarding NOx Technical Code Appendices 3 and 4

Although the measurement of hydrocarbons (HC) is required by NOx Technical Code Chapter 5 and certain related aspects are referred to in Appendix 4 there is no specification, or even comment, concerning HC analyzers in Appendix 3 and a number of omissions in Appendix 4. The proposed text follows the ISO 8178-1 specification which has been used generally to provide the basis of the emission test requirements.

The existing text of NOx Technical Code Appendix 3 should be amended as follows:

Add 3.5

3.5 *Hydrocarbon (HC) analysis*

The hydrocarbon analyser shall be of the heated flame ionization detector (HFID) type. The exhaust gas temperature at the sampling point shall be not less than 463 K (190°C). The temperature of the exhaust gas from the sampling point to the analyzer shall be maintained by using a heated filter and a heated transfer line with wall temperatures of $463\text{K} \pm 10\text{ K}/190^\circ\text{C} \pm 10^\circ\text{C}$.

The existing text of NOx Technical Code Appendix 4 should be amended as follows:

Add 2.2.1.5

.5 *propane, C₃H₈, and purified air*

Add to 5.3

'...as necessary. The HFID flame shall be optimized as necessary.'

Add to 5.4.2

'...to zero. The HFID analyser shall be set to zero using purified air.'
