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Emission Durability Procedures and Component Durability Procedures for New Light-Duty Vehicles, Light-Duty Trucks and Heavy-Duty Vehicles; Final Rule and Proposed Rule

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 86

[FRL–8019–2]

RIN 2060–AK76

Emission Durability Procedures for New Light-Duty Vehicles, Light-Duty Trucks and Heavy-Duty Vehicles

AGENCY: Environmental Protection Agency.

ACTION: Final Rule.

SUMMARY: This final rulemaking contains procedures to be used by manufacturers of light-duty vehicles, light-duty trucks, and some heavy-duty vehicles to demonstrate, for purposes of emission certification, that new motor vehicles will comply with EPA emission standards throughout their useful lives. Today's action defines procedures to be used by manufacturers to demonstrate the expected rate of deterioration of the emission levels of their vehicles.

DATES: This rule is effective February 16, 2006. The information collection requirements of this rule have been approved by OMB and are effective February 16, 2006.

ADDRESSES: EPA has established a docket for this action under Docket ID No. OAR–2002–0079. All documents in the docket are listed in the EDOCKET index at *http://www.epa.gov/edocket.* Although listed in the index, some information is not publicly available, *i.e.*, CBI or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, is not placed on the Internet and will be publicly available only in hard copy form. Publicly available docket materials are available either electronically in EDOCKET or in hard copy at the Air Docket, EPA/DC, EPA West, Room B102, 1301 Constitution Ave., NW., Washington, DC. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566–1744.

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SUPPLEMENTARY INFORMATION:

I. Background

A. Overview of certification process, CAP 2000 history

Before a manufacturer may introduce a new motor vehicle into commerce, the manufacturer must obtain an EPA certificate of conformity indicating compliance with all applicable emission standards over the vehicle's useful life period. The useful life for cars and light trucks is currently 100,000 miles or 10 years, whichever occurs first; for heavy light trucks, medium duty passenger vehicles (MDPV) and complete heavy duty vehicles the useful life period is 120,000 miles or 11 years, whichever occurs first. [Section 202(d) of the Clean Air Act and 40 CFR 86.1805–04]

To receive a certificate, the manufacturer submits an application to EPA containing various information specified in the regulations, including emissions test data. EPA reviews the submitted information as well as any other relevant information, and issues a Certificate upon a determination that the manufacturer has demonstrated that its new motor vehicle will meet the requirements of the Clean Air Act (Act) and the regulations. [40 CFR 86.1848–01] A certificate of conformity is effective for only one model year;

therefore, new vehicle certification must occur annually.

EPA's regulations detail the process motor vehicle manufacturers must follow to obtain EPA emissions certification. In 2000, EPA issued a comprehensive update to the certification regulations for light-duty vehicles and light-duty trucks.[1] These certification regulations are known as ''CAP [Compliance Assurance Program] 2000''.[2] They include detailed procedures on the selection of vehicles for testing and testing procedure, specifications on the information that must be submitted to EPA, and other requirements pertaining to reporting and testing.

Issuance of a certificate is based on a determination by EPA that the vehicles at issue will conform with the applicable emissions standards. Compliance with the emissions standards requires that the vehicles meet the standards for the specified useful life period. A determination of compliance, therefore, must be based on an evaluation of both the performance of the vehicles' emissions control system when new, as well as performance over the entire time period of the vehicles' useful life.[3]

The process of predicting how and to what degree a vehicle's emission levels will change over its useful life period [emissions deterioration] as well as the robustness of the vehicle's emission-related components [component durability] is known as an emission durability demonstration.[4] Today's final rule specifies the methods that manufacturers must use to determine emissions deterioration for the purpose of certification.

Over the years, EPA has promulgated regulations prescribing several different emissions durability demonstration methods to fulfill EPA's need to determine compliance with emission standards over the vehicle's full useful life. The following is a short summary of this prior regulatory history, to put today's final rule in context.

B. Durability Demonstration Process History

1. Durability Demonstration Methods Used Prior to the CAP 2000 Regulations

Prior to CAP 2000, EPA's regulations (ref. 40 CFR Part 86) specified the method to demonstrate a vehicle's emission durability. The method used a whole vehicle mileage accumulation cycle, commonly referred to as the Approved Mileage Accumulation (AMA) cycle. It required manufacturers to accumulate mileage on a pre-production vehicle, known as a durability data vehicle (DDV), by driving it over the prescribed AMA driving cycle for the full useful life mileage.[5] This was to simulate the real-world aging of the vehicle's emissions control systems over the useful life.

The DDV was tested in a laboratory for emissions at periodic intervals during AMA mileage accumulation, and a linear regression of the test data was performed to calculate a multiplicative deterioration factor (DF) for each exhaust constituent. Then, low mileage vehicles more representative of those intended to go into production (referred to as ''emission data vehicles,'' or EDVs) were emission-tested. The emission results from these tests were multiplied by the DFs[6] to project the emissions levels at full useful life (referred to as the ''certification levels''). The certification levels had to be at or below the applicable emission standards in order to obtain a certificate of conformity.

EPA was concerned about the ability of any fixed cycle—including the AMA cycle—to produce emission durability data that accurately predicted in-use deterioration for all vehicles. EPA had particular concerns that the AMA did not represent current driving patterns and did not appropriately age current design vehicles. In addition, manufacturers have long identified the durability process based on mileage accumulation using the AMA cycle as very costly and requiring extensive lead time for completion. As a result, EPA came to believe that the AMA had become outdated[7].

The AMA cycle was developed before vehicles were equipped with catalytic converters. It contains a substantial portion of low speed driving, designed to address concerns about engine deposits. While engine deposits were a major source of emissions deterioration in pre-catalyst vehicles, the advent of catalytic converters, better fuel control, and the use of unleaded fuel shifted the causes of deterioration from low speed driving to driving modes which include higher speed/load regimes that cause elevated catalyst temperatures. The AMA driving cycle does not adequately focus on these higher catalyst temperature driving modes. It also contains numerous driving modes which do not significantly contribute to deterioration. This makes the process longer but adds little benefit in predicting emission deterioration.

In response to these concerns, EPA began a voluntary emission durability program in the 1994 model year for light-duty vehicles. This program allowed manufacturers to develop their own procedures to evaluate durability and deterioration subject to prior Agency approval.[8] EPA's approval criteria required the manufacturer to demonstrate that the durability procedures would cover a significant majority of in-use vehicle's emission deterioration.[9] One additional condition for approval was that the manufacturer conduct or fund an in-use test program to evaluate the effectiveness of its predictions. The initial program was referred to as revised durability program

[1] Separate certification regulations exist for heavy-duty highway vehicles and engines, which refer to the light-duty certification procedures. Today's final rule will apply to those subsets for heavy-duty vehicles which use the same certification procedures as light-duty trucks. for convenience, the term ''vehicle'' or ''motor vehicle'' will be used in this preamble to mean those light-duty and heavy-duty motor vehicles subject to these regulations.

[2] 63 FR 39654 (July 23, 1998).

[3] Since a certificate must be issued before the new vehicles may be introduced into commerce, the emissions testing and other relevant data and information used to support an application for a certificate are usually developed on pre-production prototypes.

[4] The durability demonstration program consists of two elements: emission deterioration and component durability. Emission deterioration prediction is a process of predicting to what degree emissions will increase during the vehicles useful life. The deterioration factor (DF) is a measure of deterioration. Component durability is a demonstration that the emission control components will not break and will continue to operate as described in the Application for Certification during the minimum maintenance interval proscribed in 40 CFR 1834–01. The component durability demonstration is conducted by the manufacturer using good engineering judgement.

[5] At the time this durability procedure was effective, the useful life mileage for light-duty vehicles was 100,000 miles. Refer to 40 CFR 86.1805–04 for current useful life mileage values.

[6] A multiplicative DF is calculated by performing a least-squares regression of the emission versus mileage data for each exhaust emission constituent and dividing the emission level at full useful life (historically, 100,000 miles) by the emission level at the 4,000 mile point.

[7] Reference: 63 FR 39653, 39659 (July 23, 1998) (CAP 2000 NPRM).

[8] EPA approved three types of emission durability programs under these procedures: whole vehicle, full mileage, whole vehicle, accelerated mileage; and bench aging procedures which involved thermal aging of the catalyst-plus-oxygen-sensor system.

[9] Reference EPA Guidance Letter No. CD–94–13, ''Alternative Durability Guidance for MY94 through MY98'', dated July 29, 1994. This letter explained that as-received, un-screened in-use data should be compared to vehicles run on the alternative durability program (ASADP). A ''significant majority'' of the in-use data should be covered by the durability program. We defined the acceptance ceriteria in that letter as follows: ''EPA does not require ASADPs to meet a specific minimum severity level (or confidence level) because different methods may be used to estimate the degree of severity. * * * However, an ASADP would be acceptable to EPA if EPA believes that it were designed to match the in-use deterioration of 90–95 percent of vehicles in the engine family.''

I (RDP I). It was an interim program scheduled to expire after the 1995 model year and was intended to serve as a bridge to an anticipated complete revision to the durability process. The provisions of RDP I were extended in a series of regulatory actions.[10] Ultimately, the Agency instituted a comprehensive revision to the durability process as part of the CAP 2000 rulemaking.

For evaporative and refueling emissions deterioration, EPA allowed manufacturers to develop their own process to either bench age components or do whole vehicle aging, also subject to Agency review and approval. The evaporative and refueling deterioration factor is required to be additive.[11]

2. Emission Durability Procedures Under CAP 2000

The CAP 2000 rulemaking was a comprehensive update to the entire light-duty vehicle certification process. One part of this involved the manufacturer's required demonstration of emission durability. The Agency eliminated the requirement for the use of AMA for new durability demonstrations. In CAP 2000, the Agency replaced the AMA-based durability program with a durability process similar to the optional RDP–I program. Each manufacturer, except small volume manufacturers, was required to develop an emission durability process which would accurately predict the in-use deterioration of the vehicles they produce. The manufacturer had the flexibility to design an efficient program that met that objective.

The manufacturer's plan was then reviewed by EPA for approval.[12] Approval from the Agency required a demonstration that the durability process was designed to generate DFs representative of in-use deterioration. This demonstration was more than simply matching the average in-use deterioration with DFs. Manufacturers needed to demonstrate to EPA's satisfaction that their durability process would result in the same or more deterioration than is reflected by the in-use data for a significant majority of their vehicles. Manufacturers were required to provide evidence that their durability process resulted in predicted emission deterioration that were equal to or more severe than the deterioration rates experienced by a significant majority (approximately 90%) of candidate in-use vehicles.[13] Furthermore, this demonstration was required to cover the breadth of the vehicles covered by the durability procedure.

This evaluation concerning coverage of a significant majority of the in-use data was usually made independently on several potential worst-case vehicles which bound the envelope of vehicles covered by the durability procedure. Manufacturers typically demonstrated that emission deterioration predicted by their durability program would cover approximately 90 percent of the in-use population using one (or more) of the following sources of data: in-use emission tests, in-use driving characteristics, or in-use catalyst temperature measurements. At that time EPA had not developed a specific required method to make this demonstration.

Two major types of durability processes emerged from the CAP 2000 experience: whole vehicle and bench aging processes.

The whole vehicle aging procedures involve driving vehicles on a track or dynamometer on an aggressive driving cycle of the manufacturer's design. In general, the speed, acceleration rates, and/or vehicle load are significantly increased compared to the AMA cycle or normal in-use driving patterns. The vehicle can be driven either for full useful-life mileage, or, for a higher stress cycle, the vehicle can be driven for a reduced number of miles (e.g., 1 mile on the high speed cycle equals 2 miles in use). In either case, the vehicle is tested periodically and a DF is calculated.

The bench aging procedures involve the removal of critical emission components, such as the catalyst and oxygen sensor, and the accelerated aging of those components on an engine dynamometer bench.[14] During the bench aging process important engine/catalyst parameters are controlled to assure proper aging. Usually, elevated catalyst temperatures are maintained while fuel is controlled to include lean, rich, and stoichiometric control. Through a series of tests, manufacturers determine the amount of time needed to bench-age a catalyst so it is aged to the equivalent of 100,000 miles. In some cases the manufacturer developed the amount of aging time using catalyst temperature data measured on a road cycle. In other cases, the manufacturer developed the aging time through a trial and error process. Typical bench aging periods are 100–300 hours, although these can vary from manufacturer to manufacturer. Sources of deterioration other than thermal aging can be accounted for by aging the catalyst for an additional amount of time.

The CAP 2000 regulations allow manufacturers to choose from three different methods to demonstrate emissions durability. Manufacturers could calculate additive DFs, multiplicative DFs, or test EDVs with aged hardware [15] installed on them.

Regardless of whether manufacturers used whole vehicle or bench aging durability procedures, CAP 2000 also required the manufacturer to later collect emission data on candidate in-use vehicles selected under the provisions of the in-use verification program (IUVP).[16] Among other uses of the data, the IUVP data must be used by the manufacturer to check on and improve its durability program. The data also is available to assist the Agency to target vehicle testing for its recall program. The Agency may intercede [17] when the in-use data

[10] Ref. 59 FR 36368 (July 19, 1994), 62 FR 11082 (March 11, 1997) 62 FR 11138 (March 11, 1997) and 62 FR 44872 (August 22, 1997).

[11] An additive DF is calculated by performing a least-squares regression of the emission versus mileage data for each exhaust emission constituent and subtracting the 4,000-mile emission level from the full useful life emission level (historically, 100,000 miles). The DF is then used with emission data from the emission data vehicle to demonstrate compliance with the standards for the purpose of certification. The sum of the emissions from the EDV plus the additive DF is referred to as the certification level and must be less than or equal to the emission standard to receive a certificate of conformity.

[12] The CAP 2000 regulations ''grand-fathered'' procedures which had been already approved under the RDP provisions. Consequently, these grand fathered procedures were not approved again under the CAP 2000 provisions. [63 FR.39661]

[13] Candidate in-use vehicles are vehicles selected under the provisions of the in-use verification program (IUVP). This includes mileage restrictions, procurement requirements, and screening requirements designed to eliminate only tampered, mis-used or unsafe vehicles. [reference: 40 CFR 86.1845–01 and 40 CFR 86.1845.04]

[14] An engine dynamometer bench generally consists of an engine dynanometer, a ''slave'' engine, and required controllers and sensors to achieve the desired operation of the engine on the dynanometer.

[15] Under this alternative, emission components aged to the equivalent of full useful life would be installed on EDVs. The test data from the EDV would then serve to establish the certification level and show compliance with the full useful life emission standards.

[16] Reference: 40 CFR 86.1845–01 and 40 CFR 86.1845–04.

[17] The Agency may withdraw approval for a durability process if the Administrator determines, based on IUVP or other data, that the durability process does not accurately predict emission levels or compliance with the standards. [Ref. 40 CFR 86.1923–01(h)]. In addition, where the average in-use verification data for a test group (or several test groups) exceeds 1.3 times the applicable emission standard and at least 50% of the test vehicles fail the standard in use, manufacturers are required to supply additional ''recall quality'' in-use data. [Ref. 40 CFR 86.1846–01].

indicate the durability process underestimates in-use emission levels.

The CAP 2000 regulations did not change the previous procedures used to obtain DFs for evaporative/refueling families.

C. Ethyl Petition To Reconsider the CAP 2000 Rules

On August 17, 1999, Ethyl Corporation petitioned EPA to reconsider the CAP 2000 regulations. EPA requested public comment on the petition, 64 FR 60401 (November 5, 1999 and 64 FR 70665 (December 17, 1999), and received comments from various interested parties. After consideration of the petition and of all comments, EPA denied the petition for reconsideration. 66 FR 45777 (August 30, 2001).

Ethyl Corporation also petitioned the Agency to reconsider the final rule entitled ''Emissions Control, Air Pollution From 2004 and Later Model Year Heavy-Duty Highway Engines and Vehicles; Light-Duty On-Board Diagnostics Requirements, Revision; Final Rule,'' 65 FR 59896–59978 (referred to here as the ''Heavy Duty Rule''). After consideration of the petition and all of the comments, EPA denied the petition for reconsideration. 66 FR 45777 (August 30, 2001).

D. Judicial Review of the CAP 2000 Rules

Ethyl Corporation petitioned for review of the CAP 2000 rulemaking, claiming among other things that the CAP 2000 durability provisions were unlawful as EPA had not promulgated methods and procedures for making tests by regulation as required by § 206. [*Ethyl Corp.* v. *EPA*, 306 F.3d 1144 (DC Cir. Oct. 22, 2002).]

In an opinion issued on October 22, 2002, the Court found that the CAP 2000 regulations did not satisfy the requirements of section 206(d) of the CAA to establish methods and procedures for making tests through regulation.

The Court recognized that there was an important distinction between an EPA regulation that established general or vaguely articulated test procedures, with more specific details provided in a later proceeding, and a regulation which failed to establish any test procedures at all and only adopted procedures for the later development of tests. The former situation would receive deferential judicial review under the applicable case law. The latter case, however, would fail to meet the requirements of section 206(d). The Court held that the CAP 2000 regulations fell into this latter group, and were improper because EPA itself failed to establish any test procedures at all in the regulation, vaguely articulated or not. EPA's regulation provided only for the manufacturer to develop its own test procedure and submit it for later EPA approval. This was inconsistent with the scope of section 206(d), [*Ethyl* at 1149–50.]

The Court also said that ''nothing in our opinion requires that EPA use only a 'one-size-fits-all' test method. All that is required is that it establish its procedures, no matter how variegated, 'by regulation.' '' [*Ethyl* at 1150.]

Since the issue before the Court was the legality of EPA's adoption of the CAP 2000 durability provisions, EPA believes the court's vacature of ''the CAP 2000 program'' is limited to vacating the CAP 2000 durability provisions.

The Court also remanded the case to EPA with instructions to establish test methods and procedures by regulation. Today's final rule is the result of the court's decision, and is limited to emission durability procedures.

E. Applicability of the NPRM Preamble Discussion

Unless otherwise indicated below, the discussion presented in the preamble to the notice of proposed rulemaking published at 69 FR 17532 is applicable to this final rule.

F. Supplemental Notice Regarding Component Durability

The Agency received a comment from Afton Chemical Corporation (''Afton,'' formerly known as Ethyl suggesting that EPA did not address the component durability portion of the emission durability process and should establish a procedure for determining component durability. After the Court decision which remanded EPA to write new regulations regarding emissions durability, EPA discussed with the Petitioner and automotive manufacturers the ramifications of that decision. To aid in these discussions, EPA provided a draft ''mark-up'' version of the CAP 2000 regulations, showing via stricken text exactly which regulations we believed had been vacated.[18] We did not strike out the regulatory language regarding component durability. At that time, neither the petitioner nor the automotive manufacturers spoke out in opposition to this. We did not propose new procedures for component durability and proceeded with the proposed durability regulation, which retained the ''good engineering judgment'' language for component durability.[19] Today's final rule includes only procedures for the emission deterioration portion of the durability process, because our understanding was that component durability was not at issue. However, Afton's comments are significant enough, that we believe it is appropriate to take the opportunity for further comment on component durability regulations. We believe it is appropriate, given the need for notice and comment for all interested parties, that we treat component durability in a separate action. Therefore, in addition to today's final rule, EPA is also today publishing a separate Supplemental Notice of Proposed Rulemaking requesting comments on a proposal which addresses component durability. Today's final rule has not revised the regulatory language for component durability.

II. Summary and Analysis of Comments

EPA received comments from the automotive makers Ford, Volkswagen and Cummins, two automotive trade associations on behalf of their member automotive companies, the Afton Chemical Corporation (formerly know as the Ethyl Corporation), and one comment from a private citizen.

The comments have been grouped together by subject matter. The following discussion presents the summary of EPA's proposal, of the comments received on that proposal, and EPA's response to those comments.

A. The Durability Objective

Summary of proposed rule. The proposed rules included a provision that defined the durability objective [Ref 40 CFR 86.1823–08(a)] as follows: ''The durability program must predict an expected in-use emission deterioration rate and emission level that effectively represents a significant majority (approximately 90 percent) of the distribution of emission levels and deterioration in actual use over the full and intermediate useful life of candidate in-use vehicles [20] of each vehicle design which uses the durability program.''

Summary of Comments. The Alliance and AIAM commented that the phrase ''approximately 90 percent'' could

[18] A copy of the strike-out version of CAP 2000 language is included in the Docket to this regulation.

[19] Ref. 69 FR 17533 ''EPA is not proposing to change the existing regulations for determining emission-related component durability''.

[20] Candidate in-use vehicles are vehicles selected under provisions of the in-use verification program (IUVP). This includes mileage restrictions, procurement requirements, and screening requirements designed to eliminate only tampered, mis-used or unsafe vehicles. [Reference: 40 CFR 86.1845–01 and 40 CFR 86.1845–04]

effectively increase the stringency of the standards by ignoring whether vehicles are passing the standards in-use and focusing on the probability distribution that in-use emissions exceed the emission levels projected at certification. This represents a substantial and unnecessary departure from the CAP 2000 rules. Instead, the rules should be in line with the ''significant majority'' goal espoused in CAP 2000 and the RDP guidance letter (CD–94–13, July 29, 1994).

