Final Report

of the

Small Business Advocacy Review Panel

on EPA's Planned Proposed Rule

Control of Emissions from

Nonroad Spark-Ignition Engines and Equipment

October 17, 2006

Table of Contents

Panel Report of the Small Business Advocacy Review Panel on EPA's Planned Proposed Rule for Control of Emissions from Nonroad Spark-Ignition Engines and Equipment

1. Introduction

This report is presented to the Small Business Advocacy Review Panel (SBAR Panel or Panel) convened for the proposed rulemaking on the Control of Emissions from Nonroad Spark-Ignition (SI) Engines and Equipment, currently being developed by the U.S. Environmental Protection Agency (EPA). Under Section 609(b) of the Regulatory Flexibility Act (RFA) as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), a Panel is required to be convened prior to publication of the initial regulatory flexibility analysis (IRFA) that an agency may be required to prepare under the RFA. In addition to EPA's Small Business Advocacy Chairperson, this Panel will consist of the Director of EPA's Assessment and Standards Division within the Office of Transportation and Air Quality, the Administrator of the Office of Information and Regulatory Affairs within the Office of Management and Budget (OMB), and the Chief Counsel for Advocacy of the Small Business Administration (SBA).

This report includes the following:

- Background information on the proposed rule being developed;
- Information on the types of small entities that would be subject to the proposed rule;
- A summary of the Panel's outreach activities; and
- The comments and recommendations of the Small Entity Representatives (SERs).

Section 609(b) of the RFA directs the Panel to report on the comments of small entity representatives and its findings on issues related to identified elements of an 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 the projected reporting, recordkeeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities which 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 which may duplicate, overlap, or conflict with the proposed rule; and

- A description of any significant alternatives to the proposed rule which accomplish the stated objectives of applicable statutes and which minimize any significant economic impact of the proposed rule on small entities.

The purpose of the Panel is to gather information to identify potential impacts on small entities and to develop options to mitigate these concerns where possible. Once completed, the Panel report will be provided to the agency issuing the proposed rule and included in the rulemaking record. In light of the Panel report, and where appropriate, the Agency is to make changes to the draft proposed rule, the IRFA for the proposed rule, or the decision on whether an IRFA is required.

It is important to note that the Panel's findings and discussion will be based on the information available at the time the final Panel report is drafted. EPA will continue to conduct analyses relevant to the proposed rule, and additional information may be developed or obtained during the remainder of the rule development process. The Panel makes its report at a preliminary stage of rule development and its report should be considered in that light. At the same time, the report provides the Panel and the Agency with an opportunity to identify and explore potential ways of shaping the proposed rule to minimize the burden of the rule on small entities while achieving the rule's purposes.

Any options identified by the Panel for reducing the rule's regulatory impact on small entities may require further analysis and/or data collection to ensure that the options are practicable, enforceable, environmentally sound, and, of course, consistent with the Clean Air Act (CAA).

2. Background

2.1 Regulatory History

Air pollution can cause a variety of serious health effects, including respiratory problems and cancer. Mobile sources are projected to continue to be a significant contributor to air pollution across the country, notwithstanding EPA rules finalized over the past two decades that have been, and will continue, providing reductions in mobile source emissions. For many years, emission control programs at the national, state, and local levels and industry efforts at developing new technologies have resulted in reductions from all sources of air pollution, including power plants, factories, cars, light-duty and heavy-duty trucks, small and large off-road equipment, aircraft, marine vessels, land-based and marine recreational vehicles, and locomotives. The fuels used to power many of these industries, vehicles, and machines are also becoming cleaner.

At the same time, the generally strong economic growth of our country in recent decades has led to a larger number of sources of pollution. For example, although

individual new cars are much cleaner than they were in the early 1970s (and will continue to become cleaner under existing programs), Americans today on average own more cars and drive them further, negating much of the impact of the technological improvement on the quality of the air. In most cases, these trends are accelerating. The result is that our nation continues to face major challenges in moving toward healthier air for its citizens. Continued improvement in controlling the emissions of all polluting technologies, and more efficient use of vehicles and machines, will be necessary to achieve improved air quality. The following sections describe in more detail the regulatory history of the two categories of nonroad spark-ignition engines being considered by the Panel: (1) Spark-ignition engines and equipment at or below 19 kilowatt (kW) (referred to as "Small SI engines and equipment") and (2) Marine spark-ignition engines and vessels (referred to as "Marine SI engines and vessels").

