



**TWENTY THIRD MEETING OF THE GRPE WORKING GROUP ON THE
WORLDWIDE HEAVY DUTY CERTIFICATION PROCEDURE (WHDC)**

Tokyo, 10 and 11 April 2008

MINUTES OF THE MEETING

Venue: JASIC Offices, 3F, Shoei Bldg., 6 Rokubancho, Chiyoda-ku, Tokyo
Chairman: J.P. LAGUNA-GOMEZ (European Commission)

1.- ADOPTION OF THE AGENDA

The provisional agenda GRPE/WHDC/A23 was adopted as circulated.

2.- APPROVAL OF THE MINUTES OF THE 22nd WHDC MEETING
(GRPE/WHDC/22 - Geneva, 16 January 2008)

The minutes of the 22nd meeting were approved.

3.- UPDATE FROM 22nd WHDC MEETING

Document: Inf. Doc. No. GRPE-55-26

The Secretary briefly summarized the results of the 22nd WHDC meeting. The major achievements were the principal agreements of various WHDC members to actively participate in the WHDC work program with budget, engines and test cell capacity. Whereas the work program on options 1, 2 and 5 is largely defined, work on options 3 and 4 still needs further elaboration and input from members. Broad consensus was reached on extending the scope to gasoline engines, if WHDC cycles are appropriate, but EPA raised some reservation. In general, the work program is well on track.

4.- DISCUSSION OF WHDC OPTIONS

Documents: Inf. Doc. No. GRPE-55-26
GRPE/WHDC/FE13
GRPE/WHDC/FE14
GRPE/WHDC/FE15
GRPE/WHDC/FE16
GRPE/WHDC/FE17
GRPE/WHDC/FE18

4.1 Power determination

Mr. Schulte (TÜV Nord) presented an elaboration of the influence of fan power on the total cycle work (see GRPE/WHDC/FE14). Since cycle work is the denominator of the final emissions test result, it has an influence on the emissions level. For a worst case situation using a fan with constant torque, cycle work is about 3.5 % higher w/o taking fan power into account with a correspondingly lower emissions result. This situation is atypical for modern heavy duty engines. For a more realistic situation using a 3rd degree polynomial fan, the difference is only 1.2 %.

Based on Mr. Schulte's analysis, the group agreed on testing w/o fan in this gtr. For ECE members, the decision can further be justified by the fact that the same approach has already been used for nonroad engines (ECE R 96) for some 10 years. The secretary will draft a first proposal for the next meeting.

4.2 Single reference fuel

European Commission DG-JRC Ispra will run the reference fuel test program outlined in document GRPE/WHDC/FE07. OICA members will submit engines and test fuels. First engine will be Euro IV with SCR, second engine (US07) is still being tracked. The Euro IV engine will be ready for testing by mid-June 2008. The final test matrix will be agreed with JRC and presented at the next meeting.

Japan and EMA agreed to contribute to the test program, but will not strictly follow the JRC program scheme. EMA will not conduct cold start tests. EMA program is scheduled for July/August 2008 and will use a US07 engine retrofitted with SCR to represent US2010 emissions level. Japan program cannot start before September 2008 and will use JP09 technology engine.

Fuels of the same batch for JRC, Japan and EMA test programs will be delivered by Haltermann and paid by OICA. Fuel cost is estimated at about 10.000 € incl. shipment.

Testing with B5 fuel will only be done at JRC. JRC will be asked to cover the fuel cost. Preferably, the same batch of the EU reference fuel as above should be used for blending with FAME. Secretary will discuss the details with JRC. Japan offered to report about their experience with biofuels at the next meeting.

4.3 Soak time

EPA presented their proposal for test program (see GRPE/WHDC/FE13). The proposal goes beyond soak time elaboration, but asks for general WHDC vs. FTP validation. Mr. Sherwood noted that EPA needs confirmation of the same level of control before being able to adopt the WHDC gtr. EPA would like to see data from as many engines as possible with US2010 type technology. Three engine sizes (< 6 l, 6 - 10 l, > 10 l) are proposed along with a range of technologies. Manufacturer run test data would be acceptable. For EPA, there is no time pressure, results could be submitted when US2010 engines are available. Mr. Sherwood added that EPA would not only be interested in the final emission test result, but also on second-by-second data and heat management info.

Time line for gtr adoption by GRPE does not allow further delay beyond summer 2009. To accommodate this situation, EPA agreed that engines should be close to final US2010 configuration. EPA's wishlist is 3 engines per manufacturer. The following discussion showed that such an ambitious program cannot be completed within the gtr timeline. The Chairman

emphasized that the group needs to fulfill their obligations within the mandate given. Therefore, EPA was asked to check if soak time investigation could be separated from general WHDC validation.

NTSEL and JAMA gave presentations on soak time influence for different technologies. Mr. Ishii from NTSEL showed results from 2 engines (see GRPE/WHDC/FE16) that both comply with JP05 regulation. For the first engine (EGR/DPF/NSR), NOx increased with longer soaktime, while influence on PM was inconsistent. For the second engine (SCR) tested on chassis dyno, there was no NOx increase between 5 and 10 minutes soaktime, but a slight increase with 20 minutes.