In response to a request by EPA to clarify their comments, the Alliance stated that they were concerned that the proposed provision in the regulations themselves which defined ''significant majority'' to mean ''approximately 90 percent'' could be interpreted to establish an inflexible percentage criterion and eliminate EPA's discretion to consider other factors when evaluating the effectiveness of a manufacturer's durability program taken as a whole.

Response to Comments. The purpose of the durability program is to provide EPA with reasonable assurance that vehicles covered by a certificate of conformity will, in actual use, comply with the applicable emission standards over their full useful life. As discussed in the proposal, production variability or other reasons can lead to differences in actual emission levels among vehicles of the same nominal design.

In the CAP 2000 rulemaking, EPA required that a durability program adequately predict emission deterioration for a significant majority of candidate in-use vehicles. In the CAP 2000 program, EPA had typically considered ''significant majority'' to mean approximately 90 percent coverage of the distribution of in-use deterioration. This concept was discussed in the preamble to the CAP 2000 rule [21]; however, EPA had not set a strict numerical criteria in the CAP 2000 regulations.

It was not the EPA's intention to establish in this rule a single rigid method or an inflexible numerical criteria to evaluate the durability objective. EPA understands the Alliance's concerns that the proposed language might lend itself to a more rigid interpretation that may limit EPA discretion and/or impose unintended burdens on manufacturers. Consequently, EPA has removed the parenthetical phrase ''approximately 90 percent'' from the finalized durability objective language in the regulations.

By making this change we are not relaxing the requirement. The manufacturer must still demonstrate that a customized/alternative durability procedure is expected to effectively represent a significant majority of the distribution of emission deterioration in actual use to obtain EPA approval to use the procedure for certification. EPA and the manufacturers will still review IUVP data and/or other data to determine if the durability objective was achieved in use and whether it is appropriate to continue to use that durability process for future certification requests. EPA will consider a variety of different evidence and/or analyses that the durability objective has been or is expected to be achieved. However, a demonstration that approximately 90 percent of the distribution of in-use emission deterioration or emission levels is effectively represented by the durability procedure will continue to be a satisfactory showing for this purpose.

The following section discusses how the durability objective will be used to evaluate certification durability procedures based on in-use emission data.

B. Evaluation of the Certification Durability Procedures Based on In-Use Emissions Data

Summary of Proposal. Manufacturers must use information gathered from the IUVP, as well as other sources of in-use emissions data, to periodically review whether the durability procedure it employs achieves the durability objective. EPA may require a manufacturer to perform an analysis to evaluate its durability procedure. EPA may withdraw approval of a durability procedure, or require modifications to the procedure, if the Agency determines that the durability objective is not being achieved by the durability procedure. [Ref. 86.1823–08 (i) and (j)]

Summary of Comments. The Alliance and AIAM stated that they had concerns that a number of variables could affect IUVP emission data (including in-use fuel characteristics, mal-maintenance, testing variability, small sample size, random recruitment and as-received testing (rather than testing properly maintained and used vehicles)) and that these variables could affect the accuracy of decisions made using IUVP data. They stated that these concerns ''were already addressed in the CAP 2000 rulemaking in an appropriate fashion''.

To illustrate their concern, the Alliance and AIAM provided this example: All in-use vehicles can be well below the applicable standards, but the durability procedure could be deemed deficient under the proposed rule merely because in-use emissions exceed the emission levels projected at certification.

The Alliance and AIAM also suggested that ''If the IUVP data show that a manufacturer meets emissions standards in use (because, for example, the manufacturer certified with a sufficient compliance margin, known as ''headroom''), then the Agency should not be concerned and should not make decisions based on the accuracy of the certification emission deterioration seen in isolation.''

In response to a request by EPA to clarify their comments, the Alliance stated that the new provision could be interpreted to require changes in their durability programs even when a significant majority of candidate in-use vehicles comply with emission standards. They believed that the proposed rule could, therefore, effectively tighten the applicable emission standards.

Ford commented that: (1) The proposal effectively increases the stringency of the standards. (2) The focus of this criteria appear to change from the strawman which compared the IUVP emission results to the standard and the highest certification level of all certification and running change tests. (3) Applying the 90 percent criteria [significant majority] criteria to IUVP data (''as received vehicles'') rather than ''properly maintained and used'' vehicles [the quality of data used to order recalls] further increase the stringency. (4) The proposed requirement forces change and cost increases to methods where 100% of the IUVP data meet applicable standards. (5) Reviewing the rate of deterioration is inconsistent with the use of certifying with aged components (rather than calculating a deterioration factor).

The Alliance and AIAM also commented Review of durability processes should only be required when the in-use confirmatory test criteria are triggered.

Response to Comments. EPA did not propose, nor are we finalizing, any changes to the IUVP testing program promulgated in the CAP 2000 rulemaking. As discussed in the proposal, EPA does not believe these provisions were vacated by the Court's decision and they remain effective without any further action required by the Agency.

The provisions for using IUVP emissions data and/or other information to evaluate a durability procedure and for the Administrator to reject the use of a durability procedure based on such an evaluation were also contained in the CAP 2000 rules. The CAP 2000 rule established the requirement to reject a

[21] Ref. CAP 2000 NPRM preamble 63 FR 39661.

durability procedure when ''the durability process has not been shown to effectively predict emission levels *or compliance with the standards* in use on candidate vehicles'' using this data. This requirement is practically equivalent to the ''not achieving the durability objective'' language in the proposal. As long as in-use vehicle data is below the standards, the durability procedure would be considered acceptable, even if the in-use emissions exceed the emission levels projected at certification. However, if it was found that the in-use emissions were significantly higher than the projected certification levels, we may decide to review the durability procedure to determine why the in-use emission results are so far off from the projected certification results in order to improve the procedure being used.

We disagree with the comment that the comparison of IUVP emission data to the durability objective in the proposal is a new requirement (not contained in the CAP 2000 rules) that increases the stringency of the standards. As discussed in the last paragraph, the basis for the evaluation of a durability program in CAP 2000 was ''candidate in-use vehicle'' which are defined to be vehicles eligible for selection by the IUVP program. Clearly, comparing actual IUVP emission data to the durability objective is precisely what was intended by this requirement. *Consequently, this requirement is not new and therefore does not increase stringency of the standards.* Ford is confusing the ''well maintained and used'' quality of data requirement that applies to ordered recalls with the process of evaluating the effectiveness of a durability process for certification. As discussed in the CAP 2000 rule, EPA does not intend to order recalls of vehicles using unscreened IUVP data. EPA did not propose, nor are we finalizing, any provision that would change the process of ordering recalls of non-complying vehicles by using unscreened IUVP data.

We continue to believe it is necessary to re-evaluate a manufacturer's durability process using actual in-use emission, data such as IUVP data, when that information becomes available. It is only through such review that we can be assured that the predictions made at the time of certification are actually valid in use. When that data indicate that the durability process does not achieve the durability objective in actual use, then the Agency may decide to withdraw approval for the durability procedure or require modification to the procedure for future certification purposes. Again, such remedial action is necessary for the Agency to assure an effective certification program. It would be reckless for the Agency to allow the continued use of a unmodified durability process for future certification once it has been shown to be ineffective in actual use for similar vehicles.

We disagree with the suggestion that review of the durability procedures should only occur when the in use confirmatory program (IUCP) *triggers* [22] are activated. The confirmatory test criteria are considered to be a screening criteria that identifies the very worst cases only for automatic reconsideration. EPA expects that there will be cases where the durability procedures are not working satisfactorily for a particular test group that are not identified by these criteria. Furthermore, reviewing in-use data in large groups allows the Agency to determine if there is an underlying trend that a durability process is not satisfactorily achieving the durability objective. In those cases, EPA is naturally and justifiably concerned about the accuracy of the durability process. These reviews conducted on a case-by-case basis are necessary for the Agency to assure an effective certification program.

EPA has retained the proposed provision to eliminate unrepresentative in-use data when making this determination.

EPA has not established a single required method to perform an analysis to evaluate the effectiveness of the durability process using in-use emission data. The Agency will consider all information and analyses presented by the manufacturer submitted within the 60-day period specified in the regulations before reaching a final decision to withdraw approval for a durability procedure. Although there is no specified procedure for this evaluation, there are several observations which are applicable to this process.

Calculating deterioration rates only from in-use emission results conducted at various vehicle mileage points on randomly procured vehicles within a test group can be misleading. It is well known that individual vehicle configurations within a test group or durability group will have different levels of absolute emissions. Since the IUVP uses random procurement, it is possible that the lower emission vehicles would be tested at low mileage and the higher emission vehicles would be tested at high mileage. This situation would lead to a exaggeratedly high calculated deterioration rate. This, in turn, could lead to the false determination that the durability process does not meet the durability objective. Comparing individual in-use emission levels to the certification levels or the applicable emission standards will result in more accurate evaluations of the in-use data and is recommended for that reason.

It is better to make overall decisions about the effectiveness of a durability procedure using the largest possible data set of comparable vehicles. Consequently, EPA recommends performing analyses on a broad group of comparable vehicles rather than on single test groups or other small data sets. Comparable vehicles complying with different standards may be combined into the same analysis if the emission levels are standardized by the ratio of the emission standards.

We agree with the Alliance and AIAM that the Agency should not make decisions based on the accuracy of the certification emission deterioration seen in isolation. Compliance margin should also be considered in the analysis.

The proposed and finalized rules discuss ''*effectively* representing a significant majority'' (emphasis added). The word ''effectively'' in this context is intended to allow the use of compliance margin (also called ''headroom'') to expand the predictive coverage of a durability program. As stated previously, the purpose of the durability program is to provide EPA with reasonable assurance that vehicles covered by a certificate of conformity will, in actual use, comply with the applicable emission standards over their full useful life.

This purpose may be accomplished by employing a durability process that directly predicts emission levels that represent a significant majority of the distribution of emission levels in actual use. Alternatively, the durability process may under-predict emission levels, but when coupled with the compliance margin, a significant majority of the vehicles comply with the emission standards in actual use. Providing that the same amount of compliance margin is used in future certification requests, it is reasonable to conclude that such a durability process when coupled with this level of compliance margin *effectively* represents a significant majority of the distribution of emission levels in actual use.

For example: if after removing unrepresentative data only 70 percent of

[22] Mean In-Use Verification Program (IUVP) emissions for a test group exceed threshold of 1.3 times the certification emission standard and at least 50% of test vehicles for that test group fail for the same pollutant.

the emission data was less than or equal to the predicted value (the certification level determined at certification time), then one could conclude that the predictive accuracy of the durability process was approximately 70% which would not constitute a ''significant majority''. If, however, when compliance margin is taken into account, 95% of the vehicles comply with the applicable emission standards, it could be safely concluded that a significant majority of vehicles are *effectively* represented by the durability procedure. Such an analysis would be performed separately for each applicable emission constituent and associated emission standard.

Based on the preceding description of how the ''effectively represent'' criteria may be implemented, we disagree with the Alliance, AIAM, and Ford that the proposed requirements will result in the Agency withdrawing approving for a durability process when all the IUVP data is complying with the applicable standards.

Lastly, we do not see an inconsistency, as a comment suggests, in comparing IUVP emission data to the durability objective when the manufacturer elects to certify using aged components rather than calculate a deterioration factor. EPA is allowing flexibility in the method for the manufacturer to conduct this analysis. EPA does not require (nor do we recommend, as discussed above) comparing certification DFs to DFs calculated from IUVP data. EPA's preferred method for the analysis involves comparing IUVP emission results to certification levels and standards; all of this data is available to manufacturers electing to certify with aged components rather than calculating a certification DF.

In summary, the Agency is retaining the proposed requirement to require manufacturers to evaluate the durability procedures using in-use emission data generated on candidate vehicles (such as IUVP data) and the authority for EPA to withdraw approval of the durability procedure if the durability objective was not achieved in actual use on comparable vehicles. The Agency did not propose, nor are we finalizing, a specific required method to evaluate certification durability procedures based on in-use emissions data. However, a demonstration that approximately 90 percent of the distribution of in-use emission results (considering each emission constituent separately) comply with the applicable standard will be a satisfactory showing that the durability objective has been achieved.

C. Standard Whole Vehicle Durability Procedure

1. Standard Road Cycle (SRC)

Summary of Proposal. The standard whole vehicle durability procedure consists of mileage accumulation on a durability vehicle following the standard road cycle (SRC). The SRC was defined in the proposal in Appendix V of part 86.

Summary of Comments. The Alliance and AIAM commented that the proposed standard road cycle is effective at meeting the Agency's intent.

Response to Comments. Having received no adverse comments on the proposal, EPA is finalizing the SRC as proposed.

2. Vehicle Ballasting on SRC Mileage Accumulation

Summary of Proposal. The proposed rules required that during mileage accumulation ''the durability data vehicle (DDV) must be ballasted to a minimum of the loaded vehicle weight for light-duty vehicles and a minimum of the ALVW for all other vehicles'' [Ref 86.1823–08(c)(1)(iii)].

Summary of Comments. The Alliance and AIAM suggested that EPA should harmonize the vehicle weight requirements for truck DDVs with the current emission testing requirements for emission data vehicles (EDV).

Response to Comments. The proposal required heavier payload for truck mileage accumulation because trucks are designed to carry loads in addition to transporting the occupants of the vehicle. In our review of manufacturer vehicle design and durability processes, we found that trucks have special design and durability requirements acknowledging their load carrying capability. We also believe that trucks carry loads in actual use some fraction of the time.

The standard whole vehicle durability program is designed to achieve the durability objective. The durability objective requires the durability program to represent a significant majority of the distribution of emission levels and deterioration experienced in actual use on those vehicles. To reach this goal of significant majority coverage, EPA believes that it is necessary to address heavier vehicle loads that occur in trucks some fraction of the time. The adjusted loaded vehicle weight (ALVW) loading requirement requires ballasting with half the payload rather than 300 pounds (the loaded vehicle weight which is applicable to light duty vehicle mileage accumulation in the proposal).

The amount of ballasting for mileage accumulation should not be confused with the vehicle weight basis for conducting emission testing. EPA did not propose, nor are we finalizing, any change to the weight basis for emission testing, including testing that may be performed on the DDV to calculate a deterioration factor (DF).

Although EPA continues to believe it is necessary to ballast most trucks to ALVW to assure that the durability objective is achieved, this requirement may to too severe for some light light-duty trucks.[23] These lighter trucks are much more frequently used only for passenger transportation and more rarely used to transport significant payloads. Consequently, EPA is changing this provision in the final rule to require ballasting during mileage accumulation to a minimum of the loaded vehicle weight to apply to both light-duty vehicles and light light-duty trucks. We are retaining the provision to ballast all other vehicles to a minimum of the ALVW.

3. Calculating the DF From Mileage Accumulation of 75% of Full Useful Life Mileage

Summary of Proposal. The description of the proposed standard whole-vehicle durability procedure contained a provision [Ref. 86.1823–08(c)(2)] that would require mileage accumulation of at least 75% of the full useful life mileage. If the mileage accumulation was less than 100% of the useful life mileage this provision would require the DF to be based on the upper 80 percent statistical confidence limit calculated from the emission data.

Summary of Comments. The Alliance and AIAM commented that projecting a full-useful life DF from data generated over 75% percent of the useful life is sufficient without adding the proposed 80% confidence factor. The proposed requirement is more stringent than the original CAP 2000 and Tier 1 requirement for projecting DFs. Projected full useful life emissions should use mean values rather than 80% statistical point.

Response to Comments. We disagree. EPA promulgated the provision to allow reduced (75% rather than 100% useful life) mileage accumulation in the CAP 2000 and Tier 1 rules to address the concern of the excessive time necessary to complete full mileage accumulation with the AMA cycle. The excessive time concern has been addressed in the proposal by the SRC which is a

[23] Light light-duty trucks are trucks that are rated through 6000 pounds GVWR. This includes truck classes LDT1 and LDT2.

substantially faster [24] cycle than the AMA cycle. For that reason, EPA had considered eliminating the provision to allow less than full useful life mileage accumulation altogether. Although the provision has been rarely used in the past, EPA thought it would be worthwhile to retain it in the standard whole-vehicle durability procedure providing that the reduced mileage accumulation did not adversely affect the quality of the projected DF.

It is a basic statistical principle to apply a confidence factor when performing projections from a limited data set. The confidence factor addresses the added uncertainty inherent in not generating actual data for the last 25% of the mileage accumulation. The one-sided 80 percent limit is a loose requirement; it is not uncommon in projections to apply a confidence factor of 90% or higher. Running less than the full useful life mileage accumulation is voluntary.

The need for this confidence factor is heightened now that Tier 2 has extended useful life to a maximum of 150K miles. The idea of allowing the 150,000 mile useful life as an option in Tier 2 [and thereby avoiding compliance with the intermediate useful life standards] is predicated on the assumption that the added emission data between 120,000 and 150,000 miles would improve our statistical confidence that the vehicles comply with full useful life standards. If we now (as suggested in this comment) allow manufacturers to project emission compliance without considering statistical confidence when only 75% of useful life mileage is run, then 150,000 durability could be demonstrated by running only 112,500 miles. Running 75 percent of the 150,000 miles [112,500 miles] is actually less breadth of data than the normal 120,000 miles and reduces our compliance confidence rather than enhancing it.

Consequently, for the reasons discussed above, EPA is adopting its proposal to require the use of the upper 80 percent one-sided statistical confidence limit when less than full mileage accumulation is conducted using the standard whole-vehicle durability procedure.

4. Testing Required for DF Calculation

Summary of Proposal. If a manufacturer elects to calculate a DF, then it must conduct at least one FTP emission test at each of five different mileage points selected using good engineering judgement. The required testing must include testing at 5,000 miles and the highest mileage point run during mileage accumulation. Additional testing may be conducted. [Ref. 40 CFR 86.1823–08(c)(3)]

Summary of Comments. Manufacturers should be allowed to choose the number of tests for DF testing on the SRC, rather than the Agency mandating the use of five (or more) tests at different mileage points as proposed.

Response to Comments. The reason for specifying a minimum number and distribution of test points to be used in calculating a deterioration factor is to assure a minimum level of confidence in the result of the calculation. It is possible that the same level of confidence could be achieved with multiple tests conducted at a fewer number of discrete mileage points.

Since the intention of this requirement was to provide a minimum level of confidence in the DF, another plan that results in at least as much confidence would equally achieve this goal. To allow greater flexibility in deterioration testing plans, we are adding a provision in the final rule that would allow other testing plans providing the manufacturer determines, using good engineering judgement, that the alternative plan would result in equivalent or superior DF confidence interval.

To justify such an alternative testing plan, the manufacturer would need to document that the alternative testing intervals result in a DF confidence interval equal to or better than the confidence interval using the testing plan specified in the regulations [one test at 5,000 miles, one test at full useful life mileage, and three equally spaced tests between 5,000 miles and the full useful life mileage].

5. Use of an Engine Dynamometer To Recreate the Aging on the SRC

Summary of Proposal. The proposal did not specifically address what type of dynamometer could be used for mileage accumulation on the SRC. The proposed regulation simply specified use of a mileage accumulation dynamometer.

Summary of Comments. Cummins commented that vehicle mileage accumulation on the SRC could be effectively duplicated on an engine dynamometer by aging the complete engine and emission control system in an appropriate manner. They suggested that EPA allow the use of an engine dynamometer as an option for whole vehicle aging.

Response to Comments. EPA agrees with Cummins that it is possible to replicate the aging that occurs on the SRC by installing a complete engine and emission control system on an engine dynamometer and appropriately controlling the engine load and other parameters during service accumulation. Although, this option was not prohibited in the proposal, EPA decided to clarify the language and specifically allow service accumulation on a engine dynamometer as an option method to conduct aging following the SRC.

D. Standard Bench Aging Procedure

Summary of Proposal. The standard bench aging procedure requires installation of the catalyst-plus-oxygen-sensor system on a catalyst aging bench. Aging on the bench is conducted by following the standard bench cycle (SBC) for the period of time calculated from the bench aging time (BAT) equation. The BAT equation requires, as input, catalyst time-at-temperature data measured on the SRC. This procedure was not applicable to diesel vehicles.

Summary of Comments. The Alliance and AIAM commented that they believe that the standard bench cycle incorporates appropriate elements to provide an effective procedure to bench age exhaust emission hardware.

Volkswagen commented that the proposed prohibition of bench aging procedure for use on diesel vehicles is inappropriate. The Agency should allow manufacturers the opportunity to propose an appropriate bench aging procedure for diesel vehicles which EPA would approve on a case-by-case basis.

Cummins acknowledged that there is not an effective established procedure currently available for bench aging of diesel vehicles. However, they encouraged the Agency to provide some mechanism in the final rule that could allow approval of a bench aging procedure for diesels on a case-by-case basis at a later time without the need for further rulemaking.