2.1.1 Small SI Engines and Equipment

In July 1995, EPA finalized the first federal exhaust emission standards for Small SI engines. These "Phase 1" standards were estimated to result in approximately a 33% reduction in hydrocarbons (HC) + oxides of nitrogen (NOx) emissions compared to unregulated engines. The Phase 1 emission standards took effect in 1997 and 1998 and required compliance only on new engines (i.e., manufacturers were not required to demonstrate compliance over the life of the engine). To comply with the standards, manufacturers generally made minor adjustments to the engines. Table 1 presents the Phase 1 standards for Small SI engines.

Table 1: Phase 1 Exhaust Emission Standards for Small SI Engines

Engine Class	Application	Displacement	HC standard, g/kW-hr*	NOx standard, g/kW-hr*	HC+NOx standard, g/kW-hr*	CO standard, g/kW-hr*
I	Nonhandheld	<225 cc	--	--	16.1	519
II	Nonhandheld	≥225 cc	--	--	13.4	519
III	Handheld	<20 cc	295	5.36	--	805
IV	Handheld	≥20 to <50 cc	241	5.36	--	805
V	Handheld	≥50 cc	161	5.36	--	603

* - grams per kilowatt-hour

In March 1999, EPA finalized a second round of federal exhaust emission standards for Small SI engines used in nonhandheld applications such as lawnmowers, garden tractors, and generators. The "Phase 2" standards for nonhandheld engines were estimated to result in approximately a 60% reduction in HC+NOx emissions beyond the Phase 1 levels. The Phase 2 nonhandheld engine standards are being phased in between 2001 and 2007. To comply with the nonhandheld standards, manufacturers have had to make many significant engine design changes to lower emissions. One important feature of the Phase 2 standards requires manufacturers to demonstrate compliance with the standards over a designated period of time, known as the regulatory useful life period. Table 2 presents a summary of the Phase 2 standards for Small SI nonhandheld engines.

Table 2: Final Phase 2 Exhaust Emission Standards for Small SI Engines

Engine Class	Application	Displacement	Phase-In Period	HC+NOx standard, g/kW-hr*	CO standard, g/kW-hr*
I	Nonhandheld	<225 cc	2003-2007	16.1	610
II	Nonhandheld	≥225 cc	2001-2005	12.1	610
III	Handheld	<20 cc	2002-2005	50	805
IV	Handheld	≥20 to <50 cc	2002-2005	50	805
V	Handheld	≥50 cc	2004-2007	72	603

* - grams per kilowatt-hour

In April 2000, EPA finalized a second round of federal exhaust emission standards for Small SI engines used in handheld applications such as string trimmers, chainsaws, and leaf blowers. The "Phase 2" standards for handheld engines were estimated to result in approximately a 70% reduction in HC+NOx emissions beyond the Phase 1 levels. The Phase 2 handheld engine standards are being phased in between 2002 and 2007. To comply with the handheld standards, manufacturers have had to make many significant engine design changes to lower emissions as well as apply small catalysts to many of the engines. As noted above, one important feature of the Phase 2 standards requires manufacturers to demonstrate compliance with the standards over a designated period of time, known as the regulatory useful life period. Table 2 also presents a summary of the Phase 2 standards for Small SI handheld engines.

In 2003, the California Air Resources Board (CARB) adopted a new round of emissions standards for the same type of engines regulated by EPA under the Small SI engine category. These standards would only apply to engines used in specific types of Small SI equipment sold in the state of California. The CARB standards include a set of exhaust standards approximately 35 percent more stringent than EPA's Phase 2 standards for nonhandheld engines. The CARB standards also include a first round of evaporative emissions standards for Small SI equipment (i.e., both handheld equipment and nonhandheld equipment as noted above). The CARB exhaust emission requirements are scheduled to take effect in 2007 and 2008, while the CARB evaporative emission requirements are scheduled to take effect between 2006 and 2013.

2.1.2 Marine SI Engines and Vessels

In October 1996, EPA finalized exhaust emission standards for outboard and personal watercraft (OB/PWC) Marine SI engines. These standards required approximately a 75% reduction in HC+NOx emissions from OB/PWC engines. At the time the regulation was developed, the OB/PWC technology was, for the most part, two-stroke carbureted technology which emits high rates of HC exhaust emissions. Therefore, large emissions reductions were available through the use of two-stroke direct injection and four-stroke technology. Through the use of credit programs, manufacturers can sell a mix of old and new technology engines. The OB/PWC emission standards were phased-in from 1998 to 2006 to allow the smooth introduction of new technologies. Table 3 presents the existing EPA exhaust emission standards for OB/PWC engines.

