

AECD Reporting Template
Version 3
June 15, 2004

1. AECD title

2. Why the AECD is necessary

- a. Chemistry/physics behind the problem
- b. Design limits or operating condition thresholds which trigger the problem
- c. Basis for the design limits (theory, supplier information, real failure experiences, etc...)
- d. Summary of real world and lab experiences that identified the problem and confirmed the solution
- e. Impact of not using the AECD i.e., resulting engine damage, including the failure mechanisms or chain of events which lead to the engine damage
- f. Other approaches considered given current state of technology, why not selected

3. How the AECD works

a. Parameters sensed to activate the AECD (provide summary list)

- i. type and location of sensors used to directly measure design parameter or operating conditions for which limits may be exceeded
- ii. complete description of any parameters sensed as a surrogates to estimate the design parameter for which limits may be exceeded
- iii. provide the rationale or relationship between the surrogates and the design parameters being held within limits i.e. correlation data between the parameters sensed and the design parameter being protected

b. Parameters controlled (provide summary list)

- i. describe the relationship between each parameter sensed and each parameter controlled
- ii. explain why/how modulation of the controlled parameters avoid an exceedance of the design limit, avoid the operating consequence of concern, or generally protect the engine from damage

c. Calibration info (tables, graphs)

- i. summary of operational conditions expected to activate the AECD; i.e. range of altitudes, temperatures, loads, speeds, etc...
- ii. tables and/or graphs illustrating how parameters controlled respond/react to parameters sensed or estimated

iii. a brief description of and reason for basic trends contained with in the control maps, tables, or graphs

iv. actual software code or narrative description of the code

4. Environmental impacts

a. Indicate whether the AECD is substantially included in the FTP, or the Euro III or Not-to-Exceed (NTE) when emissions information is voluntarily provided for those emissions tests.

b. Indicate whether the AECD reduces the effectiveness of the emissions control system.

c. Provide empirical data and/or engineering judgement describing:

i. Emissions rates when AECD activated

ii. Frequency of activation (i.e.VMT)

d. The information in 4 c. is not necessary if one of the “substantially included” conditions in 4 a. have been met, or if the AECD does not reduce the effectiveness of the emissions control system (see 4 b. above).

5. Justification that AECD is calibrated to be the minimum strategy necessary

a. Describe process used during engine development to limit AECD activation only to the conditions which require protection (or otherwise achieve the stated purpose of the AECD).

b. Describe process used to calibrate the strategy so that modulation of the emissions control system is limited only to what is required to protect the engine (or otherwise achieve the stated purpose of the AECD)

c. Provide an engineering explanation or empirical data demonstrating why lesser frequency of use or modulation of controlled parameters would not solve the problem in question

d. The information in item 5 above is not necessary if one of the “substantially included” conditions in 4 a. have been met, or if the AECD does not reduce the effectiveness of the emissions control system (see 4 b. above).

6. Interaction with other AECDs

a. Explain hierarchy of control and indicate when multiple AECDs impact a controlled parameter

b. Justify any possible redundancy

c. Describe plans for evaluating possible, but not yet understood, interaction of new AECDs

7. Future approaches to minimize or avoid AECD given expected evolution of technology

a. Status of development work

b. Key hurdles to be overcome

c. Expected timing of development