operating hours (see Section V.C.2 for more information).

D. Testing Provisions

The test procedures provide an objective measurement for establishing whether engines comply with emission standards. The following sections describe a variety of proposed changes to the current test procedures. Except as identified in the following sections, we are proposing to preserve the testing-related regulatory provisions that currently apply under 40 CFR part 90. Note that we will approve any appropriate alternatives, deviations, or interpretations of the new testing requirements on a case-by-case basis rather than operating under any presumption that any such judgments made under the Phase 1 or Phase 2 programs will continue to apply.

(1) Migrating Procedures to 40 CFR Part 1065

Manufacturers have been using the procedures in 40 CFR part 90 to test their engines for certification of Phase 1 and Phase 2 engines. As part of a much broader effort, we have adopted comprehensive testing specifications in 40 CFR part 1065 that are intended to serve as the basis for testing all types of engines. The procedures in part 1065 include updated information reflecting the current state of available technology. We are proposing to apply the procedures in part 1065 to nonhandheld engines starting with the applicability of the Phase 3 standards as specified in 40 CFR part 1054, subpart F. As described in Section IX, the procedures in part 1065 identifies new types of analyzers and updates a wide range of testing specifications, but leaves intact the fundamental approach for measuring exhaust emissions. There is no need to shift to the part 1065 procedures for nonhandheld engines before the proposed Phase 3 standards apply. See Section IX for additional information.

We are not proposing new exhaust emission standards for handheld engines so there is no natural point in time for shifting to the part 1065 procedures. For the reasons described above and in Section IX, we nevertheless believe handheld engines should also use the part 1065 procedures for measuring exhaust emissions. We propose to require manufacturers to start using the part 1065 procedures in the 2012 model year. Manufacturers would be allowed to continue certifying engines using carryover data generated under the part 90 procedures, but any new certification testing would be subject to the part 1065 procedures.

Engine manufacturers have raised one issue related to the specified test procedures in part 1065. The calculations for determining mass emissions depend on a simplifying assumption that combustion is at stoichiometry or is in fuel-lean environment. This is not the case for many Small SI engines. The equation with the simplifying assumption does not take into account the equilibrium reaction between hydrogen and water. As a result, engines with fuel-rich operation would have detectable hydrogen concentrations in the exhaust, which would cause the analyzers to have a reading for hydrocarbon emissions that is somewhat higher than the actual value. To the extent there is a concern, we believe it would always be appropriate to rely on the reference equations without the simplifying assumptions made for the equations published in part 1065. We request comment on this approach to measurements from Small SI engines.

(2) Duty Cycle

The regulations under part 90 currently specify duty cycles for testing engines for exhaust emissions. The current requirements specify how to control speeds and loads and describe the situations in which the installed engine governor controls engine speed. We are proposing to extend these provisions to testing under the new standards with a few adjustments described below. For engines equipped with an engine speed governor, the current regulations at 40 CFR 90.409(a)(3) state:

> For Phase 2 Class I, Phase 2 Class I–B, and Phase 2 Class II engines equipped with an engine speed governor, the governor must be used to control engine speed during all test cycle modes except for Mode 1 or Mode 6, and no external throttle control may be used that interferes with the function of the engine's governor; a controller may be used to adjust the governor setting for the desired engine speed in Modes 2–5 or Modes 7–10; and during Mode 1 or Mode 6 fixed throttle operation may be used to determine the 100 percent torque value.

In addition the current regulations at 40 CFR 90.410(b) state:

> For Phase 2 Class I, I–B, and II engines equipped with an engine speed governor, during Mode 1 or Mode 6 hold both the specified speed and load within ± five percent of point, during Modes 2–3, or Modes 7–8 hold the specified load with ± five percent of point, during Modes 4–5 or Modes 9–10, hold the specified load within the larger range provided by ± 0.27 Nm (± 0.2 lb-ft), or ± ten (10) percent of point, and during the idle mode hold the specified speed within ± ten percent of the manufacturer's specified idle engine speed (see Table 1 in Appendix A of this subpart for a description of test Modes).

Manufacturers have raised some questions about the interpretation of these provisions. Our intent is that the current requirements specify that testing be conducted as follows:

- Full-load testing (Mode 1) occurs at wide-open throttle to maintain engines at rated speed, which is defined as the speed at which the engine's maximum power occurs (as declared by the manufacturer).
- Idle testing (Mode 6) occurs at the manufacturer's specified idle speed with a maximum load of five percent of maximum torque. The regulation allows adjustment to control speeds that are different than would be maintained by the installed governor.
- The installed governor must be used to control engine speed for testing at all modes with torque values between idle and full-load modes. The regulation allows adjustments for nominal speed settings that are different than would be maintained by the installed governor without modification.

We are proposing adjustments to the current regulatory requirements in 40 CFR part 90 (see § 1054.505). Since each of these proposed adjustments may have some effect on measured emission levels, we believe it is appropriate to implement these changes concurrent with the Phase 3 standards. To the extent the proposed adjustments apply to handheld engines, we believe it is appropriate to apply the changes for new testing with 2012 and later model year engines for the reasons described above for adopting the test procedures in part 1065.

First, we are proposing to require engine speed during the idle mode to be controlled by the engine's installed speed governor. We believe there is no testing limitation that would call for engine operation at idle to depart from the engine's governed speed. Allowing manufacturers to arbitrarily declare an idle speed only allows manufacturers to select an idle speed that gives them an advantage in achieving lower measured emission results, but not in a way that corresponds to in-use emission control. We are also aware that some production engines have a user-selectable control for selecting high-speed or low-speed idle (commonly identified as ''rabbit/turtle'' settings). We believe this parameter adjustment may have a significant effect on emissions that should be captured in the certification test procedure. As a result, we are proposing a requirement that manufacturers conduct testing with user-selectable controls set to keep the engine operating at low-speed idle if any production engines in the engine family have such an option.

Second, we are proposing an option in which manufacturers would test their nonhandheld engines using a ramped-modal version of the specified duty cycle, as described in Section IX. We expect this testing to be equivalent to the modal testing described above but would have advantages for streamlining test efforts by allowing for a single result for the full cycle instead of relying on a calculation from separate modal results. Under the proposal we would allow manufacturers the option to select this type of testing. EPA's testing would generally involve ramped-modal testing only if the engine manufacturer selected this option for certification.

Third, the part 90 regulations currently specify two duty cycles for nonhandheld engines: (1) Testing at rated speed; and (2) testing at 85 percent of rated speed. The regulations direct manufacturers simply to select the most appropriate cycle and declare the rated speed for their engines. We believe it is appropriate to make this more objective by stating that rated speed is 3600 rpm and intermediate speed is 3060 rpm, unless the manufacturer demonstrates that a different speed better represents the in-use operation for their engines. This is consistent with the most common in-use settings and most manufacturers' current practice.

In addition, we are proposing regulatory provisions to clarify how nonhandheld engines are operated to follow the prescribed duty cycle. As described in part 90, we are proposing to require that the engines operate ungoverned at wide-open throttle for the full-power mode. This test mode is used to denormalize the rest of the duty cycle. Testing at other modes occurs with the governor controlling engine speed. Before each test mode, manufacturers may adjust the governor to target the same nominal speed used for the full-power mode, with a tolerance limiting the variation in engine speed at each mode. Alternatively, testing may be done by letting the installed governor control engine speed, in which case only the torque value would need to be controlled within an established range.

A different duty cycle applies to handheld engines, which are generally not equipped with governors to control engine speed. The current regulations allow manufacturers to name their operating speed for testing at each of the test modes. We are proposing to continue the allowance for manufacturers to select an appropriate engine speed for idle operation. However, we are concerned that this approach allows manufacturers too much discretion for selecting a rated speed for high-load testing. Manufacturers are encouraged to select a speed that best represents in-use operation for the engine family, but there is no requirement to prevent a manufacturer from selecting a rated speed that results in lower emissions, independent of the speeds at which in-use engines operate. We are proposing to specify that manufacturers select a value for rated speed that matches the most common speed for full-load operation within the engine family. Engine manufacturers generally also make their own equipment, so this information should be readily available. We would expect manufacturers to identify the range of equipment models covered by a given engine family, identify the in-use operating speeds for those models, and select the full-load speed applicable for the greatest number of projected unit sales. We further propose to require manufacturers to describe in their application for certification how they selected the value for rated speed.

(3) Test Fuel

We are proposing to require Phase 3 testing with a standard test fuel consistent with the requirements under 40 CFR part 90 (see 40 CFR part 1065, subpart H). In particular, we do not believe it is appropriate to create a flexibility to allow for testing using oxygenated fuel since this could affect an engine's air-fuel ratio, which in turn could affect the engine's combustion and emission characteristics. However, we understand that engine manufacturers may have emission data from some model years before the Phase 3 standards take effect. We would allow for continued use of this pre-existing data as long as it is appropriate to use carryover data for demonstrating compliance with current standards.

Ethanol is commonly blended into in-use gasoline and is anticipated to be more widely used in the future. However, we are not proposing a test fuel containing ethanol for two reasons. First, the technical feasibility of this rule is based on certification gasoline. If an ethanol fuel blend were used as the certification fuel, the standards would need to be adjusted to account for the effects of this fuel on emissions. Second, manufacturers may not use ethanol blends to certify Small SI engines in California. The use of an ethanol blend would require manufacturers to test their engines separately for the California and Federal testing.

The test fuel specifications apply to all testing. However, we may be able to allow for testing with oxygenated fuel for production-line testing if manufacturers first establish the appropriate correction to account for the fuel's effect on emissions. We request comment on an appropriate approach that would allow for production-line testing with oxygenated fuel.

We are similarly proposing test fuel specifications for liquefied petroleum gas (LPG) and natural gas. Since natural gas has a very high methane content and methane is generally nonreactive in the atmosphere, we are proposing to apply the same emission standards for natural gas engines but not count methane emissions toward the total hydrocarbon measurement.

E. Certification and Compliance Provisions for Small SI Engines and Equipment

(1) Deterioration Factors

As part of the certification process, manufacturers generate deterioration factors to demonstrate that their engines meet emission standards over the full useful life. We are proposing some changes from the procedures currently included in part 90 (see § 1054.240 and § 1054.245). Much of the basis for these changes comes from the experience gained in testing many different engines in preparation for this proposal. First, we are proposing to discontinue bench aging of emission components. Testing has shown that operating and testing the complete engine is necessary to get accurate deterioration factors. Second, we are proposing to allow for assigned deterioration factors for a limited number of small-volume nonhandheld engine *families*. Manufacturers could use assigned deterioration factors for multiple small-volume nonhandheld engine families as long as the total production for all of the nonhandheld engine families for which the manufacturer is using assigned deterioration factors is estimated at the time of certification to be no more than 10,000 units per year. Third, we are proposing to allow for assigned deterioration factors for all engines produced by small-volume nonhandheld engine *manufacturers.*

For the $HC+NO_X$ standard, we propose to specify that manufacturers use a single deterioration factor for the sum of HC and NO_X emissions. However, if manufacturers get approval to establish a deterioration factor on an engine that is tested with service accumulation representing less than the full useful life for any reason, we would require separate deterioration factors for

HC and NO_X emissions. The advantage of a combined deterioration factor is that it can account for an improvement in emission levels with aging. However, for engines that have service accumulation representing less than the full useful life, we believe it is not appropriate to extrapolate measured values indicating that emission levels for a particular pollutant will decrease. This is the same approach we adopted for recreational vehicles.

EPA is not proposing the values for the assigned deterioration factors for small-volume nonhandheld engine manufacturers in this proposal. In an effort to develop deterioration factors that are appropriate for Small SI engines, we plan to evaluate certification data from Phase 3 engines certified early with EPA and from engines certified under California ARB's Tier 3 standards (which begin in 2007 and 2008). Because we are not proposing new exhaust standards for handheld engines, the assigned deterioration factor provisions adopted for Phase 2 handheld engines are being retained.

Although we are not proposing new exhaust standards for handheld engines, handheld engine manufacturers noted that California ARB has approved certain durability cycles for accumulating hours on engines for the purpose of demonstrating emissions durability. The durability cycles approved by California ARB vary from a 30-second cycle for chainsaws to a 20-minute cycle for blowers, with 85 percent of the time operated at wide open throttle and 15 percent of the time operated at idle. Engine manufacturers can run the durability cycles over and over until they accumulate the hours of operation equivalent to the useful life of the engine family. Our current regulations state that ''service accumulation is to be performed in a manner using good judgment to ensure that emissions are representative of production engines.'' While we are not proposing to change the regulatory language regarding service accumulation, we believe the California ARB-approved durability cycles are appropriate and acceptable to EPA for accumulating hours on handheld engines for demonstrating emissions durability.

Manufacturers have pointed out that they are developing a testing protocol that would allow manufacturers to develop deterioration factors for catalysts through a bench-aging procedure. A fundamental factor in evaluating the appropriateness of any bench-aging procedure is the extent to which it simulates representative exhaust gas composition and other in-use operating parameters. We request comment on any appropriate procedures, or limitations on the use of such procedures, for certifying Small SI engines.

(2) Delegated Final Assembly

The current practice of attaching exhaust systems to engines varies. Class I engines are typically designed and produced by the engine manufacturer with complete emission control systems. Equipment manufacturers generally buy these engines and install them in their equipment, adjusting equipment designs if necessary to accommodate the mufflers and the rest of the exhaust system from the engine manufacturer.

Engine manufacturers generally produce Class II engines without exhaust systems, relying instead on installation instructions to ensure that equipment manufacturers get mufflers that fall within a specified range of backpressures that is appropriate for a given engine model. Equipment manufacturers are free to work with muffler manufacturers to design mufflers that fit into the space available for a given equipment model, paying attention to the need to stay within the design specifications from the engine manufacturers. A similar situation applies for air filters, where equipment manufacturers in some cases work with component manufacturers to use air filters that are tailored to the individual equipment model while staying within the design specifications defined by the engine manufacturer.

The existing regulations require that certified engines be in their certified configuration when they are introduced into commerce. We therefore need special provisions to address the possibility that engines will need to be produced and shipped without exhaust systems or air intake systems that are part of the certified configuration. We have adopted such provisions for heavy-duty highway engines and for other nonroad engines in 40 CFR 85.1713 and 40 CFR 1068.260, respectively. These provisions generally require that engine manufacturers establish a contractual arrangement with equipment manufacturers and take additional steps to ensure that engines are in their certified configuration before reaching the ultimate purchaser.

We are proposing to apply delegated-assembly provisions for nonhandheld engines that are similar to those adopted for heavy-duty highway engines, with a variety of adjustments to address the unique situation for Small SI engines (see § 1054.610). This would require that engine manufacturers apply for certification in the normal way, identifying all the engine parts that make up the engine configurations covered by the certification. Equipment manufacturers would be able to work with muffler manufacturers to get mufflers with installed catalysts as specified in the engine manufacturer's application for certification. If equipment manufacturers would need a muffler or catalyst that is not covered by the engine manufacturer's certification, the engine manufacturer would need to amend the application for certification. This may require new testing if the data from the original emission-data engine are not appropriate for showing that the new configuration will meet emission standards, as described in § 1054.225. (Alternatively, the equipment manufacturer may take on the responsibility for certifying the new configuration, as described in § 1054.612.) Engine manufacturers would also identify in the application for certification their plans to sell engines without emission-related components. We are proposing several provisions to ensure that engines will eventually be in their certified configuration. For example, engine manufacturers would establish contracts with affected equipment manufacturers, include installation instructions to make clear how engine assembly should be completed, keep records of the number of engines produced under these provisions, and obtain annual affidavits from affected equipment manufacturers to confirm that they are installing the proper emission-related components on the engines and that they have ordered a number of components that corresponds to the number of engines involved.

While the delegated-assembly provisions are designed for direct shipment of engines from engine manufacturers to equipment manufacturers, we are aware that distributors play an important role in providing engines to large numbers of equipment manufacturers. We are proposing that these provisions apply to distributors in one of two ways. First, engine manufacturers may have an especially close working relationship with primary distributors. In such a case, the engine manufacturer would be able to establish a contractual arrangement allowing the distributor to act as the engine manufacturer's agent for all matters related to compliance with the delegated-assembly provisions. This would allow the distributor to make arrangements with equipment manufacturers to address design needs and perform oversight functions. We would hold the engine manufacturer directly responsible if the distributor failed to meet the regulatory obligations that would otherwise apply to the engine manufacturer. Second, other distributors may receive shipment of engines without exhaust systems, but they would need to add any aftertreatment components before sending the engines on to equipment manufacturers. Engine manufacturers would treat these distributors as equipment manufacturers for the purposes of delegated assembly. Equipment manufacturers buying engines from such a distributor would not have the option of separately obtaining mufflers from muffler manufacturers. In both of these scenarios, the engine manufacturer continues to be responsible for the in-use compliance of all their engines.

Engine manufacturers would need to affix a label to the engine to clarify that it needs certain emission-related components before it is in its certified configuration. This labeling information is important for alerting assembly personnel to select mufflers with installed catalysts; the label would also give in-house inspectors or others with responsibility for quality control a tool for confirming that all engines have been properly assembled and installed. Given the large numbers of engine and equipment models and the interchangeability of mufflers with and without catalysts, we believe proper labeling will reduce the possibility that engines will be misbuilt.

This labeling may be done with any of three approaches. First, a temporary label may be applied such that it would not be removed without a deliberate action on the part of the equipment manufacturer. We believe it is not difficult to create a label that will stay on the engine until it is deliberately removed. Second, manufacturers may add the words ''delegated assembly'' to the engine's permanent emission control information label. Third, manufacturers may create a unique alphanumeric code to apply to the engine's permanent emission control information label. This code would be identified in the application for certification. Creating a unique code would not provide a clear enough communication to equipment manufacturers that they are responsible for bringing the engine into its certified configuration. Engine manufacturers taking this approach would therefore need to add features to the label to make this clear. For example, creating labels with a different color or shading would make it easy to identify that an engine needs to be properly assembled before it is in its certified configuration.

Any of these labeling approaches would properly identify the engines as needing emission-related components from the equipment manufacturer. We have a remaining concern that the approaches involving permanent labels do not identify that an engine is not yet in its certified configuration. Since there is no change in the label to show the engine's status, we believe these approaches may not be as effective as the temporary labels in preventing misbuilt engines. We are also concerned that imported engines with manufacturer-specific codes will lead to confusion with Customs inspectors. With no standardized approach for identifying which engines do not need catalysts, there is a significant risk that engines will be held up while inspectors confirm their status. We request comment on the best way of requiring labeling information for these engines. For example, we request comment on adding a requirement for equipment manufacturers to add some identifying mark to the permanent label to show that the engine is in its certified configuration. We also request comment on replacing the provision allowing for a manufacturer-specific code to some standardized abbreviation for ''delegated assembly'' that would allow for unambiguous identification of the engine's status with a minimum burden in terms of requiring larger labels.

In addition, engine manufacturers would need to perform or arrange for audits to verify that equipment manufacturers are properly assembling engines. Engine manufacturers may rely on third-party agents to perform auditing functions. Since the purpose of the audit is to verify that equipment manufacturers are properly assembling products, they may not perform audits on behalf of engine manufacturers. We are proposing to require that audits must involve at a minimum reviewing the equipment manufacturer's production records and procedures, inspecting the equipment manufacturer's production operations, or inspecting the final assembled products. Inspection of final assembled products may occur at any point in the product distribution system. For example, products may be inspected at the equipment manufacturer's assembly or storage facilities, at regional distribution centers, or at retail locations. The audit must also include confirmation that the number of aftertreatment devices shipped was sufficient for the number of engines involved. We would typically expect engine manufacturers to perform more than the minimum auditing steps identified above. For example, equipment manufacturers with low order volumes, an unclear history of compliance, or other characteristics that would cause some concern may prompt us to require a more extensive audit to ensure effective oversight in confirming that engines are always built properly. Moreover, in the early years of this program, engine manufacturers should consider nearly all participating equipment manufacturers to be unfamiliar with the regulatory requirements and the mechanics of meeting their responsibilities and obligations as contracted manufacturers of certified engines. Engine manufacturers would describe in the application for certification their plan for taking steps to ensure that all engines will be in their certified configuration when installed by the equipment manufacturer. EPA approval of a manufacturer's plan for delegated assembly would be handled as part of the overall certification process. We request comment on appropriate requirements related to specific auditing procedures that would be appropriate to address these concerns and to provide adequate assurance that engines are routinely assembled in their certified configuration.

We are proposing that engine manufacturers annually audit twelve equipment manufacturers, or fewer if they are able to audit all participating equipment manufacturers on average once every four years. These audits would be divided over different equipment manufacturers based on the number of engines sold to each equipment manufacturer. We further propose that these auditing rates may be reduced after the first eight years, or after the engine manufacturer has audited all affected equipment manufacturers. This reduced auditing rate would be based on an expectation that all participating equipment manufacturers would be audited on average once every ten years.

To facilitate auditing related to catalysts, we are proposing to require engine manufacturers to establish an alphanumeric designation to identify each unique catalyst design (including size, washcoat, precious metal loading, supplier, and any other appropriate factors) and instruct equipment manufacturers to use stamping or other means to permanently display this designation on the external surface of the exhaust system, making it readily visible as much as possible when the equipment is fully assembled, consistent with the objective of verifying the identity of the installed catalyst. This designation could be the same as the code applied to the emission control information label as described above.

We are proposing that all the same requirements apply for separate shipment related to air filters if they are part of an engine's certified configuration, except for the auditing. We would require auditing related to air filters only if engine manufacturers are already performing audits related to catalysts. We believe there is much less incentive or potential for problems with equipment manufacturers producing engines with noncompliant air filters so we believe a separate auditing requirement for air filters would be unnecessary.

The draft regulation specifies that the exemption expires when the equipment manufacturer takes possession of the engine and the engine reaches the point of final equipment assembly. We would understand the point of final equipment assembly for purposes of delegated assembly for aftertreatment components to be the point at which the equipment manufacturer attaches a muffler to the engine. Engines observed in production or inventory assembled with improper mufflers would be considered to have been built contrary to the engine manufacturer's installation instructions. Catalysts are invariably designed as part of the muffler, so we would understand that there would be no reason to install a different muffler once a given muffler has been installed using normal production procedures. If equipment manufacturers sell equipment without following these instructions, they would be considered in violation of the prohibited acts (i.e., selling uncertified engines). If there is a problem with any given equipment manufacturer, we would hold the engine manufacturer responsible for those noncompliant engines and require the engine manufacturer to discontinue the practice of delegated assembly for that equipment manufacturer. We request comment on the need to more explicitly identify the meaning of the point of final equipment assembly in the regulations, as described above.

We are aware that the proposed approach of allowing equipment manufacturers to make their own arrangements to order mufflers results in a situation in which the equipment manufacturer must spend time and money to fulfill their responsibilities under the regulations. This introduces a financial incentive to install mufflers with inferior catalysts, or to omit the catalyst altogether. To address this concern for heavy-duty highway engines, we adopted a requirement for engine manufacturers to confirm that a vehicle manufacturer has ordered the appropriate aftertreatment devices before they ship an engine. Equipment manufacturers' purchasing practices for Small SI engines, especially considering the order volumes, makes this approach impractical. We are instead proposing to require that engine manufacturers get written confirmation from each equipment manufacturer before an initial shipment of engines in a given model year for a given engine model. This confirmation would document the equipment manufacturer's understanding that they are using the appropriate aftertreatment components. The written confirmation would be due within 30 days after shipping the engines and would be required before shipping any additional engines from that engine family to that equipment manufacturer.

The shipping confirmation included in the rule for heavy-duty highway engines is a very substantial provision to address the fact that vehicle manufacturers would gain a competitive advantage by producing noncompliant products, and that engines in commerce would be labeled as if they were fully compliant even though they are not yet in their certified configuration. This is especially problematic when a muffler with no catalyst can easily be installed and can perform without indicating a problem. To address this concern for Small SI engines, we are including a requirement that equipment manufacturers include in their annual affidavits an accounting for the number of aftertreatment components they have ordered relative to the number of engines shipped without the catalysts that the mufflers would otherwise require.

Production-line testing normally involves building production engines using normal assembly procedures. For engines shipped without catalysts under the delegated-assembly provisions, it is not normally possible to do this at the engine manufacturer's facility, where such testing would normally occur. To address this, we are proposing to specify that engine manufacturers must arrange to get a randomly selected catalyst that will be used with the engine. The catalyst may come from any point in the normal distribution from the aftertreatment component manufacturer to the equipment manufacturer. The catalyst may not come from the engine manufacturer's own inventory. Engine manufacturers would keep records to show how they randomly selected catalysts.

As described above, we believe this is a very significant compliance issue since it allows manufacturers to introduce into commerce engines that are labeled as meeting current emission standards even though they are not in their certified configuration. This is especially true for Small SI engines where many high-volume products are handled by many different manufacturers such that the final assembly requires equipment manufacturers to properly install otherwise indistinguishable products to keep products in the certified configuration. Also, an equipment manufacturer may install multiple engine models in a single type of equipment, some of which may need catalyzed mufflers while others would use a conventional muffler. The appearance and function of such mufflers with and without catalysts would be virtually indistinguishable, which increases the likelihood of accidentally installing the wrong muffler.

The provisions described above are intended to minimize the risks associated with this practice. However, this concern is heightened for companies that would use the delegated-assembly provisions to import noncompliant engines with the expectation that equipment manufacturers in the United States would add catalyzed mufflers as specified in the engine manufacturer's application for certification. This raises two potential problems. First, this practice could create a loophole in EPA's enforcement program that would allow for widespread importation of noncompliant engines, with the financial incentive for equipment manufacturers to complete assembly with noncompliant mufflers. Since all engines have mufflers, and since proper catalyst installation generally can be confirmed only with an emission test or a destructive inspection, it would be very difficult to find and correct any problems that might occur. Second, engine manufacturers outside the United States may be willing to take risks with noncompliant products based on their limited exposure to EPA enforcement. As described in Section VI.F we are considering bonding requirements for imported engines to ensure that we will be able to fully resolve compliance or enforcement issues with companies that have little or no presence or selling history in the United States. We would expect to specify an increased bond payment for importation of engines using the delegated-assembly provisions. Increasing the per-engine bond value by 20 percent corresponds roughly with the value of catalyzed mufflers that would be required. We believe this would be an appropriate additional bond value to address the concerns for noncompliance from imported engines.

While this section describes the compliance provisions we believe are necessary for addressing the practice of delegating assembly of emission-related components to equipment manufacturers, providing a broader view of the context for delegated assembly is also appropriate for understanding our concern regarding the duplicative aspects of delegated assembly with other provisions in this rulemaking. Recent evaluation of a wide range of equipment models powered by Small SI engines has led to several important observations. Many equipment models have mufflers installed away from all other components such that they have no space or packaging constraints. Other equipment models with mufflers that are installed inside a cage or compartment generally include substantial space around the muffler, which is necessary to isolate the muffler's high surface temperatures and radiant heat from operators and any heat-sensitive components. Another important observation was the striking uniformity of muffler geometries, even where equipment manufacturers obtained mufflers directly from muffler manufacturers. Most mufflers on Class II engines are cylindrical models with the size varying to correspond with the size of the engines. Other Class II engine models use a box-shaped muffler design, but these mufflers also exhibited little variation across models. These observations have fundamental implications for the regulatory provisions we are proposing for ensuring a smooth transition to the Phase 3 emission standards.

For example, in situations that limit equipment manufacturers to standardized muffler configurations, they would at most need to make modest changes to their equipment to accommodate somewhat different muffler geometries. We have taken these equipment design changes into account with the Transition Program for Equipment Manufacturers described below. We are therefore concerned that the proposed provisions for delegated assembly and the Transition Program for Equipment Manufacturers may be duplicative in providing additional time and/or flexibilities for equipment manufacturers to redesign their equipment for accommodating engines that meet the Phase 3 standards. If this is the case, the proposed provisions for delegated assembly merely serve to preserve the current business arrangements for the different types of manufacturers. We request comment on the need for these delegated-assembly provisions in light of the Transition Program for Equipment Manufacturers. We also request comment on the appropriateness of adopting these delegated-assembly provisions for Class I engines since these engine manufacturers already install complete exhaust systems for the large majority of their engines. Finally, we request comment on the need to allow for the use of the more restrictive delegated-assembly provisions in § 1068.260 in the event that we do not finalize the delegated-assembly provisions described above.

(3) Transition Program for Equipment Manufacturers

Given the level of the proposed Phase 3 exhaust emission standards for Class II engines, we believe there may be situations where the use of a catalyzed muffler could require equipment manufacturers to modify their equipment. We are therefore proposing a set of provisions to provide equipment manufacturers with reasonable lead time for transition to the proposed standards. The proposed provisions are similar to the program we adopted for nonroad diesel engines (69 FR 38958, June 29, 2004).

Equipment manufacturers would not be obligated to use any of these provisions, but all equipment manufacturers that produce Class II equipment would be eligible to do so. We are also proposing that all entities under the control of a common entity would have to be considered together for the purposes of applying these allowances. Manufacturers would be eligible for the allowances described below only if they have primary responsibility for designing and manufacturing equipment, and if their manufacturing procedures include installing engines in the equipment.

(a) General Provisions

Under the proposed approach, beginning in the 2011 model year and lasting through the 2014 model year, each equipment manufacturer may install Class II engines not certified to the proposed Phase 3 emission standards in a limited number of equipment applications produced for the U.S. market (see § 1054.625). We refer to these here as ''flex engines.'' These flex engines would need to meet the Phase 2 standards. The maximum number of ''allowances'' each manufacturer could use would be based on 30 percent of an average year's production of Class II equipment. The number of ''allowances'' would be calculated by determining the average annual U.S.-directed production of equipment using Class II engines produced from January 1, 2007 through December 31, 2009. Thirty percent of this average annual production level would be the total number of ''allowances'' under this transition program over four years. Manufacturers could use these allowances for their Class II equipment over four model years from 2011 through 2014, with the usage spread over these model years as determined by the equipment manufacturer. Equipment produced under these provisions could use engines that meet the Phase 2 emission standards instead of the Phase 3 standards. If an equipment manufacturer newly enters the Class II equipment market during 2007, 2008 or 2009, the manufacturer would calculate its average annual production level based only on the years during which it actually produced Class II equipment. Equipment manufacturers newly entering the Class II equipment market after 2009 would not receive any allowances under the transition program and would need to incorporate Phase 3 compliant engines into the Class II equipment beginning in 2011.

Equipment using engines built before the effective date of the proposed Phase 3 standards would not count toward an equipment manufacturer's allowances. Equipment using engines that are exempted from the Phase 3 standards for any reason would also not count toward an equipment manufacturer's allowances. For example, we are proposing that small-volume engine manufacturers may continue to produce Phase 2 engines for two model years after the Phase 3 standards apply. All engines subject to the Phase 3 standards, including those engines that are certified to FELs at higher levels than the standard, but for which an engine manufacturer uses exhaust ABT credits to demonstrate compliance, would count as Phase 3 complying engines and would not be included in an equipment manufacturer's count of allowances.

The choice of the allowances based on 30 percent of one year's production is based on our best estimate of the degree of reasonable lead time needed by the largest equipment manufacturers to modify their equipment designs as needed to accommodate engines and exhaust systems that have changed as a result of more stringent emission standards. We believe the proposed level of allowances responds to the need for lead time to accommodate the workload related to redesigning equipment models to incorporate catalyzed mufflers while ensuring a significant level of emission reductions in the early years of the proposed program.

Equipment manufacturers may face similar challenges in transitioning to rotational-molded fuel tanks that meet the proposed permeation standards. We are therefore proposing to allow equipment manufacturers to use noncompliant rotational-molded fuel tanks with any equipment that is counted under the allowances described in this section which use engines meeting Phase 2 exhaust emission standards (see § 1054.627). As part of this expanded rotational-molded fuel tank allowance, we are requiring that equipment manufacturers first use up any available credits or allowances generated from early compliance with the fuel tank permeation requirements (see Section VI.D.4).

A similar concern applies for controlling running losses. As described in Section VI, technologies for controlling running losses may involve a significant degree of integration between engine and equipment designs. In particular, routing a vapor line from the fuel tank to the engine's intake system depends on engine modifications that would allow for this connection. As a result, we are proposing that any equipment using flex engines would not need to meet running loss standards.

(b) Coordination Between Engine and Equipment Manufacturers

We are proposing two separate paths for complying with administrative requirements related to the proposed transition program, depending on how the engine manufacturer chooses to make flex engines available under the transition program. Engine manufacturers choosing to use the delegated-assembly provisions described above would be enabling equipment manufacturers to make the decision whether to complete the engine assembly in the Phase 3 configuration or to use a noncatalyzed muffler such that the engine would meet Phase 2 standards and would therefore need to be counted as a flex engine. If engine manufacturers do not use the delegated-assembly provisions, equipment manufacturers would need to depend on engine manufacturers to produce and ship flex engines that are already in a configuration meeting Phase 2 standards and labeled accordingly. Each of these scenarios involves a different set of compliance provisions, which we describe below.

(i) *Compliance based on engine manufacturers.* Engine manufacturers will in many cases produce complete engines. This would be the case if the engine does not require a catalyst or if the engine manufacturer chooses to design their own exhaust systems and ship complete engine assemblies to equipment manufacturers.

