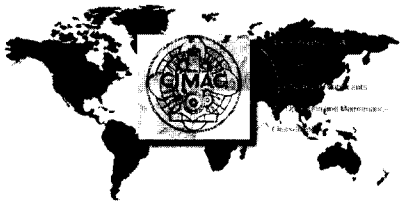

CIMAC Exhaust Emission Controls Working Group

Air Docket, U.S. Environmental Protection Agency (EPA)
Mailcode: 6102T
1200 Pennsylvania Avenue
NW Washington, DC 20460
U.S.A.

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Comments to the Environmental Protection Agency 40 CFR Part 1042
Ref.: Docket ID No. EPA-HQ-OAR-2003-0190

Control of Emissions of Air Pollution from Locomotive Engines and Marine Compression-Ignition Engines less than 30 Liters per Cylinder

Ladies and Gentlemen,

CIMAC, the International Council on Combustion Engines, is a worldwide non-profit association consisting of National Member Associations and Corporate Members in 24 countries in America, Asia and Europe. It brings together manufacturers of diesel engines and gas turbines, users such as ship owners, oil companies, classification societies and scientists.

The CIMAC EEC WG is supporting initiatives, which strive to reduce the environmental impact from diesel engine powered marine vessels and are harmonized with the technological progress in the area.

With reference to the referred NPRM the CIMAC Exhaust Emission Controls Working Group (CIMAC EEC WG) has decided to comment on the following issues:

1. The use of residual fuel in Category 2 engines
2. Remanufacturing Program
3. Conclusions and recommendations for Category 2 engines

For further clarification or information please do not hesitate to contact us

Yours sincerely

Göran Hellén
Chairman of the CIMAC Exhaust Emission Controls Working Group

CIMAC EEC WG Comments to the USA-EPA NPRM document "Control of Emissions of Air Pollution from Locomotive Engines and Marine Compression – Ignition Engines less than 30 Liters per Cylinder"

The following comments are based on our experience from marine engines belonging to Category 2.

1. The use of residual fuel in Category 2 engines

The NPRM is proposing that engines designed for operating on residual fuel must show compliance with the standards and requirements in Subpart B (§ 1042.101) also when operating on the actual fuel quality used. This means that engines operating on residual fuel and installed not only on ships in coastal waters (auxiliary and main engines) but also on ocean-going vessels (auxiliary engines) must comply on that fuel quality. As a consequence of this requirement we would like EPA to draw attention to following aspects listed below.

We are concerned about the fact that residual fuel does not represent a well defined product in terms of fuel properties – the properties are varying a lot depending on bunkering port and refinery - thus the certification of engines for a representative residual fuel quality is impractical (impossible) i.e. what kind of residual fuel quality should be used for compliance testing. We are proposing the same procedure as used by IMO i.e. certification test on distillate fuel only, although the actual used fuel would be residual fuel

Additionally our concern is related to the proposed PM measurement method which basicly is similar to ISO 8178 part 1. The applicability of ISO 8178 part 1 is limited by the fuel sulphur content. According to the recommendation in the ISO 8178 standard itself the fuel sulphur content when using this method should not exceed 0.8%-mass. According to CIMAC the upper recommended limit for this method is 0.05%-mass (see Note 1 for the reference). Based on experience within the CIMAC EEC WG the ISO 8178-1 method for particulates is showing low repeatability together with typical marine fuel qualities. The root cause for the low repeatability is the sulphur in fuel. Actually with typical marine residual fuels the measurement result may vary greatly depending on the measurement settings within the permitted requirements of the standard.

EPA should define a proper PM measurement procedure for typical marine fuel qualities before proposing provisions. CIMAC is recommending the use of ISO 9096 for marine engines operating on any fuel quality in order to achieve consistent measurement results and also enabling comparison to other land based sources, because ISO 9096 is the predominant method used for measuring particulates on land based stationary sources.

