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OFFICE OF
AIR AND RADIATION

5/30/14

MEMORANDUM

SUBJECT: Adoption of GRPE Heavy-Duty Hybrid new annex to Global Technical Regulation n°4

FROM: United States Environmental Protection Agency

TO: Chair of GRPE and Heavy-Duty Hybrid Group

The United States has been an active participant in the Heavy-Duty Hybrid (HDH) Informal Working Group since its inception in 2010. As stated in our previous memorandum (HDH-16-03e), we are pleased by the progress that the group has made in drafting the Annexes to GTR n°4 and we compliment the leadership and the participants in the work that has been done to date. In addition, we believe that the work of the HDH group will be an important means of determining criteria pollutant emissions from hybridized heavy-duty vehicles.

There are, however, currently a number of issues that are still a cause for concern for the United States. The United States summarized most of these issues at the June, 2013 GRPE meeting in informal document HDH-16-03e. This document provides an overview of the remaining concerns and also lays out the means for the United States to support the adoption of the Annexes to GTR n°4.

Over the past five months there has been a lot of progress made in addressing the United States' concerns laid out at the 68th GRPE meeting, but a number of these concerns have not been fully addressed in Annex 9 to GTR n°4. Our concerns, outlined below, touch on all four of the key elements in the terms of reference for the informal heavy-duty hybrid working group, but mainly fall under the first and last bullets.

- A system that results in outputs which are quantifiable, verifiable, and reproducible
- A system that results in outputs that provide a method for assessing real world compliance broadly and on a case by case basis
- A system that is capable of incorporating updated information and new data to produce the most accurate outputs

- A system that is appropriately transparent as to allow governments and their representatives / agents the latitude to easily assess its performance and ensure accuracy and a level playing field

1. A system that results in outputs which are quantifiable, verifiable, and reproducible

Although the United States believes that it is possible for the procedure laid out in Annex 9 to GTR n°4 to be quantifiable, verifiable and reproducible, these attributes have not been fully demonstrated in the validation process. In the United States manufacturers self-certify by submitting a certification application. During the review of a manufacturer's application for certification the Environmental Protection Agency (EPA) can choose to perform confirmatory testing before granting approval of the application. After EPA has issued an emissions certificate, EPA can also perform a selective enforcement audit on engines or vehicles that are coming off the production line. Since EPA does not have experience with performing hybrid controller in the loop testing, the United States is not confident at this point that EPA could execute a thorough confirmatory test using the procedures in Annex 9, which potentially could reduce the effectiveness of our regulatory program.

The last goal in this statement is having a reproducible procedure. The validation process has not demonstrated the repeatability or reproducibility of the procedure in Annex 9 within the same laboratory or between laboratories. In addition the procedure hasn't tested for how broadly the verified HILS model could be used to simulate other powertrains in the same family. For Annex 10, EPA and Environment Canada (EC) submitted a joint paper (HDH-11-08e) to the group on the inter-laboratory work that was done at EPA and EC. Since then, EPA has been involved with multiple powertrain testing activities in the United States and has become comfortable with the procedure. We feel that similar work should be performed to assess the reproducibility of Annex 9.

2. A system that is appropriately transparent as to allow governments and their representatives / agents the latitude to easily assess its performance and ensure accuracy and a level playing field

Given more experience with the HILS procedure it may be possible for the United States to conclude that Annex 9 could be a transparent process. To date, the HILS testing that has been performed as part of the validation process has been done solely by the manufactures. As a result, the United States hasn't been able to assess what it takes to create a validated HILS model. The United States is concerned that due to the complexity of the models it would take considerable time for us to insure that the models were implemented properly.

The United States sees 3 possible paths that the US can support:

- 1) Extend the mandate of the GTR to continue working on the Annex 9.
- 2) Finalize the GTR with only the powertrain test procedure.

- 3) Finalize the GTR, but modify 5.1.2. to allow the option for each contracting party to adopt either Annex 9 or Annex 10 or both annexes together.

It is the United States' goal to fully support the adoption of the Annexes to GTR n°4 in its final form. Our hope is that the HDH informal working group will consider the issues that United States has raised and make the appropriate adjustments to the procedure.