

Proposal for an Amendment to OCE Working Document No. 4

Transmitted by the representative of the Engine Manufacturers Association (EMA)

At the November 8, 2002 meeting in Paris, the Off-Cycle Emissions Work Group established tentative definitions for the terms "Auxiliary Emission Control Strategy" and "Defeat Strategy". EMA proposes to modify these definitions as shown below. The rationale for the proposed changes are also given. Please see *Note at the bottom of Page 2.

Auxiliary Emission Control Strategy

An auxiliary Emission Control Strategy (AECS) means any system, function, device or element of design, installed ~~to~~**on** 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~~ **causing the engine emission control system to operate in a manner that is different from the way the emission control system would otherwise operate in any part of the engine's speed and torque map.**

Rationale for proposed change:

Engine controls such as speed/load maps for injection timing, EGR flow rate or manifold pressure modulate the emission control system in response to sensed changes in engine speed and load and therefore would be AECS's under the Work Group's tentative definition. EMA believes that the basic operating maps used for the engine and the emission control systems are fundamental to the control of the engine and emission control systems and are not "auxiliary" controls. The proposed revision to the definition is intended to recognize this distinction and to clarify that those strategies that cause the engine/emission control systems to operate "off-map" are AECS's, but that the basic control maps themselves are *not* AECS's. Unless this revision is made, engine manufacturers could be faced with explaining why each nuance in these basic control maps is not a "defeat system" and why it is necessary and justified.

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~~ **AECS** is substantially included in the applicable type approval or certification test procedures;
- ~~the use of such a strategy~~ **AECS** 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~~ **AECS** does not go beyond the requirements of engine cold start, warm-up and ~~smoke management~~ **other cold operating conditions;**
- **the AECS trades off the control of one set of emission constituents in order to maintain acceptable control of another set of emission constituents under specific ambient or operating conditions. The overall effect of the AECS is to compensate for the naturally occurring effects of the conditions that trigger the AECS and do so in a manner that provides acceptable control of all emission constituents.**

Rationale for proposed changes:

- 1) EMA believes that in each of the bullet points that identify conditions under which AECS's are not defeat strategies it is more appropriate to refer to "the AECS" rather than to "*the use of* such a strategy". It is the AECS itself and not the *use of* the AECS that is or is not a defeat strategy.
- 2) EMA believes the phrase "only temporarily" should be removed from the second bullet point. The phrase is subjective and vague. Further, it should be recognized that engines of the same design may be used in different geographical regions and under different conditions. For those engines that end up being employed in severe conditions (i.e. high altitude, high or low ambient temperature, high humidity etc.) throughout their lives, the activation of the AECS may be better described as continuous rather than temporary. Unless the phrase "only temporarily" is deleted, engine protection AECS's could be considered to be defeat systems if even a small minority of the engines in the engine family is used in severe operating conditions where the activation of the AECS is judged to go beyond "temporary".
- 3) EMA believes the word "reasonable" is subjective and vague and should be deleted from the second bullet point. Because of the different types of engine protection AECS's that are currently being used or that may be found to be necessary in the future, it will likely prove difficult to provide a succinct description of "reasonable" conditions that can included as a part of this definition. Instead, we recommend that an appendix or guidance document be established and revised as necessary to describe the conditions under which certain types of engine protection AECS could be legitimately activated.
- 4) EMA believes that the third bullet should be expanded to include the phrase "other cold operating conditions". EMA members have found that under severe cold ambient conditions, it may be necessary, even after the engine has started and the coolant temperature has reached its normal operating temperature, to employ special strategies to reduce excessive cold smoke/hydrocarbon emissions to an acceptable level. The proposed revision will allow these strategies to be used as needed.
- 5) Engine emission control systems are designed to control a number of different emission constituents (i.e. NO_x, HC, CO, smoke and particulate emissions). It is well known that trade-offs exist between the emissions of the different constituents. That is, emission control strategies that reduce the emissions of one or more of these constituents often result in increases in the emissions of other constituents. Further, it is recognized that changes in ambient or operating conditions can impact the emission rates of the different emission constituents differently. It is the engine designer's challenge to provide adequate control of each of the emission constituents under a widest possible range of operating conditions. In order to fulfill this objective, it is often advantageous to employ AECS's that trade-off emissions of one set of emission constituents to ensure acceptable control of another set of constituents. Examples of such strategies include the use of injection timing advance at high altitude or rapid acceleration conditions to prevent increases in smoke and particulate emissions or the use of timing advance under certain cold operating conditions to prevent excessive hydrocarbon emissions even though these strategies may result in an increase in NO_x emissions. EMA believes that the use of such trade-off AECS's serve a legitimate purpose and should be allowed, but under the Work Group's tentative definition, they would be defeat systems and would be prohibited. EMA proposes to add a fourth bullet point to the tentative definition to overcome this deficiency.

***Note:** Please note deletions to the tentative definitions are shown by ~~strikeout~~ and additions to the tentative definitions are shown in **bold** and *italics*.