Under this scenario, we propose to require that equipment manufacturers request a certain number of flex engines from the engine manufacturer. The proposed regulatory provisions would specifically allow engine manufacturers to continue to build and sell Phase 2 engines needed to meet the market demand created by the transition program for equipment manufacturers provided they receive the written assurance from the equipment manufacturer that such engines are being procured for this purpose. We are proposing to require that engine manufacturers keep copies of the written assurance from equipment manufacturers for at least five years after the final year in which allowances are available.

Engine manufacturers are currently required to label their certified engines with a variety of information. We are proposing that engine manufacturers producing complete flex engines under this program identify on the engine label that they are flex engines. In addition, equipment manufacturers would be required to apply an Equipment Flexibility Label to the engine or piece of equipment that identifies the equipment as using an engine produced under the Phase 3 transition program for equipment manufacturers. These proposed labeling requirements would allow EPA to easily identify flex engines and equipment, verify which equipment manufacturers are using these flex engines, and more easily monitor compliance with the transition provisions. Labeling of the equipment could also help U.S. Customs to quickly identify equipment being imported lawfully using the Transition Program for Equipment Manufacturers.

While manufacturers would need to meet Phase 2 standards with their flex engines, they would not need to certify them for the current model year. We are proposing instead to apply the requirements in 40 CFR 1068.260, which requires that manufacturers keep records showing that they meet emission standards without requiring submission of an application for certification. We request comment on these requirements and whether these engines should be certified annually along with the Phase 3 engines.

(ii) *Compliance based on equipment manufacturers.* We are proposing to set up a different set of compliance provisions for engine manufacturers that ship the engine separately from the exhaust system. Under this scenario, as discussed above, the engine manufacturers must establish a relationship with the equipment manufacturers allowing the equipment manufacturer to install catalysts to complete engine assembly for compliance with Phase 3 standards.

In this case, engine manufacturers would design and produce their Phase 3 engines and label them accordingly. The normal path for these engines covered by the delegated-assembly provisions would involve shipment of the engine without an exhaust system to the equipment manufacturer, the equipment manufacturer would then follow the engine manufacturer's instructions to add the exhaust system including the catalyst to bring the engine into a certified Phase 3 configuration. Under the proposed transition program, equipment manufacturers would choose for each of these engines to either follow the engine manufacturer's instructions to install a catalyst to make it compliant with Phase 3 standards or follow a different set of instructions to install a non-catalyzed muffler to make it compliant with Phase 2 standards. Any such engines downgraded to Phase 2 standards would count toward the equipment manufacturer's total number of allowances under the transition program.

To make this work, engine manufacturers would need to take certain steps to ensure overall compliance. First, engine manufacturers would need to include emission data in the application for certification showing that the engine would meet Phase 2 standards without any modification other than installing a non-catalyzed exhaust system. This may include a specified range of backpressures that equipment manufacturers would need to meet in procuring a non-catalyst muffler. If the Phase 3 engine without a catalyst would otherwise still be covered by the emission data from engines produced in earlier model years under the Phase 2 standards, manufacturers could rely on carryover emission data to make this showing. Second, the installation instructions we specify under the delegated-assembly provisions would need to describe the steps equipment manufacturers would need to take to make either Phase 3 engines or Phase 2 flex engines. Third, for engine families that generate positive emission credits under the exhaust ABT program, engine manufacturers must decrease the number of ABT credits generated by the engine family by 10 percent. We believe the 10 percent decrease should provide an emission adjustment commensurate with the potential use of the equipment manufacturer flexibility provisions.

Equipment manufacturers using allowances under these provisions would need to keep records that would allow EPA or engine manufacturers to confirm that equipment manufacturers followed appropriate procedures and produced an appropriate number of engines without catalysts. In addition, we are proposing to require that equipment manufacturers place a label on the engine as close as possible to the engine manufacturer's emission control information label to identify it as a flex engine. This could be the full label described above or it could be a simplified label that has only the equipment manufacturer's name and a simple statement that this is a flex engine. The location of this label is important since it effectively serves as an extension of the engine manufacturer's label, clarifying that the engine meets Phase 2 standards, not the Phase 3 standards referenced on the original label. This avoids the problematic situation of changing or replacing labels, or requiring engine manufacturers to send different labels. We request comment on an approach in which we would require the full label for equipment manufacturers to be placed on the engine adjacent to the engine manufacturer's label to prevent confusion and the risks associated with multiple labels.

Engine manufacturers might choose to produce Phase 3 engines before the 2011 model year and set up arrangements for separate shipment of catalyzed mufflers as described in Section V.E.2. We would expect any engine manufacturers producing these early Phase 3 engines to continue production of comparable engine models that meet Phase 2 standards rather than forcing all equipment manufacturers to accommodate the new engine design early. We believe it would not be appropriate for equipment manufacturers to buy Phase 3 engines in 2010 or earlier model years and downgrade them to meet Phase 2 emission standards as described above. We are therefore proposing to allow the downgrading of Phase 3 engines only for 2011 and later model years.

Because equipment manufacturers in many cases depend on engine manufacturers to supply certified engines in time to produce complying equipment, we are also proposing a hardship provision for all equipment manufacturers (see § 1068.255). An equipment manufacturer would be required to use all of its allowances under the transition program described above before being eligible to use this hardship. See Section VIII.C.9 for further discussion of this proposed hardship provision for equipment manufacturers.

As described in Section V.E.2, we are concerned that the Transition Program for Equipment Manufacturers and the provisions related to delegated assembly may be redundant approaches to address the need to design equipment models to accommodate upgraded engines. The transition program is intended to give equipment manufacturers four years to make the design changes needed to reach a point of being able to accommodate low-emission Phase 3 engines, even for the most challenging equipment models. If equipment manufacturers are able to continue to independently source their exhaust systems based on the catalyst specifications determined by the engine manufacturer, it is not clear that allowances for additional lead time would be needed. We request comment on the relative advantages of these two approaches and, more specifically, which approach we should adopt in the final rule to address equipment manufacturers' needs for designing and producing equipment with Phase 3 engines. We request comment on an alternative approach of relying on the delegated-assembly provisions in § 10654.610 and the equipment-manufacturer hardship provisions in § 1068.255. This combination of tools would still allow for substantial flexibility in helping equipment manufacturers transition to Phase 3 engines. The hardship provisions of § 1068.255 were an important element of the successful transition to new emission standards for Large SI engines.

(iii) Reporting and recordkeeping requirements. Equipment manufacturers choosing to participate in the transition program would be required to keep records of the U.S-directed production volumes of Class II equipment in 2007 through 2009 broken down by equipment model and calendar year. Equipment manufacturers would also need to keep records of the number of flex engines they use under this program.

We are also proposing some notification requirements for equipment manufacturers. Under this proposal, equipment manufacturers wishing to participate in the transition provisions would need to notify EPA by June 30, 2010 that they plan to participate. They must submit information on production of Class II equipment over the three-year period from 2007 through 2009, calculate the number of allowances available, and provide basic business information about the company. For example, we would want to know the names of related companies operating under the same parent company that would be required to count engines together under this program. This early notification will not be a significant burden to the equipment manufacturer and will greatly enhance our ability to ensure compliance. Indeed, equipment manufacturers would need to have the information required in the notification to know how to use the allowances.

We are proposing an ongoing reporting requirement for equipment manufacturers participating in the Phase 3 transition program. Under this proposal, participating equipment manufacturers would be required to submit an annual report to EPA that shows its annual number of equipment produced with flex engines under the transition provisions in the previous year. Each report would include a cumulative count of the number of equipment produced with flex engines for all years. To ease the reporting burden on equipment manufacturers, EPA intends to work with the manufacturers to develop an electronic means for submitting information to EPA.

(c) Additional Allowances for Small- and Medium-Sized Companies

We believe small-volume equipment manufacturers would need a greater degree of lead time than manufacturers that sell large volumes of equipment. The small companies are less likely to have access to prototype engines from engine manufacturers and generally have smaller engineering departments for making the necessary design changes. Allowances representing thirty percent of annual U.S.-directed production provide larger companies with substantial lead time to plan their product development for compliance but smaller companies may have a product mix that requires extensive work to redesign products in a short amount of time. We are therefore proposing to specify that small-volume equipment manufacturers may use this same transition program with allowances totaling 200 percent of the average annual U.S.-directed production of equipment using Class II engines from 2007 through 2009. For purposes of this program, a small-volume equipment manufacturer would be a manufacturer that produces fewer than 5,000 pieces of nonhandheld equipment per year subject to EPA regulations in each of the three years from 2007 through 2009 or meets the SBA definition of small business equipment manufacturer (*i.e.*, generally fewer than 500 employees for manufacturers of most types of equipment). These allowances would be spread over the same four-year period between 2011 and 2014. For example, a small-volume equipment manufacturer could potentially use Phase 2 engines on all their Class II equipment for two years or they might sell half their Class II equipment with Phase 2 engines for four years assuming production stayed constant over the four years.

Medium-sized equipment manufacturers, *i.e.*, companies that produce too much equipment to be considered a small-volume equipment manufacturer but produce fewer than 50,000 pieces of Class II equipment, may also face difficulties similar to that of small-volume equipment manufacturers. These companies may be like small-volume manufacturers if they have numerous product lines with varied approaches to installing engines and mufflers. Other companies may be more like bigger companies if they produce most of their equipment in a small number of high-volume models or have consistent designs related to engine and muffler installations. We are therefore proposing to create special provisions that would enable us to increase the number of transition allowances that are available to these medium-sized companies that have annual U.S.-directed production of Class II equipment of between 5,000 and 50,000 in each of the three years from 2007 through 2009. To obtain allowances greater than 30 percent of average annual production, a medium-sized manufacturer would need to notify us by January 31, 2010 if they believe the standard allowances based on 30 percent of average annual production of Class II equipment would not provide adequate lead time starting in the 2011 model year. Additional allowances could be requested only if the equipment manufacturer can show they are on track to produce a number of equipment models representing at least half of their total U.S.-directed production volume of Class II equipment in the 2011 model year compliant with all exhaust and evaporative emission standards. As part of their request, the equipment manufacturer would need to describe why more allowances are needed to accommodate anticipated changes in engine designs resulting from engine manufacturers' compliance with changing exhaust emission standards. The equipment manufacturer would also request a specific number of additional allowances needed with supporting information to show why that many allowances are needed. We may approve additional allowances up to 70 percent of the average annual U.S.-directed production of Class II equipment from 2007 through 2009. If a medium-sized company were granted the full amount of additional allowances, they would have allowances equivalent to 100 percent of the average annual production volume of Class II equipment.

As noted above, the determination of whether a company is a small- or medium-sized manufacturer will be based primarily on production data over the 2007 through 2009 period submitted to EPA during 2010. After a company's status as a small- or medium-sized company has been established based on that data, EPA is proposing that manufactures would keep that status even if a company's production volume grows during the next few years, such that the company would no longer qualify as a small- or medium-sized company. EPA believes that equipment manufacturers need to know at the beginning of the transition program (*i.e.*, 2011) how many allowances they will receive under the program. Changing a company's size determination during the program, which could affect the number of allowances available, would make it difficult for companies to plan and could lead to situations where a company is in violation of the provisions based on the use of allowances that were previously allowed. Likewise, if a company is purchased by another company or merges with another company after the determination of small- or medium-size status is established in 2010, EPA is proposing that the combined company could, at its option, keep the status for the individual portions of the combined company. If the combined company chooses to keep the individual designations, the combined company would submit the annual reports on the use of allowances broken down for each of the previously separate companies.

(i) Requirements for foreign equipment manufacturers and importers. Under this proposal, only companies that manufacture equipment would qualify for the relief provided under the Phase 3 transition provisions. Foreign equipment manufacturers who comply with the compliance related provisions discussed below would enjoy the same transition provisions as domestic manufacturers. Foreign equipment manufacturers that do not comply with the compliance-related provisions discussed below would not receive allowances. Importers that do not manufacture equipment would not receive any transition relief directly, but could import equipment with a flex engine if it is covered by an allowance or transition provision associated with a foreign equipment manufacturer. This would allow transition provisions to be used by foreign equipment manufacturers in the same way as domestic equipment manufacturers, at the option of the foreign manufacturer, while avoiding the potential for importers to inappropriately use allowances. For the purposes of this proposal, a foreign equipment manufacturer would include any equipment manufacturer that produces equipment outside of the United States that is eventually sold in the United States.

All foreign equipment manufacturers wishing to use the transition provisions would have to comply with all requirements discussed above. Along with the equipment manufacturer's notification described earlier, a foreign equipment manufacturer would have to comply with various compliance related provisions similar to those adopted for nonroad diesel engines (see § 1054.626).[81] As part of the notification, the foreign equipment manufacturer would have to:

- Agree to provide EPA with full, complete and immediate access to conduct inspections and audits;
- Name an agent in the District of Columbia for service;
- Agree that any enforcement action related to these provisions would be governed by the Clean Air Act;
- Submit to the substantive and procedural laws of the United States;
- Agree to additional jurisdictional provisions;
- Agree that the foreign equipment manufacturer will not seek to detain or to impose civil or criminal remedies against EPA inspectors or auditors for actions performed within the scope of EPA employment related to the provisions of this program;
- Agree that the foreign equipment manufacturer becomes subject to the full operation of the administrative and judicial enforcement powers and provisions of the United States without limitation based on sovereign immunity; and
- Submit all reports or other documents in the English language, or include an English language translation.

[81] See, for example, 40 CFR 80.410 concerning provisions for foreign refiners with individual gasoline sulfur baselines.

In addition to these proposed requirements, we are proposing to require foreign equipment manufacturers that participate in the transition program to comply with a bond requirement for equipment imported into the United States. We describe a bond program below that we believe could be an important tool for ensuring that foreign equipment manufacturers are subject to the same level of enforcement as domestic equipment manufacturers. Specifically, we believe a bonding requirement for the foreign equipment manufacturer is an important enforcement tool for ensuring that EPA has the ability to collect any judgments assessed against a foreign equipment manufacturer for violations of these transition provisions. We request comments on all aspects of the specific program we describe here, but also on alternative measures that would achieve the same goal.

Under a bond program, the participating foreign equipment manufacturer would have to maintain a bond in the proper amount that is payable to satisfy judgments that result from U.S. administrative or judicial enforcement actions for conduct in violation of the Clean Air Act. The foreign equipment manufacturer would generally obtain a bond in the proper amount from a third party surety agent that has been listed with the Department of the Treasury. As discussed in Sections V.E.6.c and V.E.6.d, EPA is proposing other bond requirements as well. An equipment manufacturer required to post a bond under any of these provisions would be required to obtain only one bond of the amount specified for those sections.

In addition to the foreign equipment manufacturer requirements discussed above, EPA also proposes to require importers of equipment with flex engines from a complying foreign equipment manufacturer to comply with certain provisions. EPA believes these importer provisions are essential to EPA's ability to monitor compliance with the transition provisions. EPA proposes that the regulations would require each importer to notify EPA prior to their initial importation of equipment with flex engines. Importers would be required to submit their notification prior to the first calendar year in which they intend to import equipment with flex engines from a complying foreign equipment manufacturer. The importer's notification would need to include the following information:

- The name and address of importer (and any parent company);
- The name and address of the manufacturers of the equipment and engines the importer expects to import; and
- Number of units of equipment with flex engines the importer expects to import for each year broken down by equipment manufacturer.

In addition, EPA is proposing that any importer electing to import to the United States equipment with flex engines from a complying foreign equipment manufacturer would have to submit annual reports to EPA. The annual report would include the number of units of equipment with flex engines the importer actually imported to the United States in the previous calendar year; and identify the equipment manufacturers and engine manufacturers whose equipment and engines were imported.

(4) Equipment Manufacturer Recertification

Generally, it has been engine manufacturers who certify with EPA for exhaust emissions because the standards are engine-based. However, because the Phase 3 nonhandheld standards under consideration are expected to result in the use of catalysts, a number of equipment manufacturers, especially those that make low-volume models, believe it may be necessary to produce their own unique engine/muffler designs, but using the same catalyst substrate already used in a muffler certified by the engine manufacturer. In this situation, the engine would not be covered by the engine manufacturer's certificate, as the engine/muffler design is not within the specifications for the certified engine. The equipment manufacturer is therefore producing a new distinct engine which is not certified and needs to be certified with EPA. In order to allow the possibility of an equipment manufacturer certifying an engine/muffler design with EPA, we are proposing a simplified engine certification process for nonhandheld equipment manufacturers (see § 1054.612). Under this simplified certification process, the nonhandheld equipment manufacturer would need to demonstrate that it is using the same catalyst substrate as the approved engine manufacturer's engine family, provide information on the differences between their engine/exhaust system and the engine/exhaust system certified by the engine manufacturer, and explain why the emissions deterioration data generated by the engine manufacturer would be representative for the equipment manufacturer's configuration. The equipment manufacturer would need to perform low-hour emission testing on an engine equipped with their modified exhaust system and demonstrate that it meets the emission standards after applying the engine manufacturer's deterioration factors for the certified engine family. We would not require production-line testing for these engines. The equipment manufacturer would be responsible to meet all of the other requirements of an engine manufacturer under the regulations, including labeling, warranty, defect reporting, payment of certification fees, and other things. EPA requests comments on the usefulness of such a provision. EPA also requests comments on whether such a simplified certification provision should expire after a period of time, for example, after five years. If the provision were to expire, an equipment manufacturer could continue to certify, but they would have to follow the general certification regulations at that point.

(5) Special Provisions Related to Altitude

As described in Section V.C.1, we allow manufacturers of handheld and nonhandheld engines to comply with emission standards at high altitudes using an altitude kit. We are proposing to keep the provisions that already apply in part 90 related to descriptions of these altitude kits in the application for certification. This would include a description of how engines comply with emission standards at varying atmospheric pressures, a description of the altitude kits, and the associated part numbers. The manufacturer would also identify the altitude range for which it expects proper engine performance and emission control with and without the altitude kit, state that engines will comply with applicable emission standards throughout the useful life with the altitude kit installed according to instructions, and include any supporting information. Finally, manufacturers would need to describe a plan for making information and parts available such that altitude kits would reasonably be expected to be widely used in high-altitude areas. For nonhandheld engines, this would involve all counties with elevations substantially above 4,000 feet (see Appendix III to part 1054). This includes all U.S. counties where 75 percent of the land mass and 75 percent of the population are above 4,000 feet (see 45 FR 5988, January 24, 1980 and 45 FR 14079, March 4, 1980). For handheld engines, this would involve all areas at an elevation at or above that which they identify in their application for certification for needing an altitude kit to meet emission standards.

We are also proposing to require information related to altitude kits to be on the emission control information label, unless space limitations prevent it. We believe it is important for operators to know that engines may need to be modified to run properly at high elevations.

We request comment on all aspects of this approach for compliance at high-altitude conditions. (See §§ 1054.115, 1054.135, 1054.205, and 1054.655.)

(6) Special Provisions for Compliance Assurance

EPA's experiences in recent years have highlighted the need for more effective tools for preventing the introduction into commerce of noncompliant engines. These include noncompliant engines sold without engine labels or with counterfeit engine labels. We are proposing the special provisions in the following sections to help us address these problems.

(a) Importation Form

Importation of engines is regulated both by EPA and U.S. Customs. The current regulations for U.S. Customs specify that anyone importing a nonroad engine (or equipment containing a nonroad engine) must complete a declaration form before importation. EPA has created Declaration Form 3520–21 for this purpose. Customs requires this in many cases, but there are times when they allow engines to be imported without the proper form. It would be an important advantage for EPA's own compliance efforts to be able to enforce this requirement. We are therefore proposing to modify part 90 to mirror the existing Customs requirement (and the EPA requirement in § 1068.301) for importers to complete and retain the declaration form before importing engines (see § 90.601). This would facilitate a more straightforward processing of cases in which noncompliant products are brought to a U.S. port for importation because currently no requirement exists for measuring emissions or otherwise proving that engines are noncompliant at the port facility. Since this is already a federal requirement, we are proposing to make this effective immediately with the final rule.

(b) Assurance of Warranty Coverage

Manufacturers of Small SI engines subject to the standards are required to provide an emission-related warranty so owners are able to have repairs done at no expense for emission-related defects during an initial warranty period. Established companies are able to do this with a network of authorized repair facilities that can access replacement parts and properly correct any defects. In contrast, we are aware that some manufacturers are selling certified engines in the United States without any such network for processing warranty claims. As such, owners who find that their engines have an emission-related defect are unable to properly file a warranty claim or get repairs that should be covered by the warranty. In effect, this allows companies to certify their engines and agree to provide warranty coverage without ever paying for legitimate repairs that should be covered by the warranty. We are therefore proposing to require that manufacturers demonstrate several things before we will approve certification for their engines (see § 90.1103 and § 1054.120). The following provisions would apply to manufacturers who certify engines, and would include importers who certify engines. First, we are proposing to require manufacturers to provide and monitor a toll-free telephone number and an e-mail address for owners to receive information about how to make a warranty claim and how to make arrangements for authorized repairs. Second, we are proposing to require manufacturers to provide a source of replacement parts within the United States. For imported parts, this would require at least one distributor within the United States.

Finally, we are proposing to require manufacturers to have a network of authorized repair facilities or to take one of several alternate approaches to ensure that owners will be able to get free repair work done under warranty. If warranty-related repairs are limited to authorized repair facilities, we are proposing to require that manufacturers have enough such facilities that owners do not have to go more than 100 miles for repairs. An exception would be made for remote areas where we would allow for approval of greater travel distances for getting repairs as long as the longer travel distance applies to no more than 10 percent of affected owners. For small businesses, start-up companies, or importers, it may not be realistic to maintain a national repair network. We are proposing a variety of alternative methods for such companies to meet their warranty obligations. Manufacturers would be able to meet warranty obligations by informing owners that free shipping to and from an authorized service center is available, a service technician will be provided to come to the owner to make the warranty repair, or repair costs at a local nonauthorized service center will be reimbursed.

We believe these proposed requirements are both necessary and effective for ensuring proper warranty coverage for all owners. At the same time, we are proposing a flexible approach that allows companies to choose from widely varying alternatives to provide warranty service. We therefore believe these proposed requirements are readily achievable for any company. We are therefore proposing to implement these requirements starting with the 2009 model year. This should allow time for the administrative steps necessary to arrange for any of the allowable compliance options described above. We request comment on these provisions to ensure proper warranty coverage. We also request comment on alternative means of demonstrating effective warranty coverage comparable to that described above.

(c) Bond Requirements Related to Enforcement and Compliance Assurance

Certification initially involves a variety of requirements to demonstrate that engines and equipment are designed to meet applicable emission standards. After certification is complete, however, several important obligations apply to the certifying manufacturer or importer. For example, we require ongoing testing of production engines, warranty coverage for emission-related defects, reporting of recurring defects, and payment of penalties if there is a violation. For companies operating within the United States, we are generally able to take steps to communicate clearly and insist on compliance with applicable regulations. For companies without staff or assets in the United States, this is not the case. Accordingly, we have limited ability to enforce these requirements or recover any appropriate penalties, which increases the risk of environmental problems as well as problems for owners. This creates the potential for a company to gain a competitive advantage if they do not operate in the United States by avoiding some of the costs of complying with EPA regulations.

We request comment on a requirement for importers of certified engines and equipment to post a bond to cover any potential compliance or enforcement actions under the Clean Air Act. Importers would be exempt from the bond requirement if they were able to sufficiently demonstrate an assurance that they would meet any compliance- or enforcement-related obligations. We would consider adopting provisions to waive the bonding requirement based on a variety of specific criteria. For example, importers might show that they have physical assets in the United States with a value equal to the retail value of the engines that they will import during the model year (or equipment that they will import during the model year if they import equipment). Also, we may be able to establish an objective measure for a company to demonstrate long-term compliance with applicable regulations. Another alternative might involve a showing that an importer has been certified under certain industry standards for production quality and regulatory compliance. Finally, we may be able to rely on a company's commitment to periodically perform voluntary in-use testing in the United States to show that engines comply with emission standards. In addition to these specific criteria, we would consider adopting a provision that allows an individual importer to request a waiver from bonding requirements based on that importer's particular circumstances. If we adopt a bonding requirement, we would expect to apply that starting with the 2009 model year.

We would expect the per-engine bond amount to be $25 for handheld engines and Class I engines. Class II engines cover a much wider range of applications, so we further differentiate the bond for those engines. The proposed per-engine bond amounts for Class II engines would be $50 for engines between 225 and 740 cc, $100 for engines between 740 and 1,000 cc, and $200 for engines above 1,000 cc. These values are generally scaled to be approximately 10 to 15 percent of the retail value. In the case of handheld engines, this is based on the retail value of equipment with installed engines, since these products are generally traded that way. Class II engines are very often sold as loose engines to equipment manufacturers, so the corresponding per-engine bond values are based on the retail value of the engine alone. This approach is similar to the bond requirements that apply for nonroad diesel engines (see § 1039.626).

The total bond amount would be based on the value of imported products over a one-year period. If an importer's bond would be used to satisfy a judgment, the importer would then be required to increase the amount of the bond within 90 days of the date the bond is used to cover the amount that was used. Also, we would require the bond to remain in place for five years after the importer no longer imports Small SI engines.

(d) Bond Requirements Related to Recall

Recall is another potential compliance obligation. The Clean Air Act specifies that EPA must require the manufacturer to conduct a recall if EPA determines that a substantial number of engines do not conform to the regulations. We have experience with companies that have faced compliance-related problems where it was clear that they did not have the resources to conduct a recall if that were necessary. Such companies benefit from certification without bearing the full range of associated obligations. We believe it is appropriate again to add a requirement to post a bond to ensure that a company can meet their recall obligations. The concern for being able to meet these obligations applies similarly to domestic and foreign manufacturers. The biggest indicator of a manufacturer's ability to make recall repairs relates to the presence of repair facilities in the United States. We are therefore proposing a bond requirement starting with the 2009 model year for all manufacturers (including importers) that do not have assembly facilities in the United States that are available for processing recall repairs or a repair network in the United States capable of processing recall repairs (see § 90.1007 and § 1054.685). Note that a single bond payment would be required for companies that must post bond for compliance-related obligations, as described above, in addition to the recall-related obligations. Such a repair network would need to involve at least 100 authorized repair facilities in the United States or at least one such facility for each 5,000 engines sold in the United States, whichever is less. Companies not meeting these criteria would need to post a bond as described above for compliance assurance. We would allow these companies to arrange for any applicable recall repairs to be done at independent facilities.

(e) Restrictions Related to Naming Model Years

New exhaust emission standards apply based on the date of engine assembly. We similarly require that equipment manufacturers use engines meeting emission standards in the same model year as equipment based on the equipment assembly date. For example, a manufacturer of a 2007 model year piece of equipment must generally use a 2007 model year engine. However, we allow equipment manufacturers to deplete their normal inventories of engines from the previous model year as long as there is no stockpiling of those earlier engines. We also note that this restriction does not apply if emission standards are unchanged for the current model year. We have found many instances where companies will import new engines usually installed in equipment and claim that the engine was built before emission standards took effect, even if the start date for emission standards was several years earlier. We believe many of these engines were in fact built later than the named model year, but it is difficult to prove the date of manufacture, which then makes it difficult to properly enforce these requirements. Now that emission standards have been in place for Small SI engines for almost ten years, we believe it is appropriate to implement a provision that prevents new engines manufactured several years previously to be imported when more recent emission standards have been adopted. This would prevent companies from importing noncompliant products by inappropriately declaring a manufacture date that precedes the point at which the current standards started to apply. It would also put a time limit on our existing provisions that allow for normal inventory management to use the supply of engines from previous model years when there has been a change in standards.

Starting January 1, 2009, we are proposing to specify that engines and equipment will be treated as having a model year at most one year earlier than the calendar year in which the importation occurs when there is a change in emission standards (see § 90.616 and § 1054.695). For example, for new standards starting in the 2011 model year, beginning January 1, 2012, all imported new products would be considered 2011 or later model year engines and would need to comply with new 2011 standards, regardless of the actual build date of the engines or equipment. (Engines or equipment would be considered new unless the importer demonstrates that the engine or equipment had already been placed into service, as described below.) This would allow a minimum of twelve months for manufactured engines to be shipped to equipment manufacturers, installed in equipment and imported into the United States. This time interval would be substantially longer for most engines because the engine manufacturer's model year typically ends well before the end of the calendar year. Also, engines produced earlier in the model year would have that much more time to be shipped, installed, and imported.

Manufacturers have expressed concern that the one-year limitation on imported products may be too short since there are often delays related to shipping, inventory, and perhaps most significantly, unpredictable fluctuations in actual sales volumes. We do not believe it is appropriate to maintain long-term inventories of these products outside the United States for eventual importation when it is clear several years ahead that the new standards are scheduled to take effect. Companies may be able to import these products shortly after manufacturing and keep their inventories in a U.S. distribution network to avoid the situation of being unable to sell these products. We request comment on the need to extend the one-year limit to account for the business dynamics. We also request comment on any narrower provisions that would allow for exceptions in certain circumstances. For example, should we consider allowing an additional year for products if manufacturers let us know ahead of time that they have certain numbers of engines or equipment that will not be imported in time, and they can demonstrate that they are not stockpiling or circumventing regulatory requirements?

In years where the standards do not change, this proposed provision would have no practical effect because, for example, a 2004 model year engine meets the 2006 model year standards. We would treat such an engine as compliant based on its 2004 emission label, any emission credit calculations for the 2004 model year, and so on. These engines could therefore be imported anytime until the end of the calendar year in which new standards take effect. Also, because the changes do not affect importation until there is a change in the standards, we are proposing to implement these provisions starting with the Phase 3 standards.

We do not intend for these proposed provisions to delay the introduction of emission standards by one year. It is still a violation to produce an engine in the 2011 calendar year and call it a 2010 model year engine to avoid being subject to 2011 standards.

Importation of equipment that is not new is handled differently. These products would not be required to be upgraded to meet new emission standards that started to apply after the engine and equipment were manufactured. However, to avoid the situation where companies simply declare that they are importing used equipment to avoid new standards, we are proposing to require that they provide clear and convincing evidence that such engines have been placed into service prior to importation. Such evidence would generally include documentary evidence of purchase and maintenance history and visible wear that is consistent with the reported manufacture date. Importing products for resale or importing more than one engine or piece of equipment at a time would generally call for closer evaluation to determine that this degree of evidence has been met.

(f) Import-Specific Information at Certification

We are proposing to require additional information to improve our ability to oversee compliance related to imported engines (see § 90.107 and § 1054.205). In the application for certification, we are proposing to require the following additional information: (1) The port or ports at which the manufacturer intends to import the engines, (2) the names and addresses of the agents the manufacturer has authorized to import the engines, and (3) the location of the test facilities in the United States where the manufacturer would test the engines if we select them for testing under a selective enforcement audit. This information should be readily available so we propose to require it for the 2009 model year. The current regulations in part 90 do not include these specific requirements; however, we do specify already that we may select imported engines at a port of entry. In such a case, we would generally direct the manufacturer to do testing at a facility in the United States. The proposed provision allows the manufacturers to make these arrangements ahead of time rather than relying on EPA's selection of a test lab. The current regulations also state clearly in § 90.119 that EPA may conduct testing at any facility to determine whether engines meet emission standards.

(g) Counterfeit Emission Labels

We have observed that some importers attempt to import noncompliant products by creating an emission control information label that is an imitation of a valid label from another company. We are not proposing to require that certifying manufacturers take steps to prevent this, but we are proposing to include a provision that specifically allows manufacturers to add appropriate features to prevent counterfeit labels. This may include the engine's serial number, a hologram, or some other unique identifying feature. We propose to apply this provision immediately upon completion of the final rule since it is an allowance and not a requirement (see § 1054.135).

(h) Partially Complete Engines

As described in Section XI, we are proposing to clarify engine manufacturers' responsibilities for certification with respect to partially complete engines. While this is intended to establish a path for secondary engine manufacturers to get their engines from the original engine manufacturer, we are aware that this will also prevent manufacturers from selling partially complete engines as a strategy to circumvent certification requirements. If long blocks or engines without fuel systems are introduced into U.S. commerce, either the original manufacturer or the company completing engine assembly would need to hold a certificate for that engine.

(7) Using Certified Small SI Engines in Marine Applications

Manufacturers have described situations in which Small SI engines are used in marine applications. As described in Section III.E.5, we are proposing to allow certified Small SI engines to be used in outboard or personal watercraft applications without certifying to the Marine SI emission standards in part 1045. We request comment on the appropriateness of this provision. In particular, we request comment on the extent to which the proposed provisions will address the unique situations that apply for swamp boats and other unusual configurations.

(8) Other Provisions

We are also proposing a variety of changes in the provisions that make up the certification and compliance program. Most of these changes serve primarily to align with the regulations we have started to apply to other types of engines.