Response to Comments. Volkswagen's and Cummins suggestion that EPA allow a manufacturer to propose a bench aging durability procedure applicable to diesel vehicles without the Agency promulgating any description of the framework of the bench aging durability procedure for diesel vehicles in the regulations do not fulfill the Court's mandate. Nor does it fulfill the Clean Air Act requirement to establish methods and procedures for making

[24] The fastest allowable AMA cycle (with a top speed of 70 MPH) has an average speed of 30.72 MPH while the SRC has an average speed of 46.26 MPH. The time necessary to complete 120,000 miles on the SRC [2594 run-hours] is less than time necessary on the AMA to complete 75% of the miles [90,000 miles take 2930 run-hours].

tests through regulation [Ref. CAA section 206 (d)].

None of the comments take issue with EPA's conclusion that the proposed bench aging procedures cannot be effectively used for diesel-fueled vehicles. The proposed bench aging procedures are designed to age the vehicle's catalyst-oxygen-sensor system as well as to replicate the total aging that occurs in use. Diesel vehicles to not employ catalyst technology as the principle emission control strategy, consequently the proposed bench aging procedure will not be effective for diesels. The comments did not suggest a bench aging procedure that was effective for diesel vehicles. In fact, Cummins acknowledged that there is not an effective established procedure currently available for bench aging of diesel vehicles.

Consequently, EPA is retaining the proposed exclusion of diesel-fueled vehicles from employing the bench aging procedures finalized in these regulations. At a later date, EPA may choose to propose regulations providing bench aging procedures applicable to diesel-fueled vehicles. In the meantime, diesel-fueled vehicles must use the whole vehicle exhaust durability provisions.

E. Catalyst Time-at-Temperature Data Measurement

Summary of Proposal. EPA proposed that catalyst temperature must be measured at the highest temperature location in the hottest catalyst on the DDV. Catalyst temperature must be measured at a rate of one hertz (one measurement per second).

Summary of Comments. The Alliance and AIAM commented that the measurement rate of catalyst temperature of 1 hertz should be changed to allow manufacturers to determine the appropriate rate. EPA should not dictate the location of catalyst temperature measurements. Determining the worst-case location is not practical.

Response to Comments. Both of these measurement procedures only apply to the standard bench procedure and its elements. Manufacturers may use other procedures if using a customized/alternative process that does not use the EPA standard BAT equation, the standard aging bench design (as discussed in Appendix VIII) or EPA's standard method to experimentally determine a customized R-factor for the BAT equation (as discussed in Appendix IX).

Because the measured temperature is the basis for calculating aging time or determining that the appropriate amount of aging has actually occurred on the aging bench, it is important to carefully specify where to measure the temperature. Temperatures can vary by over 100 °C between various locations in a catalyst. In developing the BAT equation, EPA developed the equation based on measuring the maximum temperature in the catalyst. EPA has been receiving catalyst temperature data from manufacturers for many years which was measured at the hottest point in the catalyst to support carryover requests or to evaluate durability procedure approvals under RDP–I or CAP 2000. Typically, manufacturers have selected measure along the central axis of the catalyst about one inch back of the front face. This history indicates to the Agency that determination of the hottest location in the catalyst is practical.

In Appendix VIII, EPA proposes that the measurement of catalyst temperature may be either at the highest temperature location or another location (providing the temperature is adjusted by a linear transform to represent the temperature measured at the hottest catalyst location). To address the practicality of actual measurement, EPA has modified the regulation language to correspond to the appendix.

The temperature measured in a catalyst also can change quickly over time during the SBC. When EPA was developing the standard bench cycle we used time-at-temperature data recorded at a one hertz rate. The temperature measured in adjacent seconds frequently is different in these data sets. Consequently, EPA concluded that one hertz was the minimum acceptable frequency rate acceptable for this purpose. Faster measurement would be acceptable, because it would allow for more accurate measurement of the changing catalyst temperature. To allow faster measurement, EPA has changed the regulation from the proposal to specify that one hertz is a minimum frequency.

F. Customized/Alternative Durability Procedures

Summary of Proposal. Several of the comments received to the proposal discuss provisions that apply to different aspects of the customized/alternative durability procedures. As background for the discussion of these general comments, the following paragraphs summarize the provisions that were proposed for customized/alternative road cycles, calculation and use the equivalency factor, and customized/alternative bench aging durability procedures.

Customized/Alternative Road Cycles. The Agency proposed that a customized or alternative road cycle could be used for certification if approved by the Administrator. The approval criteria require that the manufacturer demonstrate that whole vehicle mileage accumulation on the alternative/customized road cycle is expected to achieve the durability objective in actual use for the full range of vehicles to be covered by the procedure.

The equivalency factor. The manufacturer must calculate an equivalency factor that equates the alternative or customized road cycle to the SRC run for full useful life mileage. The equivalency factor is used to determine how much in-use data the manufacturer must present in the analysis that the durability objective is expected to be achieved. The equivalency factor would also be made available to outside parties for their use to recreate aging conducted by the manufacturer during certification. For example, if the equivalency factor is 90% then the durability aging conducted by the manufacturer can be replicated by running the SRC for 90% of the useful life mileage or by bench aging using the SBC for the time calculated from the BAT equation using time-at-temperature data run on the SRC based on 90% of the useful life mileage.

Customized/Alternative Bench Aging Durability Procedures. The Agency proposed that a customized or alternative bench aging procedure could be used for certification if approved by the Administrator. The proposal discussed seven types of customization allowable for the bench aging procedures and presented the criteria for their approval to the Agency. Specifically the Agency could approve the following customization to the standard bench aging durability procedure:

- Use a different lower-control temperature on the SBC providing the BAT equation was used to calculate the appropriate aging time.
- Use an customized R-factor in EPA's BAT equation providing that it is determined experimentally using the manufacturer's actual catalyst design.
- Use an customized A-factor in EPA's BAT equation, to ensure that the modified durability process will achieve the durability objective.
- Conduct bench aging using fuel with additional compounds that may lead to catalyst poisoning, such as phosphorus, sulfur or lead, rather than the standard fuel.
- Use an approved customized/alternative road cycle (rather than the

SRC) to develop catalyst temperature histograms for use in the BAT equation.

- Use a different bench cycle than the SBC with prior EPA approval.
- Use a different method than the standard BAT equation to calculate bench aging time with prior EPA approval.

1. Equivalency Factors and Alternative Road Cycles

Summary of Comments. The Alliance and AIAM commented that it is pivotal that manufacturers be able to customize the standardized durability procedures. They support the equivalency factor approach because it provides the means for third parties to use the SRC to effectively replicate the aging effects produced by any manufacturer's durability protocols without requiring manufacturers to disclose proprietary engineering data and analysis. The equivalency factor, as proposed, also allows these customized/alternative procedures to be linked to the standard procedures. They do not object to the publication of the equivalency factors, themselves, but they comment that release of the underlying proprietary information is not required and is contrary to the Freedom of Information Act requirements.

Afton (formerly known as Ethyl) commented that EPA must use appropriate rulemaking procedures which meet the requirements of section 307(d) of the CAA to adopt alternative road cycles rather than using the equivalency factor and the approval process discussed in the proposal. They acknowledge that the equivalency factor may provide a constructive means to attempt to balance the competing objectives of maintaining the secrecy of individualized certification test procedures, on the one hand, and disclosing to the public the test procedures on which the government relies to issue certification decisions, on the other. However, they state that the equivalency factor does not alter the Agency's obligation to promulgate alternative test procedures by regulation and include underlying data upon which the alternative test procedure is based. Consequently they believe that the proposed provision to allow the Agency to approve alternative road cycles does not meet the CAA requirements nor does it comply with the Court's mandate in *Ethyl Corp.* v. *EPA.*

Response to Comments. We disagree with Afton's comments that the proposed regulations, which allow the Agency to approve alternative road cycles, do not meet the CAA requirements and do not comply with the Court's mandate in *Ethyl Corp.* v. *EPA.* The Court stated ''nothing in our opinion requires that EPA use only a ''one-size-fits-all'' test method. All that is required is that it establish its procedures, no matter how variegated, ''by regulation.'' That is what we have done in this rulemaking.

We have established procedures that define the SRC as the standard whole-vehicle durability process. We have also described procedures to use a customized/alternative road cycle that is tied to a comparison of that cycle to the SRC and a demonstration that the cycle achieves the durability objective. In particular, the customized road cycle is the SRC run for a different distance. The actual distance run on a customized road cycle is the basis of the equivalency factor which EPA does not believe is confidential business information (CBI). The Agency plans to provide the equivalency factors to any interested party and post a listing on its Web site for public use.

In the case of alternative cycles (cycles which use a different speed-versus-time trace than the SRC), we have also proposed (and are finalizing) durability procedures using those cycles. We have proposed procedures that specify the amount and type of data necessary for approval of such a cycle. We have proposed procedures that specify the approval method used by the Agency for approving the cycle. We have proposed procedures (the equivalency factor) to equate a customized cycle to the SRC. We have determined that the equivalency factor may be publically released. Furthermore, we have determined that if an outside party ran a vehicle on the SRC for the distance specified by the equivalency factor, the resulting deterioration would be equivalent to the manufacturer's durability showing using the customized road cycle. We have also proposed procedures that specify how to use the customized road cycle for calculating deterioration factors and/or conducting aged component testing. Lastly, we have proposed procedures for determining compliance using this data.

In summary, in addition to the SRC, we have proposed and are finalizing, many details on the durability procedure for the use of customized road cycles. We believe we have clearly articulated a durability procedure (i.e., the SRC) by regulation fulfilling the mandate of the Court. We have also used our discretion in electing to describe most, but not all details, of the alternative road cycle durability process in the regulations. (See *American Trucking Associations* v. *Department of Transportation,* 166 F.3d 374 (DC Cir. 1999) and *New Mexico* v. *EPA,* 114 F.3d 290 (DC Cir. 1997). Agencies are entitled to broad deference in picking the suitable level of detail to specify in the regulations.)

For the above reasons, EPA is finalizing the provision to allow alternative road cycles approved by the Administrator as proposed.

2. Bench Durability Aging

Summary of Comments. Afton expresses concern that whether and how new systems perform in the field can directly impact operation of the catalyst in ways that may not be captured by thermal aging. They specifically cite the lack of aging of certain engine and fuel system components. They expressed concern that the analysis presented in EPA's draft technical support document (TSD) for the CAP 2000 proposal, which shows little engine-out deterioration, may be dated. Their concern is based on the fact that the analysis does not include vehicles using certain new technology devices and strategies which may, at some future time, begin to appear in production but which are not used in general production vehicles at this time.

The Alliance and AIAM commented that the bench aging procedures incorporate appropriate elements to provide an effective method to bench age exhaust emission hardware.

Response to Comments. We do not share Afton's concern that the proposed bench aging procedures may not be sufficiently accurate for certification purposes. The bench aging procedures are designed to effectively replicate the aging that occurs during in-use operation.

As discussed in the preamble to the proposed rule, the bench aging procedures are required to be adjusted to duplicate the full emission deterioration that occurs in-use by thermally aging the catalyst. This may result in over-aging the catalyst to account for emission deterioration that occurs from other sources. The amount of over-aging may be large or small. The proposed BAT equation includes a term (the A-factor) which is used for this purpose. EPA has set the initial value of A as 1.1 based on the low expected engine-out deterioration identified in the TSD. However, if for any cause (including unexpected emission control deterioration of components not aged on the aging bench, or based on the future technology that Afton mentions in their comments), the bench aging durability does not achieve the durability objective, EPA has proposed a requirement that manufacturers change

the A factor to ensure that the durability goal is appropriately achieved by the bench aging process. Furthermore, EPA has proposed requirements that the manufacturer must periodically review their durability process to assure that the durability object is achieved in actual use. To facilitate this review, EPA requires manufacturers to provide IUVP emission data that must be used in this evaluation process. Lastly, EPA can require the manufacturer to change their durability process if the Administrator determines that the durability goal is not being achieved in actual use. Consequently, any risk that the bench aging process may not achieve the durability goal is controlled by this feedback process using IUVP emission data.

For the above reasons, EPA is finalizing the standard bench aging durability procedures as proposed.

3. Approval of Customized/Alternative Durability Procedures

Summary of Comments. The Alliance and AIAM made a series of comments to ''eliminate unnecessary and excessive administrative burden''. Specifically they suggested:

Manufacturers should be allowed to self-approve a customized/alternative durability road cycle if they can show it is more severe than the SRC.

Manufacturers should not be required to submit data from 20 in-use vehicles to obtain approval, rather the manufacturer should review in-use data as it becomes available.

The proposal requires the approval of a customized bench aging cycle even when the aging time is determined using the BAT equation. They suggest that this additional approval step is unnecessary and unjustified.

EPA should eliminate all requirements for pre-approval and re-authorization of existing durability protocols absent in-use data which does not meet the existing requirements.

Response to Comments. We disagree that the approval requirements of the proposal are either unnecessary or excessively burdensome. EPA must determine to its satisfaction that a potential customized/alternative durability process is expected to achieve the durability goal in use. Most of the durability procedures approved prior to the vacature of CAP 2000 rules were significantly changed based on the Agency's review and comment during the Agency's initial review. Although we now expect that most manufacturers have the skill necessary to design an appropriate customized/alternative process, we still believe that an initial review and approval by the Agency is still warranted.

The proposal only requires an initial approval of the customized/alternative durability process. Once a process is approved, the manufacturer must determine, using good engineering judgement, whether to apply the procedure to future durability groups.

The proposal does contain provisions to require less in-use data for EPA approval when the customized/alternative cycle is shown to be significantly more severe than the SRC. We expect that approval of more severe cycles than the SRC to be granted, but the question still remains whether the customized/alternative cycle is severe enough to achieve the durability objective in use for the vehicles involved. Consequently, approval of a more severe customized/alternative cycle is not automatic.

In the proposal, the amount of in-use emission data required for approval is varied depending whether the cycle is more or less severe than or approximately equivalent to the SRC. The amount of data required reflects the data necessary for the Agency to reach a valid conclusion to approve a cycle. As previously discussed, more severe cycles are rewarded in the approval process by a reduction in the amount of required data.

The proposal requires approval of an alternative bench aging cycle because the distribution of air/fuel ratios and temperature is important to assure that adequate aging occurs. As discussed in the preamble to the proposed rule, a manufacturer must develop a new R factor if they change the bench aging cycle. Our standard R-factor applies only to the standard bench cycle (SBC). The determination of a customized R-factor is necessary because the same temperature exposure will result in a different amount of emission deterioration if the bench aging cycle is changed. The use of the standard BAT equation [with a different R-factor] provides no added assurance that the bench aging cycle will effectively replicate the emission deterioration that occurs on the associated road cycle as suggested in the comment. Consequently, EPA is finalizing the requirement to obtain Agency approval for alternative bench cycles.

The proposed requirements are different than the CAP 2000 requirements, although the durability objective has not changed. Pertinent facts may have changed since the approval (under the CAP 2000 rules) of a particular durability procedure including production designs and the existence of more in-use data available for review. Although, the Agency expects that most of the durability processes that were approved prior to the court's vacature of the CAP 2000 rules will meet the requirements of this rule, we find no compelling case to make any blanket determination. Reviewing each durability process according to the new requirements on its own merits is an appropriate course of action for the Agency. Therefore, EPA is retaining and finalizing the proposed requirement that all customized/alternative durability procedures must be approved under the new rules (including all procedures used before the vacature of the CAP 2000 rules).

4. Experimentally Determining a Customized R-Factor

Summary of the Proposal. EPA proposed that a manufacturer may determine an customized R-factor for use in the BAT equation. This would allow the BAT equation to be customized to better predict the required amount of bench aging necessary for a particular catalyst design. EPA proposed a standard experimental method for determining a customized R-factor in Appendix IX to the rule. EPA also proposed that other experimental techniques may be used if approved by the Administrator. To obtain approval the manufacturer must demonstrate that the calculated bench aging results in the same (or larger) amount of emission deterioration as the associated approved road cycle.

Summary of Comments. The Alliance and AIAM commented that EPA's standard method for experimentally determining a R-factor [in Appendix IX] is overly restrictive and significantly increases the stringency of determining an R-factor.

Ford commented that the approval procedure for using alternative techniques to experimentally determine the R-factor for the BAT equation should be based on accomplishing the durability objective rather than a comparison to the associated road cycle (the criteria in the proposal).

Ford suggested an alternative standardized method to experimentally determine the R-factor that they felt would be more accurate and easier to implement. Their proposal (a detailed description is in the docket) suggested that emissions rather than catalyst efficiency be measured and that the emission deterioration projected from a least-squares regression of the emission versus time data be calculated directly from the experimental data rather than the two step process proposed by EPA.

Response to Comments. EPA agrees that the standard method for

experimentally determining an R-factor supplied by Ford in their comments would be appropriate to use for that purpose. We also anticipate that it would be easier to generate the emission data required in Ford's alternative procedure than the conversion efficiency required in the proposed standard R-Factor determination procedure. Also this alternative approach eliminates one step compared to the proposed process. For those reasons, we have modified the Appendix in the final rule to allow this procedure.

It should also be noted that other techniques, beyond the standard procedure outlined in Appendix IX to part 86, may be used as allowed in 40 CFR 1823–08(e)(2)(iii). Ford recommended that we take a step back from the proposed approval criteria which require ''that the calculated bench aging time results in the same (or larger) amount of emission deterioration as the associated approved road cycle.'' They recommended that we require instead that the manufacturer should demonstrate that the use of the R-factor would achieve the durability objective. One concern was that the proposed text seemed to require the existence of a customized/alternative road cycle because this would be the only cycle that was ''approved'', the SRC could be used without a specific Agency approval.

It was not our intention to require that a manufacturer have an approved customized/alternative road cycle to determine an R-factor by an alternative method (rather than the standard method in Appendix IX to Part 86). Manufacturer may also use an alternative method to calculate an R-Factor when using the SRC as the associated road cycle to measure catalyst time-at-temperature data necessary to calculate aging time. It is our intention however, that a manufacturer must generate catalyst time-at-temperature data on either the SRC or an approved customized/alternative road cycle. Furthermore, that an alternative method will only be approved if it results in the same (or more) aging as that associated cycle.

We believe that the approval criteria suggested by Ford (achieving the durability objective) will be functionally the same as the proposed criteria to replicate the aging seen on the associated road cycle but potentially less burdensome. For an alternative bench cycle to be approved the manufacturer must demonstrate that it achieves the durability objective. However, in the case where a manufacturer is using the SRC, it may not have the necessary in-use emission data to demonstrate that durability objective is being achieved. For these reasons, we continue to believe that the proposed requirement is a less burdensome and equally effective requirement as Ford's proposal. In today's final regulation text we have clarified that the road cycle used for comparison may be either the SRC or an approved customized/alternative cycle. Otherwise, we have finalized the alternative R-factor methodology approval criteria as proposed.

5. Alternative Bench Aging Cycle Content

Summary of Proposal. EPA did not propose any limitations on the content of an alternative bench aging cycle. EPA did propose that to obtain approval for such an alternative bench cycle the manufacturer must demonstrate that bench aging with the new bench cycle provides the same or larger amount of emission deterioration as the associated road cycle.

Summary of Comments. The Alliance suggested that we clarify which provisions (in the proposed section 86.1823–08(e)(2)) pertain to manufacturers bench cycle and which provisions pertain to the EPA standard bench cycle.

Response to Comments. EPA did not propose, nor are we finalizing, any limitations on the content of an alternative bench aging cycle. The alternative cycle may (among other differences) be of different length, have a different proportion of Air/Fuel ratios, different temperatures, different amounts of secondary air injection, and/or use no secondary air injection at all. However, whatever the content, the manufacturer must demonstrate that the alternative bench aging cycle works effectively by reproducing (or alternatively overstating) the aging that occurs on the associated road cycle which was used to measure the time-at-temperature data used to calculate the aging time on the aging bench.

G. Component Durability

Summary of Proposal. The proposal retains the CAP 2000 requirement that manufacturers use good engineering judgement to determine that all exhaust-related components are designed to operate properly for the useful life of the vehicles in actual use.

Summary of Comments. Afton argued that EPA did not meet the requirements of the Act or the Court's mandate in *Ethyl Corp.* v. *EPA,* by not proposing test methods or procedures for assessing the durability of emission control system components, either separately for components, or for all the components operating together as an integrated system.

In response to this comment, the Alliance and AIAM stated that there is no need to implement additional ''component'' durability test methods and procedures because the SRC re-establishes the requisite threshold level of stringency for the components as well as the system as a whole. They also claim that the Court did not impose any obligation on EPA to establish a whole new regime of component durability tests.

Response to Comments. While EPA believes that Afton has raised an important issue, the NPRM did not contemplate any revisions to the component durability regulations. Therefore, EPA believes that before taking any final action on component durability, it is appropriate to open this issue to further comment. Therefore, concurrent with today's final rule, EPA is publishing a Supplemental Notice of Rulemaking (SNPRM) that addresses component durability. The SNPRM will seek comment on several options that EPA is considering for addressing component durability during the vehicle emissions certification process. After a formal comment period, EPA will consider any further comments received and issue a final rule.

