

## **DRAFT MINUTES OF THE 5<sup>TH</sup> MEETING OF THE UNECE INFORMAL GROUP ON RETROFIT EMISSIONS CONTROL DEVICES (REC)**

**11 May 2011, 10.00 – 17.00; Brussels**

### **1. Welcome and introduction**

The chairman, Mr. Baarbé, welcomed the meeting participants (attendance list – doc. REC-05-04).

### **2. Approval of the draft agenda**

The agenda (doc. REC-05-02) was adopted without change.

### **3. Approval of the draft minutes of the 4th REC meeting (Brussels, 31 March 2011)**

Mr. Eberhardt asked that several sections of his wording be corrected. Mr. Bortfeld noted that it had been agreed that the transition from Stage IIIB to IV for PM would be deleted from the document. With these changes the minutes were adopted. The REC secretariat will issue a revised set of REC-04 minutes (doc. REC-04-06).

### **4. Discussion on the general approach for the REC Regulation**

The secretary reported that the chairman had previously mentioned the issue of including different levels of stringency in the regulation (including feedback received from GRPE secretariat and GRPE chair) and of having 2 working separate groups on PM and on NOx. He noted that some REC delegates had asked for discussion of these issues.

The chairman said that he had started discussions with the GRPE secretariat (Mr. Hubert) on the issue of having different simultaneously applicable stringency levels in one regulation. This is not permitted as such in UNECE Regulations but there could be a solution in having requirements to upgrade from level x to level y with minimum reduction percentages as a safeguard. This will be further discussed with the GRPE secretary and chairman.

The chairman also noted that for PM there are several existing schemes, but for NOx there is some work in several places (France, Switzerland, Netherlands, UK, California). The group will also need to discuss how to meet the deadline set by GRPE for the REC work (June 2012).

In discussion it was suggested that in several regulations there are different stringency levels available, but it was recognised that these are not simultaneously applicable and come with transitional provisions.

Other participants felt that the response from the GRPE secretariat would allow alternative requirements provided that all UNECE approvals would be accepted by all other contracting parties applying the Regulation. In several current requirements all contracting parties must accept the most stringent requirements, but can also choose to accept less stringent ones. It was also stated that there is nothing to stop a contracting party giving a Type Approval to a less stringent requirement for placing on the market in other regions where that level is accepted.

It was noted that the GRPE secretariat had also commented that the regulation would need to refer to UNECE amendments and not to Euro levels. Participants felt that this would need to be handled carefully, as the proposal is to set levels for specific pollutants only, not to accept in full the requirements of any given level of UNECE Regulation.

The group discussed the UK work to develop a national certification scheme for NOx and how this could be helpful for the work of the REC group. The chairman said that the group had hoped that the UK could take a lead on this, but contact with Mr. Davies of the UK DfT suggested that they are interested but might not be able to devote sufficient resources.

Following further discussion it was agreed that the chairman would prepare a short document detailing the possible approaches (with examples) to allow guidance from the GRPE chair and the GRPE secretariat in readiness for the June meeting of GRPE. The separation of technical

requirements from the political issue of the application of different levels and any related incentives was also discussed.

Mr. Åsman agreed to investigate how the EU might adopt the regulation bearing in mind the different levels. He also commented that the European Commission will also need to address the requirement on retrofit and related incentives in Euro VI and whether the UNECE regulation would properly address these requirements.

The chairman said that it had been agreed at the last meeting that Mr. Schulte and Mr. Eberhardt will lead the work on REC PM reduction systems requirements and that he in consultation with UK authorities and with support of AECC will lead the work on NOx reduction systems retrofit requirements.

The chairman then presented an initial overview of NOx reduction requirements (presentation attached – doc. REC-05-06).

In discussion, it was accepted that although the mandate is that the regulation be technology neutral, given the currently viable technologies it should initially be based on SCR requirements and provisions. The chairman proposed a list of parameters by which an SCR system type should be defined, together with the parameters to be evaluated. These would, he proposed, include NOx emissions in the applicable test cycle, NOx reduction efficiency, NOx reductions performance in a low load cycle (e.g. the urban part of the WHDC), effects on other regulated emissions and the prevention of various non-regulated emissions (ammonia, dioxins, furanes). He also proposed parameters for determination of a family approval.