Table 3: HC+NOx Exhaust Emission Standards for OB/PWC Engines, g/kW-hr

Model Year	Rated Power < 4.3 kW	Rated Power ≥ 4.3 kW
1998	278	$0.917 \times (151 + 557/kW^{0.9}) + 2.44$
1999	253	$0.833 \times (151 + 557/kW^{0.9}) + 2.89$
2000	228	$0.750 \times (151 + 557/kW^{0.9}) + 3.33$
2001	204	$0.667 \times (151 + 557/kW^{0.9}) + 3.78$
2002	179	$0.583 \times (151 + 557/kW^{0.9}) + 4.22$
2003	155	$0.500 \times (151 + 557/kW^{0.9}) + 4.67$
2004	130	$0.417 \times (151 + 557/kW^{0.9}) + 5.11$
2005	105	$0.333 \times (151 + 557/kW^{0.9}) + 5.56$
2006	81	$0.250 \times (151 + 557/kW^{0.9}) + 6.00$

EPA's October 1996 final rule for OB/PWC did not include emission standards for sterndrive and inboard (SD/I) engines. Therefore, SD/I engines are currently unregulated by EPA.

Since EPA adopted its standards for OB/PWC, CARB has implemented its own standards. The CARB standards implemented the final federal standard in 2001 and then set two additional tiers in 2004 and 2008. The 2008 standards require approximately another 65% reduction in HC+NOx emissions beyond the federal EPA standards. This will be achieved largely by discontinuing the sale of carbureted two-stroke engines in California. CARB also adopted emission standards for SD/I engines used in California. The SD/I standards, which are phased-in from 2007-2009, are based on the use of catalytic converter technology.

On October 14, 2002, EPA proposed evaporative emission standards for Marine SI engines and boats using these engines. Specifically, EPA proposed permeation standards for fuel hose and fuel tanks and proposed diurnal emission standards for fuel tanks. The proposed standards for marine evaporative emissions have not been finalized. We are including this emission source in our current proposal with some modifications. As a part of the October 14, 2002 proposal, we also stated our intent to propose new exhaust emission standards for Marine SI engines.

2.2 Description of the Rule and its Scope

Section 213(a) of the CAA directs EPA to: (1) conduct a study of emissions from nonroad engines and vehicles; (2) determine whether emissions of carbon monoxide (CO), NOx, and Volatile Organic Compounds (VOCs) from nonroad engines and vehicles are significant contributors to ozone or CO in more than one area which has failed to attain the National Ambient Air Quality Standard (NAAQS) for ozone or CO; and (3) if nonroad emissions are determined to be significant, regulate those categories or classes of new nonroad engines and vehicles that cause or contribute to such air pollution. Section 213(a)(3) states that the emission standards "shall achieve the greatest degree of emission reduction achievable through the application of technology" giving appropriate consideration to cost, noise, energy, safety, and lead time.

The Nonroad Engine and Vehicle Emission Study required by Section 213(a)(1) was completed in November 1991. The determination of the significance of emissions from nonroad engines and vehicles in more than one NAAQS nonattainment area was published on June 17, 1994. At the same time, the first set of regulations for new land-based nonroad compression-ignition (CI) engines at or above 37 kW was promulgated. EPA has also issued proposed or final rules for most other categories of nonroad engines, including engines used in lawn and garden equipment, forklifts, recreational vehicles, locomotives, ships, and recreational marine vessels. In addition, EPA has revised the emission standards for many of these categories of nonroad engines one or more times to achieve further emission reductions.

In addition to the general authority to regulate nonroad engines under the CAA, Section 428 of the Omnibus Appropriations Bill for 2004 requires EPA to propose and finalize new regulations for nonroad spark-ignition engines less than 50 horsepower (hp). The Bill directs EPA to propose regulations by December 1, 2004 and finalize them by December 31, 2005. EPA's assessment of new standards is to be carried out under Section 213 of the CAA.

Finally, Section 205 of Public Law 109-54 included an additional requirement that EPA complete a technical study, to look at safety issues related to the potential standards called for under the Omnibus Appropriations Bill for 2004. The law directed EPA to complete the study prior to issuing the proposal called for in the Omnibus Appropriations Bill for 2004. In response to this requirement, EPA prepared a technical study on safety in coordination with the Consumer Product Safety Commission (CPSC). The study analyzes the incremental risk of fire and burn to consumers that could result from the new standards. EPA published the technical study in March 2006. A copy of the Safety Study can be found at http://www.epa.gov/otaq/equip-ld.htm#phase3.