H. Minor Modifications to Approved Durability Procedures

Summary of Proposal. The proposal contained a provision [ref. 86.1823 h)(1)] that allowed a manufacturer to modify an approved durability procedure by increasing or decreasing the number of miles run on an approved road cycle to represent full or intermediate useful life emissions deterioration or by changing the A-Factor in the BAT equation for a bench aging, using good engineering judgment, to ensure that the modified procedure will achieve the durability objective.

Summary of Comments. The Alliance and AIAM commented that EPA should restore the CAP 2000 provision that allowed manufacturers to make minor modifications (using good engineering judgement) to an approved durability procedure without the need to obtain a new approval from EPA.

Response to Comments. The proposal listed only certain changes that the manufacturer could make to an approved durability procedure using good engineering judgement without obtaining approval by the Administrator. Those changes were increasing or decreasing the number of miles run on an approved road cycle or changing the A-Factor in the BAT

equation. At that time, these were the only changes that the Agency envisioned that could be applied to the standard EPA durability procedures without considering the changes to constitute a customization of the standard procedures that would require Agency approval. We also proposed that these same changes could be made to customized/alternative durability procedures without requiring Agency approval.

We agree that allowing some level of minor adjustments or changes to an approved customized/alternative manufacturer durability process would also be appropriate if the changes were limited in scope and made using good engineering judgement to assure that the modified durability procedures would achieve the durability objective. We believe that the level of adjustments allowed under CAP 2000 continue to be appropriate in the new durability regulations. In the vacated CAP 2000 durability regulations we stated: (1) Such modifications will be limited to incorporating additional data into the original algorithms of the approved durability process and (2) if a manufacturer wishes to change the algorithms used to determine the aging characteristics of the durability process, these changes will be considered a new durability process and will require advance approval by the Administrator. Therefore, we have modified the final regulation language to include a provision for manufacturers to make these minor changes, using good engineering judgement, without obtaining new approval from the Agency.

I. Required Notification to EPA That an Approved Durability Procedure Will Be Used for a Particular Durability Group

Summary of Proposal. The manufacturer must notify the Administrator of its determination to use an approved (or modified) durability procedure on particular test groups and durability groups prior to emission data vehicle testing for the affected test groups (notification at an annual preview meeting scheduled before the manufacturer begins certification activities for the model year is preferred).

Summary of Comments. The Alliance and AIAM commented that the timing of the notification (prior to emission data vehicle testing) is too early in the certification process. They suggested that notification in the Application for Certification should be sufficient and is preferable to them.

Response to Comments. The purpose of this requirement is to provide the Agency the necessary information about the manufacturers durability demonstration plans early enough in the certification process to be useful to the Agency. In particular, if the Agency wished to question the manufacturers judgement to apply a durability procedure to a particular durability group, it would be more efficient to raise this issue earlier in the certification process. Consequently, the Agency suggested that the notification occurs in the annual preview meeting which is typically scheduled before a manufacturer begins certification activity for a model year.

As discussed in the current good engineering judgement provisions [ref. 40 CFR 86.1851–01 which is not being modified in today's final action] the Administrator may reject a manufacturers decision, even after certification is granted, if it is not based on good engineering judgement. Consequently, EPA agrees that notification at the time of the Application for Certification would provide the opportunity for sufficient oversight for the Agency. The risk to the manufacturer is that any questions regarding the good engineering decision basis of the manufacturers decision to apply a durability procedure to a certain durability group will come late in the process (or even after certification was granted). The good engineering judgement provisions in the current rule provide sufficient tools for the Agency to address these concerns in that time period. We still suggest that the best time for the notification is at the preview meeting to avoid last minute questions in the certification process. Nevertheless, we are changing the final regulation language to require the notification prior to or concurrently with the Application for Certification.

J. Public Availability of the Equivalency Factor and Supporting Data

Summary of Proposal. EPA proposed methods to calculate the equivalency factor. EPA also stated the opinion in the proposal that the equivalency factor was not confidential business information (CBI) and it may be released to the public. EPA also announced its plan to post the equivalency factors on the Agency's Web site.

Summary of Comments. The Alliance agreed with the proposal that the equivalency factor is not confidential and may be released to the public. However, they stated that manufacturers should not be compelled to disclose to the public any of their underlying data or other proprietary information used to develop their durability process.

The Alliance and AIAM also commented that EPA should not require extensive engineering reports justifying equivalency factors unless there is in-use or other data suggesting that the manufacturer's cycle does not achieve the durability objective.

They also commented that manufacturers should only be required to supply equivalency factors for processes that are used in the future (after the effective date of the proposed rules).

Afton commented that the Court's mandate *Ethyl Corp.* v. *EPA,* applies to all certification decisions made since the effective date of the mandate. Specifically, they disagreed with the Alliance and AIAM comment that equivalency factor need only be supplied for new durability procedures approved under the proposed rules and need not be reported for existing durability processes that were used after the vacature of the CAP 2000 rules as well as aging processes that were approved by EPA prior to the vacature.

Response to Comments. EPA continues to believe that the equivalency factor is not confidential business information and may be released to the public. EPA renews its intention to post the equivalency factors on the Agency's Web site for public use.

We are not making any other determinations (beyond the equivalency factor) regarding whether other information submitted by a manufacturer is or is not confidential business information. These decisions to release other information will be made on a case-by-case basis using the existing regulations [Ref. 40 CFR part 2].

We agree with Afton that the Court's mandate applies to all certification decisions made after the effective date of the mandate. However, once the Court's mandate became effective, EPA ceased requiring durability showings as a prerequisite to issuing a certificate of conformity. The basis for granting certification after the vacature of the CAP 2000 rule was EPA reliance on a statement made by the manufacturer using good engineering judgement that the vehicles in question will comply with the applicable standards for their full useful life. This statement was typically placed in the Application for Certification and has not generally been viewed by manufacturers as confidential business information. There are no approved durability procedures between the effective date of the Court's mandate and the effective date and model year of today's final rules. Consequently, there are no equivalency factors nor any supporting data that can be made

available by the manufacturers that apply to certification during that period.

K. Carryover

Summary of Proposal. EPA did not propose any changes to the carryover provisions in the current regulations (ref. 40 CFR 86.1839–01). These provisions allow manufacturers to use durability data that was previously generated and used to support certification provided that the data ''represent a worst case or equivalent rate of deterioration''.

EPA proposed that the manufacturer may not, however, continue to use CAP 2000 durability processes to generate new data starting with the effective date of the new regulations. When the proposed rule becomes effective, manufacturers must use durability procedures that have been approved under the new rules to generate new durability demonstrations.

Summary of Comments. The Alliance and AIAM commented that, in addition to allowing carry over of existing durability data prior to CAP 2000 vacature, manufacturers should also be allowed to use existing durability data employed after vacature from previously approved processes conforming with good engineering judgment.

They also suggested that manufacturers should be allowed to carry over aging data generated after the vacature of the CAP 2000 rules providing that these data were compiled using aged component processes approved by EPA prior to the vacature.

Lastly, they commented that manufacturers should be allowed to continue to use aging processes approved by EPA prior to the vacature to age components on future data fleet vehicles.

Response to Comments. EPA did not propose any change to the carryover provisions. After the effective date of the new regulations, if a manufacturer can meet these requirements, it may use existing durability data (i.e., DFs or aged hardware). This would apply to any data that exists prior to the effective date of the today's regulation which is compiled using a durability procedure that was approved prior to the vacature of the CAP 2000 rules. All new data generated after the effective date of today's rulemaking must meet all the applicable requirements including the requirement that it was generated using an approved durability procedure.

L. Evaporative Durability Procedures

Summary of Proposal. The proposal contained provisions for conducting evaporative durability using either a (1) whole vehicle demonstration using the SRC or another approved road cycle or a (2) bench aging demonstration using procedures contained in the regulations or (3) a combination of whole vehicle and bench procedures.

Summary of Comments. The Alliance and AIAM commented that the Court's ruling dealt exclusively with tailpipe emissions and did not compel EPA to revisit evaporative durability.

They also commented that separate durability demonstration for each evaporative family should be allowed via carryover using good engineering judgment.

They also commented that EPA's right to revoke use of evaporative durability based on IUVP is not in keeping with CAP 2000, which said that EPA would use the data primarily for modeling purposes. They are concerned that the sample size is too small and would force manufacturers to ensure that IUVP evaporative emission test vehicles match the emission level of certification test vehicles. Non-fuel related emissions can not be represented in the certification durability process.

Response to Comments. We disagree that the Court's decision regarding durability was limited to exhaust emission deterioration. Consequently, we proposed (and are finalizing) exhaust, evaporative, and refueling durability procedures.

As discussed previously, the carryover procedures of the current regulations (ref. 40 CFR 86.1839–01) are not changed on the proposal. These provisions allow manufacturers to use durability data that was previously generated and used to support certification provided that the data ''represent a worst case or equivalent rate of deterioration''. Consequently, existing evaporative durability data and results may be carried-over providing they meet these requirements.

We agree that the IUVP sample size (one test per test group) is too small to make this decision on an individual test group basis. However, EPA intends to review in-use evaporative data and evaluate the effectiveness of the durability process to achieve the durability objective when a reasonable amount of data does exist for this purpose. This expanded data set could include data from another source or it may consist of data combined from several related test groups or from several years of IUVP data. If the expanded data set indicates a problem, EPA believes it is appropriate to invoke this provision to re-evaluate the manufacturer's evaporative durability procedure. Furthermore, if the Agency ultimately concludes that there is sufficient data and that the data indicate that the durability objective is not achieved, EPA believes it is appropriate to require modifications to the durability procedure in the same method used for exhaust emission deterioration. It would not be acceptable to continue to use an evaporative durability process that was demonstrated to not achieve the durability objective; EPA relies on the accuracy of this data to make appropriate decisions to grant certification. Consequently, we are finalizing these provisions as proposed with the acknowledgment that a sufficient body of data must exist to make this determination with appropriate confidence.

M. Starting Model Year for the Rule

Summary of Proposal. EPA proposed that the rules would apply to 2006 model year vehicles certified after the effective date of the regulations.

Summary of Comments. The Alliance and AIAM commented that the proposed effective date of 2006 model year (MY) should be changed to 2008 MY, or later if final rule published after August 2004. They stated that manufacturers are already doing durability testing on 2006 models, and developmental work is already underway for early introduction 2007 models.

Volkswagen commented that the effective date of 2006 MY is unworkable, but they do not propose an alternative date.

Ford commented that the effective date for the regulation should be changed to 2009 MY if component durability issues are addressed in a single rulemaking and 2008 MY if the emission deterioration provisions are finalized separately.

The Alliance and AIAM suggest that we add a provision allowing early opt-in at the manufacturer's discretion.

Response to Comments. We agree that 2006 is no longer possible given the current timing for publication of the final rule. Because publication of the FRM has taken longer than expected, and manufacturers are now certifying 2006 model year vehicles and already performing durability testing for 2007 models, we are delaying the implementation of the rule to become effective beginning with the 2008 MY.

N. Special Provisions for New Manufacturers

Summary of Proposal. EPA did not propose any special procedures for new manufacturers to obtain approval of a customized/alternative durability procedure. However, the standard procedures may be employed by these

manufacturers without generating any in-use emission data. Also, the Agency did not change the special certification procedures that apply to small volume manufacturers (ref. 40 CFR 86.1838–01).

Summary of Comments. The Alliance and AIAM commented that new manufacturers should not have to rely on IUVP data for feedback purposes since they supply little or no IUVP data. They suggested that the rule should have clear provisions for new manufacturers.

Response to Comments. New manufacturers may use the standard durability procedures without submitting in-use data or obtaining EPA approval. We believe that these standard procedures provide a reasonable method for new manufacturers to supply the required durability data without the need to compile in-use emission data. However, if a new manufacturer did wish to obtain approval for a customized/alternative durability road cycle, EPA would accept appropriate data from another manufacturer's comparable in-use vehicles to demonstrate the effectiveness of their durability procedures to achieve the durability objective.

O. Delete Incorrect Reference to Intermediate Useful Life Standards for the Evaporative and Refueling Durability Objective

Response to Comment. We made the appropriate correction in the final regulations.

P. Comments From a Private Citizen

Summary of Comments. One citizen submitted comments that touched upon various topics, many of which were not germain to the proposed rule. In general, the consumer believed that the proposal was ''too friendly'' to manufacturers. The commenter requested that the public should always be invited to all meetings EPA has with manufacturers to assure that no ''secret dealings'' are taking place.

EPA response. Some of the comments touched on issues that have been addressed elsewhere in this section. We disagree that the proposal was ''too friendly'' to manufacturers. Emissions durability requirements impose a significant burden on manufacturers, and the provisions to allow for alternatives does not lessen the responsibility placed upon manufacturers to perform the required emission durability demonstration. We also disagree that all meetings with manufacturers should be open to the public. The discussions at these meetings center around individual manufacturers' business plans and are forward-looking in nature. Revealing these plans publicly would compromise the competitive automotive market. However, by informing the public of what sort of information is exchanged in these meetings, we believe we have provided the public with enough assurance that no ''deals'' are being made.

III. What Is EPA Promulgating Today?

Today's final rule includes two well-defined test methods for determining the exhaust emissions durability of vehicles from which manufacturers may choose: the standard whole vehicle aging process and the standard bench aging process. It also includes well-defined criteria allowing EPA to approve customization of or alternatives to these test methods, based upon a demonstration to EPA of the level of stringency needed to meet the durability objective, and the level of stringency demonstrated for the SCR and the customization or alternative.

A. Standard Whole Vehicle Exhaust Durability Procedure

EPA is promulgating a standard road cycle (SRC) which is targeted to effectively cover a significant majority of the distribution of exhaust emission deterioration rates that occur on candidate in-use vehicles. The SRC is fuel-neutral. It applies to all vehicles, regardless of fuel used. The SRC consists of seven laps of 3.7 miles each. The average speed on the SRC is 46.3 mph, the maximum cruise speed is 75 mph, and the acceleration rates range from light to hard accelerations. Most accelerations are moderate and there are no wide-open-throttle accelerations. The SRC contains 24 fuel-cut decelerations. The deceleration rates range from coast-down (no brake force applied) to moderate.

EPA is promulgating a standard whole vehicle durability procedure which consists of running a vehicle (the durability data vehicle (DDV)) on the SRC for the full useful life mileage of the vehicle. We are also finalizing rules that manufacturers may terminate mileage accumulation at 75% of full useful life and project DFs based upon the upper 80% statistical confidence limit.

The weight of the vehicle during SRC mileage accumulation is proposed to be the loaded vehicle weight (curb plus 300 pounds) for light-duty vehicles and light light-duty trucks. The weight basis for SRC mileage accumulation is the adjusted loaded vehicle weight ((curb + gross vehicle weight)/2) for all other vehicles covered by this rule. The fuel used on the SRC is proposed to be representative of commercially available gasoline (with a provision that extra poisoning may be added, such as phosphorus, sulfur or lead).

EPA is retaining the CAP 2000 options of determining emission compliance levels by either (1) calculating deterioration factors (DF) and applying the DF to the emission data vehicle (EDV) emission results or (2) testing the EDV with emission control components aged using the SRC and installed prior to testing. If DF's are to be calculated, emission testing would be conducted at periodic intervals during milage accumulation.

B. Standard Bench Aging Exhaust Durability Procedure

Bench aging is a different way to achieve the same emission deterioration as whole-vehicle aging using a road cycle. EPA is promulgating a standard bench aging procedure that uses a bench aging time (BAT) equation and the standard bench cycle (SBC) to reproduce emission deterioration from a road cycle. EPA's standard bench procedure specifies that the SRC be used to generate the catalyst temperature histogram needed to determine bench aging time. Because the standard bench aging procedure relies on increasing catalyst thermal aging to account for all sources of emission deterioration, this procedure is not applicable to diesel fueled vehicles or vehicles which do not use a catalyst as the principal after-treatment emission control device.

The standard bench aging durability procedure has been designed to reproduce the exhaust emission deterioration that occurs on the standard whole vehicle durability procedure. The standard bench aging procedure is as follows:

a. Catalyst temperature data is measured at a minimum rate of one hertz (one measurement per second) during at least two replicates of the standard road cycle (SRC). The temperature results are tabulated into a histogram with temperature bins of no larger than 25 °C.

b. The effective reference temperature of the standard bench cycle (SBC), described below, is determined for the catalyst system and the aging bench which is to be used for the bench aging.

c. The bench aging time is calculated using the bench aging time (BAT) equation, described below, using the effective reference temperature of the SBC and the catalyst temperature histogram measured on the SRC.

d. The exhaust system (including the catalyst and oxygen sensors) is installed on the aging bench. The aging bench

follows the SBC for the amount of time calculated from the BAT equation.

e. Catalyst temperatures and A/F ratios are measured during the bench aging process to assure that the proper amount of aging has actually occurred. Aging on the bench is extended if the aging targets are not properly achieved.

1. The Standard Bench Cycle (SBC)

EPA is promulgating a standard bench cycle (SBC) which contains a mix of rich, lean and stoichiometric A/F ratios designed to achieve appropriate emission deterioration on the aging bench when operated for the period of time calculated from the BAT equation.

The standard bench cycle consists of a 60-second cycle which is defined based on the A/F ratio of the engine (which is part of the aging bench) and the amount of secondary air injection (shop air which is added to the exhaust stream in front of the first catalyst).

2. The Bench-Aging Time (BAT) Calculation

EPA is promulgating a bench aging time (BAT) equation to calculate the appropriate length of time to age a catalyst system on an aging bench to yield equivalent emission deterioration as running a vehicle on the associated road cycle. The standard bench aging durability procedure uses catalyst temperatures measured on the SRC to calculate the bench aging time necessary to reproduce the thermal exposure seen on the SRC. As discussed in the NPRM preamble, the BAT equation is based on the Arrehenius equation which relates chemical reaction rates with temperature.

3. The Effective Reference Temperature for the SBC

The BAT equation uses a single temperature value called the effective reference temperature to represent the entire temperature-history experienced during the SBC on the catalyst aging bench. The effective reference temperature will be calculated using catalyst temperature histogram data measured in the catalyst on the aging bench following the SBC. The BAT equation would then be used to calculate the effective reference temperature by iterative changes to the reference temperature (T_r) until the calculated aging time equaled the actual time representing in the catalyst temperature histogram. The resulting temperature is the effective reference temperature for the SBC.

C. Customization of the Standard Procedures

1. Customization of the Standard Road Cycle

EPA has established criteria to obtain approval for a customized/alternative road cycle that require the manufacturer to demonstrate that the objective of the durability program will be achieved for the breadth of the vehicles which are covered by the cycle. Approval of a customized/alternative road cycle requires a thorough analysis of whether the cycle will achieve the durability program objective using in-use emissions data, including a demonstration of the relative stringency of the SRC and the manufacturer's program.

To make the initial demonstration necessary for the Agency to approve a customized/alternative cycle, EPA is requiring that the manufacturer supply high mileage in-use emission data on applicable candidate in-use vehicles. The vehicles would be randomly procured from actual customer use, generally with an age of 4 to 5 years and with a minimum of approximately 50,000 miles. They would cover the breadth of the vehicles that the manufacturer intends to certify using the customized/alternative cycle. Vehicles would be procured and FTP tested as received under the provisions of the IUVP program (ref: 40 CFR 86.1845–04). Manufacturers could use previously generated in-use data from the CAP 2000 high mileage IUVP program or the fourth-year-of-service RDP ''reality check'' in-use program as well as other sources of in-use emissions data for this purpose. EPA will also consider additional emissions data or analyses that the manufacturer may choose to provide, including data from vehicles which have been screened for proper maintenance and use.

The amount of in-use emission data required for this analysis is based on whether the customized/alternative cycle is more or less severe than the SRC. In most cases, EPA will accept a minimum of 20 candidate in-use vehicles. There is less risk of underestimating actual in-use emission levels when the customized/alternative cycle is more severe than the SRC. However, if the customized/alternative cycle is significantly more severe than the SRC, EPA may accept less data. Conversely, if the customized/alternative cycle is significantly less severe than the SRC, EPA may require more data up to a maximum of 30 vehicles.

EPA will also consider the equivalency factor of the customized/alternative cycle when evaluating the cycle for approval.

Once the durability process is approved, the manufacturer must determine, using good engineering judgement, whether to apply the durability procedure to a particular test group. The manufacturer may make modifications to an approved customized/alternative road cycle and apply them to a test group to ensure that the modified process will effectively achieve the durability objective for future candidate in-use vehicles. The manufacturer would be required to identify such changes in its certification application and explain the basis for the changes. Manufacturers must use good engineering judgement in making these decisions. Significant, major, or fundamental changes to a customized/alternative cycle would be considered new cycles and would require advance approval by EPA.

2. Customization of Standard Bench Procedures

The manufacturers are allowed, subject to Agency approval, a limited degree of customization of the standard bench procedures. However, in all cases EPA is requiring that alternative bench aging procedures be based upon measured vehicle performance (such as catalyst temperature) on an approved road cycle.