Discussion of these proposals included the issue of limiting tests to existing official tests. However, it was commented by some participants that the provisions will need include measures to prove that systems work in real use and in urban operating conditions (low load) and that many cities currently require testing on their own specific bus cycles (e.g. London and the Millbrook bus cycle).

Other comments were that the package also needs to include anti-tampering/ NOx control measures and that the definition of a family approach will also be an important issue.

## **5. Discussion of draft REC Regulation**

### **a. UBA NO<sub>2</sub> measurement procedure – document REC-04-04**

Mr. Eberhardt introduced the UBA NO<sub>2</sub> measurement procedure. In Germany a two-step approach is foreseen: PM reduction is assessed during type approval testing in accordance with Anlage XXVII and in addition the UBA NO<sub>2</sub> measurement procedure can be applied to show NO<sub>2</sub> emissions performance of the PM REC in a suitable test.

UBA's NO<sub>2</sub> measurement procedure includes a requirement on HC and NO<sub>2</sub> of the test engines, which was set because few engines had been found with relatively high HC emissions that could create a NO<sub>2</sub> reducing environment during test. It was noted that figures are only shown for Euro III because this is the base level for Anlage XXVII. OICA and Euromot objected to baseline limits other than the legislative limits for test engines and after further discussion it was agreed that there is not sufficient data to support extending requirement and it could finally be withdrawn.

In the UBA procedure the maximum platinum or precious metals loading is seen as a key parameter for the selection of the 'worst case' system to be examined for NO<sub>2</sub> emissions. This is different from the PM procedure where the minimum precious metals content is a key parameter, especially for regeneration. Motor Industry representatives said they wished to avoid having to test two separate systems but it was pointed out it is not proposed to subject the NO<sub>2</sub> test system to durability. The issue of how to test non-PGM systems such as those using burners or fuel-borne catalysts was considered. It was recognised that in these cases the NO<sub>2</sub> would be measured but this could – if appropriate - be done in the same test as that for PM. It was agreed that the REC working group will take into account these discussions and the CARB procedures in further developing the proposal.

Mr. Schulte clarified that the proposal can use only harmonised cycles – so not US FTP or SFTP. Regarding the cycle for assessment of NO<sub>2</sub> from heavy-duty engines, it was suggested that the

complete ETC would be driven but the NO<sub>2</sub> assessed only for the urban part. It was also noted that for NRMM the whole cycle would be used.

It was noted that the UBA procedure does not allow use of two CLDs in parallel for measurement of NO and NO<sub>2</sub>. A two-chamber CLD is required. This was to avoid differences in NO<sub>x</sub> converter efficiency, but can be further discussed in development of the proposal.

**b. Draft REC Regulation – document REC-05-03**

Mr. Schulte summarised the changes from the previous versions of the document.

In the section on scope, the UK-language changes as proposed by Mr. Davies had been adopted. Paragraph 2.6 (*Contracting parties may choose to recognise other regulations as being equivalent to this regulation*) was put into square brackets as it is believed that this is part of the 1958 agreement.

Section 3.4 has been clarified as *“Category B retrofit emission control device (REC)” means a retrofit emission control device which is intended to control particulate matter emissions only, and which does not increase the direct NO<sub>2</sub> emissions by more than [20]% based on the engine out [NO<sub>2</sub>] level.* It was agreed that the term ‘engine baseline emissions’ would be used with a definition of that term as covering the engine with any existing aftertreatment, depending on the emissions level. There was further discussion on the percentage figure. It was agreed that this would depend on the stringency of the eventual procedure. The highlighted text from CARB under section 3.4 can now be deleted.

It was also suggested that section 3.5. (*“Category C retrofit emission control device (REC)” means a retrofit emission control device which is intended to control NO<sub>x</sub> emissions only*) should exclude systems that control NO<sub>x</sub> but increase PM. The availability of data on the effects of NO<sub>x</sub> control systems (especially SCR) on PM number was discussed, including the availability of VERT results and the ACEA database for Euro VI. In discussion it was felt that if required this could be covered under the requirements on effects on other regulated pollutants or under the Annex on secondary emissions. This could, for instance, be a requirement to demonstrate no significant increase in PM Number. Another option would be to limit, for the time being, this section to SCR. Following this discussion it was agreed not to include a PM Number requirement in section 3.5.