EPA is in the process of developing a proposed program in response to the requirement contained in the Omnibus Appropriations Bill for 2004. In order to determine which engines EPA would include in the proposal, EPA has evaluated the various regulatory categories which contain spark-ignition (SI) engines less than 50 hp. The EPA regulatory categories which contain SI engines less than 50 hp include four different categories: 1) SI engines at or below 19 kW (approximately 25 hp) which are used primarily in lawn and garden equipment; 2) SI engines above 19 kW which are used primarily in industrial applications like forklifts; 3) recreational vehicle engines which are used in all-terrain vehicles (ATVs), off-highway motorcycles, and snowmobiles; and 4) marine SI engines used in OB/PWC. Based on a variety of factors, including the level of the current standards for each of these categories, how recently EPA adopted or revised regulations for these categories, and the status of the implementation of the standards, EPA has focused on two regulatory categories for this proposal – SI engines at or below 19 kW and marine SI engines.

While we have not yet decided on a detailed approach for timing and stringency of the requirements for these categories, we have analyzed a number of options and are

focusing on a primary option for each of these categories. We are considering exhaust emission standards for land-based nonroad SI engines less than 19 kW (hereafter referred to as "Small SI") and for marine SI engines including OB/PWC as well as SD/I vessels. We are also considering evaporative emission requirements for the equipment and vessels using these engines. Based on emissions inventory projections, EPA believes that without further controls, these two categories of nonroad engines will contribute over 25 percent of HC emissions from all mobile sources.

2.3 Related Federal Rules

For Small SI engines and equipment, the primary federal rules that are related to the rule under consideration are the Phase 1 rule for Small SI engines (Federal Register Vol. 60, p. 34582, July 3, 1995), the Phase 2 rule for Small SI nonhandheld engines (Federal Register Vol. 64, p. 15208, March 30, 2004), and the Phase 2 rule for Small SI handheld engines (Federal Register Vol. 65, p. 24268, April 25, 2000). For Marine SI engines and vessels, the primary federal rule that is related to the rule under consideration is the October 1996 final rule (Federal Register Vol. 61, p. 52088, October 4, 1996).

3. Overview of Proposal under Consideration

3.1 Potential Requirements of the Proposal

As discussed below, EPA is considering various approaches for new exhaust and evaporative emission standards for both Small SI engines and equipment and Marine SI engines and vessels. For each of these approaches, EPA is seeking input on regulatory flexibilities that would be appropriate for small entities in the engine, equipment, marine vessel, fuel tank and fuel hose industries. EPA is also seeking input on what impact each of the approaches would have on small entities, such as cost, lead time needed, and other relevant impacts on small entities. This information will help EPA in developing the upcoming rule.

3.1.1 Small SI Engines and Equipment

For Small SI nonhandheld engines, we are considering exhaust emission standards similar to the recently adopted CARB standards. Table 4 shows the primary option for exhaust standards and implementation dates EPA considered for Small SI nonhandheld engines during the SBREFA process. EPA believes these standards can be met using engine modifications and the application of catalysts. We have also given some consideration to the potential of more stringent standards based on the use of improved fuel management (i.e., fuel injection systems) and catalysts. Finally we have also given some consideration to the potential of minor (i.e., around 10 percent) reductions from the current Phase 2 standards based on minor modifications of existing engines. Because the existing Phase 2 standards for handheld engines are based on the application of catalysts for most engines, and the standards are still not fully implemented, EPA is not considering new exhaust standards for handheld engines at this time.

Table 4: Primary Option for Phase 3 Exhaust Standards under Consideration for Small SI Engines

Engine Class	Application	Displacement	Potential Implementation Date	HC+NOx standard, g/kW-hr	CO standard, g/kW-hr
I	Nonhandheld	<225 cc	2010*	10.0	610
II	Nonhandheld	≥225 cc	2011	8.0	610

* EPA is also evaluating a Class I implementation date of 2012.

