Attachment H

Averaging, Banking and Trading of Credits

The staff proposes to allow manufacturers to demonstrate certification compliance to the HC+NOx standards based on the weighted corporate average emissions. The weighted corporate average emissions would be determined by the emissions durability levels, weighted by sales, power, load factor, and useful life. The process would consist of three steps: a) Determination of Certification Values, b) Determination of Family Emission Limits, and c) Determination of Certification Emissions Credits.

a. Determination of Certification Values - The certification values would be the results of the final emissions test of the certification engine at the end of the emissions durability period chosen by the manufacturer. Manufacturers would use the certification values to determine the engine family's FEL.

b. Determination of Family Emission Limits - Following determination of the engine family's certification values, a manufacturer would then determine the family's HC+NOx FEL. The FELs for an engine family must be equal to or greater than the certification values for that family. Additionally, staff proposes that FELs can be specified only to the same number of significant figures as the emissions standard(e.g.,for a standard of 12.0 g/bhp-hr, 9.8 g/bhp-hr would be an acceptable FEL, but 9.81 g/bhp-hr would not be).

The FEL would be used to determine compliance. Initial compliance would be determined as noted in paragraph c, below. Compliance to the quality audit or new engine compliance programs would be determined by multiplying the test values of an engine family by the family's DFs, and then comparing the sample mean result to its FEL or the standard as applicable; HC+NOx values would be compared to the FEL, while CO and PM values would be compared to the respective standards.

The FELs would also be used in determining HC+NOx certification credit generation; FELs below the standard would generate credits, while FELS above the standard would consume credits, as described in paragraph c below.

c. Determination of HC+NOx Certification Emissions Credits - The certification emissions credits program is essentially a mechanism for carrying out the averaging of emissions from different engine families, while considering the effects of different useful lives, different sales volumes, and different horsepowers that the engine families may possess.

Certification emission reduction credits would be determined as follows:

$$\text{Credit}_{\text{Certification}} = \{\text{HC+NOx Emission standard - FEL (g/bhp-hr)}\} * \text{power(hp)} * \text{load factor} * \text{EDP(hours)} * \text{projected California sales}$$

Thus, the engine family's certification emission reduction credits would be positive if the FEL was below the standard, and negative if the FEL was above the standard. Manufacturers could use the credits from engines below the standard to allow the production of engines above the standard by expending certification emission reduction credits. Certification would be dependent on the following condition being met for each engine family:

$$\left(\text{FEL} - \frac{\text{emission reduction credits expended}}{\text{power(hp)} * \text{load factor} * \text{EDP(hours)} * \text{projected California sales}}\right) < \text{HC+NOx standard}$$

The certification emission reduction credits would be further restricted so that the sum of a manufacturer's positive and negative credits must be zero or greater. Manufacturers would be allowed to carry positive credits forward (i.e., bank any surplus generated in one year for a future year), but would be required to make up any negative credits before an engine family could be certified. At the end of the year, manufacturers would have to "balance the books" by calculating the credits using actual sales rather than projected sales. Discrepancies would be made up through the surrender of banked certification credits or through the surrender of production credits (see paragraph d, below, for an explanation of production emission credits.) All excess emissions resulting from final non-compliance with the California standard shall be made up no later than the following model year with emission reduction credits.

Alternatively, a manufacturer could choose simply to certify its engine families directly to the emissions standards, as is currently done. This approach would require less record-keeping on the part of the manufacturer.

d. Production Emission Reduction Credits - A manufacturer would generate Production Emission Reduction Credits when the final HC+NOx sample mean (from quality-audit or production line testing) of an engine family is below the engine family's FEL. In this way, manufacturers will receive consideration of the "headroom" or compliance margin that they have designed into their engines.

Production emission reduction credits would be calculated as follows:

$Credit_{Production}$ = (FEL-Sample Mean)* emissions durability period *horsepower * load factor * California sales

Since credit generation in this case would be limited to engine families whose sample mean was below the FEL, negative production emission reduction credits would not be allowed.

Although certification emission reduction credits could only be used for certification purposes, the staff proposes that production emission reduction credits, being based on actual production engines, could be used for certification and as a remedy for noncompliance of another engine family. The staff proposes that the Board allow the Executive Officer the discretion to determine whether or not to allow the use of production emission reduction credits to remedy noncompliance on a case by case basis. The criteria considered would include the availability of sufficient emissions credits, the manufacturers past emissions performance and compliance record, and the existence of any outstanding negative certification credit balances.

e. Other Credits Issues - Most manufacturers have indicated that they favor the concept of emissions reduction credits for overachievers. However, some manufacturers were worried about how a credit program would include electric equipment without immediately disadvantaging those manufacturers which produce only engine-powered equipment. Therefore, the staff does not propose to include electric equipment in any averaging, banking or trading programs.

To reward those manufacturers who have been able to comply with the existing Tier 2 standards, the staff proposes to allow the early generation and banking of credits for 0-60 cc engine families that are certified to or below 54 g/bhp-hr HC+NOx in 1998 and 1999, and for engine families above 60 cc that are certified to or below 3.2 g/bhp-hr HC+NOx. (These levels are equivalent to the original 1999 standards, with the exception that HC and NOx have been combined for consistency with the rest of the proposed credit program.) The credits would be generated from the difference between an effective FEL baseline of the previous year’s average California Quality Audit data for the appropriate category (e.g., class 4 engines) and the engine family’s certification values. In the absence of an emissions durability demonstration, the credits would be calculated using a

default emissions durability period of 40 hours for 0-60 cc engine families, and 100 hours for engine families above 60 cc. If a manufacturer chose to conduct the durability demonstration, and agreed that any compliance testing would be evaluated according to the DF-adjusted emissions results, the manufacturer would receive credit for the demonstrated emissions durability level.

Overall, the staff believes that the averaging, banking and trading program would enable a manufacturer to develop an emissions control strategy tailored to the specifics of that manufacturer's design and production practices. This would allow a manufacturer to utilize its resources in the most economically efficient way, and should result in lower costs. For example, a manufacturer could target one engine line for large reductions because that engine can be cheaply controlled, and could forego expensive development work on low-volume products that might otherwise be discontinued.