Specifically EPA is allowing customization of any or all of the following parameters when the accompanying conditions for approval are met:

a. The lower control temperature on the SBC may be modified without prior EPA approval provided that the high control temperature is set 90 °C (± 10 °C) above the lower control temperature and an approved BAT equation is used to calculate bench aging time.

b. The R-factor used in EPA's BAT equation may be determined experimentally using EPA's standard procedures (specified in the appendix to the regulations) without prior EPA approval. Other experimental techniques to calculate the R-factor require advance EPA approval. To obtain approval, the manufacturer must demonstrate that the calculated bench aging time results in the same (or larger) amount of emission deterioration as the associated road cycle.

c. The A-factor used in EPA's BAT equation may be modified, using good engineering judgement without prior EPA approval, to ensure that the modified durability process will achieve the durability objective (discussed previously).

d. Bench-aging may be conducted using fuel with additional poisons (such as phosphorus, sulfur and lead) without prior EPA approval. Using fuel with additional poisons is worst case for emissions deterioration. Normally a manufacturer using fuel with additional poisons will either calculate a new R-factor or A-factor to assure that the durability objective is properly achieved.

e. An approved alternative road cycle or customized SRC may be used to develop catalyst temperature histograms for use in the BAT equation without additional EPA approval beyond the original approval necessary to use the road cycle for mileage accumulation.

f. A different bench cycle may be used during bench aging with prior EPA approval. To obtain approval the manufacturer must demonstrate that bench aging with the new bench cycle provides the same (or larger) amount of emission deterioration as the associated road cycle.

g. A different method to calculate bench aging time may be used with prior EPA approval. To obtain approval the manufacturer must demonstrate that bench aging for the time calculated by the alternative method results in the same (or larger) amount of emission deterioration as the associated road cycle.

3. Reproducibility by Outside Parties

EPA is finalizing the provision that an alternative road cycle must be designed to achieve the durability objective. As part of this evaluation, EPA is requiring that all alternative road cycles are equated to the SRC by means of an equivalency factor that determines the amount of SRC-driving that results in the same emission deterioration as the alternative cycle. EPA is requiring that every alternative bench aging procedure be based upon measured vehicle performance on an approved road cycle. Lastly, EPA is requiring that any alternative bench cycle be designed to result in the same levels of emission deterioration as the road cycle upon which it was based.

An important element of the regulation is that, regardless of whether a manufacturer uses the EPA standard procedures or customized procedures, any interested party will be able to use the equivalency factor to reproduce the amount of emission deterioration produced by any manufacturer's customized/alternative durability process used during vehicle certification. Any alternative road or bench procedure is equated to a given number of miles on the SRC.

To reproduce the deterioration generated by a customized/alternative road cycle, standard bench procedure, or alternative bench procedure, an outside party may run a vehicle using the SRC for the number of miles indicated by the equivalency factor.

Similarly, an outside party will be able to perform bench aging using the SBC. The aging time may be calculated using the BAT equation and measured catalyst temperature on the SRC (with full-useful-life-mileage adjusted by the equivalency factor).

D. Using IUVP Data To Improve Durability Predictions

Manufacturers are required to review their durability program and prepare an analysis for EPA evaluation when: (1) The IUVP emission levels exceed the applicable certification emission standard 50% or more of the test vehicles and (2) the average emission level is at least 1.3 times the applicable emission standard. These criteria would be evaluated independently for all applicable FTP emission constituents. Each constituent should be considered separately in this analysis.

The Agency may, from time to time, require manufacturers to analyze available IUVP data, or other information, when it indicates that the durability objective is not being achieved for some portion of the fleet of vehicles covered by a durability procedure. This provision would apply whether or not the screening criteria are exceeded.

As in the CAP 2000 program, EPA may withdraw approval of a durability program or require its modification if it determines that the program does not meet the objectives for a durability program. The Agency will give the manufacturer a preliminary notice at least 60 days prior to rendering a final decision to withdraw approval for or require modifications to a durability procedure. During this period the manufacturer may submit technical discussion, statistical analyses, additional data, or other information that is relevant to the decision. This may include an analysis to determine whether factors other than the durability program, such as part defects, are the source of the problem. The Administrator will consider all information submitted by the deadline before reaching a final decision. A final decision to withdraw approval or require modification to a durability procedure would apply to future applications for certification and to the portion of the manufacturer's product line (or the entire product line) that the Administrator determines to be affected.

If the manufacturer was using the standard road cycle or standard bench cycle, EPA will require the manufacturer to adjust the durability process so it would achieve the durability objective. The Agency will allow two options in this situation: (1) Increasing future DFs by the average percent-difference between certification levels and IUVP data, or (2) increasing the whole vehicle miles driven or catalyst aging time by the average percent-difference between certification levels and IUVP data. Additionally the manufacturer may obtain approval for a new alternative durability process that has been demonstrated to meet the durability objective. If the data set used in the analysis contains less than 20 pieces of data, the Administrator may reduce the degree of adjustment required to account for uncertainty in the data.

E. Evaporative and Refueling Durability

EPA is finalizing provisions that require manufacturers determine the evaporative/refueling deterioration using either whole vehicle durability or bench aging methods or a combination of the two methods.

Whole Vehicle Evaporative/Refueling Durability. Manufacturers may conduct evaporative and/or refueling durability program by running the DDV on the SRC or an approved alternative road cycle and conducting the applicable test at each testing point. Manufacturers may combine exhaust and evaporative/refueling whole vehicle durability demonstrations.

Bench-Aging Evaporative/Refueling Durability. Manufacturers may use bench procedures designed, using good engineering judgement, to evaluate the following potential causes of evaporative emission deterioration and achieve the durability objective:

(1) Cycling of canister loading due to diurnal and refueling events,

(2) Use of various commercially available fuels, including the Tier 2 requirement to include alcohol fuel;

(3) Vibration of components;

(4) Deterioration of hoses, etc. due to environmental conditions; and

(5) Deterioration of fuel cap due to wear.

Manufacturers will determine evaporative and refueling DFs using good engineering judgement without the need for prior EPA approval.

F. Compliance Date and Carryover of Existing Durability Data

Manufacturers must meet the requirements of today's action beginning with the 2008 model year.

EPA is not making any changes to the carryover provisions in the current regulations (ref. 40 CFR 86.1839–01). These provisions allow manufacturers to use durability data that was previously generated and used to support certification provided that the data ''represent a worst case or equivalent rate of deterioration''. Beginning in the 2008 model year, if a manufacturer can meet these requirements, it may use existing durability data (i.e., DFs or aged hardware) to support certification.

The manufacturer may not, however, continue to use CAP 2000 durability processes to generate new data starting with the 2008 model year. When the proposed rule becomes effective in the 2008 model year, manufacturers must use durability procedures that have been approved under the new rules to generate new durability demonstrations.

G. Miscellaneous Regulatory Amendments and Corrections

1. With the addition of the new durability regulations (sections 86.1823–08, 86.1824–08, and 86.1825–08), the regulatory references in a number of other sections of subpart S of part 86 have been updated accordingly.

2. Section 1864 of subpart S is being moved to section 1801. This section describes the applicability of subpart S to heavy-duty vehicles, and is more appropriately located in the Applicability section of the regulations.

3. An outdated address in section 1817–05 has been corrected.

4. A typographical error in section 1830–01(c) has been corrected.

5. Two corrections are being made to section 86.1806–05, on-board diagnostics. First, in a previous regulatory action, this section was amended to add provisions for diesel vehicles and HDVs and MDPVs. In doing this, an inadvertent error was made in paragraph (a)(3). The provision allowing compliance with 86.004–17, in lieu of 1806–05, should be limited to apply only to MDPVs and HDVs. The language has been revised accordingly. Second, in the original CAP 2000 regulation, there is an incorrect reference to section 86.094–17(e) and (f). The correct reference is 1806–05(e) and (f).

IV. What Are the Economic and Environmental Impacts?

A. Economic Impacts

1. Comparison to CAP 2000 Economic Impacts

In considering the economic and environmental impacts of today's proposal, we used the CAP 2000 regulations as a comparison benchmark. In those regulations, EPA estimated that there would be an average annual net savings to the automotive industry of about $55 million. The analysis performed to reach that conclusion was part of the record for the CAP 2000 regulation, and was not contested.

In today's final rulemaking, one of our goals was to retain those savings. In the CAP 2000 cost analysis, about half of the total estimated annual savings was attributed to the durability component of the regulations. The elements of CAP 2000 durability which provided the most significant savings are:

a. *Reduced number of durability data vehicles (DDVs).* The creation of the ''durability group'' under CAP 2000 allowed manufacturers to significantly reduce the number of required durability demonstrations. The savings that are claimed in the CAP 2000 rule resulting from the ''durability group'' provision come from requiring physically fewer DDVs, fewer durability tests, and less reporting (e.g. instead of having to report 912 durability tests, there would only be 620 tests). The ''durability group'' concept was not part of the *Ethyl* v. *EPA* litigation, nor was it mentioned in the Court's opinion on this case. Thus EPA is not modifying the ''durability group'' regulations in today's final rule.

In fact, it is possible that today's final rule could actually slightly reduce some costs to the industry, in that manufacturers using one of the EPA-prescribed durability processes (either whole-vehicle or bench) would no longer have to provide a description of their durability process (which was required under CAP 2000, and would continue to be required for manufacturers using customized procedures under today's final rule).

b. *Reduced burden-hours per DDV.* In addition to fewer DDVs, in the CAP 2000 rulemaking, EPA also slightly reduced the estimated number of burden-hours required per DDV. As above, this element was not affected by the Court mandate, and is not impacted by today's final rule.

2. Economic Impact of Today's Rule

Today's final rule prescribes two methods for determining the emission deterioration of vehicles over their useful life periods—the whole-vehicle procedure or the bench-aging procedure. Details of how to perform these procedures are prescribed in the proposed regulations. Because these procedures are similar in nature to those approved by EPA under the CAP 2000 regulations, the added burden for manufacturers utilizing them will be minimal.[25] The costs involved with either of these processes (equipment costs, vehicle costs, testing costs, labor costs, etc.) are fairly fixed. Manufacturers using one of the prescribed methods will not be required to make major changes to or add any new equipment, test any additional vehicles with any additional frequency, or to increase the amount of labor. We expect that manufacturers who, under the old CAP 2000 regulations, used a bench-aging (or whole-vehicle) process will continue to use a bench-aging (or whole-vehicle) process—the only difference is that now that process is codified.

The final regulations also include the option for manufacturers to use customized or alternative procedures, with EPA approval. The approval requires the manufacturer to submit an analysis of about 20 in-use emission tests. Most manufacturers will be able to utilize in-use data and analyses that they have previously collected from other sources (such as the CAP 2000 in-use verification data). Some manufacturers may need to augment this data by running a few additional tests, but this would be a small, one-time cost. EPA estimates that this small added cost is more than offset by the fact that once approved, manufacturers will be able to use their durability programs without the need to make any changes to those programs.

As discussed above, EPA is issuing a separate Supplemental Notice of Proposed Rulemaking which addresses component durability. Any costs associated with that proposal will be addressed in that notice.

B. Environmental Impacts

In the CAP 2000 rule, no quantifiable environmental benefits were projected. Intangible benefits were possible due to the In-Use Verification Program (IUVP) element of the CAP 2000 rule—manufacturers would be able to use the in-use data from this program to identify and fix in-use compliance problems and to make improvements upon their certification durability processes. This intangible benefit is not changed in today's final rule—the in-use verification program is not affected by the Court mandate, and no changes to this program are being proposed. EPA is modifying an existing CAP 2000 provision whereby manufacturers utilize the IUVP data to assess the ability of the durability program to

[25] Added burden will be in the form of the one-time reprogramming of automated driving or bench-aging devices with the new driving/aging cycle, and other minor equipment adjustments.

predict in-use compliance. The modification includes more explicit instructions as to what the manufacturer is required to assess and when corrective action is required (see section III C.). This proposed provision will have the effect of improving the predictive qualities of the durability process, but again, with intangible environmental benefits.

VI. What Are the Statutory and Executive Order Reviews for This Proposed Rule?

A. Executive Order 12866: Regulatory Planning and Review

Under Executive Order 12866 (58 FR 51735 October 4, 1993), EPA must determine whether the regulatory action is ''significant'' and therefore subject to Office of Management and Budget (OMB) review and the requirements of this Executive Order. The Order defines a ''significant regulatory action'' as one that is likely to result in a rule that may:

(1) Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, Local, or Tribal governments or communities;

(2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

(3) Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs, or the rights and obligations of recipients thereof; or

(4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

Pursuant to the terms of Executive Order 12866, OMB has notified EPA that it considers this a ''significant regulatory action'' within the meaning of the Executive Order. OMB has waived review of this action.

B. Paperwork Reduction Act

This action does not impose any new information collection burden under the provisions of the Paperwork Reduction Act, 44 U.S.C. 3501 et seq. However, the Office of Management and Budget (OMB) has previously approved the information collection requirements contained in the existing regulations (64 FR 23906) under the provisions of the Paperwork Reduction Act, 44 U.S.C. 3501 *et seq.* and has assigned OMB control number 2060–0104, EPA ICR number 0783.44. A copy of the OMB approved Information Collection Requests (ICR) may be obtained from Susan Auby, Collection Strategies Division; U.S. Environmental Protection Agency (2822T); 1200 Pennsylvania Ave., NW., Washington, DC 20460 or by calling (202) 566–1672.

Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose the information.

An Agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. The OMB control numbers for EPA's regulations are listed in 40 CFR part 9 and 48 CFR Chapter 15.

C. Regulatory Flexibility Analysis

EPA has determined that it is not necessary to prepare a regulatory flexibility analysis in connection with this final rule.

For purposes of assessing the impacts of today's rule on small entities, small entity is defined as: (1) A small business as defined by the Small Business Administrations' regulations at 13 CFR 121.201; (2) a small governmental jurisdiction that is a government of a city, county, town, school district or special district with a population of less than 50,000; and (3) a small organization that is any not-for-profit enterprise which is independently owned and operated and is not dominant in its field.

After considering the economic impacts of today's final rule on small entities, EPA has concluded that this action will not have a significant economic impact on a substantial number of small entities. A small business that manufacturers automobiles has a NAIC code of 336111. Based on Small Business Administration size standards, a small business for this NAIC code is defined as a manufacturer having less than 1000 employees. The requirements are only applicable to manufacturers of motor vehicles, a group which does not contain a substantial number of small entities. Out of a total of approximately 80 automotive manufacturers subject to today's proposal, EPA estimates that approximately 15–20 of these could be classified as small entities based on SBA size standards. EPA's CAP 2000 compliance regulations include numerous regulatory relief provisions for such small entities. Those provisions remain in effect and are not impacted by today's final rule.

D. Unfunded Mandates Reform Act

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA), Public Law 104–4, establishes requirements for Federal agencies to assess the effects of their regulatory action on state, local, and tribal governments and the private sector. Under section 202 of the UMRA, EPA generally must prepare a written statement, including a cost-benefit analysis, for proposed and proposed rules with ''Federal mandates'' that may result in expenditures by state, local, and tribal governments, in the aggregate, or by the private sector, of $100 million or more in any one year. Before promulgation an EPA rule for which a written statement is needed, section 205 of the UMRA generally requires EPA to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-effective or least burdensome alternative that achieves the objectives of the rule. The provisions of section 205 do not apply when they are inconsistent with applicable law. Moreover, section 205 allows EPA to adopt an alternative other than the least costly, most cost-effective or least burdensome alternative if the Administrator publishes with the proposed rule an explanation why that alternative was not adopted.

Before we establish any regulatory requirement that may significantly or uniquely affect small governments, including tribal governments, we must develop, under section 203 of the UMRA, a small government agency plan. The plan must provide for notifying potentially affected small governments, enabling officials of affected small governments to have meaningful and timely input in the development of our regulatory proposals with significant federal intergovernmental mandates. The plan must also provide for informing, educating, and advising small governments on compliance with the regulatory requirements.

EPA believes this final rule contains no Federal mandates for state, local, or tribal governments. Nor does this rule have federal mandates that may result in the expenditures of $100 million or more in any year by the private sector as defined by the provisions of Title II

of the UMRA. Nothing in the final rule would significantly or uniquely affect small governments.

E. Executive Order 13132 (Federalism)

Executive Order 13132, entitled ''Federalism'' (64 FR 43255, August 10, 1999), requires EPA to develop an accountable process to ensure ''meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications.'' ''Policies that have federalism implications'' is defined in the Executive Order to include regulations that have ''substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.''

This final rule will impose no direct compliance costs on states. Thus, Executive Order 13132 does not apply to this rule.

F. Executive Order 13175: Consultation and Coordination With Indian Tribal Governments

Executive Order 13175, entitled ''Consultation and Coordination with Indian Tribal Governments'' (65 FR 67249, November 6, 2000), requires EPA to develop an accountable process to ensure ''meaningful and timely input by tribal officials in the development of regulatory policies that have tribal implications.'' ''Policies that have tribal implications'' is defined in the Executive Order to include regulations that have ''substantial direct effects on one or more Indian tribes, on the relationship between the Federal government and the Indian tribes, or on the distribution of power and responsibilities between the Federal government and Indian tribes.''

This final rule does not have tribal implications. It will not have substantial direct effects on tribal governments, on the relationship between the Federal government and Indian tribes, or on the distribution of power and responsibilities between the Federal government and Indian tribes, as specified in Executive Order 13175. The requirements of this action impact private sector businesses, particularly the automotive and engine manufacturing industries. Thus, Executive Order 13175 does not apply to this rule.

G. Executive Order 13045: Children's Health Protection

Executive Order 13045: ''Protection of Children from Environmental Health Risks and Safety Risks'' (62 FR 19885, April 23, 1997) applies to any rule that: (1) Is determined to be economically significant as defined under E.O. 13045 and (2) concerns an environmental health or safety risk that EPA has reason to believe may have a disproportionate effect on children. If the regulatory action meets both criteria, the Agency must evaluate the environmental health or safety effects of the planned rule on children, and explain why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by the Agency.

EPA interprets E.O. 13045 as applying only to those regulatory actions that are based on health or safety risks, such that the analysis required under section 5–501 of the Order has the potential to influence the regulation. This final rule is not subject to E.O. 13045 because it is based on technology performance and not on health or safety risks.

H. Executive Order 13211: Actions That Significantly Affect Energy Supply, Distribution, or Use

This rule is not subject to Executive Order 13211, ''Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use'' (66 FR 28355, May 22, 2001) because it is not a significant regulatory action under Executive Order 12866.

I. National Technology Transfer Advancement Act

Section 12(d) of the National Technology Transfer and Advancement Act of 1995 (NTTAA), Public Law 104–113, 12(d) (15 U.S.C. 272), directs the EPA to use voluntary consensus standards (VCS) in its regulatory activities unless to do so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (e.g., materials specifications, test methods, sampling procedures, business practices, etc.) that are developed or adopted by voluntary consensus standard bodies. The NTTAA requires EPA to provide Congress, through OMB, explanations when the Agency decides not to use available and applicable voluntary consensus standards.

This final rule does not involve consideration of any new technical standards. The durability test procedures that EPA is adopting are unique and have not been previously published in the public domain.

J. Congressional Review Act

The Congressional Review Act, 5 U.S.C. 801 et seq., as amended by the Small Business Regulatory Enforcement Fairness Act of 1996, generally provides that before a rule may take effect, the agency promulgating the rule must submit a rule report, which includes a copy of the rule, to Congress and the comptroller General of the United States. We will submit a report containing this rule and other required information to the U.S. Senate, the U.S. House of Representatives, and the Comptroller General of the United States prior to publication of the rule in the **Federal Register.** A major rule cannot take effect until 60 days after it is published in the **Federal Register.** This action is not a ''major rule'' as defined by 5 U.S.C. 804(2).

List of Subjects in 40 CFR Part 86

Environmental protection, Air pollution control, Motor vehicle pollution, Confidential business information, Reporting and recordkeeping requirements.

Dated: December 29, 2005.

Stephen Johnson,

Administrator.

■ For the reasons set forth in the preamble, The Environmental Protection Agency title 40, chapter I of the Code of Federal Regulations is amended as follows:

PART 86—CONTROL OF EMISSIONS FROM NEW AND IN-USE HIGHWAY VEHICLES AND ENGINES

■ 1. The authority citation for part 86 continues to read as follows:

Authority: 42 U.S.C. 7401–7671q.

Subpart S—General Compliance Provisions for Control of Air Pollution From New and In-Use Light-Duty Vehicles, Light-Duty Trucks, and Complete Otto-Cycle Heavy-Duty Vehicles

■ 2. Amend § 86.1803–01 by adding a new definition in alphabetical order, to read as follows:

§ 86.1803–01 Definitions.

* * * * *

Secondary air injection means a system whereby air (not ingested by the engine) is introduced into the exhaust system in front of a catalyst.

* * * * *

■ 3. Amend § 86.1804–01 by adding new acronyms in alphabetical order, to read as follows:

§ 86.1804–01 Acronyms and abbreviations.