As mentioned above, EPA recently released the Safety Study called for in Section 205 of Public Law 109-54 in March 2006. The report covers the safety implications of both exhaust and evaporative emissions control for all SI engines less than 50 hp, but focuses on catalysts applied to walk-behind mowers and ride-on lawnmowers. In developing the study, EPA tested a total of 19 different baseline engines and catalyst-equipped engines both in the laboratory and in real-world operation. As directed by Congress, EPA worked with CPSC in developing the Safety Study. The main conclusion of the study is that the applications of catalysts to meet new exhaust emission standards will not lead to any incremental increase in risk of fire or burn.

We are also considering evaporative emission standards for Small SI engines that are, in many ways, similar to the CARB standards. These standards would include both permeation and venting emissions and would apply to both handheld and nonhandheld engines. The primary difference that we are considering from the CARB standards would be the test procedures. We would likely use test procedures consistent with our recreational vehicle requirements which use a different test fuel (containing 10% ethanol for permeation testing) and different test temperatures than the CARB requirements.

We believe that large reductions are feasible in fuel hose and fuel tank permeation emissions. Permeation refers to gasoline molecules passing through the rubber or plastic fuel system materials and passing out the other side. Low permeation hoses are available today and are used on some existing Small SI equipment and marine vessels. To minimize permeation, barrier layers of low permeation material, such as fluoroelastomers and fluoroplastics, are included in the fuel hose constructions. Several technologies have been identified for controlling fuel tank permeation. These technologies include surface treatments, barrier materials, and alternative materials.

In addition, we are interested in reducing venting emissions such as diurnal, running loss, and diffusion. Diurnal emissions refer to vapor displaced from the fuel tank due to vapor expansion caused by heat from daily temperature changes. Running loss emissions are similar to diurnal emissions except that the engine and other components on the equipment provide the heat source. Diffusion emissions refer to gasoline molecules that will evaporate from a fuel tank at constant temperature through a vent. Emission control strategies for controlling venting emissions include carbon canisters, sealed fuel tanks with pressure relief, insulating or moving the fuel tank away from heat

sources, routing the vent line to the engine intake, and tortuous venting paths such as through the gas cap threads.

Table 5 presents the primary option for evaporative emission standards and implementation dates EPA is considering for Small SI engines. EPA's primary option does not include the control of diurnal emissions (which the CARB evaporative standards do include) but it does include control of hose permeation for handheld engines (which the CARB evaporative standards do not include).

Table 5: Primary Option for Phase 3 Evaporative Standards under Consideration for Small SI Engines

Engine Class	Application	Implementation Date for Evaporative Requirements		
		Fuel Hose Permeation (Standard = 15 $g/m^2/day$)	Fuel Tank Permeation (Standard =1.5 $g/m^2/day$)	Running Loss Control (Design Standard)
I, II	Nonhandheld	2009*	2011	2011
III, IV, V	Handheld	2009	2009	Not Applicable

* - EPA is considering moving up implementation of the fuel hose permeation standard to 2008.

3.1.2 Marine SI Engines and Vessels

For OB/PWC engines, we are considering HC+NOx exhaust emission standards similar to the 2008 CARB standards. These standards can be met using four-stroke and direct-injection engines that manufacturers are certifying and selling today. We are also considering CO standards based on this certification data. These standards would primarily be achieved by discontinuing the sale of two-stroke carbureted engines and ramping up production of the cleaner technologies. We have also given some consideration to the potential of more stringent standards and greater emission reductions based on the use of catalysts on OB/PWC engines. One manufacturer has been using two-way catalysts on PWC engines for several years. Table 6 shows the primary option for exhaust standards EPA is considering for OB/PWC engines. EPA is considering beginning the OB/PWC standards with the 2009 model year.

Table 6: Primary Option for Exhaust Standards under Consideration for Marine SI Engines

Pollutant	Standard for Marine Sector (g/kW-hr)		
	OB/PWC P* ≤40 kW	OB/PWC P* >40 kW	SD/I
HC+NOx	$28 - 0.3 \times P^*$	16.0	5.0
CO	$500 - 5.0 \times P^*$	300	75

* P = maximum engine power in kW

For SD/I engines, we are considering exhaust emission standards similar to the CARB HC+NOx emission standards. In addition, we are considering CO standards as

well. There has been a large body of testing on SD/I engines equipped with catalysts and further testing is underway. These catalysts have been packaged into water jacketed exhaust manifolds on marine engines. The water jacketing is used to reduce the surface temperatures of the exhaust manifolds to meet Coast Guard safety requirements. The catalysts can achieve reductions of around 65% in HC+NOx emissions and 50% in CO emissions. The proposed standards are largely supported by the catalyst development test programs which include:

