

## **Off-Cycle Working Group**

### Minutes of the Second Plenary Meeting 8 November 2002

Transmitted by the Expert from the United States

#### **Second plenary meeting of the Working Group On Off-Cycle Emissions November 8, 2002 Paris, France**

##### **Meeting Minutes**

##### **Agenda Item 1.**

- A. Jane Armstrong, the Chairperson of Off-Cycle Working Group, commenced the proceedings by providing an introduction on how the working group began and its purpose.
- B. The Chairperson noted that she had been asked by the Chairman of the WMTC working group if the off-cycle working group is interested in drafting regulations on off-cycle control for motorcycles. The working group has been asked to consider this request until the next meeting, especially since the off-cycle issues are different between motorcycles and on-highway.
- C. All the working group members present introduced themselves.
- D. The Agenda was approved.

##### **Agenda Item 2.**

- A. Mr. P. Greening, the representative from the European Commission, provided an overview of the current status of off-cycle emission regulations in the EU. Mr. Greening indicated that nothing has changed since Directive 2001/27/EC was finalized in 2001 which made Directive 88/77/EEC more clear on what the EU recognizes as being a defeat device and how/when an AECD can be used. Manufacturers are required to provide information, on a confidential basis, to the certification authority justifying the use of AECDs.
- B. Mr. M. Odaka, the representative from Japan, provided a brief overview of the current off-cycle regulations in Japan. He indicated that work is progressing to develop additional regulations on the control of off-cycle emissions.
- C. Mr. E. Crupi, the representative from Environment Canada, indicated that Canada is in the process of finalizing national heavy-duty emission regulations, effective January 2004, which will be aligned with those of the US EPA for MY2004. He further indicated that the regulations will include the same prohibitions against the use of defeat devices.
- D. The Chairperson, representing the US EPA, indicated that the existing regulations, which apply to AECDs and defeat devices, are still applicable. Manufacturers, as part of the certification process, will have to conduct additional testing on both the FTP and the EURO III steady state cycle with mystery points for MY 2007. Prior to MY2007, manufacturers can conduct additional testing, and by sharing the data with the US EPA, can provide a modified statement of compliance with the applications for certification. Currently, a manufacturer run in-use testing program, which will require some type of on-board emission measurement, is being considered.

### Agenda Item 3 (Common Definitions)

- A. The definitions for AECD and Defeat Device, as they currently appear in US EPA regulations, EU Directive and Japanese regulations were reviewed. [Working Document No.1]
- B. A draft global definition for AECD provided by the Chairperson and the Secretariat was reviewed and discussed [Working Document No.2]. The working group determined that Auxiliary Emission Control Device should be changed to Auxiliary Emission Control Strategy because the use of the word Strategy more appropriately reflects the evolution of technology. It was decided that the second paragraph should be deleted from the draft definition in its entirety because it refers to what may or may not be an acceptable AECD. It was determined that it would be more appropriate to consider the inclusion of this type of language in the definition of Defeat Device or perhaps in a separation section or annex of the regulations which would specify what is and what is not considered an AECD .
- C. A proposed definition for AECD, as transmitted by the representative from the Engine Manufacturer's Association (EMA), was reviewed and it was agreed that it would be further considered at the next meeting [Informal Document No.1]. Some members of the working group felt it was very important for the definitions to be clear and unambiguous and that an effort should be made to present clearly what is and what is not an AECD. The working group decided that it would be appropriate to develop definitions for "Element of Design" and "Emission Control System". The working group decided that the definition for AECD would be modified as discussed at the meeting, but that the proposed definition submitted by EMA would be further considered at the next meeting. The new proposed definition for Auxiliary Emission Control Strategy is as follows:

#### **Auxiliary Emission Control Strategy**

*An Auxiliary Emission Control Strategy (AECS) means any system, function, device or element of design, installed to an engine or on a vehicle, that senses or responds to operating variables, such as vehicle speed, engine rpm, transmission gear, temperature, intake pressure or any other parameter, for the purpose of activating, modulating, delaying, or deactivating the operation of the emission control system.*

- D. A draft global definition for Defeat Device was also reviewed and discussed [Working Document No.2]. The working group decided that the term Defeat Device should be changed to Defeat Strategy, because the use of the word Strategy more appropriately reflects the evolution of technology. The use of words such as "reasonable", "justify", "temporarily" in the definition of Defeat Device and in definitions in general generated much discussion among the working group members. The use of such words provides flexibility that manufacturers and certification authorities need in making decisions when issuing approval, but they can also be viewed as a double edged sword because of differing levels of scrutiny among certification authorities. The working group feels it is necessary to include clarifying language in the regulation to ensure that all are subject to the same specifications and level of scrutiny.
- E. A proposed definition for Defeat Device, as transmitted by the representative from the Engine Manufacturer's Association, was reviewed and it was agreed that it would be further considered at the next meeting. Some members requested that further clarification be provided by EMA on bullet point four of its proposed definition and what precisely is meant by an "emission constituent" and what is the purpose of including this fourth bullet point. Relative to bullet point two of the proposed definition, a question was asked as to how often manufacturers need to utilize these types of strategies to protect the engine. It was decided that the current proposed definition will effectively remain the same, save and except for the modifications made, with a note that the use of the word "effectiveness" in the proposed definition will require further clarification. The new proposed definition for Defeat Strategy is as follows:

## **Defeat Strategy**

*Defeat Strategy means an AECS that reduces the [effectiveness]\* of the emission control system under conditions that may reasonably be expected to be encountered in normal vehicle operation and use, unless:*

- *the use of such a **strategy** is substantially included in the applicable type approval **or certification test procedures**;*
- *the use of such a **strategy** is activated only temporarily under certain reasonable conditions as to protect the engine and/or vehicle from damage or accident*
- *the use of such a **strategy** does not go beyond the requirements of engine cold start, engine warm-up and smoke management*

*\*effectiveness: to be further clarified*

- F. A draft global definition for Irrational Emission Control Strategy was reviewed and discussed. This definition only appears in the EU directive. The working group suggested that this definition be deleted in its entirety as this concept is covered by the definition for Defeat Strategy and is likely redundant. A decision was made to leave the definition as it appears until its relevance is discussed further at the next meeting.

### **Agenda Item 4 (Operating Regions and Conditions)**

- A. An overview of how Design Screening Thresholds are regulated under US EPA regulations, the EU Directive and the Japanese regulation. [Working Document No.3]
- B. Working group members expressed a desire to have the thresholds clearly defined, where the requirements apply for compliance testing and in-use testing. A question was asked to engine manufacturers if it is feasible, simply through engineering, to comply with the emission standards at any altitude without damaging the engine? Engine manufacturers who were represented at the working group meeting indicated that such an engine would be too cost prohibitive to manufacture, if it could even be designed to meet all extreme ambient conditions.

OICA made a presentation based on a concept of block conditions:

EXTREME		
HIGH TEMP	HIGH ALTITUDE	COLD TEMP
BASIC		

This concept is based on a limited number of blocks which would apply to engines used in vehicles in different parts of the world; the thresholds to be met would be dependent on where the vehicle was being registered. For example, Australia would have to comply with Basic, plus High Temp.; the Canadian Rockies would have to comply with Basic, plus High Altitude; Northern Canada would have to comply with Basic, plus Cold Temp. Engines would have to be labeling according to the conditions they comply with. The engines would be tested on the same cycles and would have to comply with the same standards, but they would be additionally modified to meet the climactic and/or geographic conditions for the specific region the vehicle would be registered in.

OICA and EMA were asked to prepare a report on the technology available and the costs associated with developing the technology to cover extreme altitude and climactic conditions. What is possible, from an engineering perspective? What climactic and/or geographic conditions are feasible for engines? OICA indicated it would try to have a skeleton report available for the next meeting of the working group.

### **Agenda Item 5 (Required Testing for Type Approval)**

- A. The test cycles which will be considered are the FTP, EURO III Steady State with Mystery Points, and the World Harmonized Duty Cycle which is currently being developed.. No working group member proposed any additional testing that would be necessary to evaluate off-cycle emissions at the time of type approval.

### **Agenda Item 6 (In-Use Testing)**

- A. Mr. B. Frost, the representative from the United Kingdom, made a presentation based on a study conducted in the UK on the feasibility of in-use testing. The purpose of the study was to test for off-cycle emissions and to determine if cycle-beating was occurring. At the time of type approval testing, an ECU signature could be downloaded and stored. By installing an Emission Event Recorder to the ECU, a further ECU signature could be downloaded at a future date in time. The original signature could be compared to the more recent downloaded signature to determine whether the engine strategy has been demonstrated for controlled emissions during type approval. A copy of Mr. Frost's presentation is appended herein.
- B. Mr. W. Matatko, the representative from the German technical services organization RWTÜV, made a presentation based on a study conducted on a sampling of 2 EURO I compliant engines and 6 EURO II compliant engines, with varying mileage. All the engines were retested on the EURO 13 mode steady state test. Of all the engines tested, and taking into consideration the varying kilometers of each vehicle, only one EURO II compliant engine exceeded the PM limits. A copy of Mr. Matatko's presentation is appended herein.
- C. The Chairperson will present the US EPA's report on In-Use Testing at the next meeting.

### **Additional Items**

The Chairperson will review the terms of reference for this working group to determine if we can extend the terms of reference to cover other classes of vehicles.

The next plenary meeting of the Off-Cycle Working Group is scheduled to take place on Tuesday January 14, 2003, at the Palais des Nations in Geneva, Switzerland. A draft agenda and any informal documents will be circulated to the membership prior to the meeting.

Dated this 26th day of November, 2002

Joanna Vardas, Secretariat