The proposed warranty provisions are based on the requirements that already apply under 40 CFR part 90. We are proposing to add an administrative requirement to describe the provisions of the emission-related warranty in the owners manual. We expect that many manufacturers already do this but believe it is appropriate to require this as a routine practice. (See § 1054.120.) Testing new engines requires a period of engine operation to stabilize emission levels. The regulations specify two separate figures for break-in periods for purposes of certification testing. First, engines are generally operated long enough to stabilize emission levels. Second, we establish a limit on how much an engine may operate and still be considered a ''low-hour'' engine. The results of testing with the low-hour engine are compared with a deteriorated value after some degree of service accumulation to establish a deterioration factor. For Marine SI engines, we are proposing that the engine can be presumed to have stabilized emission levels after 12 hours of engine operation, with a provision allowing approval for more time if needed, and we generally require that low-hour test engines have no more than 30 hours of engine operation. However, given the shorter useful life for many Small SI engines, this would not make for a meaningful process for establishing deterioration factors. For example, emission levels in Small SI engines may not stabilize before deterioration begins to affect emission levels, which would prevent the engine from ever truly having stabilized emission levels. Also, the low-hour emission test should occur early enough to adequately represent the deterioration over the engine's lifetime.

We are proposing that Small SI engines with a useful life above 300 hours can be presumed stable after 12 hours with low-hour testing generally occurring after no more than 24 hours of engine operation. For Small SI engines with useful life below 300 hours, we are proposing a combination of provisions to address this concern. First, we are proposing to allow manufacturers to establish a stabilization period that is less than 12 hours without showing that emission levels have fully stabilized (see § 1054.501). Second, we propose to specify that low-hour testing must generally occur after no more than 15 hours of engine operation (see § 1054.801). This allows some substantial time for break-in, stabilization, and running multiple tests, without approaching a significant fraction of the useful life. Third, we are proposing that manufacturers consistently test low-hour production-line engines (and emission-data engines in the case of carryover deterioration factors for certification) using the same degree of service accumulation to avoid inaccurate application of deterioration factors (see § 1054.301).

As described in Section VII.C, we are proposing to clarify the maintenance that manufacturers may perform during service accumulation as part of the certification process. The general approach is to allow any amount of maintenance that is not emission-related, but to allow emission-related maintenance only if it is a routine practice with in-use engines. In most of our emission control programs we specify that 80 percent of in-use engines should undergo a particular maintenance step before manufacturers can do that maintenance during service accumulation for certification testing. We are aware that Small SI engines are predominantly operated by homeowners with widely varying practices in servicing their lawn and garden equipment. As such, achieving a rate of 80 percent may be possible only for the most obvious maintenance steps. We are therefore proposing a more accommodating approach for Small SI engines. In particular, we are proposing to allow manufacturers to perform a maintenance step during certification based on information showing that 60 to 80 percent of in-use engines get the specified maintenance at the recommended interval. We would approve the use of such maintenance based on the relative effect on performance and emissions. For example, we may allow scheduled fuel-injector replacement if survey data show this is done at the recommended interval for 65 percent of engines and performance degradation is shown to be roughly proportional to the degradation in emission control for engines that do not have their fuel injectors replaced.

One maintenance step of particular interest will be replacement of air filters. In larger spark-ignition engines, we don't treat replacement of air filters as critical emission-related maintenance, largely because those engines have feedback controls to compensate for changes in varying pressure drop across the air filter. However, for Small SI engines varying air flow through the air filter has a direct effect on the engine's air-fuel ratio, which in turn directly affects the engine's emission rates for each of the regulated pollutants. Service accumulation generally takes place in laboratory conditions with far less debris, dust, or other ambient particles that would cause filter loading, so filter changes should be unnecessary to address this conventional concern. We are concerned that the greater affect is from fuel and oil that may deposit on the back side of the filter, especially from crankcase ventilation into the intake. If filters are changed before an emission test, this effect will go undetected. If filter changes are disallowed before emission testing, manufacturers would need to design their intake systems to prevent internal filter contamination. We request comment on the need for replacing air filters, the effect on emission levels, and on the extent of change that would be needed to prevent filter contamination from recirculating crankcase gases. We also request comment on the extent to which air filters are changed with in-use engines. While this is clearly done with many engines, it is not clear that the experience is common enough that we would consider it to be routine, and therefore appropriate for certification engines. Since the cost of equipment, the types of jobs performed, and the operating lifetime varies dramatically for Class I and Class II engines, commenters should distinguish between in-use maintenance that is done by engine class as much as possible. We may, for example, conclude that owners of riding mowers and other Class II equipment routinely replace air filters to keep their equipment operating properly, while owners of walk-behind mowers and other Class I equipment are more likely to treat their equipment as a disposable product and therefore not replace the air filter.

We are proposing to define criteria for establishing engine families that are very similar to what is currently specified in 40 CFR part 90. We are proposing to require that engines with turbochargers be in a different family than naturally aspirated engines since that would be likely to substantially change the engine's emission characteristics. Very few if any Small SI engines are turbocharged today so this change will not be disruptive. We are also specifying that engines must have the same number, arrangement, and approximate bore diameter of cylinders. This will help us avoid the situation where manufacturers argue that engines with substantially different engine blocks should be in the same engine family. We would expect to implement this provision consistent with the approach adopted by California ARB in which they limit engine families to include no more than 15 percent variation in total engine displacement. Similarly, the current regulations in part 90 do not provide a clear way of distinguishing engine families by cylinder dimensions (bore and stroke) so we are also proposing to change part 90 to limit the variation in displacement within an engine family to 15 percent. (See § 1054.230 and § 90.116.)

The test procedures for Small SI engines are designed for engines operating in constant-speed applications. This covers the large majority of affected equipment; however, we are aware that engines installed in some types of equipment, such as small utility vehicles or go carts, are not governed to operate only at a single rated speed. These engines would be certified based on their emission control over the constant-speed duty cycle even though they do not experience constant-speed operation in use. We are not prepared to propose a new duty cycle for these engines but we are proposing to require engine manufacturers to explain how their emission control strategy is not a defeat device in the application for certification. For example, if engines will routinely experience in-use operation that differs from the specified duty cycle for certification, the manufacturer should describe how the fuel-metering system responds to varying speeds and loads not represented by the duty cycle. We are also proposing to require that engine distributors and equipment manufacturers that replace installed governors must have a reasonable technical basis for believing that the effectiveness of the modified engine's emission controls over the expected range of in-use operation will be similar to that measured over the specified duty cycle (see § 1054.650). This may require test data. While this does not require a new certificate of conformity, it may require testing to confirm that the engine modification should not be considered tampering. In addition, we would require that engine distributors and equipment manufacturers notify the engine manufacturer before modifying the engine, follow any instructions from the engine manufacturer related to the emission control system, and avoid making any other changes to the engine that would remove it from its certified configuration. We request comment on these provisions.

F. Small Business Provisions

(1) Small Business Advocacy Review Panel

On August 17, 2006, we convened a Small Business Advocacy Review Panel (SBAR Panel or the Panel) under section 609(b) of the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA). The purpose of the Panel was to collect the advice and recommendations of representatives of small entities that could be affected by this proposed rule and to prepare a report containing the Panel's recommendations for small entity flexibilities based on those comments, as well as on the Panel's findings and recommendations regarding the elements of the Initial Regulatory Flexibility Analysis (IRFA) under section 603 of the RFA. Those elements of an IRFA are:

- A description of, and where feasible, an estimate of the number of small entities to which the proposed rule will apply;
- A description of projected reporting, recordkeeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities that will be subject to the requirements and the type of professional skills necessary for preparation of the report or record;
- An identification, to the extent practicable, of all relevant Federal rules that may duplicate, overlap, or conflict with the proposed rule; and
- A description of any significant alternative to the proposed rule that accomplishes the stated objectives of applicable statutes and that minimizes any significant economic impact of the proposed rule on small entities.

The report of the Panel has been placed in the rulemaking record for this proposal.

In addition to EPA's Director of the Office of Regulatory Management and Information who acted as chairperson, the Panel consisted of the Director of the EPA's Assessment and Standards Division of the Office of Transportation and Air Quality, the Administrator of the Office of Management and Budget's Office of Information and Regulatory Affairs, and the Chief Counsel for Advocacy of the Small Business Administration.

Using definitions provided by the Small Business Administration (SBA), companies that manufacture internal-combustion engines and that employ fewer than 1,000 people are considered small businesses for the SBAR Panel. Companies that manufacture equipment and that employ fewer than 500 people, or fewer than 750 people for manufacturers of construction equipment, or fewer than 1,000 people for manufacturers of generators, are considered small businesses for the SBAR Panel. Based on this information, we asked 25 companies that met the SBA small business thresholds to serve as small entity representatives for the duration of the Panel process. Of these 25 companies, 14 of them represented a cross-section of Small SI engine manufacturers, equipment manufacturers, and fuel system component manufacturers. (The rest of the companies were involved in the Marine SI market.)

With input from small entity representatives, the Panel drafted a report providing findings and recommendations to us on how to reduce the potential burden on small businesses that may occur as a result of this proposed rule. The Panel report is included in the rulemaking record for this proposal. In light of the Panel report, and where appropriate, we have identified provisions anticipated for the proposed rule. The proposed flexibility options, based on the recommendations of the Panel, are described below.

(2) Proposed Burden Reduction Approaches for Small-Volume Nonhandheld Engine Manufacturers

We are proposing several provisions for small business nonhandheld engine manufacturers. The purpose of these provisions is to reduce the burden on companies for which fixed costs cannot be distributed over a large number of engines. We request comment on the appropriateness of these provisions which are described in detail below.

Under EPA's current Phase 2 regulations, EPA provided a number of provisions for small-volume engine manufacturers. For the Phase 2 regulations, the criteria for determining if a company was a "small-volume engine manufacturer" was based on whether the company projected at time of certification to have production of no more than 10,000 nonhandheld engines per year (excluding engines sold in California that are subject to the California ARB standards). Based on past experience, EPA believes that determining the applicability of the provisions based on number of employees, as compared to volume of products, can be more problematic given the nature of the workforce in terms of full-time, part-time, contract, overseas versus domestic, and parent companies. EPA believes it can avoid these potential complications and still provide relief to nearly all small businesses by continuing to use the annual sales criteria for determining which entities qualify as a small volume engine manufacturer under the Phase 3 program. For these reasons, EPA is proposing to retain the current production-based criteria for determining who is a small-volume engine manufacturer and, as a result, eligible for the Phase 3 flexibilities described below (see § 1054.801).

Based on confidential sales data provided to EPA by engine manufacturers, the 10,000 unit cut-off for engine manufacturers would include all of the small business engine manufacturers currently identified using SBA's employee-based definition. To ensure all small businesses have access to the flexibilities described below, EPA is also proposing to allow engine manufacturers which exceed the production cut-off level noted above but have fewer than 1,000 employees to request treatment as a small-volume engine manufacturer (see § 1054.635). In such a case, the manufacturer would need to provide information to EPA demonstrating that the manufacturer has fewer employees than the 1,000 cut-off level.

If a small-volume engine manufacturer grows over time and exceeds the production volume limit of 10,000 nonhandheld engines per year, the engine manufacturer would no longer be eligible for the small volume flexibilities. However, because some of the flexibilities described below provide manufacturers with the ability to avoid certain testing such as durability testing or production line testing, it may be difficult for a manufacturer to fully comply with all of the testing requirements immediately upon losing its small-volume status. In such cases, EPA is proposing that the engine manufacturer would be able to contact EPA and request additional time, subject to EPA approval, to meet the testing requirements that generally apply to engine manufacturers.

(a) Assigned Deterioration Factors

We are proposing that small-volume engine manufacturers may rely on an assigned deterioration factor to demonstrate compliance with the standards for the purposes of certification rather than doing service accumulation and additional testing to measure deteriorated emission levels at the end of the regulatory useful life (see § 1054.240). EPA is not proposing actual levels for the assigned deterioration factors with this proposal. EPA intends to analyze emissions deterioration information that becomes available over the next few years to determine what deterioration factors would be appropriate for nonhandheld engines. This is likely to include deterioration data for engines certified to comply with California ARB's Tier 3 standards and engines certified early to EPA's Phase 3 standards. Prior to the implementation date for the Phase 3 standards, EPA will provide guidance to engine manufacturers specifying the levels of the assigned deterioration factors for small-volume engine manufacturers.

(b) Exemption From Production-Line Testing

We are proposing that small-volume engine manufacturers would be exempt from the production-line testing requirements (see § 1054.301). While we are proposing to exempt small-volume engine manufacturers from production line testing, we believe requiring limited production-line testing could be beneficial to implement the ongoing obligation to ensure that production engines are complying with the standards. Therefore, we request comment on the alternative of applying limited production-line testing to small-volume engine manufacturers with a requirement to test one production engine per year.

(c) Additional Lead Time

We are proposing that small-volume engine manufacturers could delay implementation of the Phase 3 exhaust emission standards for two years (see § 1054.145). Small-volume engine manufacturers would be required to comply with the Phase 3 exhaust emission standards beginning in model year 2014 for Class I engines and model year 2013 for Class II engines. Under this approach, manufacturers would be able to apply this delay to all of their nonhandheld engines or to just a portion of their production. For those engine families that are certified to meet the Phase 3 standards prior to these delayed dates by selecting an FEL at or below the Phase 3 standards, small volume engine manufacturers could generate early Phase 3 credits (as discussed in Section V.C.3) through the 2013 model year for Class I engines and through the 2012 model years for Class II engines. This option provides more lead time for small-volume engine manufacturers to redesign their products. They would also be able to learn from some of the hurdles overcome by larger manufacturers.

(d) Broad Engine Families

We are also proposing that small-volume engine manufacturers may use a broader definition of engine family for certification purposes. Under the existing engine family criteria specified in the regulations, manufacturers group their various engine lines into engine families that have similar design characteristics including the combustion cycle, cooling system, cylinder configuration, number of cylinders, engine class, valve location, fuel type, aftertreatment design, and useful life category. We are proposing to allow small-volume engine manufacturers to group all of their Small SI engines into a single engine family for certification by engine class and useful life category, subject to good engineering judgment (see § 1054.230).

(e) Hardship Provisions

We are also proposing two types of hardship provisions for nonhandheld engine manufacturers consistent with the Panel recommendations. The first type of hardship is an unusual circumstances hardship which would be available to all businesses, regardless of size. The second type of hardship is an economic hardship provision which would be available to small businesses only. Sections VIII.C.8 and VIII.C.9 provide a description of the proposed hardship provisions that would apply to nonhandheld engine manufacturers.

(3) Proposed Burden Reduction Approaches for Small-Volume Nonhandheld Equipment Manufacturers

We are proposing three provisions for small-volume nonhandheld equipment manufacturers. The purpose of these provisions is to reduce the burden on companies for which fixed costs cannot be distributed over large sales volumes. We are offering these provisions because equipment manufacturers may need more lead time to redesign their equipment to accommodate the new Phase 3 engine designs. We request comment on the appropriateness of the flexibilities described below.

Under EPA's current Phase 2 regulations, EPA provided a number of lead time provisions for small-volume equipment manufacturers. For the Phase 2 regulations, the criteria for determining if a company was a ''small-volume equipment manufacturer'' was based on whether the company produced fewer than 5,000 nonhandheld pieces of equipment per year (excluding equipment sold in California that are subject to the California ARB standards). For the same reasons noted above for engine manufacturers, EPA is proposing to retain the current production-based criteria for determining who is a small-volume equipment manufacturer and, as a result, eligible for the Phase 3 flexibilities described below (see § 1054.801). The determination of which companies qualify as small-volume equipment manufacturers for the purposes of the flexibilities described below would be based on the annual U.S.-directed production of nonhandheld equipment in each of the three years from 2007 through 2009.

Based on estimated sales data for equipment manufacturers, EPA believes the 5,000 unit cut-off for equipment manufacturers would include almost all of the small business equipment manufacturers using SBA's employee-based definition. However to ensure all small businesses have access to the flexibilities described below, EPA is also proposing to allow equipment manufacturers which exceed the production cut-off level noted above but have fewer than 500 employees for equipment manufacturers, or 750 employees for construction equipment manufacturers, or 1,000 employees for generator manufacturers, to request treatment as a small-volume equipment manufacturer (see § 1054.635). In such a case, the manufacturer would need to provide information to EPA demonstrating that the manufacturer has fewer employees than the applicable employee cut-off level.

(a) Additional Lead Time

As described in Section V.E.3., EPA is proposing a transition program for all equipment manufacturers that produce Class II equipment. Under that program, equipment manufacturers can install Phase 2 engines in limited numbers of Class II equipment over the first four years the Phase 3 standards apply (*i.e.*, 2011 through 2014). The number of equipment that can use Phase 2 engines is based on 30 percent of an average annual production level of Class II equipment. To implement this two-year extension for small-volume equipment manufacturers within the context of the transition program for equipment manufacturers, EPA is proposing that small-volume manufacturers may use Phase 2 engines at a level of 200 percent of an average annual production level of Class II equipment. Small-volume equipment manufacturers could use these allowances over the four year period of the transition program (see § 1054.625). Therefore, a small-volume equipment manufacturer could potentially use Phase 2 engines on all their Class II equipment for two years, consistent with the SBAR Panel's recommendation, or they might, for example, sell half their Class II equipment with Phase 2 engines for four years assuming sales stay constant over time.

(b) Simplified Certification Procedure

We are proposing a simplified engine certification procedure for all equipment manufacturers, including small-volume equipment manufacturers. See Section V.E.4 for further discussion of this provision.

(c) Hardship Provisions

Because nonhandheld equipment manufacturers in many cases depend on engine manufacturers to supply certified engines in time to produce complying equipment, we are also proposing a hardship provision for all nonhandheld equipment manufacturers, regardless of size. The proposed hardship would allow the manufacturer to request more time if they are unable to obtain a certified engine and they are not at fault and would face serious economic hardship without an extension (see § 1068.255). Section VIII.C.10 provides a description of the proposed hardship provision that would apply to nonhandheld equipment manufacturers.

G. Technological Feasibility

(1) Level of Standards

We are proposing new, more stringent exhaust HC+NO_X standards for Class I and II Small SI engines. We are also proposing a new CO standard for Small SI engines used in marine generator applications.

In the 2005 model year manufacturers certified over 500 Class I and II engine families to the Phase 2 standards using a variety of engine designs and emission control technology. All Class I engines were produced using carbureted air-fuel induction systems. A small number of engines used catalyst-based emission control technology. Similarly, Class II engines were predominately carbureted. A limited number of these engines used catalyst technology, electronic engine controls and fuel injection, or were water cooled. In both classes, several engine families were certified at levels that would comply with the proposed Phase 3 standards. Also, a number of families were very close to the proposed emission standards. This suggests that, even accounting for the relative increase in stringency associated with our proposed Phase 3 requirements, a number of families either will not need to do anything or will require only modest reductions in their emission performance to meet the proposed standards. However, many engine families clearly will have to do more to improve their emissions performance.

Based on our own testing of advanced technology for these engines, our engineering assessments, and statements from the affected industry, we believe the proposed requirements will require many engine manufacturers to adopt exhaust aftertreatment technology using catalyst-based systems. Other likely changes include improved engine designs and fuel delivery systems. Finally, adding electronic controls or fuel injection systems may obviate the need for catalytic aftertreatment for some engine families, with the most likely candidates being multi-cylinder engine designs.

(2) Implementation Dates

We are proposing HC+NO_X exhaust emission standards of 10.0 g/kW-hr for Class I engines starting in the 2012 model year and 8.0 g/kW-hr for Class II engines starting in the 2011 model year. For both classes of nonhandheld engines, we are proposing to maintain the existing CO standard of 610 g/kW-hr. We expect manufacturers to meet these standards by improving engine combustion and adding catalysts.

For spark-ignition engines used in marine generators, we are proposing a more stringent Phase 3 CO emission standard of 5.0 g/kW-hr. This would apply equally to all sizes of engines subject to the Class I and II Small SI standards, with implementation dates as described above relative to Class I and Class II engines.

(3) Technological Approaches

Our feasibility assessment began by evaluating the emissions performance of current technology for Small SI engines and equipment. These initial efforts focused on developing a baseline for emissions and general engine performance so that we could assess the potential for new emission standards for engines and equipment in this category. This process involved laboratory and field evaluations of the current engines and equipment. We reviewed engineering information and data on existing engine designs and their emissions performance. Patents of existing catalyst/muffler designs for Class I engines were also reviewed. We engaged engine manufacturers and suppliers of emission control-related engine components in discussions regarding recent and expected advances in emissions performance beyond that required to comply with the current Phase 2 standards. Finally, we purchased catalyst/muffler units that were already in mass production by an original equipment manufacturer for use on European walk-behind lawn mowers and conducted engineering and chemical analyses on the design and materials of those units.

We used the information and experience gathered in the above effort along with the previous catalyst design experience of our engineering staff, to design and build prototype catalyst-based emission control systems that were capable of effectively and safely achieving the proposed Phase 3 requirement based on dynamometer and field testing. We also used the information and the results of our engine testing to assess the potential need for improvements to engine and fuel system designs, and the selective use of electronic engine controls and fuel injection on some engine types. A great deal of this effort was conducted in association with our more exhaustive study regarding the efficacy and safety of implementing advanced exhaust emission controls on Small SI engines, as well as new evaporative requirements for these engines. In other testing, we evaluated advanced emission controls on a multi-cylinder Class II engine with electronic fuel injection. The results of that study are also discussed in Section XII.

In our test program to assess the feasibility of achieving the proposed Phase 3 $HC+NO_X$ standard, we evaluated 15 Class I engines of varying displacements and valve-train designs. Each of these engines was equipped with a catalyst-based control system and all achieved the applicable standard at the end of their regulatory useful lives. Our work also suggests that manufacturers of Class I engines may also need to improve the durability of their basic engine designs, ignition systems, or fuel metering systems for some engines in order to comply with the emission regulations.

We tested five single-cylinder, overhead-valve Class II engines with prototype catalyst/muffler control systems. Three of the engines were carbureted and two were equipped with electronic engine and fuel controls. This latter technology improves the management of air-fuel mixtures and ignition spark timing. This itself can reduce engine-out emissions relative to a carbureted system and also allows the use of larger catalyst volumes and higher precious metal loading. Each of the engines achieved the requisite emission limit for $HC+NO_X$ (*e.g.*, 8.0 g/kW-hr). Based on this work and information from one manufacturer of emission controls, we believe that either a catalyst-based system or electronic engine controls appear sufficient to meet the standard. Nonetheless, some applications may require the use of both technologies. Finally, similarly to Class I engines, we found that manufacturers of Class II engines may also need to improve the durability of their ignition systems or fuel metering systems for some engines in order to comply with the emission regulations.

Multi-cylinder Class II engines are very similar to their single-cylinder counterparts regarding engine design and combustion characteristics. There are no multi-cylinder Class I engines. Base on these attributes and our testing of two twin-cylinder engines, we conclude that the proposed Phase 3 $HC+NO_X$ standard is technically feasible.

Nonetheless, we also found that multi-cylinder engines may present unique concern with the application of catalytic control technology under atypical operation conditions. More specifically, the concern relates to the potential consequences of combustion misfire or a complete lack of combustion in one of the two or more cylinders when a single catalyst/muffler design is used. A single muffler is typically used in Class II applications. In a single-catalyst system, the unburned fuel and air mixture from the malfunctioning cylinder would combine with hot exhaust gases from the other, properly operating cylinder. This condition would create high temperatures within the muffler system as the unburned fuel and air charge from the misfiring cylinder combusts within the exhaust system. This could potentially destroy the catalyst.

One solution is simply to have a separate catalyst/muffler for each cylinder. Another solution is to employ electronic engine controls to monitor ignition and put the engine into ''limp-mode'' until necessary repairs are made. For engines using carburetors, this would effectively require the addition of electronic controls. For engines employing electronic fuel injection that may need to add a small catalyst, it would require that the electronic controls incorporate ignition misfire detection if they do not already utilize the inherent capabilities within the engine management system.

As described earlier, we also expect some engine families may use electronic fuel injection to meet the proposed Phase 3 standard without employing catalytic aftertreatment. Engine families that already use these fuel metering systems and are reasonably close to complying with the proposed requirement are likely to need only additional calibration changes to the engine management system for compliance. In addition, we expect that some engine families which currently use carbureted fuel systems will convert directly to electronic fuel injection. Manufacturers may adopt this strategy to couple achieving the standard without a catalyst and realizing other advantages of using fuel injection such as easier starting, more stable and reliable engine operation, and reduced fuel consumption.

Our evaluation of electronic fuel injection systems that could be used to attain the proposed standard found that a rather simple, low-cost system should be sufficient. We demonstrated this proof of concept as part of the engine test program we conducted for our safety study. In that program, we fitted two single-cylinder Class II engines with an electronic control unit and fuel system components developed for Asian motor-scooters and small-displacement motorcycles. The sensors for the system were minimized to include a throttle position sensor, air charge temperature sensor, oil temperature sensor, manifold absolute pressure sensor, and a crankshaft position sensor. This is in contrast to the original equipment manufacturer fuel injection systems currently used in some equipment with two-cylinder Class II engine applications that employ more sophisticated and expensive automotive-based components.

Finally, there are a number of Class II engines that use gaseous fuels (*i.e.*, liquid propane gas or compressed natural gas). Based on our engineering evaluation of current and likely emission control technology for these engines, we conclude that there are no special concerns relative to achieving the proposed Phase 3 $HC+NO_X$ standard.

Turning to the proposed Phase 3 CO standard for Class I and II Small SI engines used in marine generator applications, these engines have several rather unique design considerations that are relevant to achieving the proposed CO standard. Marine generator engines are designed to operate for very long periods. Manufacturers generally design the engines to operate at lower loads to accommodate continuous operation. Manufacturers also design them to take advantage of the cooling available from the water in the lake or river where the boat is operating (seawater). By routing seawater through the engine block, or using a heat exchanger that transfers heat from the engine coolant to the seawater, manufacturers are able to maintain engine temperatures as well or better than automotive engines. Stable temperatures in the engine block make a very significant difference in engine operation, enabling much less distortion of the cylinders and a much more consistent combustion event. These operating characteristics make it possible to introduce advanced technology for controlling emissions. Manufacturers also use this cooling water in a jacketing system around the exhaust in order to minimize surface temperatures and reduce the risk of fires on boats.

The vast majority of gasoline marine generators are produced by two engine manufacturers. Recently, these two manufacturers have announced that they are converting their marine generator product lines to new designs which can achieve more than a 99 percent reduction in CO emissions. These manufacturers stated that this action is to reduce the risk of CO poisoning and is a result of boat builder demand. These low CO emission designs used closed-loop electronic fuel injection and catalytic control. Both of these manufacturers have certified some low CO engines and have expressed their intent to convert their full product lines in the near future. These manufacturers also make use of electronic controls to monitor catalyst function.

(4) Consideration of Regulatory Alternatives

In developing the proposed emission standards, we considered what was achievable with catalyst technology. Our technology assessment work indicated that the proposed emission standards are feasible in the context of provisions for establishing emission standards prescribed in section 213 of the Clean Air Act. We also considered what could be achieved with larger, more efficient catalysts and improved fuel induction systems. In particular, Chapter 4 of the Draft RIA presents data on Class I engines with more active catalysts and on Class II engines with closed-loop control fuel injection systems in addition to a catalyst. In both cases larger emission reductions were achieved.

Based on this work we considered $HC+NO_X$ standards which would have involved a 50 percent reduction for Class I engines and a 65–70 percent reduction for Class II engines. Chapter 11 of the Draft RIA evaluates these alternatives, including an assessment of the overall technology and costs of meeting more stringent standards. For Class I engines a 50 percent reduction standard would require base engine changes not necessarily involved with the standards we are proposing and the use of a more active catalyst. For Class II engines this would require the widespread use of closed loop control fuel injection systems rather than carburetors, some additional engine upgrades, and the use three-way catalysts. We believe it is not appropriate at this time to propose more stringent exhaust emission standards for Small SI engines. Our key concern is lead time. More stringent standards would require three to five years of lead time beyond the 2011 model year start date we are proposing for the program. We believe it would be more effective to implement the proposed Phase 3 standards to achieve near-term emission reductions needed to reduce ozone precursor emissions and to minimize growth in the Small SI exhaust emissions inventory in the post 2010 time frame. More efficient catalysts, engine improvements, and closed loop electronic fuel injection could be the basis for more stringent Phase 4 emission standards at some point in the future.

(5) Our Conclusions

We believe the proposed Phase 3 exhaust emission standards for nonhandheld Small SI engines will achieve significant emission reductions. Manufacturers will likely meet the proposed standards with a mix of three-way catalysts packaged in the mufflers and fuel-injection systems. Test data using readily available technologies have demonstrated the feasibility of achieving the proposed emission levels.

As discussed in Section X, we do not believe the proposed standards would have negative effects on energy, noise, or safety and may lead to some positive effects.

VI. Evaporative Emissions

A. Overview

Evaporative emissions refer to hydrocarbons released into the atmosphere when gasoline or other volatile fuels escape from a fuel system. The primary source of evaporative emissions from nonroad gasoline engines and equipment is known as *permeation*, which occurs when fuel penetrates the material used in the fuel system and reaches the ambient air. This is especially common through rubber and plastic fuel-system components such as fuel lines and fuel tanks. *Diurnal emissions* are another important source of evaporative emissions. Diurnal emissions occur as the fuel heats up due to increases in ambient temperature. As the fuel heats, liquid fuel evaporates into the vapor space inside the tank. In a sealed tank, these vapors would increase the pressure inside the tank; however, most tanks are vented to prevent this pressure buildup. The evaporating fuel therefore drives vapors out of the tank into the atmosphere. *Diffusion emissions* occur when vapor escapes the fuel tank through an opening as a result of random molecular motion, independent of changing temperature. *Running loss emissions* are similar to diurnal emissions except that vapors escape the fuel tank as a result of heating from the engine or some other source of heat during operation rather than from normal daily temperature changes. *Refueling losses* are vapors that are displaced from the fuel tank to the atmosphere when someone fills a fuel tank. *Refueling spitback* is the spattering of liquid fuel droplets coming out of the filler neck during a refueling event. *Spillage* is fuel that is spilled while refueling. Regulatory provisions to set standards for several of these types of evaporative emissions effectively define the terms for establishing the specific test procedures for measuring emissions. See the proposed regulatory text for more information.

This proposal is part of a larger effort to control evaporative emissions from all mobile sources. Motor vehicles have stringent evaporative emission controls based on SHED testing of complete vehicles.[82] As a result, motor vehicle manufacturers must control diurnal emissions, permeation through all fuel-system components, running loss emissions, refueling vapor displacement, refueling spitback, and to some extent, spillage. We recently established evaporative emission standards for recreational vehicles and Large SI engines (67 FR 68242, November 8, 2002). These standards include permeation requirements for fuel tanks and fuel lines. In addition, equipment using Large SI engines must control diurnal emissions and running losses. Fuel systems used with Small SI engines and Marine SI engines are not yet subject to evaporative emission standards.

In August 2002, we proposed permeation and diurnal emission standards for fuel systems related to Marine SI engines (67 FR 53050, August 14, 2002). We finalized other portions of that proposal but chose to delay promulgation of Marine SI evaporative standards. At the time of the earlier proposal there were still open issues regarding emission control technologies for rotational-molded fuel tanks and for pressurizing fuel tanks as a diurnal emission control strategy. Since then, EPA has continued gathering information and performing tests on new technologies that could be used to address these issues. In this notice we are updating the proposed evaporative emission standards for Marine SI fuel systems. The standards in this proposal incorporate this new information.

We are also proposing standards for controlling evaporative emissions from fuel systems used with Small SI engines. These proposed standards include requirements for controlling permeation, diffusion, and running loss emissions.

B. Fuel Systems Covered by This Rule

The proposed evaporative emission standards would apply to fuel systems for both Small SI engines and Marine SI engines. The marine standards apply to fuel systems related to both propulsion and auxiliary engines. In some cases, specific standards are proposed only for certain types of equipment, as described below. These standards would apply only to new products, as described in Section VII.A.

We are proposing to write the regulations related to evaporative emission standards in 40 CFR part 1060,

[82] An entire vehicle is placed in a SHED (Sealed Housing for Evaporative Determination) and total evaporative emissions are measured over prescribed test cycles.

which is devoted to evaporative emission controls from nonroad engines and equipment. The exhaust standard-setting part (part 1045 for Marine SI and part 1054 for Small SI) defines the emission standards, but references part 1060 for certification and testing procedures, in addition to definitions, compliance-related issues, and other special provisions. Section VII describes further how the different parts work together in the certification process. Also, as described in Section XI, we are proposing to allow component manufacturers and some equipment manufacturers to certify products under the provisions of part 1060 with respect to recreational vehicles. We also plan to clarify in a separate action that marine and land-based compression-ignition engines that operate on volatile liquid fuels (such as methanol or ethanol) are subject to evaporative requirements related to part 1060. The draft regulations in part 1060 describe how those provisions would apply for compression-ignition engines, but these regulations impose no obligations until we adopt those as requirements in a separate rulemaking.

The following definitions are important in establishing which components would be covered by the proposed standards: ''evaporative,'' ''fuel system,'' ''fuel line,'' ''portable nonroad fuel tank,'' and ''installed marine fuel tank.'' See the full text of these definitions in the proposed regulations at § 1060.801.