- Lab testing of 6 catalyst designs on a 7.4 liter Multi-Port Injection (MPI) marine engine
- In water (fresh and salt) testing over industry's durability/safety/performance protocol
- Full useful life testing of 4 boats in freshwater
- Ongoing testing of 3 boats in saltwater

We also considered emission reductions that could be achieved in the near-term through engine calibration and through exhaust gas recirculation (EGR). Two of the above studies looked at the effect of closed-loop fuel injection and EGR on emissions. Only modest emission reductions were achieved through engine calibration. The data suggest that HC+NOx emission reductions of 30-40% can be achieved using EGR, with no reduction in CO emissions. Manufacturers have indicated that they would rather focus their research and development efforts on catalysts than have to develop an intermediate standard followed by a later catalyst-based emission standard. Table 6 (presented above) also shows the primary option for exhaust standards EPA is considering for SD/I engines. (Alternatively, for engines above 375 kW, EPA is strongly considering standards of 16.0 g/kW-hr for HC+NOx and 350 g/kW-hr for CO.) EPA is considering beginning the SD/I standards with the 2009 model year.

As part of the proposal for exhaust emission standards for both OB/PWC engines and SD/I engines, we are considering not-to-exceed (NTE) provisions similar in concept to current requirements for diesel marine engines. The NTE provisions require that manufacturers ensure emissions control over a wide range of operating conditions, not just under laboratory testing conditions specified in the standard certification test. Under the NTE concept, an NTE zone is created under the power curve of the engine. Within this NTE zone, the engine would not be allowed to exceed a specified emission cap. With the NTE approach, in-use testing and compliance become much easier since emissions may be sampled during normal boating (for example, as opposed to needing to perform in-use testing in a laboratory by removing the engine from the boat).

We are also considering a new proposal for evaporative emission standards for marine fuel systems. The standards would be similar to the 2002 proposal in that we are interested in achieving significant reductions in permeation and diurnal emissions. The primary changes are in regard to the form of the standards and the test procedures. In addition, we have collected much more information on potential emission control strategies since the original proposal. Table 7 shows the primary option for evaporative emission standards EPA is considering for Marine SI engines.

Table 7: Primary Option for Evaporative Standards under Consideration for Marine SI Engines

Category	Implementation Date for Evaporative Requirements		
	Fuel Hose Permeation (Standard = 15 $g/m^2/day$)	Fuel Tank Permeation (Standard = 1.5 $g/m^2/day$)	Diurnal Control (Standard = 0.40 g/gal/day)
PWC and Portable Tanks	2009	2011	2009
Other Tanks	2009	2012	2010

Low permeation hoses are available today and are used on some existing Small SI equipment and marine vessels. To minimize permeation, barrier layers of low permeation material, such as fluoroelastomers and fluoroplastics, are included in the fuel hose constructions. Several technologies have been identified for controlling fuel tank permeation. These technologies include surface treatments, barrier materials, and alternative materials. For diurnal emissions, emission control strategies include sealed systems with pressure relief, fuel or air bladders, and activated carbon canisters in the vent line. One significant issue raised by fuel tank manufacturers in the 2001 SBAR Panel was the concern that their fuel tanks would not be able to withstand much pressure. Since that time, we and industry have collected data on passive carbon canisters which can achieve meaningful reductions in diurnal emissions without significant pressure forming in the fuel tank.

3.2 Options Likely to be Proposed

3.2.1 Potential Burden Reduction Measures for Small SI Engine and Equipment Manufacturers

EPA has looked at the existing Phase 2 rule for small engines, as well as other recent EPA rules, to provide potential ideas which might be offered with the Phase 3 standards. As with the existing Phase 2 rules, EPA is considering using an annual production volume (i.e., units per year) to determine if a business qualifies for small business flexibilities.

For engine manufacturers, potential flexibilities include extra time before the Phase 3 requirements would apply and reduced testing burden, such as assigned deterioration factors for certification purposes and exemption from the Production Line Testing requirements. For equipment manufacturers, potential flexibilities include extra time before having to use Phase 3 engines and the ability to request extra time for a variety of reasons including technical hardship, economic hardship, and unusual circumstances. For tank and hose manufacturers, EPA has tried to develop the timing of the proposal to accommodate all manufacturers, including small businesses. We would consider offering manufacturers the ability to request extra time for a variety of reasons including economic hardship and unusual circumstances.