* * * * *

A/F—Air/Fuel

* * * * *

BAT—Bench-Aging Time

* * * * *

SBC—Standard Bench Cycle
* * * * *
SRC—Standard Road Cycle
* * * * *

■ 4. Amend § 86.1817–05 by revising paragraph (i)(3)(i) to read as follows:

§ 86.1817–05 Complete heavy-duty vehicle averaging, trading, and banking program.

* * * * *
(i) * * *
(3) * * *
(i) These reports shall be submitted within 90 days of the end of the model year to: Director, Certification and Compliance Division, U.S. Environmental Protection Agency, Mail Code 6405J, 1200 Pennsylvania Ave., NW., 20460.
* * * * *

■ 5. Add a new § 86.1823–08 subpart S to read as follows:

§ 86.1823–08 Durability demonstration procedures for exhaust emissions.

This section applies to all 2008 and later model year vehicles which meet the applicability provisions of § 86.1801. Optionally, a manufacturer may elect to use this section for earlier model year vehicles which meet the applicability provisions of § 86.1801. Eligible small volume manufacturers or small volume test groups may optionally meet the requirements of §§ 86.1838–01 and 86.1826–01 in lieu of the requirements of this section. A separate durability demonstration is required for each durability group.

(a) *Durability program objective.* The durability program must predict an expected in-use emission deterioration rate and emission level that effectively represents a significant majority of the distribution of emission levels and deterioration in actual use over the full and intermediate useful life of candidate in-use vehicles of each vehicle design which uses the durability program.

(b) *Required durability demonstration.* Manufacturers must conduct a durability demonstration for each durability group using a procedure specified in either paragraph (c), (d), or (e) of this section.

(c) *Standard whole-vehicle durability procedure.* This procedure consists of conducting mileage accumulation and periodic testing on the durability data vehicle, selected under the provisions of § 86.1822 described as follows:

(1) Mileage accumulation must be conducted using the standard road cycle (SRC). The SRC is described in Appendix V of this part.

(i) Mileage accumulation on the SRC may be conducted on a track or on a chassis mileage accumulation dynamometer. Alternatively, the entire engine and emission control system may be aged on an engine dynamometer using methods that will replicate the aging that occurs on the road for that vehicle following the SRC.

(ii) The fuel used for mileage accumulation must comply with the mileage accumulation fuel provisions of § 86.113 for the applicable fuel type (e.g., gasoline or diesel fuel).

(iii) The DDV must be ballasted to a minimum of the loaded vehicle weight for light-duty vehicles and light light-duty trucks and a minimum of the ALVW for all other vehicles.

(iv) The mileage accumulation dynamometer must be setup as follows:

(A) The simulated test weight will be the equivalent test weight specified in § 86.129 using a weight basis of the loaded vehicle weight for light-duty vehicles and ALVW for all other vehicles.

(B) The road force simulation will be determined according to the provisions of § 86.129.

(C) The manufacturer will control the vehicle, engine, and/or dynamometer as appropriate to follow the SRC using good engineering judgement.

(2) Mileage accumulation must be conducted for at least 75% of the applicable full useful life mileage period specified in § 86.1805. If the mileage accumulation is less than 100% of the full useful life mileage, then the DF calculated according to the procedures of paragraph (f)(1)(ii) of this section must be based upon a line projected to the full-useful life mileage using the upper 80 percent statistical confidence limit calculated from the emission data.

(3) If a manufacturer elects to calculate a DF pursuant to paragraph (f)(1) of this section, then it must conduct at least one FTP emission test at each of five different mileage points selected using good engineering judgement. Additional testing may be conducted by the manufacturer using good engineering judgement. The required testing must include testing at 5,000 miles and at the highest mileage point run during mileage accumulation (e.g. the full useful life mileage). Different testing plans may be used providing that the manufacturer determines, using good engineering judgement, that the alternative plan would result in an equivalent or superior level of confidence in the accuracy of the DF calculation compared to the testing plan specified in this paragraph.

(d) *Standard bench-aging durability procedure.* This procedure is not applicable to diesel fueled vehicles or vehicles which do not use a catalyst as the principle after-treatment emission control device. This procedure requires installation of the catalyst-plus-oxygen-sensor system on a catalyst aging bench. Aging on the bench is conducted by following the standard bench cycle (SBC) for the period of time calculated from the bench aging time (BAT) equation. The BAT equation requires, as input, catalyst time-at-temperature data measured on the SRC.

(1) *Standard bench cycle (SBC).* Standard catalyst bench aging is conducted following the SBC

(i) The SBC must be run for the period of time calculated from the BAT equation.

(ii) The SBC is described in Appendix VII to Part 86.

(2) *Catalyst time-at-temperature data*

(i) Catalyst temperature must be measured during at least two full cycles of the SRC.

(ii) Catalyst temperature must be measured at the highest temperature location in the hottest catalyst on the DDV. Alternatively, the temperature may be measured at another location providing that it is adjusted to represent the temperature measured at the hottest location using good engineering judgement.

(iii) Catalyst temperature must be measured at a minimum rate of one hertz (one measurement per second).

(iv) The measured catalyst temperature results must be tabulated into a histogram with temperature bins of no larger than 25° C.

(3) *Bench-aging time.* Bench aging time is calculated using the bench aging time (BAT) equation as follows:

t_e for a temperature bin = $t_h\ e^{((R/Tr)-(R/Tv))}$
Total t_e = Sum of t_e over all the temperature bins
Bench-Aging Time = A (Total t_e)

Where:

A = 1.1 This value adjusts the catalyst aging time to account for deterioration from sources other than thermal aging of the catalyst.
R = Catalyst thermal reactivity coefficient. For the SBC, R=17500 for Tier 2 vehicles and R=18500 for all other vehicles.
t_h = The time (in hours) measured within the prescribed temperature bin of the vehicle's catalyst temperature histogram adjusted to a full useful life basis e.g., if the histogram represented 400 miles, and full useful life was 100,000 miles; all histogram time entries would be multiplied by 250 (100000/400).
Total t_e = The equivalent time (in hours) to age the catalyst at the temperature of T_r on the catalyst aging bench using the catalyst aging cycle to produce the

same amount of deterioration experienced by the catalyst due to thermal deactivation over the vehicle's full useful life.

t_e for a bin = The equivalent time (in hours) to age the catalyst at the temperature of T_r on the catalyst aging bench using the catalyst aging cycle to produce the same amount of deterioration experienced by the catalyst due to thermal deactivation at the temperature bin of T_v over the vehicle's full useful life.

T_r = The effective reference temperature (in °K) of the catalyst on the catalyst bench run on the bench aging cycle. The effective temperature is the constant temperature that would result in the same amount of aging as the various temperatures experienced during the bench aging cycle.

T_v = The mid-point temperature (in °K) of the temperature bin of the vehicle on-road catalyst temperature histogram.

(4) *Effective reference temperature on the SBC.* The effective reference temperature of the standard bench cycle (SBC) is determined for the actual catalyst system design and actual aging bench which will be used using the following procedures:

(i) Measure time-at-temperature data in the catalyst system on the catalyst aging bench following the SBC.

(A) Catalyst temperature must be measured at the highest temperature location of the hottest catalyst in the system. Alternatively, the temperature may be measured at another location providing that it is adjusted to represent the temperature measured at the hottest location using good engineering judgement.

(B) Catalyst temperature must be measured at a minimum rate of one hertz (one measurement per second) during at least 20 minutes of bench aging.

(C) The measured catalyst temperature results must be tabulated into a histogram with temperature bins of no larger than 10° C.

(ii) The BAT equation must be used to calculate the effective reference temperature by iterative changes to the reference temperature (T_r) until the calculated aging time equals the actual time represented in the catalyst temperature histogram. The resulting temperature is the effective reference temperature on the SBC for that catalyst system and aging bench.

(5) *Catalyst Aging Bench.* The manufacturer must design, using good engineering judgement, a catalyst aging bench that follows the SBC and delivers the appropriate exhaust flow, exhaust constituents, and exhaust temperature to the face of the catalyst.

(i) A manufacturer may use the criteria and equipment discussed in Appendix VIII to part 86 to develop its catalyst aging bench without prior Agency approval. The manufacturer may use another design that results in equivalent or superior results with advance Agency approval.

(ii) All bench aging equipment and procedures must record appropriate information (such as measured A/F ratios and time-at-temperature in the catalyst) to assure that sufficient aging has actually occurred.

(6) *Required Testing.* If a manufacturer is electing to calculate a DF (as discussed in paragraph (f)(1) of this section), then it must conduct at least two FTP emissions tests on the DDV before bench aging of emission control hardware and at least two FTP emission tests on the DDV after the bench-aged emission hardware is re-installed. Additional testing may be conducted by the manufacturer using good engineering judgement.

(e) *Additional durability procedures*—(1) Whole vehicle durability procedures. A manufacturer may use either a customized SRC or an alternative road cycle for the required durability demonstration, with prior EPA approval.

(i) *Customized SRC.* A customized SRC is the SRC run for a different number of miles and/or using a different mileage accumulation fuel with higher levels of certain compounds that may lead to catalyst poisoning, such as phosphorus, sulfur and lead, than specified in paragraph (c)(1)(ii) of this section.

(ii) *Alternative Road Cycle.* An alternative cycle is a whole vehicle mileage accumulation cycle that uses a different speed-versus-time trace than the SRC, conducted for either the full useful life mileage or for less than full useful life mileage. An alternative road cycle may also include the use of fuel with higher levels of certain compounds that may lead to catalyst poisoning, such as phosphorus, sulfur and lead, than specified in paragraph (c)(1)(ii) of this section.

(iii) *Approval Criteria.* The manufacturer must obtain approval from EPA prior to using a customized/alternative road cycle. EPA may approve a customized/alternative cycle when the manufacturer demonstrates that the cycle is expected to achieve the durability program objective of paragraph (a) of this section for the breadth of vehicles using the customized/alternative cycle. To obtain approval the manufacturer must submit all the following information and perform all the following analyses:

(A) The manufacturer must supply in-use FTP emission data on past model year vehicles which are applicable to the vehicle designs it intends to cover with the customized/alternative cycle.

(*1*) The amount of in-use emission data required to demonstrate the effectiveness of a customized/alternative cycle in meeting the durability objective is based on whether the customized/alternative cycle is more or less severe than the SRC. In most cases, EPA will accept a minimum of 20 candidate in-use vehicles tested as-received on the FTP cycle. If the customized/alternative cycle is significantly more severe than the SRC, EPA may accept less data. Conversely, if the customized/alternative cycle is significantly less severe than the SRC, EPA may require more data, up to a maximum of 30 vehicles.

(*2*) This data set must consist of randomly procured vehicles from actual customer use. The vehicles selected for procurement must cover the breadth of the vehicles that the manufacturer intends to certify using the customized/alternative cycle. Vehicles should be procured and FTP tested in as-received condition under the guidelines of the high mileage IUVP program (ref: 40 CFR 86.1845–04).

(*3*) Manufacturers may use previously generated in-use data from the CAP 2000 IUVP or the RDP ''reality check'' in-use program as well as other sources of in-use emissions data for approval under this section.

(*4*) Manufacturers must remove unrepresentative data from the data set using good engineering judgement. The manufacturer must provide EPA with the data removed from the analysis and a justification for the removal of that data.

(*5*) Manufacturers may supply additional in-use data.

(B) The manufacturer must submit an analysis which includes a comparison of the relative stringency of the customized/alternative cycle to the SRC and a calculated equivalency factor for the cycle.

(*1*) The equivalency factor may be determined by an evaluation of the SRC and the customized/alternative cycle using catalyst time-at-temperature data from both cycles and the BAT equation to calculate the required bench aging time of each cycle. The equivalency factor is the ratio of the aging time on the SRC divided by the aging time on the alternative cycle.

(*2*) If emissions data is available from the SRC, as well as time-at-temperature data, then that emissions information

may be included in the evaluation of the relative stringency of the two cycles and the development of the equivalency factor.

(*3*) A separate equivalency factor may be determined for each test group, or test groups may be combined together (using good engineering judgement) to calculate a single equivalency factor.

(C) The manufacturer must submit an analysis which evaluates whether the durability objective will be achieved for the vehicle designs which will be certified using the customized/alternative cycle. The analysis must address of the following elements:

(*1*) How the durability objective has been achieved using the data submitted in paragraph (e)(1)(iii)(A) of this section.

(*2*) How the durability objective will be achieved for the vehicle designs which will be covered by the customized/alternative cycle. This analysis should consider the emissions deterioration impact of the design differences between the vehicles included in the data set required in (e)(1)(iii)(A) of this section and the vehicle designs that the manufacturer intends to certify using the customized/alternative cycle.

(2) *Bench-aging durability procedures.* A manufacturer may use a customized or alternative bench aging durability procedure for a required durability demonstration, if approved as described in paragraphs (e)(2)(i) through (vii) of this section. A customized/alternative bench aging procedure must use vehicle performance data (such as catalyst temperature) measured on an approved road cycle as part of the algorithm to calculate bench aging time. The manufacturer must obtain approval from the Agency prior to using a customized bench durability procedure.

(i) The lower control temperature on the SBC may be modified without prior EPA approval provided that the high control temperature is set 90 °C above the lower control temperature and an approved BAT equation is used to calculate bench aging time.

(ii) The R-factor used in EPA's BAT equation may be determined experimentally using EPA's standard procedures (specified in Appendix IX of this part) without prior EPA approval. Other experimental techniques to calculate the R-factor require advance EPA approval. To obtain approval, the manufacturer must demonstrate that the calculated bench aging time results in the same (or larger) amount of emission deterioration as the associated road cycle.

(iii) The A-factor used in EPA's BAT equation may be modified, using good engineering judgement without prior EPA approval, to ensure that the modified durability process will achieve the durability objective of paragraph (a) of this section.

(iv) Bench aging may be conducted using fuel with additional compounds that may lead to catalyst poisoning, such as phosphorus, sulfur or lead, without prior EPA approval. A manufacturer using fuel with these additional compounds may either calculate a new R-factor or A-factor to assure that the durability objective of paragraph (a) of this section is properly achieved regardless of the use of worst-case fuel, in which case the approval criteria for those changes would apply.

(v) An approved customized/alternative road cycle may be used to develop catalyst temperature histograms for use in the BAT equation without additional EPA approval beyond the original approval necessary to use that cycle for mileage accumulation.

(vi) A different bench cycle than the SBC may be used during bench aging with prior EPA approval. To obtain approval the manufacturer must demonstrate that bench aging for the appropriate time on the new bench cycle provides the same or larger amount of emission deterioration as the associated road cycle.

(vii) A different method to calculate bench aging time may be used with prior EPA approval. To obtain approval the manufacturer must demonstrate that bench aging for the time calculated by the alternative method results in the same or larger amount of emission deterioration as the associated road cycle.

(f) *Use of deterioration program to determine compliance with the standard.* A manufacturer may select from two methods for using the results of the deterioration program to determine compliance with the applicable emission standards. Either a deterioration factor (DF) is calculated and applied to the emission data vehicle (EDV) emission results or aged components are installed on the EDV prior to emission testing.

(1) *Deterioration factors.*

(i) Deterioration factors are calculated using all FTP emission test data generated during the durability testing program except as noted:

(A) Multiple tests at a given mileage point are averaged together unless the same number of tests are conducted at each mileage point.

(B) Before and after maintenance test results are averaged together.

(C) Zero-mile test results are excluded from the calculation.

(D) Total hydrocarbon (THC) test points beyond the 50,000-mile (useful life) test point are excluded from the intermediate useful life deterioration factor calculation.

(E) A procedure may be employed to identify and remove from the DF calculation those test results determined to be statistical outliers providing that the outlier procedure is consistently applied to all vehicles and data points and is approved in advance by the Administrator.

(ii) The deterioration factor must be based on a linear regression, or another regression technique approved in advance by the Administrator. The deterioration must be a multiplicative or additive factor. Separate factors will be calculated for each regulated emission constituent and for the full and intermediate useful life periods as applicable. Separate DF's are calculated for each durability group except as provided in § 86.1839.

(A) A multiplicative DF will be calculated by taking the ratio of the full or intermediate useful life mileage level, as appropriate (rounded to four decimal places), divided by the stabilized mileage (reference § 86.1831–01(c), e.g., 4000-mile) level (rounded to four decimal places) from the regression analysis. The result must be rounded to three-decimal places of accuracy. The rounding required in this paragraph must be conducted in accordance with § 86.1837. Calculated DF values of less than one must be changed to one for the purposes of this paragraph.

(B) An additive DF will be calculated to be the difference between the full or intermediate useful life mileage level (as appropriate) minus the stabilized mileage (reference § 86.1831–01(c), *e.g.* 4000-mile) level from the regression analysis. The full useful life regressed emission value, the stabilized mileage regressed emission value, and the DF result must be rounded to the same precision and using the same procedures as the raw emission results according to the provisions of § 86.1837–01. Calculated DF values of less than zero must be changed to zero for the purposes of this paragraph.

(iii) The DF calculated by these procedures will be used for determining full and intermediate useful life compliance with FTP exhaust emission standards, SFTP exhaust emission standards, and cold CO emission standards. At the manufacturer's option and using procedures approved by the Administrator, a separate DF may be calculated exclusively using cold CO test data to determine compliance with cold CO emission standards. Also at the manufacturer's option and using procedures approved by the Administrator, a separate DF may be

calculated exclusively using US06 and/or air conditioning (SC03) test data to determine compliance with the SFTP emission standards.

(2) *Installation of aged components on emission data vehicles.* For full and intermediate useful life compliance determination, the manufacturer may elect to install aged components on an EDV prior to emission testing rather than applying a deterioration factor. Different sets of components may be aged for full and intermediate useful life periods. Components must be aged using an approved durability procedure that complies with paragraph (b) of this section. The list of components to be aged and subsequently installed on the EDV must selected using good engineering judgement.

(g) *Emission component durability.* [Reserved] For guidance see 40 CFR 86.1823–01(e).

(h) *Application of the durability procedure to future durability groups.* The manufacturer may apply a durability procedure approved under paragraphs (c), (d) or (e) of this section to a durability group, including durability groups in future model years, if the durability process will achieve the objective of paragraph (a) of this section for that durability group. The manufacturer must use good engineering judgment in determining the applicability of an approved durability procedure to a durability group.

(1) Modifications to a durability procedure.

(i) Standard durability procedures. The manufacturer may modify a standard durability procedure (allowed in paragraphs (c) or (d) of this section) by increasing or decreasing the number of miles run on the SRC to represent full or intermediate useful life emissions deterioration or by changing the A-Factor in the BAT equation for a bench aging, using good engineering judgment, to ensure that the modified procedure will achieve the objective of paragraph (a) of this section for that durability group.

(ii) Customized/Alternative durability procedures. The manufacturer may modify an alternative/customized durability procedure approved under the provisions of paragraph (e) of this section, using good engineering judgment, for the purposes of ensuring that the modified procedure will achieve the objective of paragraph (a) of this section for that durability group.

(2) The manufacturer must notify the Administrator of its determination to use an approved (or modified) durability procedure on particular test groups and durability groups prior to, or concurrently with, its submission of the Application for Certification for the affected test groups (notification at an annual preview meeting scheduled before the manufacturer begins certification activities for the model year is preferred).

(3) Prior to certification, the Administrator may reject the manufacturer's determination in paragraph (h) of this section to apply an approved or modified durability procedure for a durability group or test group if:

(i) It is not made using good engineering judgment,

(ii) It fails to properly consider data collected under the provisions of §§ 86.1845–04, 86.1846–01, and 86.1847–01 or other information, or

(iii) The Administrator determines that the durability procedure has not been shown to achieve the objective of paragraph (a) of this section for particular test groups which the manufacturer plans to cover with the durability procedure.

(i) *Evaluation of the certification durability procedures based on in-use emissions data.*

(1) Manufacturers must use the information gathered from the IUVP, as well as other sources of in-use emissions data, to periodically review whether the durability procedure it employs achieves the objective specified in paragraph (a) of this section.

(2) Required analysis of a manufacturer's approved durability procedures.

(i) In addition to any periodic reviews under paragraph (i)(1) of this section, a manufacturer must conduct a review of whether the durability procedure it employs achieves the durability objective specified in paragraph (a) of this section when the criteria for additional testing specified in § 86.1846 (b) are activated.

(ii) These criteria are evaluated independently for all applicable FTP emission constituents.

(iii) This analysis must be performed for each test group certified by the manufacturer.

(iv) These procedures apply to the EPA standard durability procedures discussed in paragraphs (c) and (d) of this section as well as durability procedures approved under paragraph (e) of this section, including modifications under paragraph (h) of this section.

(v) The analysis must be submitted to EPA no later than 60 days after the submission of the IUVP data report specified in § 86.1847(f).

(3) EPA may require a manufacturer to perform an analysis as described in paragraph (i)(2) of this section if EPA is concerned that the manufacturer's durability procedure may not achieve the durability objective of paragraph (a) of this section.