Note in particular that the proposed standards would apply to fuel lines, including hose or tubing that contains liquid fuel. This would include fuel supply lines but not vapor lines or vent lines not normally exposed to liquid fuel. We consider fuel return lines for handheld engines to be vapor lines, not fuel lines. Data in Chapter 5 of the Draft RIA suggest that permeation rates through vapor lines and vent lines are already lower than the proposed standard; this is due to the low vapor concentration in the vapor line. In contrast, permeation rates for materials that are consistently exposed to saturated fuel vapor are generally considered to be about the same as that for liquid fuel. The standards also do not apply to primer bulbs exposed to liquid fuel only for priming. This standard would apply to marine filler necks that are filled or partially filled with liquid fuel after a refueling event where the operator fills the tank as full as possible. In the case where the fuel system is designed to prevent liquid fuel from standing in the fill neck, the fill neck would be considered a vapor line and not subject to the proposed fuel line permeation standard. We request comment on the appropriateness of applying permeation standards to filler necks, vapor lines and vent lines for Small SI engines and Marine SI engines.

One special note applies to fuel systems for auxiliary marine engines. These engines must meet exhaust emission standards that apply to land-based engines. This is appropriate because these engines, typically used to power generators, operate more like land-based engines than like marine propulsion engines. For evaporative emissions, however, it is important that the fuel systems for propulsion and auxiliary engines be subject to the same standards because these engines typically draw fuel from a common fuel tank and share other fuel-system components. We are therefore proposing to apply the Marine SI evaporative emission standards and certification requirements to the fuel systems for both auxiliary and propulsion marine engines on marine vessels.

Our evaporative emission standards for automotive applications are based on a comprehensive measurement from the whole vehicle. However, the evaporative standards in this proposal are generally based on individual fuel-system components. For instance, we are proposing permeation standards for fuel lines and fuel tanks rather than for the equipment as a whole.[83] We are taking this approach for several reasons. First, most production of Small SI equipment and Marine SI vessels is not vertically integrated. In other words, the fuel line manufacturer, the engine manufacturer, the fuel tank manufacturer, and the equipment manufacturer are often separate companies. In addition, there are several hundred equipment manufacturers and boat builders, many of which are small businesses. Testing the systems as a whole would place the entire certification burden on the equipment manufacturers and boat builders. Specifying emission standards and testing for individual components allows for measurements that are narrowly focused on the source of emissions and on the technology changes for controlling emissions. This correspondingly allows for component manufacturers to certify that their products meet applicable standards. We believe it would be most appropriate for component manufacturers to certify their products since they are best positioned to apply emission control technologies and demonstrate compliance. Equipment manufacturers and boat builders would then be able to purchase certified fuel-system components rather than doing all their own testing on individual components or whole systems to demonstrate compliance with every requirement. In contrast, controlling running loss emissions cannot be done on a component basis so we are proposing to require engine or equipment manufacturers to certify that they meet the running loss standard. We would otherwise expect most equipment manufacturers to simply identify a range of certified components and install the components as directed by the component manufacturer to demonstrate compliance with the proposed emission standards.

Second, a great deal of diversity exists in fuel-system designs (hose lengths, tank sizes/shapes, number of connections, etc.). In most cases, the specific equipment types are low-volume production runs so sales would not be large enough to cover the expense of SHED-type testing. Third, there are similarities in fuel lines and tanks that allow for component data to be used broadly across products in spite of extensive variety in the geometry and design of fuel systems. Fourth, many equipment types, primarily boats, would not fit in standard-size SHEDs and would require the development of very large, very expensive test facilities if the entire vessel were tested.

Finally, by proposing separate standards for fuel line permeation, fuel tank permeation, diurnal emissions, and diffusion emissions, we are able to include simplified certification requirements without affecting the level of the standards. Specifying a comprehensive test with a single standard for all types of evaporative emissions would make it difficult or impossible to rely on design-based certification. Requiring emission tests to cover the wide range of equipment models would greatly increase the cost of compliance with little or no increase in the effectiveness of the certification program. We believe the proposed approach allows substantial opportunity for market forces to appropriately divide compliance responsibilities among affected manufacturers and accordingly results in an effective compliance program at the lowest possible cost to society.

The proposed emission standards generally apply to the particular engines and their associated fuel systems. However, for ease of reference, we may refer to evaporative standards as being related to Small SI equipment or Marine SI vessels, meaning the relevant

[83] An exception to component certification is the design standard for contolling running loss emissions.

evaporative standards for engines and fuel systems used in such equipment or vessels.[84] See Section VI.F for a more detailed description of certification responsibilities for all the proposed evaporative standards.

C. Proposed Evaporative Emission Standards

We are proposing permeation standards for Small SI equipment and Marine SI vessels, covering permeation from fuel tanks and fuel lines. We are also proposing diurnal emission standards for Marine SI vessels. We are proposing diffusion emission standards but not diurnal emission standards for nonhandheld Small SI equipment. In addition, we are proposing a running loss standard for nonhandheld Small SI equipment (except wintertime engines), with a variety of specified options for manufacturers to demonstrate compliance. Based on the current state of technology, we believe the proposed standards are a logical extension of the standards proposed for marine vessels in August 2002 and the standards finalized for recreational vehicles in November 2002.

All the proposed evaporative emission standards would apply to new equipment for a useful life period in years that matches the useful life of the corresponding engine. We propose to specify a five-year useful life for evaporative requirements for Small SI equipment (we are not proposing a year-based useful life requirement related to exhaust emissions for Small SI engines). Manufacturers have expressed concern that they will not have time to gain five years of in-use experience on low-permeation fuel tanks by the proposed dates of the tank permeation standards. Unlike barrier fuel line, which is well established technology, some fuel tanks may use barrier technologies that have not been used extensively in other applications. An example of this technology would be barrier surface treatments that must be properly matched to the fuel tank material. Therefore, we are proposing a shorter useful life of two years for Marine SI and Small SI fuel tanks through the 2013 model year to allow manufacturers to gain experience in use (see §§ 1045.145 and 1054.145). We do not expect this interim provision to affect manufacturer designs or in-use compliance efforts. We do not believe this interim provision to specify a shorter useful life period is necessary for other fuel-system components, either because there is adequate durability experience in other sectors or because the control inherently does not involve a concern over in-use deterioration.

The rest of this section summarizes the proposed standards, additional requirements, and implementation dates. Unless otherwise stated, implementation dates specified below refer to the model year. Section VI.D describes how manufacturers may use emission credits to meet fuel tank permeation standards. Section VI.E describes the test procedures corresponding to each standard. Section VI.F describes how component and equipment manufacturers certify their products and how their responsibilities overlap in some cases. Section VI.F also describes the simplified process of design-based certification for meeting many of the proposed standards.

(1) Fuel Line Permeation Standards and Dates

The proposed fuel line permeation standard applies to fuel lines intended for use in new Small SI equipment and Marine SI vessels is 15 g/m²/day at 23 °C on a test fuel containing 10 percent ethanol (see § 1060.102 and § 1060.515). The form of the standard refers to grams of permeation over a 24-hour period divided by the inside surface area of the fuel line. This proposed standard is consistent with that adopted for fuel lines in recreational vehicles. The move toward low-permeation fuel lines in recreational vehicles—and further development work in this area since the first proposed rule for marine evaporative emissions—demonstrates that low-permeation fuel lines are available on the market today for Small SI equipment and Marine SI vessels. In addition, many manufacturers are already using low-permeation technologies in response to permeation standards in California. We are therefore proposing that this standard apply beginning with 2008 for nonhandheld Small SI equipment and 2009 for Marine SI vessels. For handheld equipment, we are proposing a fuel line permeation implementation date of 2012, except that small-volume families as defined in § 1054.801 would have until 2013. Although low-permeation fuel line technology is available, handheld equipment is not currently subject to fuel line permeation requirements in California and does not typically use low-permeation fuel lines today. In addition, much of the fuel line used on handheld equipment is not straight-run fuel line for which low-permeation replacements are readily available; thus, more lead time is required. We request comment on the proposed standard and implementation dates.

Component manufacturers would be required to certify to the proposed emission standard for fuel lines (this may involve certification to a family emission limit above the emission standard for handheld engines, as described in Section VI.D), except in certain circumstances. Equipment manufacturers may need to certify that their fuel lines meet the proposed emission standards if they use any sections or pieces of fuel line that are not already certified by the fuel line manufacturer, or if they comply using emission credits, as described in Section VI.F.

To address the short lead time associated with the 2008 requirements for Small SI equipment, we are proposing an interim arrangement in which engine manufacturers would include compliant fuel lines under their existing certification (see § 90.127). This would prevent the need for other companies to submit new applications for certification that would need to be processed immediately. This arrangement would allow for engine manufacturers to start complying well ahead of the time that the fuel line standards become mandatory. The certification requirements described above for component manufacturers would start once Small SI engines and equipment would be subject to Phase 3 standards.

By specifying standards for fuel-system components rather than the entire fuel system, we must separately address appropriate requirements for connecting pieces, such as valves, O-rings, seals, plugs, and grommets that are exposed to liquid fuel but are not part of the fuel line. We are proposing to require that these ancillary pieces meet the broad specifications described in § 1060.101(f), which generally requires that fittings and connections be designed to prevent leaks. As described in Section VI.E.1, we are also proposing to allow testing of fuel line assemblies that include connecting pieces, primer bulbs, and other fuel line components as a single item (see § 1060.102). For example, manufacturers may certify fuel lines for portable marine fuel tanks as

[84] ''Small SI equipment'' includes all nonroad equipment powered by Small SI engines. ''Marine SI vessels'' includes all vessels powered by engines that run on volatile liquid fuels. In almost all cases these engines are powered by gasoline. Note also that volatile liquid fuels include methanol or ethanol, which could be used in a compression-ignition engine. While we are aware of no such equipment or vessels today, they would be covered by the proposed regulations. In this preamble, we nevertheless refer to all the vessels that fall within the scope of the proposed regulations as marine SI vessels. Throughout this section, we generally refer to Small SI equipment and Marine SI vessels as ''equipment,'' consistent with the proposed regulatory text.

assemblies of fuel line, primer bulbs, and self-sealing end connections. Finally, we are proposing to require that detachable fuel lines be self-sealing when they are removed from the fuel tank or the engine because this would otherwise result in high evaporative emissions (see § 1060.101). To the extent that equipment manufacturers and boat builders certify their products, they would need to describe how they meet the equipment-based requirements proposed in § 1060.101(e) and (f) in their application for certification. If boat builders rely on certified components instead of certifying, they would need to keep records describing how they meet the equipment-based requirements proposed in § 1060.101(e) and (f).

Handheld equipment manufacturers have raised concerns that fuel lines constructed of available low-permeation materials may not perform well in some handheld applications under extreme cold weather conditions such as below −30 °C. These products often use injected molded fuel lines with complex shapes and designs needed to address the unique equipment packaging issues and the high vibration and random movement of the fuel lines within the overall equipment when in use. Industry has expressed concern and the data in Chapter 5 of the Draft RIA suggest that durability issues may occur from using certain low-permeation materials in these applications when the weather is extremely cold and that these could lead to unexpected fuel line leaks. Handheld equipment types that could be considered as cold-weather products include cut-off saws, clearing saws, brush cutters over 40cc, commercial earth and wood drills, ice augers, and chainsaws.

The extreme cold temperatures needed to induce the potential fuel line failures are very rare but do occur each year in Alaska and the continental United States. EPA considered a number of different options aimed at developing special provisions for equipment most likely to be used in these extreme cold weather situations without providing relief to all of the equipment sold in the broad categories identified by industry as cold weather products. These included focusing the provisions on products used by professionals (longer useful life equipment or Class V equipment only), geographic-based retrofit kits, product segregation, and special labeling. While each of the options has some merit, none could provide the full assurance that handheld equipment using low-permeation fuel lines not compatible with extreme cold weather would not be used in such weather conditions. While very low temperature materials are available that can achieve the fuel line permeation standards discussed above, these materials come at a substantially higher cost than that for fuel lines used in non cold weather products and none have been evaluated in fuel lines on the handheld equipment at issue.

If we consider a less stringent standard, we believe there are lower cost materials available that could be used to achieve permeation reductions in equipment designed for cold weather applications without creating potential safety concerns related to fuel leaks. As discussed in the Draft RIA, rubbers with high acrylonitrile (ACN) content are used in some handheld applications. These materials have about half the permeation of lower ACN-content rubbers also used in handheld applications. To capture the capability of these materials to reduce permeation emissions without creating other issues for cold weather products, we are proposing a fuel line permeation standard of 175 g/m²/day in 2013 for cold-weather products. We request comment on appropriateness of this standard and whether there are materials that could be used to achieve larger fuel line permeation reductions from cold-weather products.

We request comment on what products should be considered to be cold-weather products and if it would be possible to distinguish between products used in warm versus cold climates. We also request comment regarding whether the proposed ABT program discussed below for handheld equipment would provide enough flexibility to manufacturers to address cold weather issues through credit trading rather than through a differentiated standard.

Outboard engine manufacturers have expressed concern that it would be difficult for them to meet proposed 2009 date for the sections of fuel lines that are mounted on their engines under the engine cowl. While some sections of straight-run fuel line are used on the outboards, many of the smaller sections between engine mounted fuel-system components and connectors are preformed or even injection-molded parts. Outboard engine manufacturers stated that they would need additional time to redesign and perform testing on low-permeation fuel lines under the cowl. PWC and SD/I manufacturers have indicated that this is not an issue on their engines because they are dominantly straight-run pieces. Outboard engine manufacturers have also stated that, in contrast to under cowl fuel line, they would be able to facilitate the introduction of low-permeation fuel line, from the fuel tank to the engine, in 2008.

We request comment on implementing an optional program where the implementation dates for fuel line under the cowl can be delayed beyond 2009, provided low-permeation fuel line from the fuel tank to the engine is used beginning on January 1, 2008. Under this approach, permeation standards for primer bulbs on fuel lines from the tank to the engine would still begin in 2009. One specific approach would be to phase in the use of low-permeation fuel lines on outboards based on the total inside surface area of the under cowl fuel lines. For instance the following phase-in could be implemented: 30 percent in 2010, 60 percent in 2011, and 90 percent in 2012. This would allow manufacturers to transition to the use of low-permeation fuel lines in an orderly fashion. Also, it would give them some flexibility to continue to use short sections of uncontrolled fuel lines, in the longer term, that are more difficult or costly to replace with low-permeation fuel lines. At some point in the future, such as 2015, we could require the use of 100 percent low-permeation fuel lines. Manufacturers would be expected to target 100 percent use of low-permeation fuel lines in new engine designs. If the surface area percentages were weighted across a manufacturers entire product line of outboard engines (rather than on a per-engine basis), it would allow manufacturers to use 100 percent low-permeation fuel lines on new engine designs, while making less changes to engines that are planned to be phased out of production.

We also request comment on how the above program could be implemented given that the fuel line from the tank to the engine is typically installed by the boat builder while the under-cowl fuel line is installed by the engine manufacturer. One approach that has been considered is requiring the engine manufacturer to specify low-permeation fuel line in its installation instructions beginning in 2008. The engines would not be made available to boat builders who do not begin using low-permeation fuel lines in 2008.

(2) Fuel Tank Permeation Standards and Dates

Except as noted below, we are proposing a fuel tank permeation standard of 1.5 g/m²/day for tanks intended for use in new Small SI equipment and Marine SI vessels based on the permeation rate of gasoline containing 10 percent ethanol at a test temperature of 28 °C (see § 1060.103 and § 1060.520). The emission standard is based on the inside surface area of the fuel tank rather than the volumetric capacity because permeation is a function of surface area exposed to fuel. This proposed standard is consistent with that adopted for fuel tanks in recreational vehicles.

We are proposing a fuel tank permeation standard of 2.5 $g/m^2/day$ for handheld equipment with structurally integrated nylon fuel tanks (see § 1060.801 for the proposed definition of structurally integrated nylon fuel tanks). These fuel tanks are molded as part of the general structure of the equipment. In most cases, these fuel tanks are made of glass-reinforced nylon for strength and temperature resistance. These nylon constructions typically have significantly lower permeation rates than other plastics used for fuel tanks, such as high-density polyethylene; however, based on data in Chapter 5 of the Draft RIA the nylon constructions may not be able meet a standard of 1.5 $g/m^2/day$. Therefore, we believe a higher standard is necessary for these fuel tank constructions. We request comment on this separate permeation standards for structurally integrated fuel tanks.

Many Small SI equipment manufacturers are currently using low-permeation fuel tanks for products certified in California. The California tank permeation test procedures use a nominal test temperature of 40 °C with California certification gasoline while we are proposing to require testing at 28 °C with gasoline containing 10 percent ethanol. We are proposing to allow manufacturers the alternative of testing their fuel tanks at 40 °C with our test fuel. Because permeation increases as a function of temperature, we are proposing an alternative standard of 2.5 g/m2/day for fuel tanks tested at 40 °C. For structurally integrated nylon fuel tanks, the alternative standard at 40 °C would be 4.0 $g/m^2/day$.

We consider three distinct classes of marine fuel tanks: (1) Portable marine fuel tanks (generally used with small outboards); (2) personal watercraft (PWC) fuel tanks; and (3) other installed marine fuel tanks (generally used with SD/I and larger outboards). The fuel tank permeation standards are proposed to start in 2011 for all Small SI equipment using Class II engines and for personal watercraft and portable marine fuel tanks. For Small SI equipment using Class I engines and for other installed marine fuel tanks, we propose to apply the same standard starting in 2012. Most of the marine fuel tanks with the later standards are produced in low volumes using rotational-molded cross-link polyethylene or fiberglass construction, both of which generally present a greater design challenge. We believe the additional lead time will be necessary for these fuel tanks to allow for a smooth transition to low-permeation designs. For Small SI equipment, these dates also align with the schedule for introducing the proposed Phase 3 exhaust emission standards.

Component manufacturers would be required to certify to the proposed permeation emission standard for fuel tanks (this may involve certification to a family emission limit above the emission standard, as described in Section VI.D), except in certain circumstances. Equipment manufacturers would need to certify that their fuel tanks meet the proposed emission standards if they are not already certified by the fuel tank manufacturer, or if they comply using emission credits, as described in Section VI.F. However, we are proposing that manufacturers of portable marine fuel tanks be required to certify that their products meet the new permeation standard. This is necessary because portable fuel tanks are not sold to boat builders for installation in a vessel. There is therefore no other manufacturer who could be treated as the manufacturer and responsible for meeting emission standards that apply to portable marine fuel tanks.

For handheld equipment, we are proposing a phased-in implementation of the fuel tank permeation standards. Manufacturers would be required to meet the proposed fuel tank permeation standards in 2009 for products that they already certify in California (see § 90.129). The remaining equipment, except for structurally integrated nylon fuel tanks and small-volume families, would be subject to the proposed tank permeation standards in 2010 (see § 1054.110). Structurally integrated nylon fuel tanks would be subject to the proposed standards in 2011 and small-volume families would have to meet the proposed tank permeation standards beginning in 2013. Manufacturers would need to start using EPA-specified procedures starting in 2010, except that equipment certified using carryover data would be allowed to use data collected using procedures specified for compliance in California for model years 2010 and 2011 (see § 1054.145).

For the purpose of the proposed fuel tank permeation standards, a fuel cap mounted on the fuel tank is considered to be part of the fuel tank. We consider a fuel cap to be mounted on the fuel tank unless the fuel tank is designed to have a filler neck at least 12 inches long with the opening at least six inches above the top of the fuel tank. The fuel cap would therefore be included in the tank permeation standard and test. The cap may optionally be tested separately from the tank and the results combined to determine the total tank permeation rate (see § 1060.521). Cap manufacturers could also test their caps and certify them separately to a separate 1.5 $g/m^2/day$ cap permeation standard. The permeation requirements apply independently of the diffusion standards described below, which address venting of fuel vapors. We are concerned that allowing certification of fuel caps could add complexity to the certification process. It would also add a measure of uncertainty in our efforts to ensure compliance with emission standards—for fuel tanks certified to permeation standards alone, it would be hard ensure that the fuel tanks in the final installation would be in a certified configuration with respect to diffusion emissions. We therefore request comment on the value to manufacturers of allowing fuel caps to be certified independently from the fuel tank. Note that a single certification fee would apply to fuel tanks that are certified to permeation and diffusion emission standards, but only if there is no optional fuel cap certification. With the option of fuel cap certification, a separate certification fee would apply to diffusion and permeation families, even if a single fuel tank manufacturer certifies to both standards.

(3) Diurnal Emission Standards and Dates

We are proposing diurnal emission standards for fuel tanks intended for use in new Marine SI vessels (see § 1045.107). We consider three distinct classes of marine fuel tanks: (1) Portable marine fuel tanks (used with small outboards); (2) personal watercraft (PWC) fuel tanks; and (3) other installed fuel tanks (used with SD/I and larger outboards). For diurnal emissions from portable fuel tanks, we are proposing a design requirement that the tank remain sealed up to a pressure of 5.0 psi, starting in the 2009 model year (see § 1060.105). We are also proposing that portable fuel tanks must continue to be self-sealing when disconnected from an engine.

We are proposing a general emission standard of 0.40 g/gal/day based on a 25.6–32.2 °C temperature profile for installed tanks. The applicable test procedures are described in Section VI.E.3. Manufacturers have expressed concerns that some very large boats stay in the water throughout the boating season and therefore will see a much smaller daily swing in fuel temperatures, which corresponds with a smaller degree of diurnal emissions. We are proposing to address this concern with an alternative standard and test procedure that would apply only for nontrailerable boats. Using available measurements related to fuel temperatures and emission models to relate temperatures to projected diurnal emission levels, we are proposing an alternative standard of 0.16 g/gal/day based on a 27.6–30.2 °C temperature cycle for fuel tanks installed in nontrailerable boats. For the purposes of this rule, we are proposing to define a nontrailerable boat as 26 feet or more in length, which is consistent with the U.S. Fish and Wildlife Service definition for ''nontrailerable recreational vessels'' in 50 CFR 86.12. The diurnal emission standards would apply starting in 2009 for PWC fuel tanks and in 2010 for other installed fuel tanks.

Component manufacturers would be required to certify to the proposed diurnal emission standard for fuel tanks, except in certain circumstances. Equipment manufacturers would need to certify that their fuel tanks meet the proposed emission standards if they are not already certified by the fuel tank manufacturer, as described in Section VI.F. As described above for permeation standards, we are proposing to require manufacturers of portable marine fuel tanks to certify that they meet the proposed diurnal emission standards since there is no ''equipment manufacturer'' to assume certification responsibility for those tanks.

We believe the proposed requirements would achieve at least a 50 percent reduction in diurnal emissions from PWC and other installed marine fuel tanks and nearly a 100 percent reduction from portable marine tanks. We request comment on the proposed diurnal emission standards for Marine SI vessels.

It is common today for portable marine fuel tanks to maintain an airtight seal when the engine is not operating. These tanks typically have caps that are fitted with a valve that can be manually opened during engine operation and closed when the fuel tank is stored. Although this technology could be used to control diurnal emissions effectively, it depends on user intervention. We are proposing that portable fuel tanks be required to be fitted with a self-sealing vent rather than a manually-controlled vent. For instance, a one-way diaphragm valve could be used to allow air in when fuel is drawn from the tank (to prevent vacuum conditions), but otherwise seal the fuel tank. Current portable marine fuel tanks are small and designed to hold pressure when the manual valve is closed. We are proposing to require that portable marine fuel tanks be designed to maintain a seal to allow for pressure buildup resulting from normal temperature swings. These tanks should include valves that prevent a vacuum in the tank during engine operation which could restrict fuel flow to the engine and potentially stall the engine. We believe portable marine fuel tanks with valves that seal automatically will control diurnal emissions without relying on user operation. We are proposing to implement this design standard beginning with the 2009 model year. We request comment on this approach.

Manufacturers will likely control emissions from installed marine fuel tanks either by sealing the fuel system up to 1.0 psi or by using a carbon canister in the vent line. As discussed below, we believe PWC manufacturers will likely seal the fuel tank with a pressure-relief valve while manufacturers of other boats with installed fuel tanks are more likely to use carbon canisters. However, either technology would be acceptable for either kind of installed marine fuel tank as long as every system meets the numerical standard applicable to the specific tank.

Personal watercraft currently use sealed fuel systems for preventing fuel from exiting, or water from entering, the fuel tank during typical operation. These vessels use pressure-relief valves for preventing excessive positive pressure in the fuel system; the pressure to trigger the valve may range from 0.5 to 4.0 psi. Such fuel systems would also need a low-pressure vacuum relief valve to allow the engine to draw fuel from the tank during operation. In the 2002 proposal, we discussed a diurnal emission standard largely based on the use of a sealed system with a 1.0 psi pressure-relief valve. The Personal Watercraft Industry Association (PWIA) expressed support in their comments for this proposal. We estimate that diurnal emissions from a sealed system with a 1.0 psi pressure-relief valve would be about half that of the same system on a PWC with an open vent. For personal watercraft, we are proposing an implementation date of 2009 because the anticipated technology is widely used today.

The National Marine Manufacturers Association (NMMA) expressed concern in their comments on the 2002 proposal that pressurized fuel tanks could lead to safety issues for larger installed fuel tanks. NMMA commented that these tanks would deform under pressure and that pressure could lead to fuel leaks. Manufacturers also commented that bladder fuel systems, which would not be pressurized, would be too expensive. At the time of the 2002 proposal, we considered the use of carbon canisters to control diurnal emissions, but were concerned that active purging would occur infrequently due to the low hours of operation per year seen by many boats. However, we have since collected data on carbon canisters showing that canisters can reduce emissions by more than 50 percent with passive purge that occurs during the normal breathing process without creating any significant pressure in the fuel tank. For installed marine fuel tanks, other than PWC, we are therefore proposing an implementation date of 2010 to allow additional lead time for designing and producing canisters for marine vessels.

During the SBREFA process described in Section VI.I, NMMA expressed general support of the feasibility of using carbon canisters on boats. However, they commented that there are many small boat builders that may need additional time to become familiar with and install carbon canisters in their boats. We request comment on either a three-year phase-in (say 33/66/100 percent over the 2010 through 2012 model years) or an extra year of lead time for small businesses to comply with the proposed diurnal emission standards. We also request comment on which small business companies would be eligible for this flexibility. One option would be to use the SBA definition of a small boat builder which is based on having fewer than 500 employees. Another option would be to base the flexibility on the annual boat sales of the company. One issue with the latter approach would be the wide range of boat sizes and sales prices in the marine industry. With a given number of employees, many more small than large boats can be manufactured in a year.

If a manufacturer uses a canister-based system to comply with the standard applicable to the specific tank, we are also proposing to require that manufacturers design their systems not to allow liquid gasoline to reach the canister during refueling or from fuel sloshing (see § 1060.105). Liquid gasoline would significantly degrade the carbon's ability to capture hydrocarbon vapors. One example of an approach to protect the canister from exposure to liquid gasoline is a design in which the canister is mounted higher than the fuel level and a small orifice or a float valve is installed in the vent line to stop the flow of liquid gasoline to the canister.

Several manufacturers have stated that it is common for users to fill their fuel tank until they see fuel coming out of the vent line. In addition to being a source of hydrocarbon emissions, if liquid fuel were to reach a carbon canister, it would significantly reduce the effectiveness of the canister. Solutions for this problem are relatively straightforward and have been used in automotive applications for many years. We are therefore proposing to require that boat builders use good engineering judgment in designing fuel systems that address diurnal emission control in a way that does not increase the occurrence of fuel spitback or spillage during refueling beginning in the years specified in Table VI–1. While this provision is not detailed or prescriptive, it communicates a requirement that manufacturers appropriately take refueling design into account, and it allows EPA to make enforcement decisions as the industry establishes sound practices in this area. In addition, we are proposing that manufacturers would have to meet certain specifications with their fuel tank caps, including requirements to tether the cap to the equipment and designing the cap to provide physical or audible feedback when the vapor seal is established. Also, adding vents to a fuel tank would generally not be allowed. To the extent that boat builders certify their vessels to meet emission standards, they would need to describe how they meet these refueling-related requirements in their application for certification. If boat builders rely on certified components instead of applying for certification, they would need to keep records describing how they meet these refueling-related requirements; Section VI.F describes how such companies can meet certification requirements without applying for a certificate.

Any increase in fuel temperature resulting from engine operation would cause a potential for emissions that is very similar to diurnal emissions. We are therefore proposing to disallow manufacturers from disabling their approaches for controlling diurnal emissions during engine operation (see § 1060.105). This would ensure that any running loss emissions that would otherwise occur will be controlled to a comparable degree as diurnal emissions.

We are not proposing diurnal emission standards for Small SI equipment. However, we request comment on such a requirement. We believe passively purging carbon canisters could reduce diurnal emissions by 50 to 60 percent from Small SI equipment. Active purging would result in even greater reductions. However, we believe some important issues would need to be resolved, such as cost, packaging, and vibration. The cost sensitivity is especially noteworthy given the relatively low emissions levels (on a per-equipment basis) from such small fuel tanks. We request comment on the appropriate level of such a standard and when it could be implemented.

There are some small outboard marine engines that have fuel tanks directly mounted on the engine. In these cases, the fuel tank could be considered to be more similar to those on Small SI equipment than other marine fuel tanks. Typically, these outboard engines have fuel tanks on the order of 1–2 liters in size. Manufacturers have expressed concern about the practicality of using carbon canisters for these applications due to space constraints and durability impacts of engine handling. We request comment on excluding fuel tanks less than 2 liters in size that are mounted on outboard engines from the proposed diurnal emission requirements. Since it may be a viable alternative, comments should address the feasibility of using sealed fuel tanks with pressure relief in these applications. Similar to Small SI equipment, marine fuel tanks mounted on the engine are directly exposed to heat from the engine during operation. In the case where diurnal standards were not applied to these fuel tanks, we request comment on applying the proposed diffusion and running loss standards, described below, to these fuel tanks.

(4) Diffusion Standards and Dates

As described above, diffusion emissions occur when vapor escapes the fuel tank through an opening as a result of random molecular motion, independent of changing temperature. Diffusion emissions can be easily controlled by venting fuel tanks in a way that forces fuel vapors to go through a long, narrow path to escape. We are proposing that manufacturers may choose between certifying to a performance standard or a design standard. Under a performance standard, we specify a test procedure and a maximum emission rate. Under a design standard, we specify certain designs that a manufacturer may use to comply with the standard. This standard would take effect at the same time as the exhaust emission standards—2011 for Class II engines and 2012 for Class I engines.

We are proposing a performance standard of 0.80 g/day for diffusion emissions for fuel tanks intended for use in new nonhandheld Small SI equipment (§ 1060.105). This standard would not apply to a manufacturer who certifies using one of the four alternative design standards described below.

1. We are proposing a design standard for diffusion in which the tank must be sealed except for a single vent line. This vent line would need to be at least 180 mm long and have a ratio of length to the square of the diameter of at least 5.0 mm^{-1} (127 $inches^{-1}$). For example, a vent line with 6 mm inside diameter would have to be at least 180 mm long to meet this design standard.

2. We are proposing a second alternative design standard for diffusion in which vapors from a fuel tank are vented solely through a tortuous path through the fuel cap. Many fuel cap manufacturers use this cap design today to prevent fuel from splashing out through the vent during operation. As described in Chapter 5 of the Draft RIA, we tested three low-diffusion fuel caps used on Class I equipment with high annual sales. Based on these designs, we proposing to define a tortuous path fuel cap as one that is vented through a small path in the gasket and then around the threads where the cap screws onto the fuel tank. Specifically, we are proposing an average path length to total cross sectional area in the gasket pathways of greater than 1 mm^{-1} and a vent path through at least 360° of the threads.

3. We are proposing a third alternative design standard for diffusion in which the fuel tank is sealed except for a vent through a carbon canister. Carbon canisters are one technology that manufacturers may use to meet diurnal emission standards in California.

4. We are proposing a fourth alternative design standard for diffusion in which a fuel tank is sealed so that vapors may not exit the fuel tank. Under this design standard, it would be acceptable to have a pressure relief valve with an opening pressure of at least 0.5 psi.

We request comment on the appropriateness of setting a design standard for diffusion and on the designs described above. We also request comment on any additional diffusion data from fuel caps that are capable of meeting the proposed performance-based diffusion standard and on the design of these fuel caps. Even without the alternative of a design standard, we anticipate that fuel cap manufacturers, with a small number of designs covering a large number of equipment models, would be able to perform the necessary testing for a performance-standard without being unreasonably burdened.

Fuel tank manufacturers would be required to certify that their products limit venting sufficiently to meet the proposed diffusion emission standard, except in certain circumstances. Fuel cap manufacturers may optionally certify their fuel caps to the diffusion emission standard, in which case they would become subject to all the compliance requirements related to the standards, including certification. Equipment manufacturers would need to certify that their fuel tanks meet the proposed emission standards if they are not already certified by the fuel tank manufacturer, as described in Section VI.F.