3.2.2 Potential Burden Reduction Measures for Marine SI Engine and Vessel Manufacturers

EPA has already completed two SBAR Panels related to standards for marine engines and vessels. These Panels took place in 1999 and 2001 and addressed small business issues related to exhaust and evaporative emission standards similar to those we are considering today. Some examples of flexibilities would be those listed below from the previous SBAR Panels for marine engines and vessels. Since the earlier Panels, a great deal of development has been performed on exhaust and evaporative emission control technology. The flexibility options listed below will need to be considered in the context of this new information.

On June 7, 1999, we convened a SBAR Panel to address small entity issues related to anticipated exhaust emission standards for SD/I marine engines. As part of that Panel, we considered a range of regulatory options including standards that would be expected to require the use of catalytic control. With input from Small Entity Representatives (SERs), 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. Small business flexibility approaches recommended by the Panel included the following:

- Broadening the definition of engine families for certification
- Minimizing compliance testing requirements
- Design-based certification (as an option to emission testing)
- Use of emission credits
- Delay of the implementation date of the standards
- Hardship provisions (for economic reasons or under unusual circumstances)
- Limited temporary exemptions for small boat builders

On May 3, 2001, we convened a SBAR Panel to address potential small entity issues for a number of emission programs under consideration. One of the programs was evaporative emission standards for boats using gasoline engines. With input from SERs, 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 flexibility approaches recommended by the Panel included the following:

- Broad definition of emission families for certification
- Design-based certification (as an option to emission testing)
- Use of emission credits
- Delay of the implementation date of the standards
- Hardship provisions (for economic reasons or under unusual circumstances)

4. Applicable Small Entity Definitions

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

Small businesses (as well as large businesses) would be regulated by this rulemaking, but not small governmental jurisdictions or small organizations as described above. The rulemaking under consideration is expected to affect small businesses in several industry sectors. We have used the criteria for small entities developed by SBA for the North American Industry Classification System (NAICS). For each industry sector impacted by this proposal, SBA defines small entities by number of employees. The following section describes the categories of small businesses that will potentially be affected by this rulemaking and the applicable SBA definitions.

4.1 Small SI Engine and Equipment Small Entity Definitions

For EPA regulatory purposes, the Small SI engine category is divided into two sub-categories – (1) engines used in nonhandheld applications such as walk behind mowers, riding mowers, generators, pumps and pressure washers; and (2) engines used in handheld applications such as string trimmers, leaf blowers, and chainsaws. For Small SI engines and equipment, the SBA small business size standards are 1,000 employees for engine manufacturers, 750 employees for construction equipment manufacturers, and 500 employees for manufacturers of other types of equipment. The SBA small business size standard for manufacturers that produce fuel tanks or fuel hose is 500 employees.

4.2 Marine SI Engine and Vessel Small Entity Definitions

For Marine SI engines and vessels, the SBA small business size standards are 1,000 employees for engine manufacturers and 500 employees for boat builders. The SBA small business size standard for manufacturers that produce fuel tanks or fuel hose is 500 employees.

5. Small Entities that may be Subject to the Proposed Regulation

We have used a variety of sources to identify which companies in each of the industry sectors are appropriately considered small entities. As noted above, for each sector impacted by this proposal, SBA defines small entities by number of employees. This section gives an overview of the Small SI engine and equipment industries and the Marine SI engine and vessel industries, specifically related to small businesses.

5.1 Small SI Engines and Equipment Manufacturers

Based on EPA certification records, the Small SI nonhandheld engine industry is made up primarily of large manufacturers including Briggs and Stratton, Tecumseh, Honda, Kohler and Kawasaki. The Small SI handheld engine industry is also made up primarily of large manufacturers including Electrolux Home Products, MTD, Homelite, Stihl and Husqvarna. EPA has identified 10 Small SI engine manufacturers that qualify as a small business under SBA definitions. Half of these small manufacturers certify gasoline engines and the other half certify liquefied petroleum gas (LPG) engines.

The Small SI equipment market is dominated by a few large businesses including Toro, John Deere, MTD, Briggs and Stratton, and Electrolux Home Products. While the Small SI equipment market may be dominated by just a handful of companies, there are many small businesses in the market; however these small businesses account for less than 10 percent of equipment sales. We have identified over three hundred equipment manufacturers that qualify as a small business under the SBA definitions. More than 90 percent of these small companies manufacture less than 5,000 pieces of equipment per year. The median employment level is 65 employees for nonhandheld equipment manufacturers and 200 employees for handheld equipment manufacturers. The median sales revenue is approximately $9 million for nonhandheld equipment manufacturers and $20 million for handheld equipment manufacturers.