Mr. Kakegawa from JAMA presented the effect of soaktime on NOx from 3 engines, 2 with SCR, 1 with NSR technology (see GRPE/WHDC/FE15). For both SCR engines, NOx increased with longer soaktime, for the NSR engine, the influence was minor.

Following the discussion with EPA, Mr. Narusawa outlined the Japanese situation with respect to adoption of the WHDC gtr. In general, MLIT is supporting the introduction of gtr's for the sake of international harmonization. The same technical committee that was responsible for the JE05 procedure would be called for WHDC discussion and introduction. In any case, WHDC is not intended to replace JE05, but to become an option to JE05.

4.4 Cold start weighting

JAMA presented elaboration of cold start weighting method (see GRPE/WHDC/FE17). The weighting factor determination is based on the method of equivalent cold start ratio. As a result, the cold start weighting factor for the JE05 cycle would be 0.09. The method needs further elaboration for the WHDC.

Mr. Kleinschek from Scania presented cold start frequency data from typical European truck driving conditions (see GRPE/WHDC/FE18). Cold start is defined as cooling water temperature below 70°C. For long haul operation in Spain, it accounts for 10% of total operation, for long haul operation in Sweden for 5%, and for lumber operation in Sweden for 8%. More test data are needed from other manufacturers or truck operators.

4.5 PM filter specification

TÜV Nord will conduct the test program on PM filter specification on the basis of the offer detailed in document GRPE/WHDC/FE09. OICA members will fund the program and supply 2 test engines (one Mercedes 12 I Euro V SCR engine w/o PM aftertreatment, one Iveco 6 I EEV engine with SCR/DPF). Additional investigations within the program will be the determination of NOx measurement accuracy at low levels and the measurement of particle number according to the PMP protocol. Anticipated start of the program is May 2008. The Euro V engine with SCR will be tuned for low NOx to be better suited for the low NOx program part.

The Chairman proposed to add NO2 measurement to the evaluation.

5.- OTHER WHDC ELEMENTS

Document: GRPE/WHDC/FE12
GRPE/WHDC/FE19

5.1 Gasoline engines

There was broad consensus to extend the scope of the gtr to gasoline engines, although EPA still has reservations. EMA will check with member companies that produce gasoline engines whether the WHDC cycles are appropriate for US manufactured gasoline engines. Currently, lab resources for testing are not available.

Russian test results with gasoline fuelled commercial vehicles were presented (see document GRPE/WHDC/FE12). Engines did not meet cycle stats, but WHTC was better than ETC. Mr. Schulte raised questions as to dyno type and response. The correct dyno response might improve cycle statistics.

The Chinese delegation offered the possibility for conducting a test program with the WHDC test cycles in China. The secretary contacted CATARC, directly.

Japan indicated that gasoline engine testing is not their top priority.

5.2 Alignment with NRMM gtr

Secretary reported about status. Next meeting of NRMM group is anticipated for end of April. Part 1065 amendments will be published soon as part of the loco/marine rulemaking in the USA. Mr. Kokrda from EMA promised to supply table with differences between Part 1065/NRMM gtr and WHDC gtr within a couple of weeks.

Japan presented proposals for amendment (see GRPE/WHDC/FE19). The editorial proposal for table 3 was accepted. Background correction for gaseous emissions is already included in the WHDC gtr, but better wording, as proposed by Japan, was agreed. Wording for buoyancy correction of PM sampling filter needs clarification.

6.- REVIEW OF WHDC TIME LINE

The timeline was confirmed.

7.- SUMMARY AND CONCLUSIONS

The secretary summarized the results of the meeting as follows:

- Engine testing w/o fan was agreed; corresponding list of auxiliaries to be considered for the emissions test will be added to the gtr.
- DG-JRC will run reference fuel test program (option 2); OICA members will submit engines and fuels; test with B5 fuel will be added, but fuel will be have to be supplied by JRC. Japan and EMA will conduct additional test program.
- EPA proposal on soaktime (option 3) goes beyond soaktime evaluation, but requires complete WHTC/FTP validation. Proposal needs further discussion among engine industry.
- Japan and Scania presented evaluation of cold start data. Other WHDC members are asked to collect data on cold start weighting, as well (option 4).
- TÜV Nord will conduct test program on PM filter specification (option 5). OICA members will fund this program and supply one EEV (with DPF) and one Euro V engine to best cover the range of future PM emission levels.
- Broad agreement to extend scope to gasoline engines; reservation from EPA. Russia presented first test results, China offered to also run validation program; EMA/EPA to check US industry position.

- Shimpi/Stein to elaborate differences between NRMM and WHDC gtr's taking into account latest Part 1065 amendments.

The next meetings will take place as follows:

- 24th WHDC meeting on 03rd June 2008, Geneva
- 25th WHDC meeting mid October, China asked to host

8.- OTHER BUSINESS

None.