We are also proposing that equipment manufacturers subject to diffusion emission standards must ensure that the fuel cap is tethered to the fuel tank or the equipment to prevent it from being accidentally misplaced (see § 1060.101). A missing fuel tank cap would bypass any design intended to control these losses and could lead to very high emission rates. Fuel cap or fuel tank manufacturers could address this as part of their component certification. If this is not part of the component certification, an equipment manufacturer would need to describe how it meets the tethering requirement in its application for certification.

We are not proposing diffusion standards for handheld equipment. Handheld equipment use fuel caps that are either sealed or have tortuous venting pathways to prevent fuel from spilling during operation. We believe these fuel cap designs limit diffusion emissions sufficiently that handheld equipment already meet the proposed standard. In addition, we are not proposing diffusion standards for Marine SI vessels. The diurnal emission standard for Marine SI vessels will lead manufacturers to adopt technologies that automatically limit diffusion losses, so there is no need to propose a separate diffusion standard for those systems. Similarly, we would not finalize the proposed diffusion standard if we adopt a diurnal emission standard for Small SI equipment. We request comment on the proposed diffusion standard for nonhandheld equipment and whether it should apply to handheld equipment and marine vessels as well.

(5) Running Loss Emission Standards and Dates

We are proposing standards to control running loss emissions from nonhandheld Small SI equipment beginning in the same year as the proposed Phase 3 exhaust emission standards—2012 for Class I engines and 2011 for Class II engines (see § 1060.104). Equipment manufacturers would need to certify that their equipment models meet the proposed running loss requirements since component certification is not practical.

We have measured fuel temperatures and found that some types of equipment experience significant fuel heating during engine operation. This was especially true for fuel tanks mounted on or near the engine. This occurs in many types of Small SI equipment.

It would be very difficult to define a measurement procedure to consistently and accurately quantify running losses. Also, a performance standard with such a procedure would introduce a challenging testing requirement for hundreds of small-volume equipment manufacturers. Moreover, we believe there are several different design approaches that will reliably and effectively control running losses. We are therefore not proposing to control running losses using the conventional approach of establishing a procedure to measure running losses and adopting a corresponding emission standard. Manufacturers could choose from one of the following approaches to meet this requirement:

- Vent running loss fuel vapors from the fuel tank to the engine's intake manifold in a way that burns the fuel vapors in the engine instead of venting them to the atmosphere. The use of an actively purged carbon canister would qualify under this approach.
- Use a bladder to minimize fuel vapor volume in a sealed fuel tank.
- Design the equipment so that fuel temperature does not rise more than 8 °C during normal operation. Such a design may use insulation or forced cooling to minimize temperature increases. This would require measuring fuel temperatures to show that each covered equipment configuration does not exceed the temperature threshold (see § 1060.535).
- Show that the equipment qualifies as wintertime equipment.

We believe any of these approaches will ensure that manufacturers will be substantially controlling running losses, either by preventing or managing running loss vapors. While none of these approaches are expected to require extensive design changes or lead time, any manufacturer choosing the option to vent running loss fuel vapors into the engine's intake manifold would need to make this change in coordination with the engine design. As a result, we believe it is appropriate to align the timing of the running loss standards with the introduction of the proposed Phase 3 standards.

We request comment on the proposed running loss requirement for nonhandheld Small SI equipment. We also request comment on any other design approaches that will reliably and effectively control running losses. Examples of other approaches may be to seal the fuel tank for pressures up to 3.5 psi or, for equipment that does not include fuel recirculation, locate the fuel tank at least 12 inches away from the engine and other heat sources (such as exhaust pipes, hydraulic lines, etc.).

We are not proposing to apply the running loss requirements to handheld Small SI engines. We believe running loss emission standards should not apply to handheld engines at this time because the likely approach to controlling running losses could require that manufacturers revisit their design for controlling exhaust emissions. As described above, we are not proposing to change the exhaust emission standards for handheld engines in this rulemaking. In addition, there are some technical challenges that would require further investigation. For example, the compact nature of the equipment makes it harder to isolate the fuel tank from the engine and the multi-positional nature of the operation may prevent a reliable means of venting fuel vapors into the intake manifold while the engine is running. We request comment on the appropriateness of requiring manufacturers to address running loss emissions from handheld engines.

Furthermore, we are not proposing to apply running loss requirements to Marine SI engines. Installed marine fuel tanks are generally not mounted near the engine or other heat sources so running losses should be very low. A possible exception to this is personal watercraft since they are designed with the fuel tank closer to the engine. However, under the proposed standard for controlling diurnal emissions, we expect that manufacturers will design their fuel tanks to stay pressurized up to 1 psi. This would also help control running loss emissions. We request comment on applying running loss controls to Marine SI engines. In particular, we request comment on the possibility that other design configurations would have higher running loss emissions. One example may be outboard applications in which a fuel tank is mounted directly on the engine.

(6) Requirements Related to Refueling

Refueling spitback and spillage emissions represent a substantial additional amount of fuel evaporation that contributes to overall emissions from equipment with gasoline-fueled engines. We are not proposing measurement procedures with corresponding emission standards to address these emission sources. However, we believe equipment manufacturers can take significant steps to address these refueling issues by incorporating sound practices into their equipment designs. For example, designing a marine filler neck with a horizontal segment near the fuel inlet will almost inevitably lead to high levels of spillage since fuel flow will invariably reach the nozzle, leading to substantial fuel flow out of the fuel system. In contrast, designing for automatic shutoff would prevent this. Also, maintaining a vertical orientation of the filler neck would allow the fuel to flow back into the filler neck and into the tank after the nozzle shuts off.

For Small SI equipment, designing fuel inlets that are readily accessible and large enough to see the rising fuel level (either through the tank wall or the fuel inlet) will substantially reduce accidental spillage during refueling. We are therefore proposing to require that equipment manufacturers design and build their equipment such that operators could reasonably be expected to fill the fuel tank without spitback or spillage during the refueling event (see § 1060.101). This proposed requirement mirrors the following requirement recently adopted with respect to portable fuel containers (72 FR 8428, February 26, 2007):

> You are required to design your portable fuel containers to minimize spillage during refueling to the extent practical. This requires that you use good engineering judgment to avoid designs that will make it difficult to refuel typical vehicle and equipment designs without spillage. (40 CFR 59.611(c)(3))

While the proposed requirement is not as objective and quantifiable as the other standards and requirements we are proposing, we believe this is important, both to set a requirement for manufacturers in designing their products and to give EPA the ability to require manufacturers to select designs that are consistent with good engineering practice regarding effective refueling strategies. To the extent that equipment manufacturers and boat builders certify their products to emission standards, they would need to describe how they meet this refueling-related requirement in their application for certification. If boat builders rely on certified components instead of applying for certification, they would need to keep records describing how they meet this refueling-related requirement; Section VI.F describes how such companies can meet certification requirements without applying for a certificate. We request comment on this approach to addressing refueling emissions from nonroad spark-ignition engines. We also request comment on the possibility of relying on current or future published industry standards to establish designs for equipment and fueling containers that minimize refueling emissions under normal in-use conditions.

Spitback and spillage are a particular concern for gasoline-fueled boats. Marine operators have reported that relatively large quantities of gasoline are released into the marina environment during refueling events. The American Boat and Yacht Council (ABYC) has a procedure in place to define a standard practice to address refueling. However, this procedure calls for testing by refueling up to a 75 percent fill level at a nominal flow rate of 5 gallons per minute. This procedure is clearly not consistent with prevailing practices and is not effective in preventing spills. We believe the most effective means of addressing this problem is for ABYC to revise their test procedure to reflect current practices. Specifically, we would recommend a procedure in which the marine fuel tank is filled at flow rates between 5 and 20 gallons per minute until automatic shutoff occurs.

A variety of technological solutions are available to address spitback and spillage from marine vessels. The simplest would be a system much like is used on cars. A small-diameter tube could run along the filler neck from the top of the tank to a point near the top of the filler neck. Once liquid fuel would reach the opening of the filler neck and the extra tube, the fuel would go faster up the small-diameter tube and trigger automatic shutoff before the fuel climbs up the filler neck. This design would depend on the user to use the equipment properly and may not be fully effective, for example, with long filler necks and low refueling rates. An alternative design would involve a snug fit between the nozzle's spout and the filler neck, which would allow for a tube to run from a point inside the tank (at any predetermined level) directly to the shutoff venturi on the spout. The pressure change from the liquid fuel in the tank reaching the tube's opening would trigger automatic shutoff of the nozzle. This system would prevent overflowing fuel without depending on the user. These are just two of several possible configurations that would address fuel spillage from marine vessels.

We request comment on the degree of fuel spillage with current technologies and practices with marine vessels. We request comment on the potential for ABYC standards to address fuel spillage or on the need for EPA to adopt such procedures and standards. We request comment on the specific procedures that would be appropriate for measuring spitback and spillage. Finally, we request comment on adopting provisions such as those in 40 CFR 80.22 to regulate the dimensions of refueling nozzles for marine applications, including a specification of a nominal nozzle diameter of 1.187±0.010 inches and nominal venturi placement ⅝ inch from the terminal end of the nozzle.

(7) Summary Table of Proposed Evaporative Emission Standards

Table VI–1 summarizes the proposed standards and implementation dates discussed above for evaporative emissions from Small SI equipment and Marine SI vessels. Where a standard does not apply to a given class of equipment, ''NA'' is used in the table to indicate ''not applicable.''

TABLE VI.–1.—PROPOSED EVAPORATIVE EMISSION STANDARDS AND MODEL YEAR DATES

Standard/ category	Hose permeation	Tank permeation	Diurnal	Diffusion	Running loss
Proposed Standards					
Standard level	15 g/m²/day	1.5 g/m²/day	0.40 g/gal/day	0.80 g/day	Design standard.
Implementation Dates: Small SI Equipment					
Handheld	2012 [a b]	2009–2013 [c d]	NA	NA	NA.
Class I	2008	2012	NA	2012 [g]	2012.
Class II	2008	2011	NA	2011 [g]	2011.

TABLE VI.–1.—PROPOSED EVAPORATIVE EMISSION STANDARDS AND MODEL YEAR DATES—Continued

Standard/ category	Hose permeation	Tank permeation	Diurnal	Diffusion	Running loss
Implementation Dates: Marine Vessels					
Portable tanks	2009	2011	2009 [e]	NA	NA.
PWC	2009	2011	2009	NA	NA.
Other installed tanks	2009	2012	2010 [f]	NA	NA.

[a] 2013 for small-volume families and cold weather equipment.
[b] Fuel line permeation standard of 175 g/m^2/day for cold-weather equipment.
[c] 2.5 g/m^2/day for structurally integrated nylon fuel tanks.
[d] 2009 for families certified in California, 2013 for small-volume families, 2011 for structurally integrated nylon fuel tanks, and 2010 for remaining families.
[e] Design standard.
[f] Fuel tanks installed in nontrailerable boats (≥26 ft. in length) may meet a standard of 0.16 g/gal/day over an alternative test cycle.
[g] Alternatively, may meet a design standard.

D. Emission Credit Programs

A common feature of mobile source emission requirements is an emission credit program that allows manufacturers to generate emission credits based on certified emission levels for engine families that are more stringent than the standard. See Section VII for background information and general provisions related to emission credit programs.

We believe it is appropriate to consider compliance based on emission credits relative to permeation standards for fuel lines used with handheld engines and for fuel tanks used in all applications. As described above, the emission standards apply to the fuel tanks and fuel lines directly, such that we would generally expect component manufacturers to certify their products. However, we believe it is best to avoid placing the responsibility for demonstrating a proper emission credit balance on component manufacturers for three main reasons. First, it is in many cases not clear whether these components will be produced for one type of application or another. Component manufacturers might therefore be selling similar products into different applications that are subject to different standards—or no standards at all. Component manufacturers may or may not know in which application their products will be used. Second, there will be situations in which equipment manufacturers and boat builders take on the responsibility for certifying components. This may be the result of an arrangement with the component manufacturer, or equipment manufacturers and boat builders might build their own fuel tanks. We believe it would be much more difficult to manage an emission credit program in which manufacturers at different places in the manufacturing chain would be keeping credit balances. There would also be a significant risk of double-counting of emission credits. Third, most component manufacturers would be in a position to use credits or generate credits, but not both. Equipment manufacturers and boat builders are more likely to be in a position where they would keep an internal balance of generating and using credits to meet applicable requirements. Our experience with other programs leads us to believe that an emission credit program that depends on trading is not likely to be successful.

We are therefore proposing emission credit provisions in which equipment manufacturers and boat builders keep a balance of credits for their product line. Equipment manufacturers and boat builders choosing to comply based on emission credits would need to certify all their products that either generate or use emission credits. Component manufacturers would be able to produce their products with emission levels above or below applicable emission standards but would not be able to generate emission credits and would not need to maintain an accounting to demonstrate a balance of emission credits.

We are aware that some component manufacturers would be making products that generate emission credits that would belong to equipment manufacturers or boat builders. Equipment manufacturers or boat builders could in turn use those emission credits to enable them to buy components from different competing component manufacturers. This would potentially put fuel tank manufacturers producing low-FEL products at a competitive disadvantage with other manufacturers producing high-FEL fuel tanks. We request comment on the best approach to setting up an ABT program. We specifically request comment on special provisions that may be appropriate to address these competitiveness issues for component manufacturers.

(1) Averaging, Banking, and Trading for Nonhandheld Equipment and Marine Vessels

We are proposing averaging, banking, and trading (ABT) provisions for fuel tank permeation from nonhandheld Small SI equipment and Marine SI vessels (see subpart H in parts 1045 and 1054). See the following section for similar provisions for handheld Small SI equipment.

We are aware of certain control technologies that would allow manufacturers to produce fuel tanks that reduce emissions more effectively than we would require. These technologies may not be feasible or practical in all applications, but we are proposing to allow equipment manufacturers using such low-emission technologies to generate emission credits. In other cases, an equipment manufacturer may want to or need to use emission credits that would allow for fuel tanks with permeation rates above the applicable standards. Equipment manufacturers would quantify positive or negative emission credits by establishing a Family Emission Limit (FEL) to define the applicable emission level, then factoring in sales volumes and useful life to calculate a credit total. This FEL could be based on testing done either by the component manufacturer or the equipment manufacturer. Through averaging, these emission credits could be used by the same equipment manufacturer to offset other fuel tanks in the same model year that do not have control technologies that control emissions to the level of the standard. Through banking, such an equipment manufacturer could use the emission credits in later model years to offset high-emitting fuel tanks. The emission credits could also be traded to another equipment manufacturer to offset that company's high-emitting fuel tanks.

We believe an ABT program is potentially very advantageous for fuel tanks because of the wide variety of tank designs. The geometry, materials, production volumes, and market dynamics for some fuel tanks are well suited to applying emission controls but other fuel tanks pose a bigger challenge. The proposed emission credit program allows us to set a single standard that applies broadly without dictating that all fuel tanks be converted to use low-permeation technology at the same time.

We are requesting comment on one particular issue. We are not proposing to limit the life of evaporative emission credits under the proposed banking program. However, we are concerned that this could result in a situation where credits generated by a fuel tank sold in a model year are not used until many years later when the fuel tanks generating the credits have been scrapped and are no longer part of the fleet. EPA believes there may be value to limiting the use of credits to the period that the credit-generating fuel tanks exist in the fleet. For this reason, EPA requests comment on limiting the lifetime of the credits generated under the proposed evaporative emission ABT program to five years. The five-year period is consistent with the proposed useful life for fuel tank evaporative emissions.

We are proposing not to allow manufacturers to generate emission credits by using metal fuel tanks. These tanks would have permeation rates well below the standard, but there is extensive use of metal tanks today, so it would be difficult to allow these emission credits without undercutting the stringency of the standard and the expected emission reductions from the standard.

Emission control technologies and marketing related to portable marine fuel tanks are quite different than for installed tanks. Since these fuel tanks are not installed in vessels that are subject to emission standards, the fuel tank manufacturer would need to take on the responsibility for certification. As a result, we would treat these companies as both component manufacturer and equipment manufacturer with respect to their portable fuel tanks. As described above, we are proposing that component manufacturers not be responsible for compliance as part of an emission credit program. We would expect all portable fuel tank manufacturers to also make nonportable fuel tanks, which would again lead to a confusing combination of manufacturers maintaining credit balances to demonstrate compliance. In addition, most if not all portable fuel tanks are made using high-density polyethylene in a blow-molding process. The control technologies for these tanks are relatively straightforward and readily available so we do not anticipate that these companies will need emission credits to meet the proposed standards. We are therefore proposing to require portable marine fuel tanks to meet emission standards without an emission credit program.

We are proposing not to allow cross-trading of emission credits between Small SI equipment and Marine SI vessels. The proposed standards are intended to be technology-forcing for each equipment category. We are concerned that cross-trading may allow marginal credits in one area to hamper technological advances in another area. We are also proposing not to allow credit exchanges with Small SI equipment certified in California because California has its own emission standards for these products. Similarly, if California ARB adopts different evaporative requirements or separate ABT provisions for Marine SI vessels, we would not allow credit exchanges with marine vessels certified in California. These restrictions are consistent with our existing ABT programs. We also would not allow credit exchanges between handheld and nonhandheld equipment or between Class I and Class II equipment. We are concerned that cross trading between these equipment types could give an unfair competitive advantage to equipment manufacturers with broader product lines. We request comment regarding whether the competitive nature of the market warrants such a restriction in cross-trading between Class I and Class II equipment.

In the early years of the ABT program we are proposing not to have an FEL cap. This would give manufacturers additional time to use uncontrolled fuel tanks, primarily in small-volume applications, until they could convert their full product lines to having fuel tanks with permeation control. After an initial period of three years after the implementation date of the fuel tank standards, we are proposing an FEL cap of 5.0 $g/m^2/day$ (8.3 $g/m^2/day$ if tested at 40 °C). For Class II equipment, portable marine fuel tanks, and personal watercraft, the FEL cap would begin in 2014. For Class I equipment, handheld equipment, and other installed marine fuel tanks, the FEL cap would begin in 2015. See § 1045.107 and § 1054.110. For small volume, Small SI equipment families, we are proposing an FEL cap of 8.0 $g/m^2/day$ (13.3 $g/m^2/day$ if tested at 40 °C). The purpose of the FEL cap would be to prevent the long-term production of fuel tanks without permeation control, while still providing regulatory flexibility. We request comment on the level of the FEL that would be necessary to achieve this goal.

While the FEL cap is intended to require manufacturers to move toward widespread use of emission control technologies, we are aware of technologies that have measured emission levels between the proposed standard and the proposed FEL cap. As a result, the effect of an FEL cap may be that there will be little or no use of emission credits as a compliance strategy once the FEL cap applies. We request comment on the usefulness of maintaining an ABT program after we implement an FEL cap.

We are proposing that emission credits under the tank permeation standards would be calculated using the following equation: Credits [grams] = (Standard − FEL) × useful life [years] × 365 days/year × inside surface area [m^2]. Both the standard and the FEL are in units of $g/m^2/day$ based on testing at 28 °C.

As discussed earlier, we are proposing an alternative standard for tank permeation testing performed at 40 °C. Because permeation is higher at this temperature than the primary test temperature, emissions credits and debits calculated at this test temperature would be expected to be higher as well. An FEL 10 percent below the standard would generate 0.15 grams of credit for the primary standard and 0.25 grams of credit for the alternative standard. Therefore, we are proposing that credits and debits that are calculated based on the alternative standard be adjusted using a multiplicative factor of 0.6 (1.5/2.5 = 0.6).

We request comment on the need for averaging, banking and trading for fuel tanks and on the specific provisions proposed above.

(2) Averaging, Banking, and Trading Program for Handheld Equipment

We are proposing an ABT program for handheld equipment that would include fuel tanks and fuel lines. Under this program, a manufacturer would be able to use credits from fuel tanks to offset debits from fuel lines, or vice versa. This category of equipment generally involves very short sections of fuel lines, which are often made using complex, injection-molded designs. We believe an ABT program would help handheld equipment manufacturers meet fuel line permeation standards sooner than would otherwise be possible.

As discussed earlier, we are proposing a higher standard level of 2.5 g/m^2/day for structurally integrated handheld fuel tanks. This standard is intended to reflect the measured permeation rates and characteristics of materials used in these fuel tanks and manufacturer concerns regarding uncertainty about the permeation rates from tanks used in the wider range of products and the lack of definitive control strategies to reduce emissions while meeting other product requirements. A similar issue exists for cold-weather fuel lines, for which we are proposing a less stringent permeation standard of 175 g/m^2/day to address uncertainty associated with the availability of appropriate low-permeation cold-weather materials in the time frame of the new standards. We are concerned that windfall credits that may be generated for these applications if products are produced that are below the adjusted standards, but do not meet the primary standards for fuel tanks and fuel lines. To address this issue, we are proposing that credits would only be earned below 1.5 g/m^2/day for fuel tanks and below 15 g/m^2/day for fuel lines on handheld equipment. To promote early introduction of low-permeation products, we are proposing to allow manufacturers to be able to earn credits on this basis even before the permeation standards go into effect. Credit use would be calculated based on the applicable standards. Emission credits would otherwise be calculated using the same equation described in Section VI.D.1 above.

Both the fuel line and fuel tank standards are in units of g/m^2/day. However, fuel line testing is performed at 23 °C while tank testing is performed at 28 °C. Because permeation tends to increase with increases in temperature, we request comment regarding whether the credits should be adjusted to account for temperature. This adjustment would be smaller than the adjustment described above for a 28 °C versus 40 °C test.

For non-structurally integrated fuel tanks, we are proposing to apply an FEL cap of 5.0 g/m^2/day (8.3 g/m^2/day if tested at 40°C) beginning in 2015. For structurally integrated fuel tanks we are proposing an FEL cap of 3.0 g/m^2/day (5.0 g/m^2/day if tested at 40 °C) in 2015. We believe this cap gives adequate flexibility for manufacturers to address variability in the permeation rates of these fuel tanks. For small volume, Small SI equipment families (including handheld and nonhandheld equipment), we are proposing a long term FEL cap of 8.0 g/m^2/day (13.3 g/m^2/day if tested at 40°C) to provide additional regulatory flexibility where costs cannot be spread over high production volumes. We request comment on the need for continuing an ABT program once there is an FEL cap, as described for nonhandheld equipment above.

(3) Other Evaporative Sources

We are not proposing an emission credit program for other evaporative sources. We believe technologies are readily available to meet the applicable standards for fuel line permeation, diurnal emissions and diffusion emissions (see Section VI.H.). The exception to this is for fuel lines on handheld equipment as discussed above. In addition, the diurnal emission standards for portable marine fuel tanks and PWC fuel tanks are largely based on existing technology so any meaningful emission credit program with the proposed standards would result in windfall credits. The running loss standard is not based on emission measurements and refueling-related requirements are based on design specifications only, so it is not appropriate or even possible to calculate emission credits.

(4) Early-Allowance Programs

Manufacturers may in some cases be able to meet the proposed emission standards earlier than we would require. We are proposing provisions for equipment manufacturers using low-emission evaporative systems early to generate allowances before the standards apply. These early allowances could be used, for a limited time, after the implementation date of the standards to sell equipment or fuel tanks that have emissions above the standards. We are proposing two types of allowances. The first is for Small SI equipment as a whole where for every year that a piece of equipment is certified early, another piece of equipment could delay complying with the proposed standards by an equal time period beyond the proposed implementation date. The second is similar but would be just for the fuel tank rather than the whole equipment (Small SI or Marine SI). Equipment or fuel tanks certified for the purposes of generating early allowances would be subject to all applicable requirements. These allowances are similar to the emission credit program elements described above but they are based on counting compliant products rather than calculating emission credits. Establishing appropriate credit calculations would be difficult because the early compliance is in some cases based on products meeting different standards using different procedures.

(a) Nonhandheld Small SI Equipment

Many Small SI equipment manufacturers are currently certifying products to evaporative emission standards in California. The purpose of the proposed early-allowance program is to provide an incentive for manufacturers to begin selling low-emission products nationwide. We are proposing to give allowances to manufacturers for equipment meeting the California evaporative emission standards that are sold in the United States outside of California and are therefore not subject to California's emission standards. Manufacturers would need to have California certificates for these equipment types. See § 1054.145.

Allowances could be earned in any year before 2012 for Class I equipment and before 2011 for Class II equipment. We are proposing that the allowances may be used through the 2014 model year for Class I and through the 2013 model year for Class II equipment. We are proposing not to allow trading of allowances between Class I and Class II. To keep this program simpler, we are not proposing to adjust the allowances based on the anticipated emission rates from the equipment. Therefore, we believe it is necessary to at least distinguish between Class I and Class II equipment. We request comment on the early allowance program described above for nonhandheld Small SI equipment.

(b) Fuel Tanks

We are also proposing an early-allowance program for nonhandheld Small SI equipment for fuel tanks (see § 1054.145). This program would be similar to the program described above for equipment allowances, except that it would be for fuel tanks only. We would accept California-certified configurations. Allowances could be earned prior to 2011 for Class II equipment and prior to 2012 for Class II equipment; allowances could be used through 2013 for Class II equipment and through 2014 for Class II equipment. Allowances would not be exchangeable between Class I and Class II equipment. See Section V.E.3 for a description of how this provision would interact with the proposed transition program for equipment manufacturers.

The proposed early-allowance program for marine fuel tanks would be similar except that there are no California standards for these tanks (see § 1045.145). Manufacturers certifying early to the proposed fuel tank permeation standards would be able to earn allowances that they could use to offset high-emitting fuel tanks after the proposed standards go into place. We are proposing not to allow cross-trading of allowances between portable fuel tanks, personal watercraft, and other installed fuel tanks. Each of these categories includes significantly different tank sizes and installed tanks have different implementation dates and are expected to use different permeation control technology. For portable fuel tanks and personal watercraft, allowances could be earned prior to 2011 and used through the 2013 model year. For other installed tanks, allowances could be earned prior to 2012 and used through the 2014 model year.

E. Testing Requirements

Compliance with the emission standards is determined by following specific testing procedures. This section describes the proposed test procedures for measuring fuel line permeation, fuel tank permeation, diurnal emissions, and diffusion emissions. We also describe measurement procedures related to running loss emissions. As discussed in Section VI.H, we are proposing design-based certification as an alternative to testing for certain standards.

(1) Fuel Line Permeation Testing Procedures

We are proposing that fuel line permeation be measured at a temperature of 23 ± 2 °C using a weight-loss method similar to that specified in SAE J30 [85] and J1527 [86] recommended practices (see § 1060.515). We are proposing two modifications to the SAE recommended practice. The first modification is for the test fuel to contain ethanol; the second modification is to require preconditioning of the fuel line through a fuel soak. These modifications are described below and are consistent with our current requirements for recreational vehicles.

(a) Test Fuel

The recommended practice in SAE J30 and J1527 is to use ASTM Fuel C (defined in ASTM D471–98) as a test fuel. We are proposing to use a test fuel containing 10 percent ethanol. We believe the test fuel must contain ethanol because it is commonly blended into in-use gasoline and because ethanol substantially increases the permeation rates for many materials.

Specifically, we are proposing to use a test fuel of ASTM Fuel C blended with 10 percent ethanol by volume (CE10).[87] Manufacturers have expressed support of this test fuel because it is a consistent test fluid compared to gasoline and because it is widely used today by industry for permeation testing. In addition, most of the data used to develop the proposed fuel line permeation standards were collected on this test fuel. This fuel is allowed today as one of two test fuels for measuring permeation from fuel lines under the recreational vehicle standards.

We request comment on allowing permeation testing using EPA certification gasoline (known as indolene and specified in 40 CFR 1065.710) blended with 10 percent ethanol as the test fuel (IE10). This test fuel is also specified in the recreational vehicle standards and has the advantage of being more similar to in-use fuel than CE10. Based on data contained in Chapter 5 of the Draft RIA, most materials used in fuel line constructions have lower permeation rates on IE10 than CE10. Because the proposed standards are based primarily on data collected using CE10 as a test fuel, we also request comment on how the level of the standard would need to be adjusted for testing performed on IE10.

(b) Preconditioning Soak

The second difference from weight-loss procedures in SAE practices is in fuel line preconditioning. We believe the fuel line should be preconditioned with an initial fuel fill followed by a long enough soak to ensure that the permeation rate has stabilized. We are proposing a soak period of four to eight weeks at 23 ± 5 °C. Manufacturers should use the longer soak period as necessary to achieve a stabilized permeation rate for a given fuel line design, consistent with good engineering judgment. For instance, thick-walled marine fuel line may take longer to reach a stable permeation rate than the fuel line used in Small SI equipment. After this fuel soak, the fuel reservoir and fuel line would be drained and immediately refilled with fresh test fuel prior to the weight-loss test. We request comment on the need to require a longer fuel soak, especially for marine lines.

(c) Alternative Approaches

We also propose to allow permeation measurements using alternative equipment and procedures that provide equivalent results (see § 1060.505). To use these alternative methods, manufacturers would first need to get our approval. Examples of alternative approaches that we anticipate manufacturers may use are the recirculation technique described in SAE J1737 or enclosure-type testing such as in 40 CFR part 86.[88] Note that the proposed test fuel, test temperatures, and preconditioning soak described above would still apply. Because permeation increases with temperature we would accept data collected at higher temperatures (greater than 23 °C) for a demonstration of compliance.

For portable marine fuel tanks, the fuel line assembly from the engine to the fuel tank typically includes two sections of fuel line with a primer bulb in-between and quick-connect assemblies on either end. We are proposing a provision to allow manufacturers to test the full assembly as a single fuel line to simplify testing for these fuel line assemblies (see § 1060.102). This gives the manufacturer the flexibility to use a variety of materials as needed for performance reasons while meeting the fuel line permeation standard for the fully assembled product. Measured values would be based on the total measured permeation divided by the total internal surface area of the fuel line assembly. However, where it is impractical to calculate the internal surface area of individual parts of the assembly, such as a primer bulb, we would allow a simplified calculation that treats the full assembly as a straight fuel line. This small inaccuracy would cause reported emission levels (in $g/m^2/day$) to be slightly higher so it would not jeopardize a manufacturer's effort to demonstrate compliance with the applicable standard.

We request comment on the above approaches for fuel line permeation testing and on the proposed test fuel.

(2) Fuel Tank Permeation Testing Procedures

The proposed test procedure for fuel tank permeation includes preconditioning, durability simulation, and a weight-loss permeation test (see § 1060.520). The preconditioning and the durability testing may be conducted

[85] Society of Automotive Engineers Surface Vehicle Standard, ''Fuel and Oil Hoses,'' SAE J30, June 1998 (Docket EPA–HQ–OAR–2004–0008–0176).

[86] SAE Recommended Practice J1527, ''Marine Fuel Hoses,'' 1993, (Docket EPA–HQ–OAR–2004–0008–0195–0177).

[87] ASTM Fuel C is a mix of equal parts toluene and isooctane. We refer to gasoline blended with ethanol as E10.

[88] SAE Recommended Practice J1737, ''Test Procedure to Determine the Hydrocarbon Losses from Fuel Tubes, Hoses, Fittings, and Fuel Line Assemblies by Recirculation,'' 1997, (Docket EPA–HQ–OAR–2004–0008–0178).

simultaneously; manufacturers would put the tank through durability testing while the tank is undergoing its preconditioning fuel soak to reach a stabilized permeation level. We request comment on the proposed tank permeation test procedures and options.

(a) Test Fuel

Similar to the proposed fuel line testing procedures, we are proposing to use a test fuel containing 10 percent ethanol to help ensure in-use emission reductions with the full range of in-use fuels. We are proposing to specify IE10 as the test fuel; this is made up of 90 percent certification gasoline and 10 percent ethanol (see 40 CFR 1065.710). This is the same test fuel specified for testing fuel tanks for recreational vehicles. In addition, IE10 is representative of in-use test fuels. We are proposing that Fuel CE10 may be used as an alternative test fuel. Data in Chapter 5 of the Draft RIA suggest that permeation tends to be somewhat higher on CE10 than IE10, so testing on CE10 should be an acceptable demonstration of compliance. We request comment on the proposed test fuels.

We included a provision allowing recreational vehicle manufacturers to perform emission measurements after preconditioning using IE10. This allowance has created substantial confusion and necessitated including additional provisions to prevent manufacturers from exercising the test option in a way that undermines the objective of maintaining a procedure that accounts for the effect of ethanol. As a result, we believe it is appropriate to propose a test procedure for Small SI equipment and Marine SI vessels that maintains a consistent approach by including ethanol in the test fuel for both preconditioning and emission measurements. We request comment on this approach.

(b) Preconditioning Fuel Soak

Before testing fuel tanks for permeation, the fuel tank must be preconditioned by allowing it to sit with fuel inside until the hydrocarbon permeation rate has stabilized. Under this step, we are proposing that the fuel tank be filled with test fuel and soaked—either for 20 weeks at 28 ± 5 °C or for 10 weeks at 43 ± 5 °C. The manufacturer may need to use a longer soak period if necessary to achieve a stabilized permeation rate for a given fuel tank, consistent with good engineering judgment.