The EPA emission standards for propulsion engines (category 3 engines) are based on the use of residual fuel. However, auxiliary engines designed and operated on residual fuel on ocean-going ships must comply with emission standards of category 1 and category 2 and these standards are now in this proposal based in practise on the use of distillate fuel. The design principle of a residual fuel operated engine (category 2 and 3 engines) is different from that of an engine type designed for distillate fuel operation only. Residual fuel designed and operated engines inherently emit higher PM and NOx emissions than engines designed and operated on distillate fuel only. These facts should be reflected in the legislation by allowing more relaxed emission standards for residual fuel designed and operated engines.

The difficulties listed above could be avoided e.g. by expanding the IMO Marpol Annex 6 approach also to category 2 engines.

EPA should be aware of the fact that most probably no engine type belonging to category 2 will be certified for operation on residual fuel on these proposed conditions (tight PM and NOx levels with Tier 2, 3 and 4 and inadequate PM measurement method) - the use of residual fuel is not possible. As a consequence US flagged ocean-going ships operating in international traffic will be excluded to operate the auxiliary engines on residual fuel – as the foreign flagged ships will do. A better approach would be the introduction of geographically based emission standards e.g. a type of regulation that California has introduced for auxiliary engines and diesel electric propulsion within California waters i.e. regulation of the fuel quality in coastal waters.

2. Remanufacturing Program

We have some concerns in respect of the "Remanufacturing program" in the Preamble to NPRM.

Obviously there are many old marine engine types that have not been regulated by any emission standard and consequently emission data is lacking, especially with regard to PM. Manufacturers of such marine engines (engines not used in locomotives either) - and those engine types are many – have not been in a position for a need to develop any "Remanufacturing Kits". For those engine types the manufacturers need to perform emission testing to evaluate emission levels for all engine types referred to in this program. This will impose heavy burden on engine manufacturers at the same time as the focus is on developing new engine types meeting more stringent emission standards. Many of these engine types are not produced anymore, so finding a test engine (and place) would be sometimes practically impossible. In some cases the engine manufacturer does not exist anymore. It is unclear whether EPA is considering this program to be applied only to distillate fuel operated marine engines or whether residual fuel engines would be included. If the intention is to introduce this provision also to residual fuel operated engines EPA should clarify the PM measurement method to be used.

3. Conclusions and recommendations for Category 2 engines

<u>Recommendation for the compliance test procedure</u>

- Compliance test on distillate fuel only although the engine will be operated in use on any fuel quality (also residual fuel)
    - Similar approach as IMO Annex 6 to MARPOL
- However, if compliance tests are required on the actual used fuel a proper practicable PM measurement method should be defined. ISO 8178 should be avoided - our recommendation is ISO 9096

<u>Recommendation for the emission levels for PM and NOx</u>

- More realistic emission standards also reflecting the need of the residual fuel designed and operated engines are recommended.
    - Expanding the IMO Marpol Annex 6 approach also to category 2 engines is recommended

  - The proposed set of emission limits in combination with the proposed PM measurement method is so tight that no residual fuel operated engines will comply. This will result in an extra burden on US flagged ships operating in international traffic

- A geographically-based emission standard is recommended for consideration.
  - Marine engines operating at open sea could operate in compliance with IMO standards and near coastline in compliance with some EPA emission standards.

Recommendation for the "Remanufacturing Program"

- Exclusion of residual fuel operated engines because:
  - These engine types have no counterpart among locomotive engines
  - Lack of defined proper PM measurement procedure
    - or use ISO 9096
    - test on distillate fuel only
- Exclusion of engine types not more in production and not used as locomotive engine because arranging testing is impractical (almost impossible) and sometimes the manufacturer does not exist anymore.

Note 1)
Cimac Recommendation paper Number 23/2005 "Standards and methods for sampling and analysing emission components in non automotive diesel and gas engine exhaust gases – marine and land based power plant sources"