(j) If, based on the analysis required in paragraph (i) of this section and/or any other information, EPA determines that the durability procedure does not achieve the durability objective of paragraph (a) of this section, EPA may withdraw approval to use the durability procedure or condition approval on modifications to the durability procedure. Such withdrawal or conditional approval will apply to future applications for certification and to the portion of the manufacturer's product line (or the entire product line) that the Administrator determines to be affected. Prior to such a withdrawal the Administrator will give the manufacturer a preliminary notice at least 60 days prior to the final decision. During this period, the manufacturer may submit technical discussion, statistical analyses, additional data, or other information which is relevant to the decision. The Administrator will consider all information submitted by the deadline before reaching a final decision.

(k) If EPA withdraws approval, under the provisions of paragraph (j) of this section, for a durability procedure approved under the provisions of paragraphs (c) and/or (d) of this section, the following procedures apply:

(1) The manufacturer must select one of the following options for future applications for certification for the applicable portion of the manufacturers product-line affect by the Agency's decision:

(i) Increase future DFs calculated using the applicable durability process by the average percent-difference between certification levels and IUVP data; or

(ii) Increase the miles driven on the SRC or the aging time calculated by the BAT equation by the average percent-difference between certification levels and IUVP data, or

(iii) The manufacturer may obtain approval for a new customized durability process, as allowed in paragraph (e) of this section, that has been demonstrated to meet the durability objective.

(2) If EPA's decision to withdraw approval under the provisions of paragraph (j) of this section is based on fewer than 20 tests, the Administrator may require a smaller adjustment than specified in paragraph (k)(1)(i) or (ii) of this section.

(l) Any manufacturer may request a hearing on the Administrator's

withdrawal of approval in paragraphs (j) or (k) of this section. The request must be in writing and must include a statement specifying the manufacturer's objections to the Administrator's determinations, and data in support of such objection. If, after review of the request and supporting data, the Administrator finds that the request raises a substantial factual issue, she/he must provide the manufacturer a hearing in accordance with § 86.1853–01 with respect to such issue.

■ 6. Add § 86.1824–08 to subpart S to read as follows:

§ 86.1824–08 Durability demonstration procedures for evaporative emissions.

This section applies to gasoline-, methanol-, liquefied petroleum gas-, and natural gas-fueled 2008 and later model year vehicles which meet the applicability provisions of § 86.1801. Optionally, a manufacturer may elect to use this section for earlier model year gasoline-, methanol-, liquefied petroleum gas-, and natural gas-fueled vehicles which meet the applicability provisions of § 86.1801. Eligible small volume manufacturers or small volume test groups may optionally meet the requirements of §§ 86.1838–01 and 86.1826–01 in lieu of the requirements of this section. A separate durability demonstration is required for each evaporative/refueling family.

(a) *Durability program objective.* The durability program must predict an expected in-use emission deterioration rate and emission level that effectively represents a significant majority of the distribution of emission levels and deterioration in actual use over the full useful life of candidate in-use vehicles of each vehicle design which uses the durability program.

(b) *Required durability demonstration.* Manufacturers must conduct a durability demonstration which satisfies the provisions of either paragraph (c), (d), or (e) of this section.

(c) *Whole vehicle evaporative durability demonstration.*

(1) Mileage accumulation must be conducted using the SRC or any road cycle approved under the provisions of § 86.1823(e)(1).

(2) Mileage accumulation must be conducted for either:

(i) The applicable full useful life mileage period specified in § 86.1805, or

(ii) At least 75 percent of the full useful life mileage. In which case, the manufacturer must calculate a df calculated according to the procedures of paragraph (f)(1)(ii) of this section, except that the DF must be based upon a line projected to the full-useful life mileage using the upper 80 percent statistical confidence limit calculated from the emission data.

(3) The manufacturer must conduct at least one evaporative emission test at each of the five different mileage points selected using good engineering judgement. The required testing must include testing at 5,000 miles and at the highest mileage point run during mileage accumulation (e.g. the full useful life mileage). Additional testing may be conducted by the manufacturer using good engineering judgement. The manufacturer may select to run either the 2-day and/or 3-day evaporative test at each test point using good engineering judgement.

(d) *Bench aging evaporative durability procedures.* Manufacturers may use bench procedures designed, using good engineering judgement, to evaluate the emission deterioration of evaporative control systems. Manufacturers may base the bench procedure on an evaluation the following potential causes of evaporative emission deterioration:

(1) Cycling of canister loading due to diurnal and refueling events,

(2) Use of various commercially available fuels, including the Tier 2 requirement to include alcohol fuel;

(3) Vibration of components;

(4) Deterioration of hoses, etc. due to environmental conditions; and

(5) Deterioration of fuel cap due to wear.

(e) *Combined whole-vehicle and bench-aging programs.* Manufacturers may combine the results of whole vehicle aging and bench aging procedures using good engineering judgement.

(f) *Fuel requirements.*

(1) For gasoline fueled vehicles certified to meet the evaporative emission standards set forth in § 86.1811–04(e)(1), any mileage accumulation method for evaporative emissions must employ gasoline fuel for the entire mileage accumulation period which contains ethanol in, at least, the highest concentration permissible in gasoline under federal law and that is commercially available in any state in the United States. Unless otherwise approved by the Administrator, the manufacturer must determine the appropriate ethanol concentration by selecting the highest legal concentration commercially available during the calendar year before the one in which the manufacturer begins its mileage accumulation. The manufacturer must also provide information acceptable to the Administrator to indicate that the mileage accumulation method is of sufficient design, duration and severity to stabilize the permeability of all non-metallic fuel and evaporative system components to the mileage accumulation fuel constituents.

(2) For flexible-fueled, dual-fueled, multi-fueled, ethanol-fueled and methanol-fueled vehicles certified to meet the evaporative emission standards set forth in § 86.1811–04(e)(1), any mileage accumulation method must employ fuel for the entire mileage accumulation period which the vehicle is designed to use and which the Administrator determines will have the greatest impact upon the permeability of evaporative and fuel system components. The manufacturer must also provide information acceptable to the Administrator to indicate that the mileage accumulation method is of sufficient design, duration and severity to stabilize the permeability of all non-metallic fuel and evaporative system components to mileage accumulation fuel constituents.

(3) A manufacturer may use other methods, based upon good engineering judgment, to meet the requirements of paragraphs (f)(1) and (2) of this section, as applicable. These methods must be approved in advance by the Administrator and meet the objectives of paragraphs (f)(1) and (2) of this section, as applicable: to provide assurance that the permeability of all non-metallic fuel and evaporative system components will not lead to evaporative emission standard exceedance under sustained exposure to commercially available alcohol-containing fuels for the useful life of the vehicle.

(g) *Calculation of a deterioration factor.* The manufacturer must calculate a deterioration factor which is applied to the evaporative emission results of the emission data vehicles. The deterioration factor must be based on a linear regression, or an other regression technique approved in advance by the Administrator. The DF will be calculated to be the difference between the full life mileage evaporative level minus the stabilized mileage (e.g., 4000 − mile) evaporative level from the regression analysis. The full useful life regressed emission value, the stabilized mileage regressed emission value, and the DF result must be rounded to the same precision and using the same procedures as the raw emission results according to the provisions of § 86.1837–01. Calculated DF values of less than zero must be changed to zero for the purposes of this paragraph.

(h) *Emission component durability.* [Reserved] For guidance see 40 CFR 86.1824–01(d).

(i) If EPA determines based on IUVP data or other information that the

durability procedure does not achieve the durability objective of paragraph (a) of this section, EPA may withdraw approval to use the durability procedure or condition approval on modifications to the durability procedure. Such withdrawal or conditional approval will apply to future applications for certification and to the portion of the manufacturer's product line (or the entire product line) that the Administrator determines to be affected. Prior to such a withdrawal the Administrator will give the manufacturer a preliminary notice at least 60 days prior to the final decision. During this period, the manufacturer may submit technical discussion, statistical analyses, additional data, or other information which is relevant to the decision. The Administrator will consider all information submitted by the deadline before reaching a final decision.

(j) Any manufacturer may request a hearing on the Administrator's withdrawal of approval in paragraph (i) of this section. The request must be in writing and must include a statement specifying the manufacturer's objections to the Administrator's determinations, and data in support of such objection. If, after review of the request and supporting data, the Administrator finds that the request raises a substantial factual issue, she/he must provide the manufacturer a hearing in accordance with § 86.1853–01 with respect to such issue.

■ 7. Add a new § 86.1825–08 to Subpart S to read as follows:

§ 86.1825–08 Durability demonstration procedures for refueling emissions.

This section applies to 2008 and later model year light-duty vehicles, light-duty trucks, and heavy-duty vehicles which are certified under light-duty rules as allowed under the provisions of § 86.1801–01(c)(1) which are subject to refueling loss emission compliance. Optionally, a manufacturer may elect to use this section for earlier model year light-duty vehicles, light-duty trucks, and heavy-duty vehicles which are certified under light-duty rules as allowed under the provisions of § 86.1801–01(c)(1) which are subject to refueling loss emission compliance. Refer to the provisions of §§ 86.1811, 86.1812, 86.1813, 86.1814, and 86.1815 to determine applicability of the refueling standards to different classes of vehicles for various model years. Diesel fuel vehicles may qualify for an exemption to the requirements of this section under the provisions of § 86.1810.

(a) *Durability program objective.* The durability program must predict an expected in-use emission deterioration rate and emission level that effectively represents a significant majority of the distribution of emission levels and deterioration in actual use over the full useful life of candidate in-use vehicles of each vehicle design which uses the durability program.

(b) *Required durability demonstration.* Manufacturers must conduct a durability demonstration which satisfies the provisions of either paragraph (c), (d), or (e) of this section.

(c) *Whole vehicle refueling durability demonstration.* The following procedures must be used when conducting a whole vehicle durability demonstration:

(1) Mileage accumulation must be conducted using the SRC or a road cycle approved under the provisions of § 86.1823(e)(1).

(2) Mileage accumulation must be conducted for either:

(i) The applicable full useful life mileage period specified in § 86.1805, or

(ii) At least 75 percent of the full useful life mileage. In which case, the manufacturer must calculate a df calculated according to the procedures of paragraph (f)(1)(ii) of this section, except that the DF must be based upon a line projected to the full-useful life mileage using the upper 80 percent statistical confidence limit calculated from the emission data.

(3) The manufacturer must conduct at least one refueling emission test at each of the five different mileage points selected using good engineering judgement. The required testing must include testing at 5,000 miles and at the highest mileage point run during mileage accumulation (e.g. the full useful life mileage). Additional testing may be conducted by the manufacturer using good engineering judgement.

(d) *Bench aging refueling durability procedures.* Manufacturers may use bench procedures designed, using good engineering judgement, to evaluate the emission deterioration of evaporative/refueling control systems. Manufacturers may base the bench procedure on an evaluation the following potential causes of evaporative/refueling emission deterioration:

(1) Cycling of canister loading due to diurnal and refueling events;

(2) Use of various commercially available fuels, including the Tier 2 requirement to include alcohol fuel;

(3) Vibration of components;

(4) Deterioration of hoses, etc. due to environmental conditions; and

(5) Deterioration of fuel cap due to wear.

(e) *Combined whole-vehicle and bench-aging programs.* Manufacturers may combine the results of whole vehicle aging and bench aging procedures using good engineering judgement.

(f) [Reserved]

(g) *Calculation of a deterioration factor.* The manufacturer must calculate a deterioration factor which is applied to the evaporative emission results of the emission data vehicles. The deterioration factor must be based on a linear regression, or an other regression technique approved in advance by the Administrator. The DF will be calculated to be the difference between the full life mileage evaporative level minus the stabilized mileage (e.g., 4000-mile) evaporative level from the regression analysis. The full useful life regressed emission value, the stabilized mileage regressed emission value, and the DF result must be rounded to the same precision and using the same procedures as the raw emission results according to the provisions of § 86.1837–01. Calculated DF values of less than zero must be changed to zero for the purposes of this paragraph.

(h) *Emission component durability.* [Reserved] For guidance see 40 CFR 86.1845–01 (e).

(i) If EPA determines based on IUVP data or other information that the durability procedure does not achieve the durability objective of paragraph (a) of this section, EPA may withdraw approval to use the durability procedure or condition approval on modifications to the durability procedure. Such withdrawal or conditional approval will apply to future applications for certification and to the portion of the manufacturer's product line (or the entire product line) that the Administrator determines to be affected. Prior to such a withdrawal the Administrator will give the manufacturer a preliminary notice at least 60 days prior to the final decision. During this period, the manufacturer may submit technical discussion, statistical analyses, additional data, or other information which is relevant to the decision. The Administrator will consider all information submitted by the deadline before reaching a final decision.

(j) Any manufacturer may request a hearing on the Administrator's withdrawal of approval in paragraph (i) of this section. The request must be in writing and must include a statement specifying the manufacturer's objections to the Administrator's determinations, and data in support of such objection.

If, after review of the request and supporting data, the Administrator finds that the request raises a substantial factual issue, she/he must provide the manufacturer a hearing in accordance with § 86.1853–01 with respect to such issue.

■ 8. Amend § 86.1826–01 by revising paragraphs (a) and (b)(3)(iv) to read as follows:

§ 86.1826–01 Assigned deterioration factors for small volume manufacturers and small volume test groups.

(a) *Applicability.* This program is an option available to small volume manufacturers certified under the small volume manufacturer provisions of § 86.1838–01(b)(1) and small volume test groups certified under the small volume test group provisions of § 86.1838–01(b)(2). Manufacturers may elect to use these procedures in lieu of the requirements of §§ 86.1823, 86.1824, and 86.1825 of this subpart.

(b) * * *

(3) * * *

(iv) The manufacturer must develop either deterioration factors or aged components to use on EDV testing by generating durability data in accordance with §§ 86.1823, 86.1824, and/or 86.1825 on a minimum of 25 percent of the manufacturer's projected sales (based on durability groups) that is equipped with unproven emission control systems.

* * * * *

■ 9. Amend § 86.1829–01 by revising paragraphs (a)(3) and (d)(1) to read as follows:

§ 86.1829–01 Durability and emission testing requirements; waivers.

(a) * * *

(3) The DDV shall be tested and accumulate service mileage according to the provisions of §§ 86.1831–01, 86.1823, 86.1824 and 86.1825. Small volume manufacturers and small volume test groups may optionally meet the requirements of § 86.1838–01.

* * * * *

(d)(1) Beginning in the 2004 model year, the exhaust emissions must be measured from all LDV/T exhaust emission data vehicles tested in accordance with the federal Highway Fuel Economy Test (HWFET; 40 CFR part 600, subpart B). The oxides of nitrogen emissions measured during such tests must represent the full useful life emissions in accordance with § 86.1823–08(f) and subsequent model year provisions. Those results are then rounded and compared with the applicable emission standard in § 86.1811–04. All data obtained from the testing required under this paragraph (d) must be reported in accordance with the procedures for reporting other exhaust emission data required under this subpart.

* * * * *

■ 10. Amend § 86.1830–01 by revising paragraphs (b)(1), (b)(2), (c)(1), (c)(2), (c)(3) and (c)(4) to read as follows:

§ 86.1830–01 Acceptance of vehicles for emission testing.

* * * * *

(b) Special provisions for durability data vehicles. (1) For DDV's, the mileage at all test points shall be within 250 miles of the scheduled mileage point as required under § 86.1823–08(c)(3). Manufacturers may exceed the 250 mile upper limit if there are logistical reasons for the deviation and the manufacturer determines that the deviation will not affect the representativeness of the durability demonstration.

(2) For DDV's aged using the standard or a customized/alternative whole-vehicle cycle, all emission-related hardware and software must be installed and operational during all mileage accumulation after the 5000-mile test point.

* * * * *

(c) *Special provisions for emission data vehicles.* (1) All EDV's shall have at least the minimum number of miles accumulated to achieve stabilized emission results according to the provisions of § 86.1831–01(c).

(2) Within a durability group, the manufacturer may alter any emission data vehicle (or other vehicles such as current or previous model year emission data vehicles, running change vehicles, fuel economy data vehicles, and development vehicles) in lieu of building a new test vehicle providing that the modification will not impact the representativeness of the vehicle's test results. Manufacturers shall use good engineering judgment in making such determinations. Development vehicles which were used to develop the calibration selected for emission data testing may not be used as the EDV for that configuration. Vehicles from outside the durability group may be altered with advance approval of the Administrator.

(3) Components used to reconfigure EDV's under the provisions of paragraph (c)(2) of this section must be appropriately aged if necessary to achieve representative emission results. Manufacturers must determine the need for component aging and the type and amount of aging required using good engineering judgment.

(4) Bench-aged hardware may be installed on an EDV for emission testing as a method of determining certification levels (projected emission levels at full or intermediate useful life) using bench aging procedures under the provisions of § 86.1823.

■ 11. Amend § 86.1831–01 by revising paragraphs (a)(1) and (b)(1) to read as follows:

§ 86.1831–01 Mileage accumulation requirements for test vehicles.

(a) *Durability Data Vehicles.* (1) The manufacturer must accumulate mileage on DDV's using the procedures in § 86.1823.

(b) * * *

(1) The standard method of mileage accumulation for emission data vehicles and running change vehicles is mileage accumulation using either the Standard Road Cycle specified in Appendix V to this part or the Durability Driving Schedule specified in Appendix IV to this part.

* * * * *

■ 12. Amend § 86.1838–01 by revising paragraph (c)(1) to read as follows:

§ 86.1838–01 Small volume manufacturers certification procedures.

* * * * *

(c) * * *

(1) Durability demonstration. Use the provisions of § 86.1826–01 rather than the requirements of §§ 86.1823, 86.1824, and/or 86.1825.

* * * * *

■ 13. Amend § 86.1839–01 by revising paragraph (b) to read as follows:

§ 86.1839–01 Carryover of certification data.

* * * * *

(b) In lieu of using newly aged hardware on an EDV as allowed under the provisions of § 86.1823–08(f)(2), a manufacturer may use similar hardware aged for an EDV previously submitted, provided that the manufacturer determines that the previously aged hardware represents a worst case or equivalent rate of deterioration for all applicable emission constituents for durability demonstration.

■ 14. Amend § 86.1841–01 by revising paragraphs (a)(1) introductory text and (a)(2) and removing and reserving paragraph (a)(3) to read as follows:

§ 86.1841–01 Compliance with emission standards for the purpose of certification.

(a) * * *

(1) If the durability demonstration procedure used by the manufacturer under the provisions of §§ 86.1823, 86.1824, or 86.1825 requires a DF to be calculated, the DF shall be applied to the official test results determined in § 86.1835–01(c) for each regulated

emission constituent and for full and intermediate useful life, as appropriate, using the following procedures:

* * * * *

(2) If the durability demonstration procedure used by the manufacturer under the provisions of §§ 86.1823, 86.1824, or 86.1825, as applicable, requires testing of the EDV with aged emission components, the official results of that testing determined under the provisions of § 86.1835–01(c) shall be rounded to the same level of precision as the standard for each regulated constituent at full and intermediate useful life, as appropriate. This rounded emission value is the certification level for that emission constituent at that useful life mileage.

(3) [Reserved]

* * * * *

■ 15. Amend § 86.1844–01 by revising paragraph (d)(4) to read as follows:

§ 86.1844–01 Information requirements: Application for certification and submittal of information upon request.

* * * * *

(d) * * *

(4) Durability information.

(i) A description of the durability method used to establish useful life durability, including exhaust and evaporative/refueling emission deterioration factors as required in §§ 86.1823, 86.1824 and 86.1825 when applicable.

(ii) The equivalency factor required to be calculated in § 1823–06(e)(iii)(B), when applicable.

* * * * *

■ 16. Add Appendices V, VII, VIII, and IX to part 86 to read as follows:

Appendix V to Part 86—The Standard Road Cycle (SRC)

1. The standard road cycle (SRC) is a mileage accumulation cycle that may be used for any vehicle which is covered by the applicability provisions of § 86.1801. The vehicle may be run on a track or on a mileage accumulation dynamometer.

2. The cycle consists of 7 laps of a 3.7 mile course. The length of the lap may be changed to accommodate the length of the service-accumulation track.