The tank would have to be sealed during this fuel soak and we are proposing that any components that are directly mounted to the fuel tank, such as a fuel cap, must be attached. Other openings, such as fittings for fuel lines or petcocks, would be sealed with impermeable plugs. In addition, if there is a vent path through the fuel cap, that vent path may be sealed. Alternatively, we are proposing that the opening could be sealed for testing and the fuel cap tested separately for permeation (discussed below). If the fuel tank is designed to have a separate fill neck between the fuel cap and the tank that is at least 12 inches long and at least 6 inches above the top of the fuel tank, the tank may be sealed with something other than a production fuel cap.

Manufacturers may do the durability testing described below during the time period specified for preconditioning. The time spent in durability testing may count as preconditioning time as long as the fuel tank has fuel inside the entire time. During the slosh testing, a fuel fill level of 40 percent would be considered acceptable for the fuel soak. Otherwise, we are proposing to require that the fuel tank be filled to nominal capacity during the fuel soak.

(c) Durability Tests

We are proposing three tests to evaluate the durability of fuel tank permeation controls: (1) Fuel sloshing; (2) pressure-vacuum cycling; and (3) ultraviolet exposure. The purpose of these deterioration tests would be to help ensure that the technology is durable under the wide range of in-use operating conditions. For sloshing, the fuel tank would be filled to 40 percent capacity with E10 fuel and rocked for one million cycles. The pressure-vacuum testing would consist of 10,000 cycles from −0.5 to 2.0 psi. These two proposed durability tests are based on draft recommended SAE practice.[89] The third durability test would be intended to assess potential impacts of ultraviolet sunlight (*i.e.*, light with wavelength ranging from 300 to 400 nanometers) on the durability of surface treatment. In this test, the tank would be exposed to ultraviolet light with an intensity of at least 0.40 W-hr/m^2/min on the tank surface for 450 hours. Alternatively, we are proposing the tank could be exposed to direct natural sunlight for an equivalent period of time.

We are proposing to include a provision that would allow manufacturers to omit one or more of the durability tests if it is not appropriate for a certain tank design. For example, coextruded plastic tanks rely on a thin layer of material within the wall of the tank. This material is never exposed to sunlight or liquid fuel so the sloshing, pressure, and ultraviolet-exposure tests would not be necessary. At the same time, we request comment on whether other durability tests would be necessary to ensure that the fuel tank would not be compromised for safety due to changes to address permeation. Examples may be temperature cycling or impact testing.

[89] Draft SAE Information Report J1769, ''Test Protocol for Evaluation of Long Term Permeation Barrier Durability on Non-Metallic Fuel Tanks,'' (Docket EPA–HQ–OAR–2004–0008–0195).

(d) Weight-Loss Test

Following the fuel soak, we are proposing that the fuel tank must be drained and refilled with fresh fuel immediately after to prevent the fuel tank from drying out. The tank would have to be sealed within eight hours after refreshing the fuel at the end of the soak period. The permeation rate from fuel tanks would be measured by comparing mass measurements of the tank before and after a soaking period of at least two weeks at a temperature of 28 ± 2 °C. In the case of fuel tanks with very low permeation, the weight loss of the fuel tank over two week period could be too small to obtain an accurate measurement. We are proposing that manufacturers may extend the test period by two weeks to obtain an accurate measurement for fuel tanks with low permeation rates, consistent with good engineering judgment.

A change in atmospheric pressure over the weeks of testing can affect the accuracy of measured weights for testing due to the buoyancy of the fuel tank. The buoyancy effect on emission measurements is proportional to the volume of the fuel tank, so this procedure is appropriate even for testing very small fuel tanks. To address this we are proposing a procedure in which a reference fuel tank filled with sand or some other inert material to the approximate total weight of the test tank be used to zero the scale used for measuring the test tank. This would result in measured and reported values representing the change in mass from permeation losses rather than a comparison of absolute masses. This is similar to an approach in which weighing would determine absolute masses with a mathematical correction to account for the effects of buoyancy. We believe the proposed approach is better because it minimizes the possibility of introducing or propagating error.

We propose to allow permeation measurements for certification using alternative equipment and procedures that provide equivalent results. To use these alternative methods, manufacturers would first need to get our approval. An example of an alternative weight-loss measurement procedure would be to test the fuel tank in a SHED and determine the permeation by measuring the concentration of hydrocarbons in the enclosure.

(e) Fuel Cap Permeation Testing

As discussed above, we are proposing that manufacturers would have the option to test the fuel cap separately from the tank and combine the results to determine the total tank permeation rate. In this case, the permeation test would be performed as described above except that the fuel cap would be mounted on an impermeable reservoir such as a metal or glass tank. The volume of the test reservoir would have to be at least one liter to ensure sufficient fuel vapor exposure. We are proposing that the ''tank'' surface area for calculating the results would be the smallest inside cross sectional area of the opening on which the cap is mounted. The fuel cap would need to be tested in conjunction with a representative gasket. In the case where the vent path is through grooves in the gasket, another gasket of the same material and dimensions, without the vent grooves, may be used. In the case where the vent is through the cap, that vent would be sealed for testing.

(3) Diurnal Emission Testing Procedures

The proposed test procedure for diurnal emissions from installed marine fuel tanks involves placing the fuel tank in a SHED, varying the temperature over a prescribed profile, and measuring the hydrocarbons escaping from the fuel tank (see § 1060.525). The final result would be reported in grams per gallon where the grams are the mass of hydrocarbons escaping from the fuel tank over 24 hours and the gallons are the nominal fuel tank capacity. The proposed test procedure is derived from the automotive evaporative emission test with modifications specific to marine applications.[90] We request comment on the proposed diurnal test procedures described below.

(a) Temperature Profile

We believe it is appropriate to base diurnal measurements on a summer day with ambient temperatures ranging from 72 to 96 °F (22.2 to 35.6 °C). This temperature profile, which is also used for automotive testing, represents a hot summer day when ground-level ozone formation is most likely. Due to the thermal mass of the fuel and, in some cases, the inherent insulation provided by the boat hull, the fuel temperatures would cover a narrower range. Data presented in Chapter 5 of the Draft RIA suggest that the fuel temperature in an installed marine fuel tank would see a total change of about half the ambient temperature swing. We are therefore proposing a test temperature range of 78 to 90 °F (25.6 to 32.2 °C) for installed marine fuel tanks. This testing would be based on fuel temperature instead of ambient temperature.

We are proposing an alternative, narrower temperature range for fuel tanks installed in nontrailerable boats (≥26 ft.). Data presented in Chapter 5 of the Draft RIA suggest that the fuel temperature swing in a boat stored in the water would be about 20 percent of the ambient temperature swing. Based on this relationship, we are proposing an alternative temperature cycle for tanks installed in nontrailerable boats of 81.6 to 86.4 °F (27.6 to 30.2 °C). This alternative temperature cycle would be associated with an alternative standard as discussed earlier. See the proposed regulations at § 1060.525 for further detail. We request comment on the proposed test temperatures, especially on the appropriateness of the alternative test procedure and standard for tanks installed in nontrailerable boats.

The automotive diurnal test procedure includes a three-day temperature cycle to ensure that the carbon canister can hold at least three days of diurnal emissions without vapors breaking through to the atmosphere. For marine vessels using carbon canisters as a strategy for controlling evaporative emissions, we are proposing a three-day cycle here for the same reason. In the automotive test, the canister is loaded and then purged by the engine during a warm-up drive before the first day of testing. Here, we are proposing a different approach because we anticipate that canisters on marine applications will be passively purged. Before the first day of testing, the canister would be loaded to full working capacity and then run over the diurnal test temperature cycle, starting and ending at the lowest temperature, to allow one day of passive purging. The test result would then be based on the highest recorded value during the following three days.

For fuel systems using a sealed system (including those that rely on pressure-relief valves with no canister), we believe a three-day test would not be necessary. Before the first day of testing, the fuel would be stabilized at the initial test temperature. Following this stabilization, the SHED would be purged, followed by a single run through the diurnal temperature cycle. Because this technology does not depend on purging or storage capacity of a canister, multiple days of testing should not be necessary. We are therefore proposing a one-day test for the following technologies: Sealed systems, sealed systems with a pressure-relief valve, bladder fuel tanks, and sealed fuel tanks with a volume-compensating air bag. We request comment on this simplified approach.

(b) Test Fuel

Consistent with the automotive test procedures, we are proposing to specify a gasoline test fuel with a volatility of 9 psi.[91] We are not proposing that the fuel used in diurnal emission testing include ethanol for two reasons. First, we do not believe that ethanol in the fuel affects the diurnal emissions or control effectiveness other than the effect that ethanol in the fuel may have on fuel volatility. Second, in-use fuels containing ethanol are generally blended in such a way as to control for ethanol effects in order to meet fuel volatility requirements. We request comment on the proposed test fuel and whether it would be appropriate to specify a test fuel blended with ethanol either as the primary test fuel or as an optional test fuel. If so, we request comment regarding whether the volatility of the test fuel should be controlled to 9 psi or if ethanol should be blended into certification gasoline. We also request comment on the effect of ethanol in the fuel on controlled diurnal emissions and if the standard would need to be adjusted to account for ethanol in the test fuel.

Diurnal emissions are not only a function of temperature and fuel volatility, but of the size of the vapor space in the fuel tank. Consistent with the automotive procedures, we are proposing that the fill level at the start of the test be 40 percent of the nominal capacity of the fuel tank. Nominal capacity of the fuel tank would be defined as the a fuel tank's volume as specified by the fuel tank manufacturer, using at least two significant figures, based on the maximum volume of fuel the tank can hold with standard refueling techniques. The ''permanent'' vapor space above a fuel tank that has been filled to capacity would not be considered in the nominal capacity of the fuel tank.

[90] See 40 CFR part 86, subpart B, for the automotive evaporative emission test procedures.

[91] Volatility is specified based on a procedure known as Reid Vapor Pressure (see ASTM D 323–99a).

(c) Fuel Tank Configuration

The majority of marine fuel tanks are made of plastic. Even plastic fuel tanks designed to meet our proposed standards would be expected to have some amount of permeation. However, over the length of the diurnal test, if it were performed on a new tank that had not been previously exposed to fuel, the effect of permeation on the test results should be insignificant. For fuel tanks that have reached their stabilized permeation rate (such as testing on in-use tanks), we believe it would be appropriate to correct for permeation. In such a case, we propose that the permeation rate be measured from the fuel tank and subtracted from the final diurnal test result. The fuel tank permeation rate would be measured with the established procedure for measuring permeation emissions, except that the test fuel would be the same as that used for diurnal emission testing. This test measurement would have to be made just before the diurnal emission test to ensure that the permeation rate does not change when measuring diurnal emissions. In no case would we allow a permeation correction higher than that corresponding to the applicable permeation standard for a tank with a given inside surface area. Because not correcting for permeation represents the worst-case test result, we would accept data from manufacturers in which no permeation correction was applied. We request comment on this approach.

(4) Diffusion Testing Procedures

The proposed procedure for measuring diffusion emissions is very similar to that for diurnal emissions, with three primary differences (see § 1060.530). First, the fuel tank should be filled to 90 percent of its nominal capacity. Second, the fuel tank is held in a controlled environment to stabilize at test temperatures. Third, the test run is proposed to be six hours in length. Testing has shown that diffusion occurs at a steady rate, so we would want manufacturers to be able to run a full test in a single day's shift rather than running a test for a full 24 hours. Measured emissions are then adjusted mathematically for comparison to the gram-per-day standard.

There is some concern that fluctuating temperatures during this test could cause small diurnal effects that would result in higher measured emissions. Filling the fuel tank to 90 percent would help minimize the potential for diurnal effects by increasing the thermal mass of the fuel and by reducing the volume of the vapor space. In addition, the proposed diffusion standard is based on data collected from testing in this manner.

As described above, we are proposing to allow fuel cap manufacturers to voluntarily certify their fuel caps to diffusion standard. This would require a separate test with a fuel cap mounted on a test tank with a representative sealing configuration of production tanks.

As described for diurnal measurements, we are proposing that manufacturers would be able to separately quantify permeation emissions occurring during the diffusion test and subtract the permeation contribution so the reported result isolates the test to quantifying diffusion emissions.

(5) Measurement Procedures Related to Running Loss Emissions

We do not specify a procedure for measuring running loss emissions, but we are proposing to allow manufacturers to demonstrate control of running losses by showing that fuel temperatures will not increase by more than 8 °C during normal operation (see § 1060.104 and § 1060.535). This requires testing to measure fuel temperatures on each equipment configuration. We are proposing a fuel temperature test that includes filling the fuel tank with commercially available gasoline and operating the equipment for one hour over a normal in-use duty cycle with a load factor approximately the same as the specified test cycle. If the equipment consumes 80 percent of the fuel capacity in one hour of operation, a shorter period may be used based on time until the fuel tank is drained to 20 percent capacity. We are proposing that manufacturers would be required to document a description of the operation and include grass height or equivalent variables affecting load.

We are proposing that the testing must occur outdoors with a beginning ambient temperature ranging from 20 to 30 °C with no precipitation and with average wind speeds below fifteen miles per hour. The ambient temperature would have to be steady or increasing during the test and it must be during a mostly sunny time period with a maximum cloud cover of 25 percent as reported by the nearest local airport making hourly meteorological observations.

We are proposing that the temperature of the fuel in the tank must be within 2 °C of (but not exceeding) the ambient temperature at the beginning of the test. Fuel temperature would be measured with a thermocouple positioned in the fuel but not touching the inside walls or bottom of the tank. Ambient temperature would be measured on-site in the shade. The equipment configuration meets the requirement to control running losses if measured minimum and maximum fuel temperatures throughout the period of operation do not differ by more than 8 °C. In the case were the equipment has multiple fuel tanks, the temperature would have to be measured on each fuel tank. We request comment on this procedure for measuring fuel temperatures.

We are also proposing to allow manufacturers to use an alternative procedure in a laboratory with prior EPA approval. The alternative test procedure would need to simulate outdoor conditions and consider engine operation, solar load, temperature, and wind speed. The manufacturer would be required to make a demonstration of equivalency.

F. Certification and Compliance Provisions

Sections VII and VIII describe several general provisions related to certifying emission families and meeting other regulatory requirements. This section notes several particulars related to applying these general provisions to evaporative emissions.

Marine vessels do not always include installed fuel systems. Manufacturers of vessels without installed fuel systems do not have the ability to control engine or fuel system design parameters. We are therefore proposing that vessels without an installed fuel system would not be subject to the proposed standards (see § 1045.5). As a result, it is necessary for us to treat manufacturers of uninstalled fuel-system components as the equipment manufacturer with respect to evaporative emission standards. This includes manufacturers of outboard engines (including any fuel lines or fuel tanks produced with the engine), portable fuel tanks, and the fuel line system (including fuel line, primer bulb, and connectors).

For ease of reference, Small SI equipment manufacturers, Marine SI boat builders, and manufacturers of portable marine fuel tanks (and associated fuel-system components) are all referred to as equipment manufacturers in this section.

(1) Liability for Certification and Compliance

The proposed standards for fuel lines and fuel tanks apply to any such components that are used with or intended to be used with Small SI engines or Marine SI engines (see § 1060.1 and § 1060.601). Section VI.C describes for each standard which manufacturer is expected to certify. Engine manufacturers would describe these fuel-system components in the same certification application in which they document their compliance with exhaust emission standards (see § 1045.201 and § 1054.201).

In most cases, nonroad standards apply to the manufacturer of the engine or the manufacturer of the nonroad equipment. Here, the products subject to the standards (fuel lines and fuel tanks) are typically manufactured by a different manufacturer. In most cases the engine manufacturers do not produce complete fuel systems and would therefore not be in a position to do all the testing and certification work necessary to cover the whole range of products that will be used. We are therefore proposing an arrangement in which manufacturers of fuel-system components are in most cases subject to the standards and are subject to certification and other compliance requirements associated with the applicable standards. We are proposing to prohibit the introduction into commerce of noncompliant fuel-system components that are intended for installation in Small SI equipment or Marine SI vessels unless the component manufacturer either certifies the component or has a contractual arrangement for each equipment manufacturers using their products to certify those components. As a matter of good practice, any components not intended for installation in Small SI equipment or Marine SI vessels should be labeled accordingly to prevent the possibility of improper installation to prevent confusion in this regard.

As described in Section VI.D, component manufacturers may certify with measured emission levels showing that the components meet the emission standard, or they may certify to an FEL above or below the standard. If any component manufacturer certifies using an FEL, the FEL becomes the emission standard for that emission family for all practical purposes. The component manufacturer however would not be required to meet any overall average for their products, but would have the option to certify to an FEL above or below the standard. This is to facilitate the use of ABT by equipment manufacturers, as discussed below.

Equipment manufacturers would be subject to all the proposed evaporative standards. This applies for the general standards described above with respect to fuel caps, miscellaneous fuel-system components, and refueling. These standards generally depend on design specifications rather than emission measurements, so we believe it is appropriate to simply deem these products to be certified if they are designed and produced to meet the standards we specify. The vessel manufacturer would also need to keep records of the components used (see § 1060.210). This would allow us, by operation of the regulation, to have certified products without requiring the paperwork burden associated with demonstrating compliance with these relatively straightforward specifications. Manufacturers could optionally apply for and receive a certificate of conformity with respect to these general standards, but this would not be necessary and we would expect this to be a rare occurrence.

Equipment manufacturers would also be subject to all the proposed emission standards. Equipment manufacturers may comply with requirements related to evaporative emission standards in three different situations. First, equipment manufacturers might install only components certified by the component manufacturer, without using emission credits. In this case all the components must meet the proposed emission standard or have an FEL below the standard. Such an equipment manufacturer would be subject to the fuel line and fuel tank standards, but would be able to satisfy their requirements by using certified components. They would need to apply for certification only with respect to the remaining emission standards they are subject to, such as running loss emissions (if applicable). Equipment manufacturers must also design and produce their equipment to meet the requirements specified in § 1060.101(f), though this would not necessarily involve an application for certification. Such an equipment manufacturer would generally need only to use certified components, add an emission label, and follow any applicable emission-related installation instructions to ensure that certified components are properly installed. This is similar to an equipment manufacturer that is required to properly install certified engines in its equipment, except that the equipment manufacturer must meet general design standards and shares the liability for meeting emission standards.

Second, equipment manufacturers may be required to certify certain components based on contractual arrangements with the manufacturer of those components. In this case, the equipment manufacturer's certification causes the component manufacturer to no longer be subject to the standard. This approach might involve the equipment manufacturer relying on test data from the component manufacturer. The equipment manufacturer might also be producing its own fuel tanks for installation in its equipment, in which case it would be subject to the standards and all requirements related to certification and compliance. In either case, the equipment manufacturer would take on all the responsibilities associated with certification and compliance with respect to those components.

Third, equipment manufacturers may comply with evaporative emission requirements by using certified components, some of which are certified to an FEL above the standard. The equipment manufacturer would then comply based on emission credits. In this case, the equipment manufacturer would take on all the certification and compliance responsibilities with respect to any components that are part of the equipment manufacturer's emission credit calculations. Equipment manufacturers would generally use only certified components for meeting evaporative emission requirements, but they might also hold the certificate for such components. For purposes of certification, equipment manufacturers would not need to submit new test data if they use certified components. Equipment manufacturers would make an annual accounting to demonstrate a net balance of credits for the model year. Under this approach, the component manufacturer would continue to be subject to the standards for its products and be required to meet the certification and compliance responsibilities related to the standard. However, as in the first option, the component manufacturer would not be required to meet any averaging requirements or be required to use emissions credits. Where equipment manufacturers use ABT with components that have already been certified by the component manufacturer, there will be overlapping certifications between the two parties. We propose to address this by specifying that all parties are responsible for meeting applicable requirements associated with the standards to which they have certified, but if any specific requirement is met by one company, we will consider the requirement to be met for all companies (see § 1060.5). For example, either the component manufacturer or the equipment manufacturer could honor warranty claims, but we may hold both companies responsible for the violation if there is a failure to meet warranty obligations.

Similarly, if we find that new equipment is sold without a valid certificate of conformity for the fuel lines or fuel tanks, then the equipment manufacturer and all the affected fuel-system manufacturers subject to the standards would be liable for the noncompliance (see § 1060.601).

Liability for recall of noncompliant products would similarly fall to any manufacturer whose product is subject to the standard, as described above. If more than one manufacturer is subject to the standards for a noncompliant product, we would have the discretion to assign recall liability to any one of those manufacturers. In assigning this liability, we would generally consider factors such as which manufacturer has substantial manufacturing responsibility and which manufacturer holds the certificate (see § 1060.5). However, we may hold equipment manufacturers liable for recall even if they don't manufacture or certify the defective product. This would generally be limited to cases where the component manufacturer is unavailable to execute any remedial action. For example, if a foreign component manufacturer discontinues their participation in the U.S. market or a component manufacturer goes out of business, we would turn to the equipment manufacturer.

The proposed running loss standards for nonhandheld Small SI engines are not geared toward component certification, which necessitates some special provisions. If engine manufacturers sell their engines with a complete fuel system, which is typical for Class I engines, they would also be subject to and need to comply with running loss standards as part of their overall certification. Of the available alternatives for demonstrating compliance with the running loss standard, we would expect the only practical approach for these companies would be to route vapors from the fuel tank into the engine's air intake system for combustion. Any engine manufacturer certifying its engines this way would need to test for exhaust emissions with an installed running loss vent (see § 1054.501). If equipment manufacturers use only fuel-system components that have been certified by component manufacturers (without using emission credits) and engines that are certified by the engine manufacturer to meet both exhaust and running loss standards, they would have no responsibility to certify. However, if the engine manufacturer does not sell its engine with a complete fuel system that has been certified for running loss control, the equipment manufacturer would need to certify with respect to the running loss standard.

The running loss standard is not a typical standard based on emission measurements using established procedures. Some of the available compliance demonstrations involve straightforward design specifications that involve no measurement at all. The approach of keeping fuel temperatures from increasing above a specified threshold involves a test procedure with a performance standard, but does not involve emission measurements. As described above, it may be possible to identify design specifications that would replace the need for the proposed temperature measurements. In this case running loss control would be a straightforward design standard that we could treat like the general standards above, in which equipment manufacturers are deemed to be certified by operation of the regulations, rather than submitting an application for certification. The regulations would prohibit the sale of equipment without the specified running loss controls.

(2) Regulatory Requirements Related to Certification

The established provisions for implementing exhaust emission standards apply similarly for evaporative emission standards; however, because the control technologies are very different, these requirements require further clarification. For example, scheduled maintenance is an important part of certifying engines to exhaust emission standards. There is little or no maintenance involved for the expected technologies for controlling evaporative emissions. The regulations still require manufacturers to identify specified maintenance procedures, if there are any, but there are no specific limitations on the maintenance intervals and no distinction for emission-related maintenance. Manufacturers may not do any maintenance during testing for certification. (See § 1060.125 and § 1060.235.) We also do not expect that emission-related warranty claims would be common, but we are proposing a two-year period for emission-related warranties with respect to evaporative emission controls.

Similarly, we do not expect manufacturers to use evaporative emission control technologies that involve adjustable parameters or auxiliary emission control devices. Technologies that control evaporative emissions are generally passive designs that prevent vapors from escaping, in contrast to the active systems engines use to control exhaust emissions. The regulations state the basic expectation that systems must comply with standards throughout any adjustable range without auxiliary emission control devices, but it is clear that these provisions will not apply to most evaporative systems. We also do not allow emission control strategies that cause or contribute to an unreasonable risk to public health or welfare or that involve defeat devices. While these are additional statutory provisions that are meaningful primarily in the context of controlling exhaust emissions, we are proposing to include them for addressing evaporative emissions (see § 1045.101). This also addresses the possibility that future technologies may be different in a way that makes these provisions more meaningful. We request comment on this approach. In particular we request comment on best way of adapting these provisions to evaporative emission controls.

The testing specified for certifying fuel systems to the evaporative emission standards includes measurements for evaluating the durability of emission control technologies where appropriate. While we adopted evaporative requirements for recreational vehicles relying on a testing approach that used deterioration factors, we believe it is more appropriate to incorporate the durability testing for each family directly. Therefore, no requirement exists for generating deterioration factors for any evaporative emission standard. We request comment on the best approach to incorporate durability testing for evaporative emission standards

We are proposing to require that Small SI engine or equipment manufacturers add an emission control information label if they certify with respect to running losses or if they certify based on the use of emission credits. We are proposing to require that Marine SI engine or vessel manufacturers add an emission control information label for evaporative emission only if they certify based on the use of emission credits. (See § 1060.135.) If engine, equipment, or vessel manufacturers also certify fuel-system components separately, they may include that additional information in a combined label. If the equipment is produced by the same company that certifies the engine for exhaust standards, the emission control information label for the engine may include all the appropriate information related to evaporative emissions.

In addition, we are proposing a simplified labeling requirement for fuel lines (see § 1060.136). This would involve only the fuel line manufacturer's name, EPA's standardized designation for an emission family, and the family emission limit (FEL), if applicable. This labeling information would need to be repeated continuously, with not more than 12 inches before repeating. There is some concern that if short sections of fuel lines are used, that sections of the fuel line may be found on equipment without sufficient markings on them. We request comment regarding whether the length of the repeated labeling information should be shorter than 12 inches. We are proposing simplified labeling requirements for fuel filters, primer bulbs, or short preformed fuel lines (less than 12 inches long) (see § 1060.138).

Fuel tanks that are certified separately would need to include an emission control information label (see § 1060.137). This would involve fuel tank manufacturer's name, EPA's standardized designation for an emission family, the FEL (if applicable), a simple compliance statement, and a description of the method of controlling emissions. For example, a label on a certified marine fuel tank would need to describe how it meets permeation emission standards and identify the part numbers of any associated components for meeting diurnal emission standards.

Including the fuel tank's family emission limit is important, not only for EPA oversight, but also to communicate this information to equipment manufacturers and end users. Unlike the situation for exhaust emissions, the certifying manufacturer establishes the FEL, but does not maintain a balance of emission credits. Equipment manufacturers may buy fuel tanks and fuel lines that have an FEL, which would be the basis for calculating emission credits for the equipment manufacturer. Any other approach would require equipment manufacturers to be vigilant about verifying FEL values with EPA or the component manufacturer, or both. Also, as described in Section VI.F.6, we are proposing to require that owners find replacement fuel tanks and fuel lines with FELs that match or exceed the emission control performance represented by the original parts. This is an unrealistic expectation unless the FEL is readily available on the original equipment.

Other fuel-system components would need to be labeled with the manufacturer's name and part number, if space allows, and EPA's standardized designation for an emission family (see § 1060.138). This would apply for carbon canisters, fuel tanks that are not certified separately, and any other fuel-system components (such as fuel caps) that are certified separately. Equipment manufacturers could meet the requirement to label fuel tanks by placing the overall equipment label on the fuel tank, as long as the fuel tank and label are positioned such that the label can be read easily.

Manufacturers have expressed concern that it would be very difficult to properly label very small fuel tanks and fuel lines. To the extent that engine manufacturers are certifying their products with respect to evaporative emissions, this problem can be addressed in part by putting the information related to evaporative emissions on the engine label already required for exhaust emissions. This is most likely to be the case for the smallest products. We request comment on any additional provisions we would need to specify to address space limitations on very small fuel-system components.

While we are proposing no requirement for manufacturers to test production-line or in-use products, we may pursue testing of certified products to evaluate compliance with evaporative emission standards (see § 1060.301).

(3) Emission Families

To certify equipment or components, manufacturers would first define their emission families. This is generally based on selecting groups of products that have similar emission characteristics throughout the useful life (see § 1060.230). For example, fuel tanks could be grouped together if they were made of the same material (including consideration of additives such as pigments, plasticizers, and UV inhibitors that may affect emissions) and the same control technology. For running loss control for nonhandheld Small SI engines and equipment, emission families are based on the selected compliance demonstration. For example, certifying manufacturers would have one emission family for all their products that vent fuel vapors to the engine's air intake system, and another emission family for all their products that comply based on keeping fuel temperatures below the specified threshold.

The manufacturer would then select a single product from the emission family for certification testing. This product would be the one that is most likely to exceed the applicable emission standard. For instance, the "worst-case" fuel tank in a family of monolayer tanks would likely be the tank with the thinnest average wall thickness. For fuel lines or co-extruded fuel tanks with a permeation barrier layer, the worst-case configuration may be the thinnest barrier thickness.

Testing with those products, as specified above, would need to show compliance with emission standards. The manufacturers would then send us an application for certification. After reviewing the information in the application, we would issue a certificate of conformity allowing equipment manufacturers to introduce into commerce certified equipment from the covered emission family, or alternatively, equipment with the components from certified emission families.

(4) Compliance Provisions From 40 CFR Part 1068

As described in Section VIII, we are proposing to apply the provisions of 40 CFR part 1068 to Small SI and Marine SI engines, equipment, and vessels. This section describes how some of the provisions of part 1068 apply specifically with respect to evaporative emissions.

The provisions of § 1068.101 prohibit introducing into commerce new nonroad engines and equipment unless they are covered by a certificate of conformity and labeled appropriately. Section VI.F.1 describes the responsibilities for engine manufacturers, equipment manufacturers, and manufacturers of fuel-system components with respect to the prohibition against introducing uncertified products into commerce. In the case of portable marine fuel tanks and outboard engines, there is no equipment manufacturer so we are proposing to treat manufacturers of these items as equipment manufacturers relative to this prohibition.

While engine rebuilding or extensive engine maintenance is commonplace in the context of exhaust emission controls, there is very little analogous servicing related to evaporative emission controls. Nevertheless, it can be expected that individual components, such as fuel lines, fuel tanks, or other fuel-system components, may be replaced periodically. While the detailed rebuilding provisions of § 1068.120 have no meaning for evaporative emission controls, the underlying requirement applies generally. Specifically, if someone is servicing a certified system, there must be a reasonable basis to believe that the modified emission control system will perform at least as well as the original system. We are not proposing any recordkeeping requirements related to maintenance of evaporative emission control systems.

There are many instances where we specify in 40 CFR part 1068, subparts C and D, that engines (and the associated equipment) are exempt from emission standards under certain circumstances, such as for testing, national security, or export. Our principle objective in applying these provisions to evaporative emission standards is to avoid confusion. We are therefore proposing that an exemption from exhaust emission standards, automatically triggers a corresponding exemption from evaporative emission standards for the same products. We believe it is unlikely that an equipment manufacturer will need a separate exemption from evaporative emission standards, but the exemptions related to national security, testing, and economic hardship would apply if such a situation were to occur. We believe these are the only three reasons that would ever call for evaporative systems to be exempt when the engines have not already been exempted for some reason. We request comment on this approach to addressing exemptions and importation provisions for evaporative requirements.

Given the extended times required to precondition fuel-system components, we have no plans to require evaporative testing of units from the production line. This means that evaporative measurements are not part of the production-line testing program or selective enforcement audits. On the other hand, we may require certifying manufacturers to supply us with production equipment or components as needed for our own testing or we may find our own source of products for testing.

The defect-reporting requirements of § 1068.501 apply to certified evaporative systems. This requires the certifying manufacturer to maintain information, such as warranty claims, that may indicate an emission-related defect. The regulations describe when manufacturers must pursue an investigation of apparent defects and when to report defects to EPA. These provisions apply to every certifying manufacturer and their certified products, including component manufacturers.

(5) Interim Compliance Flexibility for Small SI Equipment

Most Small SI equipment manufacturers are currently certifying products to evaporative emission requirements in California. However, these standards and their associated test procedures differ somewhat from those proposed in this document. Although the standards are different, we believe evaporative emission control technologies are available to meet the California ARB's standards and our proposed emission standards. To help manufacturers transition to selling low-emission equipment nationwide, we are proposing to accept California ARB certification of equipment and components in the early years of the proposed federal program.

As discussed above, we are proposing to accept California ARB certification for nonhandheld equipment and fuel tanks for the purposes of the proposed early-allowance program (see §§ 1045.145 and 1054.145). We are also proposing to accept California ARB certification of handheld fuel tanks through the 2011 model year (see § 90.129).

We are proposing to accept Class I/ Class II fuel lines meeting California ARB certification or certain SAE specifications through the 2011/2010 model years (see § 90.127). These SAE specifications include SAE J30 R11A, SAE J30 R12, and SAE J2260 Category 1. Such fuel lines would need to be labeled accordingly. As described in Section VI.C.1, we are proposing to require that engine manufacturers certify fuel lines used with their engines until the proposed Phase 3 standards are in place. The purpose of this provision is to give Small SI equipment manufacturers additional lead time before they have to certify to the proposed standards. For any fuel lines installed on the equipment, but not supplied with the engine, we are proposing that the engine manufacturer would be required to supply low-permeation fuel line specifications in its installation instructions (see § 90.128). Equipment manufacturers would be required, under the prohibited acts specified in the regulations, to use the fuel line specified by the engine manufacturer.

We are proposing to allow certification of walk-behind mowers under § 90.127 as an alternative to the proposed fuel line permeation standards if manufacturers rely on SHED-based certification to meet the California standards that apply to the overall equipment (diurnal, tank permeation, and fuel line permeation). While this might allow for use of fuel lines that exceed the proposed standards, we believe the overall emission control will be at least as great from systems that have been tested and certified using SHED-based procedures. The Phase 3 standards described above do not rely on diurnal emission control, so we do not intend to continue the provision for SHED-based testing and certification. However, we request comment on the possible administrative advantages or emission control advantages of continuing this alternative approach in the Phase 3 time frame.