Mr. Galey commented that in Section 3.6 (*“Category D retrofit emission control device (REC)” means a retrofit emission control device which is intended to control both particulate matter emissions and NO<sub>x</sub> emissions, and thus NO<sub>2</sub> emissions*) there could be systems that reduced NO<sub>x</sub> but not NO<sub>2</sub>.

The term ‘PN’ has been modified throughout the document to ‘PM number’ to align with the wording used in Euro VI.

Text had been added (currently under section 3.29) to cover cases where modifications to the Original Equipment specifications are necessary, requiring the applicant submit additional test data, engineering justification and analysis and to get OEM permission for any changes to the original emissions control system.

The tables in section 4 have been updated. Following discussion it was agreed table 4.4 would be revised to reflect the fact that some NRMM limits are framed in terms of HC+NO<sub>x</sub>.

Under section 5.5 an accelerated aging procedure was to be provided by Bosal, but this has not yet been received.

Mr. Williams pointed out that the requirement to use the same test bed for tests before and after the field durability test may be difficult to achieve in practice. Over 1000 hrs elements of the equipment in any given test cell may have changed.

Corrections need to section 5.1 a) were noted (the category referred to should be M, not M1 and the mass should be the reference mass).

The issue of durability tests was considered in detail, including the length of the durability requirements, the possibility of requiring field durability rather than permitting bench tests, and a suggestion to include a vibration test in conjunction with bench testing. The latter option was

rejected but it was agreed that there could be a general 'robustness' requirement that the manufacturer must ensure general durability in real use. Participants were asked to propose suitable text. Also text in the CARB document on installer responsibility could be examined.

In section 6.1 c) the wording was revised to "*Minimum total charge of catalytically active materials of the particulate reduction system including upstream catalysers (if fitted) (in g)*". The definition of particulate reduction system will be extended to include DOCs. Participants will also consider whether the charge should be framed in terms of mass only or as mass per unit volume. It was agreed that the type of catalytically active material should also be specified in section 6.1.

Under section 10 the CARB reference on space velocity has still to be traced.

Under section 12 the base emissions level for the particulate reduction family also needs to be specified.

The effect on performance or durability of the fitment of a given system to different engines, under the family criteria, was examined. It was felt that key issues such as exhaust back-pressure are covered by the proposals. This led to a discussion on the need for market surveillance and/or periodical inspection to ensure in-service durability, but it was eventually agreed that this cannot be an issue of this regulation.

The Annex on measurement of secondary emissions is currently a 'cut and paste' from the Swiss SNR 277205 (VERT) standard. Text needs to be adapted to this draft and it needs to make clear that secondary emission testing is not directly linked to each type approval measure. The requirements in SNR 277205 cover NO<sub>2</sub>, VOCs, oxidised VOCs (such as aldehydes), PAHs, nitro-PAHs, PCDD/F and catalytically active elements (metals). It was noted that Euro VI and the NRMM regulations already include requirements on ammonia. In Switzerland there are no specific limits for these secondary emissions - the technical authority has to decide whether the results are 'state of the art'. Some participants felt that the cost and time implications would be significant and that the type of equipment specified is not available in most emissions laboratories. It was suggested that the likelihood of such emissions should be assessed to evaluate the need for controls in this regulation and the chairman suggested that the requirement could be satisfied by referring to existing tests of similar materials unless a new type of material were to be used in the emissions reduction system. In response for the need to then provide guidance, it was reported that this issue is being considered by the European Commission and the conclusions from this could be adopted when completed.

It was felt that EMC (electromagnetic compatibility) requirements would be covered by the EMC Directive. It was also suggested that there should be requirements on maintenance documentation.

#### **c. Other input - CARB's "Verification Procedure, Warranty and In-Use Compliance Requirements for In-Use Strategies to Control Emissions from Diesel Engines"**

A document was circulated by EMA for information only and was not discussed.

### **6. Next meetings**

The next meeting will be in Geneva during GRPE week (Monday 6 June 10.00-12.30), with one other REC informal group meeting during the January 2012 GRPE meeting.

The REC-chairman proposed two further meetings between the next REC informal group meetings in Geneva to progress the work on the draft REC Regulation. It was proposed that the first meeting should be a 2-day meeting at DG-JRC, Ispra, Italy in September. The second meeting could be in November in Brussels, Belgium or in The Hague, the Netherlands.

### **7. Any Other Business**

No other issues were raised.

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