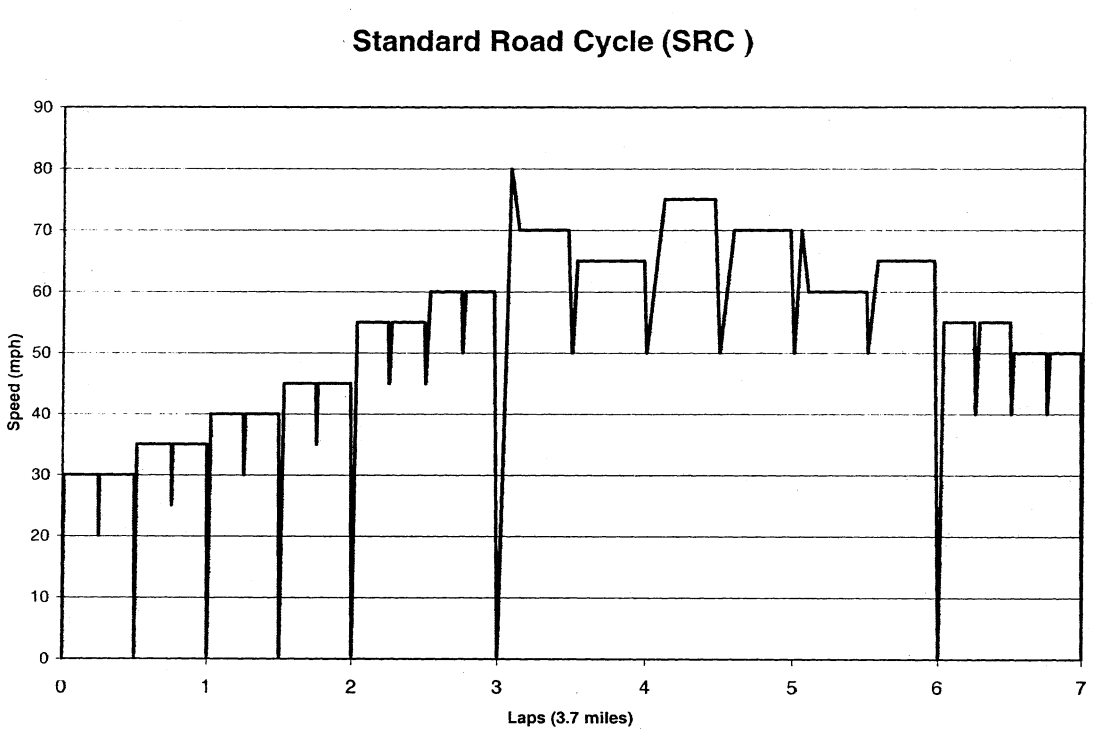
DESCRIPTION OF THE SRC

Lap	Description	Typical accel rate (MPH/s)
1	(start engine) Idle 10 sec	0
1	Mod accel to 30 MPH	4
1	Cruise at 30 MPH for ¼ lap	0
1	Mod. decel to 20 MPH	−5
1	Mod accel to 30 MPH	4
1	Cruise at 30 MPH for ¼ lap	0
1	Mod. decel to stop	−5
1	Idle 5 sec	0
1	Mod accel to 35 MPH	4
1	Cruise at 35 MPH for ¼ lap	0
1	Mod. decel to 25 MPH	−5
1	Mod accel to 35 MPH	4
1	Cruise at 35 MPH for ¼ lap	0
1	Mod. decel to stop	−5
2	Idle 10 sec	0
2	Mod accel to 40 MPH	3
2	Cruise at 40 MPH for ¼ lap	0
2	Mod. decel to 30 MPH	−5
2	Mod accel to 40 MPH	3
2	Cruise at 40 MPH for ¼ lap	0
2	Mod. decel to stop	−5
2	Idle 5 sec	0
2	Mod accel to 45 MPH	3
2	Cruise at 45 MPH for ¼ lap	0
2	Mod. decel to 35 MPH	−5
2	Mod accel to 45 MPH	3
2	Cruise at 45 MPH for ¼, lap	0
2	Mod. decel to stop	−5
3	Idle 10 sec	0
3	Hard accel to 55 MPH	4
3	Cruise at 55 MPH for ¼ lap	0
3	Mod. decel to 45 MPH	−5
3	Mod accel to 55 MPH	2
3	Cruise at 55 MPH for ¼ lap	0
3	Mod. decel to 45 MPH	−5
3	Mod accel to 60 MPH	2
3	Cruise at 60 MPH for ¼ lap	0
3	Mod. decel to 50 MPH	−5
3	Mod. accel to 60 MPH	2
3	Cruise at 60 MPH for ¼ lap	0
3	Mod. decel to stop	−4
4	Idle 10 sec	0
4	Hard accel to 80 MPH	3
4	Coastdown to 70 MPH	−1
4	Cruise at 70 MPH for ½ Lap	0
4	Mod. decel to 50 MPH	−3

DESCRIPTION OF THE SRC—Continued

Lap	Description	Typical accel rate (MPH/s)
4	Mod accel to 65 MPH	2
4	Cruise at 65 MPH for ½ lap	0
4	Mod. decel to 50 MPH	−3
5	Mod accel to 75 MPH	1
5	Cruise at 75 MPH for ½ lap	0
5	Mod. decel to 50 MPH	−3
5	Lt. accel to 70 MPH	1
5	Cruise at 70 MPH for ½ lap	0
5	Mod. decel 50 MPH	−3
6	Mod accel to 70 MPH	2
6	Coastdown to 60 MPH	−1
6	Cruise at 60 MPH for ½ lap	0
6	Mod. decel to 50 MPH	−4
6	Mod. accel to 65 MPH	1
6	Cruise at 65 MPH for ½ lap	0
6	Mod. decel to stop	−4
7	Idle 45 sec	0
7	Hard accel to 55 MPH	4
7	Cruise at 55 MPH for ¼ lap	0
7	Mod. decel to 40 MPH	−5
7	Mod. accel to 55 MPH	2
7	Cruise at 55 MPH for ¼ lap	0
7	Mod. decel to 40 MPH	−5
7	Mod. accel to 50 MPH	2
7	Cruise at 50 MPH for ¼ lap	0
7	Mod. decel to 40 MPH	−5
7	Mod. accel to 50 MPH	2
7	Cruise at 50 MPH for ¼ lap	0
7	Mod. decel to stop	−5

The standard road cycle is represented graphically in the following figure:



* * * * *

Appendix VII to Part 86—Standard Bench Cycle (SBC)

1. The standard bench aging durability procedures [Ref. § 86.1823–08(d)] consist of aging a catalyst-oxygen-sensor system on an aging bench which follows the standard bench cycle (SBC) described in this appendix.

2. The SBC requires use of an aging bench with an engine as the source of feed gas for the catalyst.

3. The SBC is a 60-second cycle which is repeated as necessary on the aging bench to conduct aging for the required period of time. The SBC is defined based on the catalyst temperature, engine air/fuel (A/F) ratio, and the amount of secondary air injection which is added in front of the first catalyst.

Catalyst Temperature Control

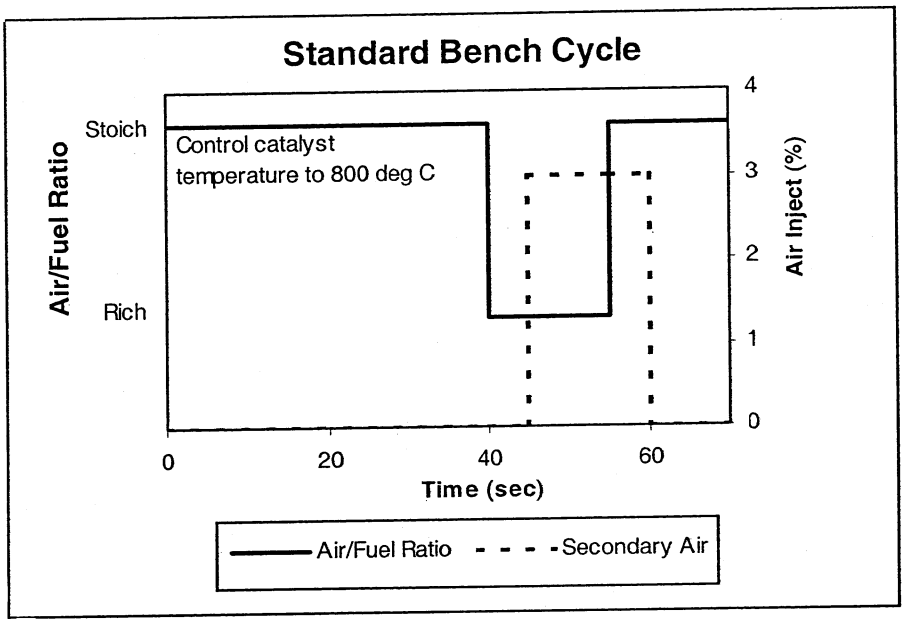
1. Catalyst temperature shall be measured in the catalyst bed at the location where the highest temperature occurs in the hottest catalyst. Alternatively, the feed gas temperature may be measured and converted to catalyst bed temperature using a linear transform calculated from correlation data collected on the catalyst design and aging bench to be used in the aging process.

2. Control the catalyst temperature at stoichiometric operation (01 to 40 seconds on the cycle) to a minimum of 800 °C (± 10 °C) by selecting the appropriate Engine speed, load, and spark timing for the engine. Control the maximum catalyst temperature that occurs during the cycle to 890 °C (± 10 °C) by selecting the appropriate A/F ratio of the engine during the ''rich'' phase described in the table below.

3. If a low control temperature other than 800 °C is utilized, the high control temperature shall be 90 °C higher than the low control temperature.

STANDARD BENCH CYCLE (SBC)

Time (seconds)	Engine air/fuel ratio	Secondary air injection
01–40	14.7 (stoichiometric, with load, spark timing, and engine speed controlled to achieve a minimum catalyst temperature of 800 °C).	None
41–45	''Rich'' (A/F ratio selected to achieve a maximum catalyst temperature over the entire cycle of 890 °C, or 90° higher than low control temperature).	None
46–55	''Rich'' (A/F ratio selected to achieve a maximum catalyst temperature over the entire cycle of 890 °C, or 90° higher than low control temperature).	3% (± 0.1%)
56—60	14.7 (stoichiometric, same load, spark timing, and engine speed as used in the 01–40 sec period of the cycle).	3% (± 0.1%)



Appendix VIII to Part 86—Aging Bench Equipment and Procedures

This appendix provides specifications for standard aging bench equipment and aging procedures which may be used to conduct bench aging durability under the provisions of § 86.1823–08.

1. Aging Bench Configuration

The aging bench must provide the appropriate exhaust flow rate, temperature, air-fuel ratio, exhaust constituents and secondary air injection at the inlet face of the catalyst.

a. The EPA standard aging bench consists of an engine, engine controller, and engine dynamometer. Other configurations may be acceptable (*e.g.* whole vehicle on a dynamometer, or a burner that provides the correct exhaust conditions), as long as the catalyst inlet conditions and control features specified in this appendix are met.

b. A single aging bench may have the exhaust flow split into several streams providing that each exhaust stream meets the requirements of this appendix. If the bench has more than one exhaust stream, multiple catalyst systems may be aged simultaneously.

2. Fuel and Oil

The fuel used by the engine shall comply with the mileage accumulation fuel provisions of § 86.113 for the applicable fuel type (*e.g.*, gasoline or diesel fuel). The oil used in the engine shall be representative of commercial oils and selected using good engineering judgement.

3. Exhaust System Installation

a. The entire catalyst(s)-plus-oxygen-sensor(s) system, together with all exhaust piping which connects these components, [the ''catalyst system''] will be installed on the bench. For engines with multiple exhaust streams (such as some V6 and V8 engines), each bank of the exhaust system will be installed separately on the bench.

b. For exhaust systems that contain multiple in-line catalysts, the entire catalyst system including all catalysts, all oxygen sensors and the associated exhaust piping will be installed as a unit for aging. Alternatively, each individual catalyst may be separately aged for the appropriate period of time.

4. Temperature Measurement

Catalyst temperature shall be measured using a thermocouple placed in the catalyst bed at the location where the highest temperature occurs in the hottest catalyst (typically this occurs approximately one-inch behind the front face of the first catalyst at its longitudinal axis). Alternatively, the feed gas temperature just before the catalyst inlet face may be measured and converted to catalyst bed temperature using a linear transform calculated from correlation data collected on the catalyst design and aging bench to be used in the aging process. The catalyst temperature must be stored digitally at the speed of 1 hertz (one measurement per second).

5. Air/Fuel Measurement

Provisions must be made for the measurement of the air/fuel (A/F) ratio (such as a wide-range oxygen sensor) as close as possible to the catalyst inlet and outlet flanges. The information from these sensors must be stored digitally at the speed of 1 hertz (one measurement per second).

6. Exhaust Flow Balance

Provisions must be made to assure that the proper amount of exhaust (measured in grams/second at stoichiometry, with a tolerance of ±5 grams/second) flows through each catalyst system that is being aged on the bench. The proper flow rate is determined based upon the exhaust flow that would occur in the original vehicle's engine at the steady state engine speed and load selected for the bench aging in paragraph (7).

7. Setup

a. The engine speed, load, and spark timing are selected to achieve a catalyst bed temperature of 800 °C (± 10 °C) at steady-state stoichiometric operation.

b. The air injection system is set to provide the necessary air flow to produce 3.0% oxygen (± 0.1%) in the steady-state stoichiometric exhaust stream just in front of the first catalyst. A typical reading at the upstream A/F measurement point (required in paragraph 5) is lambda 1.16 (which is approximately 3% oxygen).

c. With the air injection on, set the ''Rich'' A/F ratio to produce a catalyst bed temperature of 890 °C (± 10 °C). A typical A/F value for this step is lambda 0.94 (approximately 2% CO).

8. Aging Cycle

The standard bench aging procedures use the standard bench cycle (SBC) which is described in Appendix VII to Part 86. The SBC is repeated until the amount of aging calculated from the bench aging time (BAT) equation [ref. § 86.1823–08 (d)(3)] is achieved.

9. Quality Assurance

a. The temperatures and A/F ratio information that is required to be measured in paragraphs (4) and (5) shall be reviewed periodically (at least every 50 hours) during aging. Necessary adjustments shall be made to assure that the SBC is being appropriately followed throughout the aging process.

b. After the aging has been completed, the catalyst time-at-temperature collected during the aging process shall be tabulated into a histogram with temperature bins of no larger than 10 °C. The BAT equation and the calculated effective reference temperature for the aging cycle [ref. § 86.1823–08(d)] will be used to determine if the appropriate amount of thermal aging of the catalyst has in fact occurred. Bench aging will be extended if the thermal effect of the calculated aging time is not at least 95% of the target thermal aging.

10. Startup and Shutdown

Care should be taken to assure that the maximum catalyst temperature for rapid deterioration (*e.g.*, 1050 °C) does not occur during startup or shutdown. Special low temperature startup and shutdown procedures may be used to alleviate this concern.

Appendix IX to Part 86—Experimentally Determining the R-Factor for Bench Aging Durability Procedures

The R-Factor is the catalyst thermal reactivity coefficient used in the bench aging time (BAT) equation [Ref. § 86.1826–08(d)(3)]. Manufacturers may determine the value of R experimentally using the following procedures.

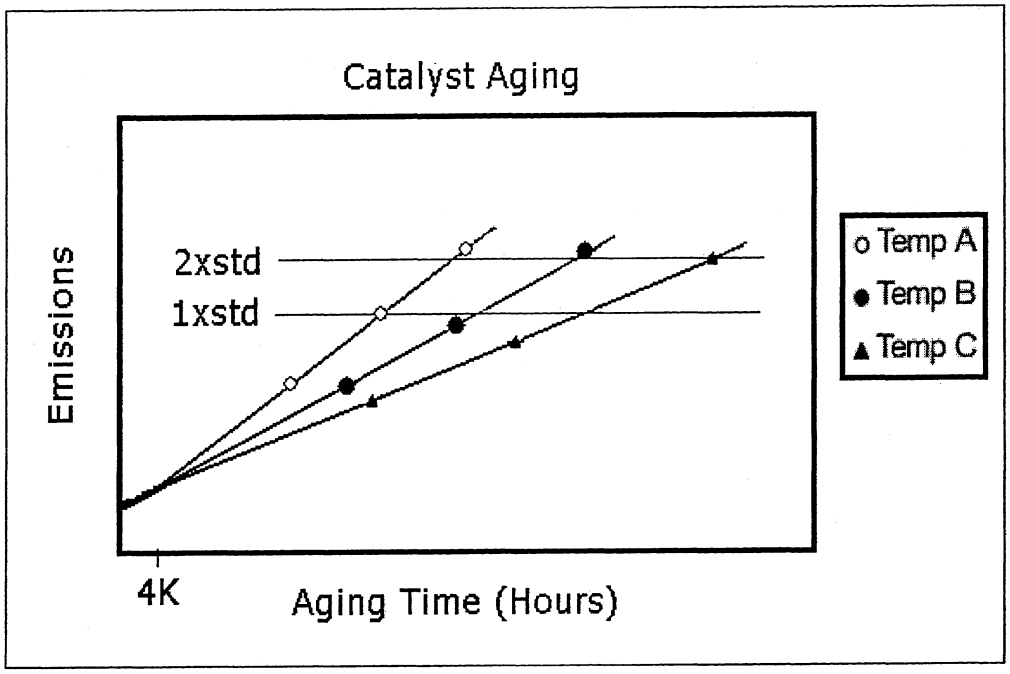
1. Using the applicable bench cycle and aging bench hardware, age several catalysts (minimum of 3 of the same catalyst design) at different control temperatures between the normal operating temperature and the damage limit temperature. Measure emissions (or catalyst inefficiency (1-catalyst efficiency)) for each constituent. Assure that the final testing yields data between one- and two-times the standard.

2. Estimate the value of R and calculate the effective reference temperature (T_r) for the bench aging cycle for each control temperature according to the procedure described in § 86.1826–08(d)(4).

3. Plot emissions (or catalyst inefficiency) versus aging time for each catalyst. Calculate the least-squared best-fit line through the data. For the data set to be useful for this purpose the data should have an approximately common intercept between 0 and 4000 miles. See the following graph for an example.

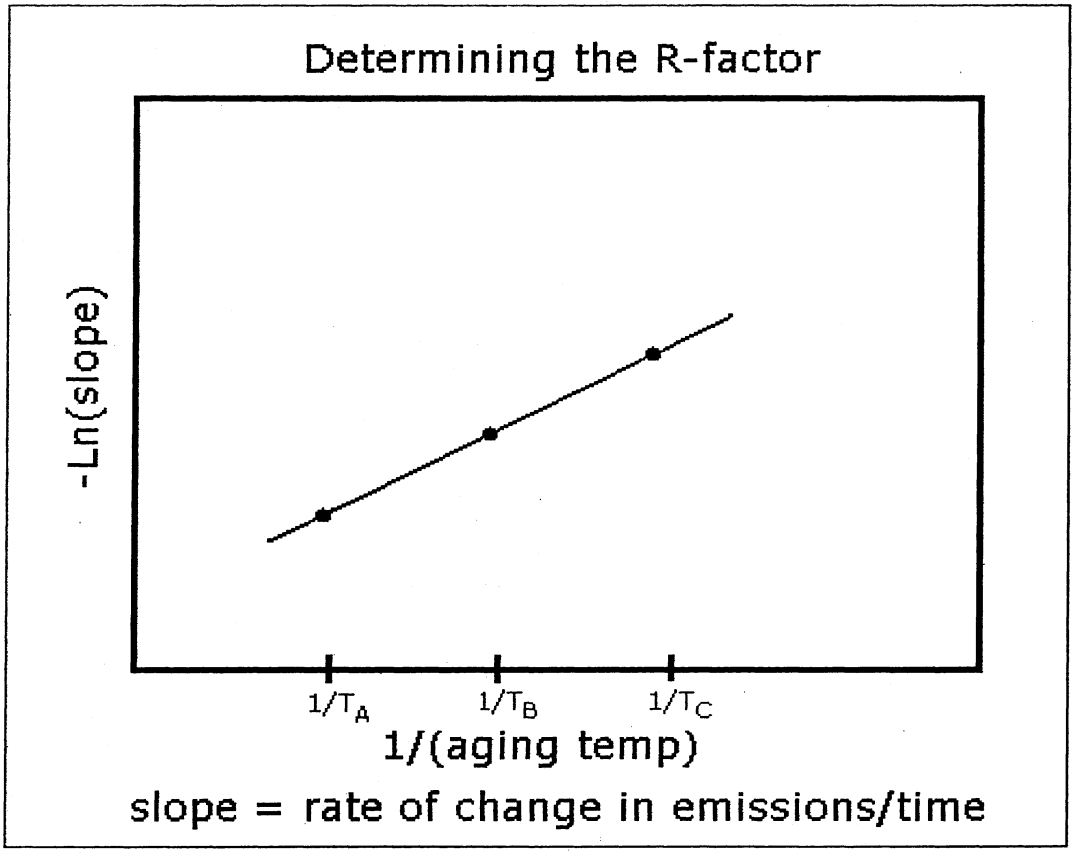
4. Calculate the slope of the best-fit line for each aging temperature.

5. Plot the natural log (ln) of the slope of each best-fit line (determined in step 4) along the vertical axis, versus the inverse of aging temperature (1/(aging temperature, deg K)) along the horizontal axis, Calculate the least-squared best-fit lines through the data. The slope of the line is the R-factor. See the following graph for an example.



6. Compare the R-factor to the initial value that was used in Step 2. If the calculated R-factor differs from the initial value by more than 5%, choose a new R-factor that is between the initial and calculated values, then repeat Steps 2–6 to derive a new R-factor. Repeat this process until the calculated R-factor is within 5% of the initially assumed R-factor.

7. Compare the R-factor determined separately for each constituent. Use the lowest R-factor (worst case) for the BAT equation.



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