(6) Replacement Parts

We are proposing to apply the tampering prohibition in § 1068.101(b)(1) for evaporative systems. This means that it would be a violation to replace compliant fuel tanks or fuel lines with noncompliant products. This would effectively disable the applicable emission controls. To address the concern that low-cost replacement products will be easy to make available and difficult to prevent, we are proposing several new noncompliance-related provisions. In § 1060.610 we clarify the meaning of tampering for evaporative systems and propose two requirements. First, for the period from January 1, 2012 to December 31, 2019, we propose to require that manufacturers, distributors, retailers, and importers of these replacement parts clearly label their products with respect to the applicable requirements. For example, a package might be labeled as compliant with the requirements in 40 CFR part 1060 or it might be labeled as noncompliant and appropriate only for use in applications not covered by EPA standards. Unless the packaging clearly states otherwise, the product is presumed to be intended for applications that are subject to EPA standards. Second, starting in 2020 we are proposing a provision stating that it is presumed that all replacement parts intended for applications covered by EPA standards will be installed in such equipment. This presumption significantly enhances our ability to enforce the tampering prohibition because the replacement part is then noncompliant before it is installed in a vessel or a piece of equipment. We believe shifting to a blanket presumption in 2020 is appropriate since in-use vessels and equipment will be almost universally subject to EPA's evaporative emission standards by that time.

We are aware that producing low-permeation fuel tanks in very low production volumes can be costly. In particular, some equipment owners may need to replace a fuel tank that has been certified to a Family Emission Limit (FEL) that is lower than the emission standard. The owner would need to find and install a replacement fuel tank that is certified with an FEL that is the same as or lower than that of the replaced fuel tank. However, we are concerned that such replacement fuel tanks may in some cases not be available. We are proposing to allow equipment owners to ask for an exemption from the tampering prohibition if there is no low-FEL tank available. The replacement tank would still need to meet applicable standards, but would not need to meet the more stringent emission levels reflected by the old tank's FEL. We request comment on the need for this provision. In particular, we request comment on the likelihood that owners would be unable to find replacement tanks that match the emission level of the fuel tanks being replaced.

(7) Certification Fees

Under our current certification program, manufacturers pay a fee to cover the costs associated with various certification and other compliance activities associated with an EPA issued certificate of conformity. These fees are based on the projected costs to EPA per emission family. For the fees rule published May 11, 2004, we conducted a cost study to assess EPA's costs associated with conducting programs for the industries that we certify (69 FR 26222). A copy of the cost study worksheets that were used to assess the fees per category may be found on EPA's fees Web site at *http://www.epa.gov/otaq/proprule.htm.* We are proposing to establish a new fees category for certification related to the proposed evaporative emission standards. The costs for this category will be determined using the same method used in conducting the previous cost study.

As under the current program, this depends on an assessment of the anticipated number of emission families and the corresponding EPA staffing necessary to perform this work. At this time, EPA plans to perform a basic level of certification review of information and data submitted to issue certificates of conformity for the evaporative emission standards, as well as conducting some testing to measure evaporative emissions. This is especially the case for equipment manufacturers that use only certified components for meeting applicable emission standards. We are proposing a fee of $241 based on Agency costs for half of a federal employee's time and three employees hired through the National Senior Citizens Education and Research Center dedicated to the administration of the evaporative certification program, including the administrative, testing, and overhead costs associated with these people. The total cost to administer the program is estimated to be $362,225. We divided this cost by the estimated number of certificates, 1503, to calculate the proposed fee.

We will update the fees related to evaporative emission certificates each year when we update the fees for all categories. The actual fee in 2015 and later model years will depend on these annual calculations. The fees update will be based upon EPA's costs of implementing the evaporative category multiplied by the consumer price index (CPI), then divided by the average of the number of certificates received in the two years prior to the update. The CPI will be applied to all of EPA's costs except overhead. This is a departure from EPA's current fees program wherein the CPI is applied only to EPA's labor costs. In the most recent fees rulemaking, commenters objected to applying the CPI to EPA's fixed costs. In the proposed fee program for the evaporative category, however, there are no fixed costs. EPA expects all its costs to increase with inflation and we therefore think it is appropriate to apply the inflation adjustment to all of the program costs.

Where a manufacturer holds the certificates for compliance with exhaust emission standards and includes certification for evaporative emissions in that same certificate, we would assess an additional charge related to compliance with evaporative emission standards to that for the exhaust emission certification.

EPA believes it appropriate to charge less for a certificate related to evaporative emissions relative to the existing charge for certificates of conformity for exhaust emissions from the engines in these same vessels and equipment. The amount of time and level of effort associated with reviewing the latter certificates is higher than that projected for the certificates for evaporative emissions.

(8) Engineering Design-Based Certification

Certification of equipment or components that are subject to performance-based emission standards depends on test data showing that products meet the applicable standards. We are proposing a variety of approaches that reduce the level of testing needed to show compliance. As described above, we allow manufacturers to group their products into emission families so that a test on a single worst-case configuration can be used to show that all products in the emission family are compliant. Also, test data from a given year could be ''carried over'' for later years for a given emission control design (see § 1060.235). These steps help reduce the overall cost of testing.

Design-based certification is an additional step that may be available to reduce testing requirements (see § 1060.240). To certify their products using design-based certification, certifying manufacturers would describe, from an engineering perspective, how their fuel systems meet the applicable design specifications. These manufacturers could then forego the testing described in Section VI.E. We believe there are several emission control designs that use established technologies that are well understood to have certain emission characteristics. At the same time, while engineering design-based certification is a useful tool for reducing the test burden associated with certification, this does not remove a manufacturer's liability for meeting the emission standard throughout the useful life.

The following sections describe how we propose to implement engineering design-based certification for each of the different performance standards. We are proposing that we may establish additional engineering design-based certification options where we find that new test data demonstrate that the use of other technology designs will ensure compliance with the applicable emission standards. These designs would need to produce emission levels comfortably below the proposed emission standards when variability in the emission control performance is considered.

(a) Fuel Line Permeation

In our program for recreational vehicles, we specified that fuel lines meeting certain SAE specifications could be certified by design. However, we are not proposing to allow this for Small SI equipment or marine vessels. That decision was appropriate for recreational vehicles, because that program did not include provisions for component certification. Fuel line manufacturers will need to conduct testing anyway to qualify their fuel lines as meeting the various industry ratings so any testing burden to demonstrate compliance with EPA standards should be minimal. We would allow test data used to meet industry standards to be used to certify to the proposed standards provided that the data were collected in a manner consistent with this proposal and that the data were made available to EPA if required.

(b) Fuel Tank Permeation

We are proposing to consider that a metal fuel tank meets the design criteria for a design-based certification as a low-permeation fuel tank. There is also a body of existing test data showing that co-extruded fuel tanks from automotive applications have permeation rates that are well below the proposed standard. We are proposing to allow design-based certification for co-extruded high-density polyethylene fuel tanks with a continuous ethylene vinyl alcohol barrier layer. The EVOH barrier layer would be required to be at least 2 percent of the wall thickness of the fuel tank.

To address the permeability of the fuel cap, seals, and gaskets used on metal and co-extruded tanks, we are proposing that the design criteria include a specification that seals and gaskets that are not made of low-permeation materials must have a total exposed surface area smaller than 1000 mm^2. A metal or co-extruded fuel tank with seals that meet this design criterion would reliably pass the standard. However, we believe it is not appropriate to assign an emission level to fuel tanks using a design-based certification option that would allow them to generate emission credits. Given the uncertainty of emission rates from the seals and gaskets, we would not consider these tanks to be any more effective than other fuel tanks meeting emission standards.

(c) Diurnal Emissions

For portable marine fuel tanks, we are proposing a design standard based on automatically sealing the tank to prevent fuel venting while fuel temperatures are rising. The options described below for design-based certification therefore deal only with installed marine fuel tanks (including personal watercraft).

We are proposing that fuel systems sealed to 1.0 psi would meet the criteria for engineering design-based certification to the proposed diurnal emission standards. Systems that remain sealed up to positive pressures of 1.0 psi have a predictable relationship to changing fuel temperatures that ensure that total diurnal emissions over the specified test procedure will be below the proposed standard. This type of system would allow venting of fuel vapors only when pressures exceed 1.0 psi or when the fuel cap is removed for refueling. Note that systems with anti-siphon valves would have to be designed to prevent fuel releases when the system is under pressure to meet Coast Guard requirements.

Bladder fuel tanks and tanks with a volume-compensating air bag are specialized versions of tanks that may meet the specifications for systems that remain sealed up to positive pressures of 1.0 psi. In each of these designs, volume changes within a sealed system prevent pressure buildup. As long as these designs meet basic specifications for system integrity they would also qualify for design-based certification.

We are proposing that fuel tanks equipped with a passively purged carbon canister to control diurnal emissions may be certified by design, subject to several technical specifications. To ensure that there is enough carbon to collect a sufficient mass of hydrocarbon vapors, we propose to specify a minimum butane working capacity of 9 g/dL based on the test procedures specified in ASTM D5228–92. The carbon canister would need a minimum carbon volume of 0.040 liters per gallon of fuel tank capacity. For fuel tanks certified to the optional standards for tanks in nontrailerable boats (26 ft. in length), we are proposing a minimum carbon volume of 0.016 liters per gallon of fuel tank capacity.

We are proposing two additional specifications for the quality of the carbon. We believe these specifications are necessary to ensure that the canister will continue to function effectively over the full useful life of a marine vessel. First, the carbon would need to meet a moisture adsorption capacity maximum of 0.5 grams of water per gram of carbon at 90 percent relative humidity and a temperature of 25 ± 5 °C. Second, the carbon would need to pass a dust attrition test similar to that in ASTM D3802–79. The moisture adsorption and dust attrition tests are described in more detail in Chapter 5 of the Draft RIA. We are also proposing that the carbon canister must be properly designed to ensure the in-use effectiveness of the carbon.

The canisters would need to be designed using good engineering judgment to ensure structural integrity. They must include a volume compensator or other device to hold the carbon pellets in place under vibration and changing temperatures and the vapor flow would need to be directed so that it reaches the whole carbon bed rather than just passing through part of the carbon. We are proposing that the geometry of the carbon canister must have a length to diameter ratio of at least 3.5.

The emission data we used to develop these proposed engineering design-based certification options are presented in Chapter 5 of the Draft RIA. Manufacturers wanting to use designs other than those we discuss here would have to perform the applicable testing. However, once an additional technology is proven, we may consider adding it to the list as one that qualifies for engineering design-based certification. For example, if several manufacturers were to pool resources to test a diurnal emission control strategy and submit this data to EPA, we could consider this particular technology, with any appropriate design specifications, as one that qualifies to be considered compliant under engineering design-based certification. We would intend to revise the regulations to include any additional technologies we decide are suitable for design-based certification, but we would be able to approve the use of additional engineering design-based certification with these technologies before changing the regulations. We request comment on this approach to design-based certification for diurnal emission control technologies and on the specific technologies discussed above. Section IV.H presents a more detailed description of these technologies and how they can be used to reduce evaporative emissions.

G. Small-Business Provisions

(1) Small Business Advocacy Review Panel

On May 3, 2001, we convened a Small Business Advocacy Review Panel under section 609(b) of the Regulatory Flexibility Act as amended by the Small Business Regulatory Enforcement Fairness Act of 1996. The purpose of the Panel was to collect the advice and recommendations of representatives of small entities that could be affected by this proposed rule and to report on those comments and the Panel's findings and recommendations as to issues related to the key elements of the Initial Regulatory Flexibility Analysis under section 603 of the Regulatory Flexibility Act. We convened a Panel again on August 17, 2006 to update our findings for this new proposal. The Panel reports have been placed in the rulemaking record for this proposal. Section 609(b) of the Regulatory Flexibility Act directs the review Panel to report on the comments of small entity representatives and make findings as to issues related to identified elements of an initial regulatory flexibility analysis (IRFA) under RFA section 603. Those elements of an IRFA are:

- A description of, and where feasible, an estimate of the number of small entities to which the proposed rule will apply;

- A description of projected reporting, recordkeeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities that will be subject to the requirements and the type of professional skills necessary for preparation of the report or record;

- An identification, to the extent practicable, of all relevant Federal rules that may duplicate, overlap, or conflict with the proposed rule; and

• A description of any significant alternative to the proposed rule that accomplishes the stated objectives of applicable statutes and that minimizes any significant economic impact of the proposed rule on small entities.

In addition to the EPA's Small Business Advocacy Chairperson, the Panel consisted of the Director of the Assessment and Standards Division of the Office of Transportation and Air Quality, the Administrator of the Office of Information and Regulatory Affairs within the Office of Management and Budget, and the Chief Counsel for Advocacy of the Small Business Administration.

Using definitions provided by the Small Business Administration (SBA), companies that manufacture internal-combustion engines and that employ fewer than 1000 people are considered small businesses for a Small Business Advocacy Review (SBAR) Panel. Equipment manufacturers, boat builders, and fuel-system component manufacturers that employ fewer than 500 people are considered small businesses for the SBAR Panel. Based on this information, we asked 25 companies that met the SBA small business thresholds to serve as small entity representatives for the duration of the Panel process. These companies represented a cross-section of engine manufacturers, equipment manufacturers, and fuel-system component manufacturers.

With input from small-entity representatives, the Panel drafted a report providing findings and recommendations to us on how to reduce potential burden on small businesses that may occur as a result of this proposed rule. The Panel Report is included in the rulemaking record for this proposal. We are proposing all of the recommendations as presented in the Panel Report. The proposed flexibility options recommended to us by the Panel, and any updated assessments, are described below.

(2) Proposed Burden Reduction Approaches for Small Businesses Subject to the Proposed Evaporative Emission Standards

The SBAR Panel Report includes six general recommendations for regulatory flexibility for small businesses affected by the proposed evaporative emission standards. This section discusses the provisions being proposed based on each of these recommendations. In this industry sector, we believe the burden reduction approaches presented in the Panel Report should be applied to all businesses with the exception of one general economic hardship provision described below which is designed specifically for small businesses. The majority of fuel tanks produced for the Small SI equipment and Marine SI vessel market are made by small businesses or by companies producing small volumes of these products. The purpose of these options is to reduce the potential burden on companies for which fixed costs cannot be distributed over a large product line. For this reason, we often also consider the production volume when making decisions regarding burden reduction options.

(a) Consideration of Appropriate Lead Time

Small businesses commented that they would need to make significant changes to their plastic fuel tank designs and molding practices to meet the proposed fuel tank permeation standards. For blow-molded tank designs with a molded-in permeation barrier, new blow-molding machines would be needed that could produce multi-layer fuel tanks. One small business commented that, due to the lead time needed to install a new machine and to perform quality checks on the tanks, they would not be ready to sell multi-layer blow-molded fuel tanks until 2011 for the Small SI and Marine SI markets.

Small businesses that rotational-mold fuel tanks were divided in their opinion of when they would be ready to produce low-permeation fuel tanks. One manufacturer stated that it is already producing fuel tanks with a low-permeation inner layer that are used in Small SI applications. This company also sells marine fuel tanks, but not with the low-permeation characteristics. However, they have performed Coast Guard durability testing on a prototype 40 gallon marine tank using their technology which passed the tests. Two other small businesses, that rotationally mold fuel tanks, stated that they have not been able to identify and demonstrate a low-permeation technology that would meet their cost and performance needs. They commented that developing and demonstrating low-permeation technology is especially an issue for the marine industry because of the many different tank designs and Coast Guard durability requirements.

Consistent with the Panel recommendations in response to the above comments, we are proposing to provide sufficient lead time for blow-molded and marine rotational molded fuel tanks. We are proposing tank permeation implementation dates of 2011 for Class II equipment and 2012 for Class I equipment. For marine fuel tanks, we are proposing to implement the tank permeation standards in 2011 with an additional year (2012) for installed fuel tanks which are typically rotational-molded marine fuel tanks (see § 1054.110 and § 1045.107).

There was no disagreement on the technological feasibility of the Marine SI diurnal emission standard EPA is considering. Small businesses commented that they would like additional time to install carbon canisters in their vessels. They stated that some boat designs would require deck and hull changes to assist in packaging the canisters and they would like to make these changes in the normal turnover cycle of their boat molds. Small businesses commented that they would consider asking EPA to allow the use of low-permeation fuel line prior to 2009 as a method of creating an emission neutral option for providing extra time for canisters. We are requesting comment on phase-in schemes or other burden reduction approaches which would provide small businesses additional lead time to meet these requirements without losing overall emission reductions.

The majority of large equipment manufacturers have indicated that they will be using low-permeation fuel lines in the near term as part of their current product plans. As a result, we are proposing an implementation date of 2008 for Small SI fuel line permeation standards for nonhandheld equipment (see § 90.127). The Panel expressed concern that small equipment manufacturers who do not sell products in California may not necessarily be planning on using low-permeation fuel line in 2008. Therefore, we are proposing a 2009 implementation date for low-permeation fuel line for small businesses producing Small SI nonhandheld equipment.

(b) Fuel Tank ABT and Early-Incentive Program

The Panel recommended that we propose an ABT program for fuel tank permeation and an early-allowance program for fuel tank permeation. Our proposed ABT and early-allowance programs are described above. We are requesting comment on including service tanks in the ABT program. These are tanks that are sold as replacement parts for in-use equipment.

(c) Broad Definition of Emission Family

The Panel recommended that we propose broad emission families for fuel tank emission families similar to the existing provisions for recreational vehicles. As described above, we are proposing permeation emission families be based on type of material (including additives such as pigments, plasticizers, and UV inhibitors), emission control strategy, and production methods. Fuel tanks of different sizes, shapes, and wall thicknesses would be grouped into the same emission family (see § 1045.230 and § 1054.230). Manufacturers therefore would be able to broadly group similar fuel tanks into the same emission family and then only test the configuration most likely to exceed the emission standard. Although Small SI and Marine SI fuel tanks would not be allowed in the same emission family, it could be possible to carry-across certification test data from one category to another.

(d) Compliance Progress Review for Marine Fuel Tanks

One manufacturer of rotational-molded fuel tanks has stated that they are already selling low-permeation tanks into the Small SI market and they have plans to sell them into marine applications. However, other manufacturers of rotational-molded marine fuel tanks have expressed concern that they do not have significant in-use experience to demonstrate the durability of low-permeation rotational-molded fuel tanks in boats. To address this uncertainty, EPA intends to continue to engage on a technical level with rotational-molded marine fuel tank manufacturers and material suppliers to assess the progress of low-permeation fuel tank development and compliance. If systematic problems are identified across the industry, this would give EPA the opportunity to address the problem. If problems were identified only for individual businesses, this would give EPA early notice of the issues that may need to be addressed through the proposed hardship relief provisions.

(e) Engineering Design-Based Certification

In the existing evaporative emission program for recreational vehicles, manufacturers using metal fuel tanks may certify by design to the tank permeation standards. Tanks using design-based certification provisions are not included in the ABT program because they are assigned a certification emission level equal to the standard. The Panel recommended that we propose to allow design-based certification for metal tanks and plastic fuel tanks with a continuous EVOH barrier. The Panel also recommended that we propose design-based certification for carbon canisters. A detailed description of the proposed design-based certification options that are consistent with the Panel recommendations is presented earlier in this document.

The National Marine Manufacturers Association (NMMA) the American Boat and Yacht Council (ABYC) and the Society of Automotive Engineers (SAE) have industry recommended practices for boat designs that must be met as a condition of NMMA membership. NMMA stated that they are working to update these recommended practices to include carbon canister installation instructions and low-permeation fuel line design. The Panel recommended that EPA accept data used for meeting the voluntary requirements as part of the EPA certification. We are proposing that this data could be used as part of EPA certification as long as it is collected consistent with the test procedures and other requirements described in this proposal.

(f) Hardship Provisions

We are proposing two types of hardship provisions consistent with the Panel recommendations. The first type of hardship is an unusual circumstances hardship which would be available to all businesses, regardless of size. The second type of hardship is an economic hardship provision which would be available to small businesses only. Sections VIII.C.8 and VIII.C.9 provide a description of the proposed hardship provisions that would apply to the range of manufacturers subject to the proposed Marine SI and Small SI evaporative emission requirements. This would include Marine SI engine manufacturers, nonhandheld engine manufacturers, nonhandheld equipment manufacturers, handheld equipment manufacturers, boat builders, and fuel-system component manufacturers.

The proposed criteria for small businesses are presented earlier in Sections III.F.2 and IV.G for Marine SI engine manufacturers, Section V.F.2 for nonhandheld engine manufacturers, and Section V.F.3 for nonhandheld equipment manufacturers. For handheld equipment manufacturers, EPA is proposing to use the existing small-volume manufacturer criteria which relies on a production cut-off of 25,000 pieces of handheld equipment per year. For boat builders and fuel-system component manufacturers, EPA is proposing to base the determination of whether a company is a small business based on the SBA definition. The SBA small business definition for companies manufacturing boats subject to the proposed standards is fewer than 500 employees. Likewise, the SBA small business definition for companies manufacturing fuel-system components such as fuel tanks and fuel lines is fewer than 500 employees.

Because many boat builders, nonhandheld equipment manufacturers, and handheld equipment manufacturers will depend on fuel tank manufacturers and fuel line manufacturers to supply certified products in time to produce complying vessels and equipment, we are also proposing a hardship provision for all boat builders and Small SI equipment manufacturers, regardless of size. The proposed hardship would allow the boat builder or equipment manufacturer to request more time if they are unable to obtain a certified fuel system component and they are not at fault and would face serious economic hardship without an extension (see § 1068.255). Section VIII.C.10 provides a description of the proposed hardship provisions that would apply to boat builders and Small SI equipment manufacturers.

H. Technological Feasibility

We believe there are several strategies that manufacturers can use to meet the proposed evaporative emission standards. We have collected and will continue to collect emission test data on a wide range of technologies for controlling evaporative emissions. The design-based certification levels discussed above are based on this test data and we may amend the list of approved designs and emission levels as more data become available.

In the following sections we briefly describe how we decided to propose specific emission standards and implementation dates, followed by a more extensive discussion of the expected emission control technologies. A more detailed discussion of the feasibility of the proposed evaporative requirements, including all the underlying test data, is included in Chapter 5 of the Draft RIA. See Table VI–1 for a summary of the proposed evaporative emission standards.

(1) Level of Standards

The proposed fuel line and fuel tank permeation standards for Small SI equipment and Marine SI vessels are based on the standards already adopted for recreational vehicles. These applications use similar technology in their fuel systems. In cases where the fuel systems differ we have identified technological approaches that could be used to meet these same emission levels. The control strategies are discussed below. For structurally integrated nylon fuel tanks and for fuel lines used with cold-weather equipment, we are proposing slightly relaxed standards based on available permeation data. In addition, we have proposed higher numerical standards for fuel tank permeation for tests performed at higher temperature (40 °C vs. 28 °C). These higher numerical standards are based on data described in Chapter 5 of the Draft RIA.

For fuel tanks installed in personal watercraft and for portable marine fuel tanks, we are proposing diurnal emission standards based on the current capabilities of these systems. We are basing the proposed standard for other installed marine fuel tanks on the capabilities of passive systems that store emitted vapors in a carbon canister. The Draft RIA describes the test results on passively purged canisters, and other technologies, that led us to the proposed level of the diurnal emission standard.

Control of diffusion emissions from Small SI equipment requires application of a simple technological approach that is widely used today. The Draft RIA describes the testing we conducted on fuel caps with tortuous vent paths and short vent lines on which we based the diffusion emission standard.

We have measured running loss emissions and found that some Small SI products have very high emission levels. The large variety of manufacturers and equipment types makes it impractical to design a measurement procedure, which means that we are unable to specify a performance standard. We are proposing a design standard for running losses from Small SI equipment by specifying that manufacturers may use any of a variety of specified design solutions, as described in Section VI.C.6. Several of these design options are already in common use today.

We are proposing to require that equipment and vessel manufacturers use good engineering judgment in their designs to minimize refueling spitback and spillage. In general, it would simply require manufacturers to use system designs that are commonly used today. Several refueling spitback and spillage control strategies are discussed in Chapter 5 of the Draft RIA.

(2) Implementation Dates

Low-permeation fuel line is available today. Many Small SI equipment manufacturers certifying to permeation standards in California are selling products with low-permeation fuel line nationwide. In addition, many boat builders have begun using low-permeation marine fuel lines to feed fuel from the fuel tank to the engine. For this reason, we are proposing to implement the fuel line permeation standards in 2008 for nonhandheld Small SI equipment and in 2009 for Marine SI vessels. This date is the same as for recreational vehicles and is two years later than the California requirements for Small SI equipment. For handheld equipment, there are no fuel line permeation requirements in California. In addition, injection molded fuel lines are common in many applications rather than straight-run extruded fuel line. For this reason we are proposing to delay implementation of fuel line permeation standards for handheld equipment until 2012 (or 2013 for small volume emission families). We request comment on the proposed implementation dates for fuel line permeation standards.

Similar to fuel line technology, low-permeation fuel tank constructions are used today in automotive and portable fuel tank applications. This technology is also being developed for use in recreational vehicles and for Small SI equipment sold in California. The available technology options include surface treatment and multi-layer constructions, though rotational molding presents some unique design challenges. Based on discussions with fuel tank manufacturers, and on our own assessment of the lead time necessary to change current industry practices, we believe low-permeation fuel tank technology can be applied in the 2011–2012 model years for Small SI and Marine SI fuel tanks. We are proposing to implement the fuel tank permeation standards in 2011 for Class II equipment and portable and PWC marine fuel tanks. For Class I equipment and installed marine fuel tanks, we are proposing an implementation date of 2012. We are proposing to phase-in the handheld fuel tank standards on the following schedule: 2009 for equipment models certifying in California, 2013 for small-volume families, and 2010 for the remaining fuel tanks on handheld equipment. We believe this will facilitate an orderly transition from current fuel tank designs to low-permeation fuel tanks.

We are proposing the additional year of lead time for the large fuel tanks installed in marine vessels largely due to concerns raised over the application of low-permeation rotational-molded fuel tank technology to marine applications. The majority of these fuel tanks are typically rotational-molded by small businesses. Although low-permeation technology has emerged for these applications, we believe additional lead time will be necessary for all manufacturers to be ready to implement this technology. This will give these manufacturers additional time to make changes to their production processes to comply with the standards and to make any tooling changes that may be necessary. We are similarly proposing the implementation of fuel tank permeation standards for Class I fuel tanks installed in Small SI equipment in 2012, mostly to align with the implementation date for the Phase 3 exhaust emission standards. This is especially important for Class I engines where most of the engine manufacturers will also be responsible for meeting all evaporative emission standards. We request comment on the proposed implementation dates for the proposed fuel tank permeation standards.

We are proposing to implement the running loss standards for nonhandheld Small SI equipment in the same year as the exhaust emission standards. We believe this is appropriate because the running loss vapor will in some cases be routed to the intake manifold for combustion in the engine. Manufacturers would need to account for the effect of the additional running loss vapor in their engine calibrations. We request comment on this approach.

We are proposing to implement the proposed diurnal standards for portable marine fuel tanks and personal watercraft in 2009. We believe these requirements will not result in a significant change from current practice so this date will provide sufficient lead time for manufacturers to comply with standards. For other installed fuel tanks, however, we are proposing a later implementation date of 2010. The development of canisters as an approach to control diurnal emissions without pressurizing the tanks has substantially reduced the expected level of effort to redesign and retool for making fuel tanks. However, canister technology has not yet been applied commercially to marine applications and additional lead time may be necessary to work out various technical parameters, such as design standards and installation procedures to ensure component durability and system integrity. We request comment on the proposed diurnal implementation dates.

(3) Technological Approaches

We believe several emission control technologies can be used to reduce evaporative emissions from Small SI equipment and Marine SI vessels. These emission control strategies are discussed below. Chapter 5 of the Draft RIA presents more detail on these technologies and Chapter 6 provides information on the estimated costs. We request comment on these or other technological approaches for reducing evaporative emissions from these engines and equipment.

(a) Fuel Line Permeation

Fuel lines produced for use in Small SI equipment and Marine SI applications are generally extruded nitrile rubber with a cover for abrasion resistance. Fuel lines used in Small SI applications often meet SAE J30 R7 recommendations, including a permeation limit of 550 g/m^2/day at 23 °C on ASTM Fuel C. Fuel lines for personal watercraft are typically designed to meet SAE J2046, which includes a permeation limit of 300 g/m^2/day at 23 °C on ASTM Fuel C.[92] Marine fuel lines subject to Coast Guard requirements under 33 CFR part 183 are designated as either Type A or Type B and either Class 1 or Class 2. SAE J1527 provides detail on these fuel line designs. Type A fuel lines pass the U.S. Coast Guard fire test while Type B designates fuel lines that have not passed this test. Class 1 fuel lines are intended for fuel-feed lines where the fuel line is normally in contact with liquid fuel and has a permeation limit of 100 g/m^2/day at 23 °C. Class 2 fuel lines are intended for vent lines and fuel fill necks where liquid fuel is not continuously in contact with the fuel line; it has a permeation limit of 300 g/m^2/day at 23 °C. In general practice, most boat builders use Class 1 fuel lines for both vent lines and fuel-feed lines to avoid carrying two types of fuel lines. Most fuel fill necks, which have a much larger diameter and are constructed differently, use materials meeting specifications for Class 2 fuel lines. The marine industry is currently in the process of revising SAE J1527 to include a permeation rating of 15 g/m^2/day at 23 °C on fuel CE10 for marine fuel lines.

Low-permeability fuel lines are in production today. One fuel line design, already used in some marine applications, uses a thermoplastic layer between two rubber layers to control permeation. This thermoplastic barrier may either be nylon or ethyl vinyl acetate. Barrier approaches in automotive applications include fuel lines with fluoroelastomers such as FKM and fluoroplastics such as Teflon and THV. In addition to presenting data on low-permeation fuel lines, Chapter 5 of the Draft RIA lists several fuel-system materials and their permeation rates. Molded rubber fuel line components, such as primer bulbs and some handheld fuel lines, could meet the standard by using a fluoroelastomer such as FKM. The Draft RIA also discusses low-permeation materials that retain their flexibility at very low temperatures.

Automotive fuel lines made of low-permeation plastic tubing are generally made from fluoroplastics. An added benefit of these low-permeability fuel lines is that some fluoropolymers can be made to conduct electricity and therefore prevent the buildup of static charges. This type of fuel line can reduce permeation by more than an order of magnitude below the level associated with barrier-type fuel lines, but it is relatively inflexible and would need to be molded in specific shapes for each equipment or vessel design. Manufacturers have commented that they need flexible fuel lines to fit their many designs, resist vibration, prevent kinking, and simplify connections and fittings. An alternative to custom molding is to manufacture fuel lines with a corrugated profile (like a vacuum hose). Producing flexible fluoropolymer fuel lines is somewhat more expensive but the result is a product that meets emission standards without compromising in-use performance or ease of installation.

(b) Fuel Tank Permeation

Blow-molding is widely used for the manufacture of Small SI, portable marine, and PWC fuel tanks. Typically, blow-molding is performed by creating a hollow tube, known as a parison, by pushing high-density polyethylene (HDPE) through an extruder with a screw. The parison is then pinched in a mold and inflated with an inert gas. In highway applications, nonpermeable plastic fuel tanks are produced by blow molding a layer of ethylene vinyl alcohol (EVOH) or nylon between two layers of polyethylene. This process is called coextrusion and requires at least five layers: the barrier layer, adhesive layers on either side of the barrier layer, and two outside layers of HDPE that make up most of the thickness of the fuel tank walls. However, multi-layer construction requires additional extruder screws, which significantly increases the cost of the blow-molding process. One manufacturer has developed a two-layer barrier approach using a polyarylamide inner liner. This technology is not in production yet but appears to be capable of permeation levels similar to the traditional EVOH barrier designs. This approach would enable blow-molding of low-permeation fuel tanks with only one additional extruder screw.

Multi-layer fuel tanks can also be formed using injection molding. In this method a low-viscosity polymer is forced into a thin mold to create the two sides of the fuel tank (*e.g.*, top and bottom), which are then fused together. To add a barrier layer, a thin sheet of the barrier material is placed inside the mold before injecting the poleyethylene. The polyethylene, which generally has a much lower melting point than the barrier material, bonds with the barrier material to create a shell with an inner liner.

A less expensive alternative to coextrusion is to blend a low-permeable resin with the HDPE and extrude it with a single screw to create barrier platelets. The trade name typically used for this permeation control strategy is Selar. The low-permeability resin, typically EVOH or nylon, creates noncontinuous platelets in the HDPE fuel tank to reduce permeation by creating long, tortuous pathways that the hydrocarbon molecules must navigate to escape through the fuel tank walls. Although the barrier is not continuous, this strategy can still achieve greater than a 90 percent reduction in permeation of gasoline. EVOH has much higher permeation resistance to alcohol than nylon so it would likely be the preferred material for meeting the proposed standard based on testing with a 10 percent ethanol fuel.

Many fuel tanks for Small SI equipment are injection-molded out of either HDPE or nylon. Injection-molding can be used with lower production volumes than blow-molding due to lower tooling costs. In this method, a low-viscosity polymer is forced into a thin mold to create the two sides of the fuel tank; these are then fused together using vibration, hot plate or sonic welding. A strategy such as Selar has not been demonstrated to work with injection-molding due to high shear forces.

An alternative to injection-molding is thermoforming which is also cost-effective for lower production volumes. In this process, sheet material is heated and then drawn into two vacuum dies. The two halves are then fused while the plastic is still molten to form the fuel tank. Low-permeation fuel tanks can be constructed using this process by using multi-layer sheet material. This multi-layer sheet material can be extruded using similar materials to multi-layer blow-molded fuel tank designs. A typical barrier construction would include a thin EVOH barrier, adhesion layers on both sides, a layer of HDPE regrind, and outside layers of pure virgin HDPE.

Regardless of the molding process, another type of low-permeation technology for HDPE fuel tanks would

[92] Society of Automotive Engineers Surface Vehicle Standard, ''Personal Watercraft Fuel Systems,'' SAE J2046, Issues 1993–01–19 (Docket EPA–HQ–OAR–2004–0008–0179).

be to treat the surfaces with a barrier layer. Two ways of achieving this are known as fluorination and sulfonation. The fluorination process causes a chemical reaction where exposed hydrogen atoms are replaced by larger fluorine atoms, which creates a barrier on the surface of the fuel tank. In this process, batches of fuel tanks are generally processed post-production by stacking them in a steel container. The container is then voided of air and flooded with fluorine gas. By pulling a vacuum in the container, the fluorine gas is forced into every crevice in the fuel tanks. Fluorinating with this process would treat both the inside and outside surfaces of the fuel tank, thereby improving the reliability and durability of the permeation-resistance. As an alternative, fuel tanks can be fluorinated during production by exposing the inside surface of the fuel tank to fluorine during the blow-molding process. However, this method may not prove as effective as post-production fluorination.

Sulfonation is another surface treatment technology where sulfur trioxide is used to create the barrier by reacting with the exposed polyethylene to form sulfonic acid groups on the surface. Current practices for sulfonation are to place fuel tanks on a small assembly line and expose the inner surfaces to sulfur trioxide, then rinse with a neutralizing agent. However, sulfonation can also be performed using a batch method. Either of these sulfonation processes can be used to reduce gasoline permeation by more than 95 percent.

Over the first month or so of use, polyethylene fuel tanks can experience a material expansion of as much as three percent due to saturation of the plastic with fuel. Manufacturers have raised the concern that this hydrocarbon expansion could degrade the effectiveness of surface treatments like fluorination or sulfonation. However, we believe this will not significantly affect these surface treatments. California ARB has performed extensive permeation testing on portable fuel containers with and without these surface treatments. Prior to the permeation testing, the tanks were prepared by performing a durability procedure where the fuel container cycled a minimum of 1,000 times between—1 psi and 5 psi. In addition, the fuel containers were soaked with fuel for a minimum of four weeks before testing. Their test data, presented in Chapter 5 of the Draft RIA, show that fluorination and sulfonation are still effective after this durability testing. We have conducted our own permeation testing on fluorinated fuel tanks that have been exposed to fuel for more than a year with excellent results. These results are presented in the Draft RIA.

Manufacturers have also commented that fuel sloshing in the tank under normal in-use operation could wear off the surface treatments. However, we believe this is unlikely to occur. These surface treatments actually result in an atomic change in the structure of the surface of the fuel tank. To wear off the treatment, the plastic itself would need to be worn away. In addition, testing by California ARB shows that the fuel tank permeation standard can be met by fuel tanks that have undergone 1.2 million slosh cycles. Test data on a sulfonated automotive HDPE fuel tank after five years of use showed no deterioration in the permeation barrier. These data are presented in Chapter 5 of the Draft RIA.

A fourth method for molding plastic fuel tanks is called rotational-molding. Rotational-molding is a lower-cost alternative for smaller production volumes. In this method, a mold is filled with a powder form of polyethylene with a catalyst material. While the mold is rotated in an oven, the heat melts the plastic. When cross-link polyethylene (XLPE) is used, this heat activates a catalyst in the plastic, which causes a strong cross-link material structure to form. This method is often used for relatively large fuel tanks in Small SI equipment and for installed marine fuel tanks. The advantages of this method are low tooling costs, which allow for smaller production volumes, and increased strength and flame resistance. Flame resistance is especially important for installed marine fuel tanks subject to 33 CFR part 183. At this time, the barrier treatment approaches discussed above for HDPE have not been demonstrated to be effective for XLPE.

We have evaluated two permeation control approaches for rotational-molded fuel tanks. The first is to form an inner layer during the molding process. Historically, the primary approach for this is to use a drop-box that opens after the XLPE tank begins to form. However, processes have been developed that eliminate the need for a drop box. With this construction a low-permeation inner liner can be molded into the fuel tank. Manufacturers are currently developing acetyl copolymer, nylon, and polybutylene terephthalate inner liners for this application. In fact, one fuel tank manufacturer is already selling tanks with a nylon inner liner into Class II Small SI equipment applications. Initial testing suggests that these barrier layers could be used to achieve the proposed standards.

The second approach to creating a barrier layer on XLPE rotational-molded fuel tanks is to use an epoxy barrier coating. One manufacturer has demonstrated that a low-permeation barrier coating can be adhered to an XLPE fuel tank that results in a permeation rate below the proposed standard. In this case, the manufacturer used a low level of fluorination to increase the surface energy of the XLPE so the epoxy would adhere properly.

Marine fuel tanks are also fabricated out of either metal or fiberglass. Metal does not permeate so tanks that are constructed and installed properly to prevent corrosion should meet the proposed standards throughout their full service life. For fiberglass fuel tanks, one manufacturer has developed a composite that has been demonstrated to meet the proposed fuel tank permeation standard. Permeation control is achieved by incorporating fillers into a resin system and coating the assembled tank interior and exterior. This filler is made up of nanocomposites (very small particles of treated volcanic ash) which are dispersed into a carrier matrix. These particles act like the barrier platelets discussed above by creating a tortuous pathway for hydrocarbon migration through the walls of the fuel tank.

(c) Diurnal

Portable marine fuel tanks are currently equipped with a valve that can be closed by the user when the tank is stored to hold vapor in the fuel tank. These fuel tanks are designed to hold the pressure that builds up when a sealed fuel tank undergoes normal daily warming. This valve must be opened when the engine is operating to prevent a vacuum from forming in the fuel tank as the fuel level in the tank decreases. A vacuum in the fuel tank could prevent fuel from being drawn into the engine. Because the valve is user-controlled, any emission control is dependent on user behavior. This can be corrected by replacing the user-controlled valve with a simple one-way valve in the fuel cap. For instance, a diaphragm valve that is common in many automotive applications seals when under pressure but opens at low-vacuum conditions.

Personal watercraft currently use sealed systems with pressure-relief valves that start venting vapors when pressures reach a threshold that ranges from 0.5 to 4.0 psi. We believe the proposed standard can be met through the use of a sealed fuel system with a 1.0 psi pressure-relief valve. Personal watercraft should therefore be able to meet the proposed standard with little or no change to current designs.

For other vessels with installed fuel tanks, manufacturers have commented that even 1.0 psi of pressure would be too high for their applications. They expressed concern that their fuel tanks had large, flat surfaces that would deform or leak at pressures of 0.5 psi or higher. This concern led us to consider several technologies for controlling diurnal emissions without pressurizing the tank, including carbon canisters, volume-compensating air bags, and bladder fuel tanks.

The primary evaporative emission control device used in automotive applications is a carbon canister. With this technology, vapor generated in the tank is vented to a canister containing activated carbon. The fuel tank must be sealed such that the only venting that occurs is through the carbon canister. This prevents more than a minimal amount of positive or negative pressure in the tank. The activated carbon collects and stores the hydrocarbons. The activated carbon bed in the canister is refreshed by purging.

In a marine application, an engine purge is not practical; therefore, canisters were not originally considered to be a practical technology for controlling diurnal vapor from boats. Since that time, however, we have collected information showing that the canister is purged sufficiently during cooling periods to reduce diurnal emissions effectively. When the fuel in the tank cools, fresh air is drawn back through the canister into the fuel tank. This fresh air partially purges the canister and returns hydrocarbons to the fuel tank. This creates open sites in the carbon so the canister can again collect vapor during the next heating event. Test data presented in Chapter 5 of the Draft RIA show that a canister starting from empty is more than 90 percent effective until it reaches the point of saturation. Once it reaches saturation, a canister is still capable of reducing diurnal emissions by more than 60 percent due to the normal airflow across the canister bed during cooling periods. Adding active purging during engine operation would improve the level of control somewhat depending on how often the engine is operated.

Manufacturers have raised the concern that it is common for fuel to pass out the vent line during refueling. If there were a canister in the vent line it would become saturated with fuel. While this would not likely cause permanent damage to the canister, we believe marine fuel systems should prevent liquid fuel from exiting the vent line for both environmental and safety reasons. A float valve or small orifice in the entrance to the vent line from the fuel tank would prevent liquid fuel from reaching the canister or escaping from the tank. Any pressure build-up from such a valve would cause fuel to back up the fill neck and shut off the fuel dispensing nozzle. Manufacturers have also expressed concerns for canister durability in marine applications due to vibration, shock, and humidity. However, there are now marine grades of activated carbon that are harder and more moisture-resistant than typical automotive carbon. Industry installed canisters equipped with the marine grade carbon on 14 boats in a pilot program and no problems were encountered. This is discussed in more detail in Chapter 5 of the Draft RIA.

Another concept for minimizing pressure in a sealed fuel tank is through the use of a volume-compensating air bag. The purpose of the bag is to fill up the vapor space above the liquid fuel. By minimizing the vapor space, the equilibrium concentration of fuel vapors occupies a smaller volume, resulting in a smaller mass of vapors. As the equilibrium vapor concentration increases with increasing temperature, the vapor space expands, which forces air out of the bag through the vent to atmosphere. Because the bag volume decreases to compensate for the expanding vapor space, total pressure inside the fuel tank stays very close to atmospheric pressure. Once the fuel tank cools in response to cooling ambient temperatures the resulting vacuum in the fuel tank will make the bag expand again by drawing air from the surrounding environment. Our test results show that pressure could be kept below 0.8 psi using a bag with a capacity equal to 25 percent of the fuel tank capacity. The use of a volume-compensating air bag, in conjunction with a pressure-relief valve, would be very effective in controlling diurnal emissions.

Probably the most effective technology for reducing diurnal emissions from marine fuel tanks is through the use of a collapsible fuel bladder. In this concept, a low-permeation bladder is installed in the fuel tank to hold the fuel. As fuel is drawn from the bladder the vacuum created collapses the bladder. There is, therefore, no vapor space and no pressure build-up from fuel heating. No vapors would be vented to the atmosphere since the bladder is sealed. This option could also significantly reduce emissions during refueling that would normally result from dispensed fuel displacing vapor in the fuel tank. We have received comments that this would be cost-prohibitive because it could increase costs from 30 to 100 percent, depending on tank size. However, bladder fuel tanks have safety advantages and they are already sold by at least one manufacturer to meet market demand in niche applications.

(d) Running Loss

Running loss emissions can be controlled by sealing the fuel cap and routing vapors from the fuel tank to the engine intake. In doing so, vapors generated by heat from the engine will be burned in the engine's combustion chamber. It may be necessary to use a valve or limited-flow orifice in the purge line to prevent too much fuel vapor from reaching the engine and to prevent liquid fuel from entering the line if the equipment flips over. Depending on the configuration of the fuel system and purge line, a one-way valve in the fuel cap may be desired to prevent a vacuum in the fuel tank during engine operation. We anticipate that a system like this would eliminate running loss emissions. However, higher temperatures during operation and the additional length of vapor line would slightly increase permeation. Considering these effects, we still believe that the system described here would reduce running losses from Small SI equipment by more than 90 percent. Other approaches would be to move the fuel tank away from heat sources or to use heat protection such as a shield or directed air flow.

We are not considering running loss controls for marine vessels. For portable fuel tanks and installed fuel tanks on larger vessels we would expect the significant distance from the engine and the cooling effect of operating the vessel in water to prevent significant heating of the fuel tanks during engine operation. For personal watercraft, fuel tanks have a sealed system with pressure relief that should help contain running loss emissions. For other installed fuel tanks, we would expect the system for controlling diurnal emissions would capture about half of any running losses that would occur.

(e) Diffusion

Many manufacturers today use fuel caps that effectively limit the diffusion of gasoline from fuel tanks. In fact, the proposed diffusion emission standard for Small SI equipment is based to a large degree on the diffusion control capabilities of these fuel caps. As discussed in Chapter 5 of the Draft RIA, venting a fuel tank through a tube (rather than through an open orifice) also greatly reduces diffusion. We have conducted additional testing with short, narrow-diameter vent lines that provide enough resistance to diffusion to meet the proposed emission standards.

A secondary benefit of the running loss control described above for Small SI equipment relates to diffusion emissions. In a system that vents running loss vapors to the engine, venting losses would occur through the vapor line to the engine intake, rather than through open vents in the fuel cap. This approach should therefore eliminate diffusion emissions.

(4) Regulatory Alternatives

We considered both less and more stringent evaporative emission control alternatives for fuel systems used in Small SI equipment and Marine SI vessels. Chapter 11 of the Draft RIA presents details on this analysis of regulatory alternatives. The results of this analysis are summarized below. We believe the proposed permeation standards are reflective of available technology and represent a step change in emissions performance. Therefore, we consider the same permeation control scenario in the less stringent and more stringent regulatory alternatives.

For Small SI equipment, we considered a less stringent alternative without running loss emission standards Small SI engines. However, we believe controlling running loss and diffusion emissions from nonhandheld equipment is feasible at a relatively low cost. Running loss emissions can be controlled by sealing the fuel cap and routing vapors from the fuel tank to the engine intake. Other approaches would be to move the fuel tank away from heat sources or to use heat protection such as a shield or directed air flow. Diffusion can be controlled by simply using a tortuous tank vent path, which is commonly used today on Small SI equipment to prevent fuel splashing or spilling. These emission control technologies are relatively straight-forward, inexpensive, and achievable in the near term. Not requiring these controls would be inconsistent with section 213 of the Clean Air Act. For a more stringent alternative, we considered applying a diurnal emission standard for all Small SI equipment. We believe passively purging carbon canisters could reduce diurnal emissions by 50 to 60 percent from Small SI equipment. However, we believe some important issues would need to be resolved for diurnal emission control, such as cost, packaging, and vibration. The cost sensitivity is especially noteworthy given the relatively low emissions levels (on a per-equipment basis) from such small fuel tanks.

For marine vessels, we considered a less stringent alternative, where there would be no diurnal emission standard for vessels with installed fuel tanks. However, installed fuel tanks on marine vessels are much larger in capacity than those used in Small SI applications. Our analysis indicates that traditional carbon canisters are feasible for boats at relatively low cost. While packaging and vibration are also issues with marine applications, we believe these issues have been addressed. Carbon canisters were installed on fourteen boats by industry in a pilot program. The results demonstrated the feasibility of this technology. The proposed standards would be achievable through engineering design-based certification with canisters that are very much smaller than the fuel tanks. In addition, sealed systems, with pressure control strategies would be accepted under the proposed engineering design-based certification. For a more stringent scenario, we consider a standard that would require boat builders to use an actively purged carbon canister. This means that, when the engine is operating, it would draw air through the canister to purge the canister of stored hydrocarbons. However, we rejected this option because active purge occurs infrequently due to the low hours of operation per year seen by many boats. The gain in overall efficiency would be quite small relative to the complexity active purge adds into the system in that the engine must be integrated into a vessel-based control strategy. The additional benefit of an actively purged diurnal control system is small in comparison to the cost and complexity of such a system.

(5) Our Conclusions

We believe the proposed evaporative emission standards reflect what manufacturers can achieve through the application of available technology. We believe the proposed lead time is necessary and adequate for fuel tank manufacturers, equipment manufacturers, and boat builders to select, design, and produce evaporative emission control strategies that will work best for their product lines. We expect that meeting these requirements will pose a challenge, but one that is feasible when taking into consideration the availability and cost of technology, lead time, noise, energy, and safety. The role of these factors is presented in detail in Chapters 5 and 6 of the Draft RIA. As discussed in Section X, we do not believe the proposed standards would have negative effects on energy, noise, or safety and may lead to some positive effects.

VII. General Concepts Related to Certification and Other Requirements

This section describes general concepts concerning the proposed emission standards and various requirements related to these standards. There is a variety of proposed requirements that serve to ensure effective implementation of the emission standards, such as applying for certification, labeling engines, and meeting warranty requirements. The following discussion reviews these requirements for Small SI engines and outboard and personal-watercraft engines that have already been subject to exhaust emission standards, explains a variety of changes, and describes how these provisions apply to evaporative emissions. Sterndrive and inboard marine engines will be subject to emission standards for the first time so all these requirements are new for those engines.

Rather than making changes to existing regulations, we have drafted new regulatory text describing the new emission standards and related requirements and included that text in this proposal. The proposed regulations are written in plain-language format. In addition to the improved clarity of the regulatory text, this allows us to harmonize the regulations with our other programs requiring control of engine emissions.[93]

The proposed regulatory text migrates the existing requirements for Small SI engines, including all the emission standards and other requirements related to getting and keeping a valid certificate of conformity, from 40 CFR part 90 to 40 CFR part 1054. For nonhandheld engines, manufacturers must comply with all the provisions in part 1054 once the Phase 3 standards begin to apply in 2011 or 2012. For handheld engines, manufacturers must comply with the provisions in part 1054 starting in 2010. Similarly, we are proposing to migrate the existing requirements for Marine SI engines from 40 CFR part 91 to 40 CFR part 1045. Manufacturers must comply with the provisions in part 1045 for an engine once the proposed exhaust emission standards begin to apply in 2009.

The proposed requirements for evaporative emissions are described in 40 CFR part 1060, with some category-specific provisions in 40 CFR parts 1045 and 1054, which are referred to as the exhaust standard-setting parts for each

[93] For additional background related to plans for migrating regulations, see ''Plain Language Format of Emission Regulations for Nonroad Engines,'' EPA420–F–02–046, September 2002 (*http://www.epa.gov/otaq/regs/nonroad/2002/f02046.pdf*).

type of engine. Adopting the provisions related to evaporative emissions in a broadly applicable part has two main advantages. First, we anticipate that in many cases boat builders, equipment manufacturers, and manufacturers of fuel-system components will need to certify their products only to the standards for evaporative emissions, with no corresponding responsibility for exhaust emissions. These companies will not need to focus on the exhaust standard-setting part except to read the short section defining the evaporative emission standards and requirements. Second, manufacturers of fuel-system components make products that are not necessarily unique to a specific category of engines. The regulations in 40 CFR parts 1045 and 1054 will highlight the standards that apply and provide any specific directions in applying the general provisions in part 1060. The standards, test procedures, and certification provisions are almost completely uniform across our programs so this combined set of evaporative-related provisions will make it much easier for companies to certify their products if they are not subject to the exhaust emission standards. In Section XI we describe how we might apply the provisions of part 1060 to recreational vehicles regulated under 40 CFR part 1051.

Other provisions describing general testing procedures, including detailed laboratory and equipment specifications and procedures for equipment calibration and emission measurements, are written in 40 CFR part 1065. The exhaust standard-setting parts also include testing specifications that are specific to each type of engine, including duty cycles, test-fuel specifications, and procedures to establish deterioration factors. See Section IX for further discussion of these test procedures. Engines, equipment, and vessels subject to the new standard-setting parts (parts 1045, 1054, and 1060) will also be subject to the general compliance provisions in 40 CFR part 1068. These include prohibited acts and penalties, exemptions and importation provisions, selective enforcement audits, defect reporting and recall, and hearing procedures. See Section VIII for further discussion of these general compliance provisions. Both part 1065 and part 1068 already apply to various other engine categories. We are therefore publishing in this proposal only the changes needed to apply the existing regulations to the engines, equipment, and vessels covered by this rulemaking.

A. Scope of Application

This proposal covers spark-ignition propulsion marine engines and vessels powered by those engines introduced into commerce in the United States. The proposal also covers other nonroad spark-ignition engines rated at or below 19 kW and the corresponding equipment. The following sections describe generally when emission standards apply to these products. Refer to the specific program discussion in Sections III through VI for more information about the scope of application and timing of the proposed standards.

(1) Do the standards apply to all engines, equipment, and vessels or only to new products?

The scope of this proposal is broadly set by Clean Air Act section 213(a)(3), which instructs us to set emission standards for new nonroad engines and new nonroad vehicles. Generally speaking, the proposed rule is intended to cover all new engines and vehicles in the identified categories (including any associated vehicles, vessels, or other equipment). Once the emission standards apply to an engine, piece of equipment, or fuel-system component manufacturers must get a certificate of conformity from us before selling them or otherwise introducing them into commerce in the United States. Note that the term ''manufacturer'' includes any individual or company introducing into commerce in the United States engines, equipment, vessels, or components that are subject to emission standards. These Clean Air Act requirements relate to importation and any other means of introducing covered products into commerce. In addition to any applicable evaporative requirements, we also require equipment manufacturers that install engines from other companies to install only certified engines once emission standards apply. The certificate of conformity (and corresponding emission control information label) provides assurance that manufacturers have met their obligation to make engines, equipment, and vessels that meet emission standards over the useful life we specify in the regulations.

(2) How do I know if my engine or equipment is new?

We are proposing to define ''new'' consistent with previous rulemakings. Under the proposed definition, a nonroad engine (or nonroad equipment) is considered new until its title has been transferred to the ultimate purchaser or the engine has been placed into service. This proposed definition would apply to engines, equipment, and vessels so the nonroad equipment using these engines would be considered new until their title has been transferred to an ultimate buyer. In Section VII.B.1 we describe how to determine the model year of individual engines, equipment, and vessels.

To further clarify the proposed definition of new nonroad engine, we are proposing to specify that a nonroad engine, equipment, or vessel is placed into service when it is used for its intended purpose. We are therefore proposing that an engine subject to the proposed standards is used for its intended purpose when it is installed in a vessel or other piece of nonroad equipment. We need to make this clarification because some engines are made by modifying a highway or land-based nonroad engine that has already been installed on a vessel or other piece of equipment, so without this clarification, these engines may escape regulation. For example, an engine installed in a marine vessel after it has been used for its intended purpose as a land-based highway or nonroad engine is considered ''new'' under this definition. We believe this is a reasonable approach because the practice of adapting used highway or land-based nonroad engines may become more common if these engines are not subject to the standards in this proposal.

In summary, an engine would be subject to the proposed standards if it is:

- Freshly manufactured, whether domestic or imported; this may include engines produced from engine block cores;
- Installed for the first time in nonroad equipment after having powered a car, a truck, or a category of nonroad equipment subject to different emission standards;
- Installed in new nonroad equipment, regardless of the age of the engine; or
- Imported—whether new or used, as long as the engine was not built before the initial emission standards started to apply.

(3) When do imported engines, equipment, and vessels need to meet emission standards?

The proposed emission standards would apply to all new engines, equipment, and vessels that are used in the United States. According to Clean Air Act section 216 ''new'' includes engines or equipment that are imported by any person, whether freshly manufactured or used. Thus, the proposed program would include engines that are imported for use in the United States whether they are imported as loose engines or are already installed on a vessel or other piece of nonroad equipment built elsewhere. All imported engines would need an EPA-issued certificate of conformity to clear customs, with limited exemptions (as described in Section VIII).

If an engine or piece of nonroad equipment that was built after emission standards take effect is imported without a currently valid certificate of conformity, we would still consider it to be a new engine, equipment, or vessel. This means it would need to comply with the emission standards that apply based on its model year. Thus, for example, a marine vessel manufactured in a foreign country in 2009, then imported into the United States in 2010, would be considered ''new.'' The engines on that piece of equipment would have to comply with the requirements for the 2009 model year, assuming that the engine has not been modified and no other exemptions apply. This provision is important to prevent manufacturers from avoiding emission standards by building products abroad, transferring their title, and then importing them as used products. Note that if an imported engine has been modified it must meet emission standards based on the year of modification rather than the year of manufacture. See Section V.E.6 and Section XI.C for proposed and contemplated restrictions related model years for importation of new engines and equipment.

(4) Do the standards apply to exported engines, equipment, or vessels?

Engines, equipment, or vessels intended for export would generally not be subject to the requirements of the proposed emission control program, except that we would not exempt engines exported to countries having standards identical to the United States. However, engines, equipment, or vessels that are exported and subsequently re-imported into the United States must be certified. For example, this would be the case when a foreign company purchases engines manufactured in the United States for installation in nonroad equipment for export back to the United States. Those engines would be subject to the emission standards that apply on the date the engine was originally manufactured. If the engine is later modified and certified (or recertified), the engine is subject to emission standards that apply on the date of the modification. So, for example, foreign equipment manufacturers buying U.S.-made engines without recertifying the engines will need to make sure they purchase complying engines for the products they sell in the United States.

(5) Are there any new products that would be exempt from the emission standards?

We are proposing to extend our basic nonroad exemptions to the engines, equipment, and vessels covered by this proposal. These include the testing exemption, the manufacturer-owned exemption, the display exemption, and the national security exemption. These exemptions are described in more detail in Section VIII.C.

In addition, the Clean Air Act does not consider engines used solely for competition to be nonroad engines so the proposed emission standards do not apply to them. The Clean Air Act similarly does not consider engines used in stationary applications to be nonroad engines; however, EPA has proposed to apply emission standards for stationary spark-ignition engines that are comparable to the standards that apply to nonroad engines (71 FR 33804, June 12, 2006). As described in Section V, we are proposing in this notice to apply the Phase 3 standards for Small SI engines equally to stationary spark-ignition engines at or below 19 kW. Refer to the program discussions in Sections III through VI for a discussion of how the various exclusions apply for different categories of engines.

B. Emission Standards and Testing

(1) How is the model year determined?

The proposed emission standards are effective on a model-year basis. We are proposing to define model year much like we do for passenger cars. It would generally mean either the calendar year or some other annual production period based on the manufacturer's production practices. For example, manufacturers could start selling 2006 model year engines as early as January 2, 2005 as long as the production period extends until at least January 1, 2006. All of a manufacturer's engines from a given model year would have to meet emission standards for that model year. For example, manufacturers producing new engines in the 2006 model year would need to comply with the 2006 standards.

(2) How do adjustable engine parameters affect emission testing?

Many engines are designed with components that can be adjusted for optimum performance under changing conditions, such as varying fuel quality, high altitude, or engine wear. Examples of adjustable parameters include spark timing, idle speed setting, and fuel injection timing. While we recognize the need for this practice, we are also concerned that engines maintain a consistent level of emission control for the whole range of adjustability. We are therefore proposing to require that engines meet emission standards over the full adjustment range.

Manufacturers would have to provide a physical stop to prevent adjustment outside the established range. Operators would then be prohibited from adjusting engines outside this range. Refer to the proposed regulatory text for more information about adjustable engine parameters. See especially the proposed sections 40 CFR 1045.115 for Marine SI engines and 40 CFR 1054.115 for Small SI engines.

(3) Alternate Fuels

The emission standards apply to all spark-ignition engines regardless of the fuel they use. Almost all Marine SI engines and Small SI engines operate on gasoline, but these engines may also operate on other fuels, such as natural gas, liquefied petroleum gas, ethanol, or methanol. The test procedures in 40 CFR part 1065 describe adjustments needed for operating test engines with oxygenated fuels.

In some special cases, a single engine is designed to alternately run on different fuels. For example, some engines can switch back and forth between natural gas and LPG. We request comment on the best way of certifying such engines so they can be in a single engine family, even though we would normally require engines operating on different fuels to be in separate engine families. We could require such manufacturers to conduct emission testing with emission-data engines operating on both fuels to establish the worst-case configuration. In particular, we request comment on the appropriate data for demonstrating compliance at the end of the service-accumulation period for durability testing.

Once an engine is placed into service, someone might want to convert it to operate on a different fuel. This would take the engine out of its certified configuration, so we are proposing to require that someone performing such a fuel conversion go through a certification process. We would expect to allow certification of the complete engine using normal certification procedures, or the aftermarket conversion kit could be certified using the provisions of 40 CFR part 85, subpart V. This contrasts with the existing provisions that allow for fuel conversions that can be demonstrated not to increase emission levels above the applicable standard. We propose to apply this requirement starting January 1, 2010. (See § 90.1003 and § 1054.635.)

C. Demonstrating Compliance

We are proposing a compliance program to accompany emission standards. This consists first of a process for certifying engine models and fuel systems (either as a part of or independently from the vessel or equipment). In addition to certification, we are proposing several provisions to ensure that emission control systems continue to function over long-term operation in the field. Most of these certification and durability provisions are consistent with previous rulemakings for these and other nonroad engines, equipment, and vessels. Refer to the discussion of the specific programs in Sections III through VI for additional information about these requirements for each engine category.

(1) How would I certify my engines, equipment, or vessels?

Sections III through VI describe the proposed emission standards for new engines, equipment, and vessels. Section VI in particular describes which companies are responsible for certifying to the new standards. This section describes the general certification process.

We are proposing a certification process similar to that already adopted for these and other engines and equipment. Certifying manufacturers generally test representative prototype engines or fuel system components and submit the emission data along with other information to EPA in an application for a Certificate of Conformity. If we approve the application, then the manufacturer's Certificate of Conformity allows the manufacturer to sell the engines, equipment, or vessels described in the application in the United States. We are proposing to include clarifying language to specify that the certificate is valid starting with the indicated effective date, but that it is not valid for any production after December 31 of the model year for which it is issued. We are also proposing a provision to preclude issuance of certificates after December 31 of a given model year. This would avoid a situation in which a manufacturer receives certification after it is no longer valid for further production.

We are proposing that manufacturers certify their engine models by grouping them into emission families. Under this approach, engines expected to have similar emission characteristics would be classified in the same emission family. The emission family definition is fundamental to the certification process and to a large degree determines the amount of testing required for certification. The proposed regulations include specific engine characteristics for grouping emission families for each category of products. To address a manufacturer's unique product mix, we may approve using broader or narrower emission families as long as the manufacturer can show that all the engines in an engine family will have similar emission control characteristics over the engines' useful life.

The useful life period specified in the regulations defines the period over which manufacturers are responsible for meeting emission standards. The useful life values included in our regulations are intended to reflect the period during which engines are designed to properly function without being remanufactured. Useful life values are unique for each category of engines. As proposed, for purposes of certification, manufacturers would be required to use test data to estimate the rate of deterioration for each emission family over its useful life. Manufacturers would show that each emission family meets the emission standards after incorporating the estimated deterioration in emission control.

The emission-data engine is the engine from an emission family that will be used for certification testing. To ensure that all engines in the family meet the standards, we are proposing that manufacturers select for certification testing the engine from the family that is most likely to exceed emission standards. In selecting this ''worst-case'' engine, the manufacturer uses good engineering judgment. Manufacturers would consider, for example, all engine configurations and power ratings within the emission family and the range of allowed options. Requiring the worst-case engine to be tested ensures that all engines within the emission family are complying with emission standards. A similar approach would be used for evaporative emission control systems in emission families.

We are proposing to require manufacturers to include in their application for certification the results of all emission tests from their emission-data units (engines, fuel tanks, etc.), including any diagnostic-type measurements (such as ppm testing) and invalidated tests. This complete set of test data ensures that the valid tests forming the basis of the manufacturer's application are a robust indicator of emission control performance rather than a spurious or incidental test result.

Clean Air Act section 206(h) specifies that test procedures for certification (including the test fuel) should adequately represent in-use operation. We are proposing test fuel specifications intended to represent in-use fuels. Engines would have to meet the standards on fuels with properties anywhere in the range of proposed test fuel specifications. The test fuel is generally to be used for all testing associated with the regulations proposed in this document, including certification, production-line testing, and in-use testing.

We are proposing to require that engine manufacturers give engine operators instructions for properly maintaining their engines. We are including limitations on the frequency of scheduled maintenance that a manufacturer may specify for emission-related components to help ensure that emission control systems do not depend on an unreasonable expectation of maintenance in the field. These maintenance limits would also apply during any service accumulation that a manufacturer may do to establish deterioration factors. This approach is common to all our engine programs. We are proposing new regulatory language to clarify that engine manufacturers may perform emission-related maintenance during service accumulation only to the extent that they can demonstrate that such maintenance will be done with in-use engines. It is important to note, however, that these provisions would not limit the maintenance an operator could perform. It would merely limit the maintenance that operators would be expected to perform on a regularly scheduled basis. Some of these requirements are new for engines that are already subject to standards. We believe it is important to define limits to these maintenance parameters, especially with the expectation that engines will begin to incorporate aftertreatment technologies. See § 1045.125 and § 1054.125 of the proposed regulations for more information.

(2) What emission labels are required?

Once an emission family is certified every product a manufacturer produces from that emission family would need an emission label with basic identifying information. We request comment on the proposed requirements for the design and content of engine labels, which are detailed in § 1045.135 and § 1054.135 of the proposed regulation text.

The current regulations require equipment manufacturers to put a duplicate label on the equipment if the