EPA has identified 25 manufacturers that produce fuel tanks for the Small SI equipment market that meet the SBA definition of a small business. Fuel tank manufacturers rely on three different processes for manufacturing plastic tanks – rotational molding, blow molding and injection molding. EPA has identified small business fuel tank manufacturers using the rotational molding and blow molding processes but has not identified any small business manufacturers using injection molding. In addition, EPA has identified two manufacturers that produce fuel hose for the Small SI equipment market that meet the SBA definition of a small business. The majority of fuel hose in the Small SI market is made by large manufacturers including Avon Automotive and Dana Corporation.

5.2 Marine SI Engine and Vessel Manufacturers

Based on EPA certification records, the OB/PWC market is made up primarily of large manufacturers including, Brunswick (Mercury), Bombardier Recreational Products, Yamaha, Honda, Kawasaki, Polaris, Briggs & Stratton, Nissan, and Tohatsu. One company that qualifies as a small business under the SBA definitions has certified their product as a PWC. This company is Surfango who makes a small number of motorized surfboards.

The SD/I market is made up mostly of small businesses; however, these businesses account for less than 20% of engine sales. Two large manufacturers, Brunswick (Mercruiser) and Volvo Penta, dominate the market. We have identified 28 small entities manufacturing SD/I marine engines. The third largest company is Indmar,

which has much less than the SBA threshold of 1,000 employees. Based on sales estimates, number of employees reported by Thomas Register, and typical engine prices, we estimate that the average revenue for the larger small SD/I manufacturers is about $50-60 million per year. However, the vast majority of the SD/I engine manufacturers produce low production volumes of engines and typically have less than 50 employees.

The two largest boat building companies are Brunswick and Genmar. Brunswick owns approximately 25 boat companies and Genmar owns approximately 12 boat companies. Based on a manufacturer list maintained by the U.S. Coast Guard, there are over 1,600 boat builders in the United States. We estimate that, based on manufacturer identification codes, more than 1,000 of these companies produce boats using gasoline marine engines. According to the National Marine Manufacturers Association (NMMA), most of these boat builders are small businesses. These small businesses range from individuals building one boat per year to businesses near the SBA small business threshold of 500 employees.

We have identified 15 marine fuel tank manufacturers in the United States that qualify as small businesses under the SBA definition. These manufacturers include five rotational molders, two blow molders, seven aluminum fuel tank manufacturers, and two specialty fuel tank manufacturers. The small rotational molders average less than 50 employees while the small blow-molders average over 100 employees. Moeller qualifies as a large business because they are owned by Moore; however, their rotational molding business is a small part of the company and operates similar to the smaller businesses. Other blow-molders are in the same situation such as Attwood which is owned by Brunswick.

We have only identified one small hose manufacturer that produces for the Marine SI market. Novaflex primarily distributes hoses made by other manufacturers, but does produce its own fill neck hose. The majority of fuel hose in the Marine SI market is made by large manufacturers including Goodyear and Parker-Hannifin.

6. Summary of Small Entity Outreach

6.1 Small Entity Outreach

For Small SI engines and equipment, we actively engaged in talking to entities that would potentially be affected by the upcoming rulemaking well before beginning the formal SBREFA process. Based on information from EPA certification databases and non-governmental sales and employment databases, we were able to identify the small entities within the Small SI engine and equipment sectors. Based on information from engine manufacturers and equipment manufacturers as well as trade groups and the Internet, we were able to identify small entities in the fuel tank and fuel hose sectors for Small SI engines and equipment. After identifying these small entities, we then began talking to businesses to locate potential SERs to participate in the SBREFA process. For equipment manufacturers, we also attended the 2004 Lawn and Garden Expo in Louisville, Kentucky and established some small entity contacts.

For marine SI engine and vessels, EPA has already completed two SBAR Panels. These panels took place in 1999 and 2001 and addressed small business issues related to exhaust emission standards and evaporative emission standards, respectively, similar to those we are considering today. Nineteen small entities that sell in the marine SI engine and vessel sectors participated as SERs in those two Panels.

Since the 1999 and 2001 SBAR Panels, we have continued to meet with the marine industry to discuss issues related to exhaust and evaporative emission standards for SI marine engines and vessels. These meetings have been in the form of manufacturer visits, presentations and meetings at tradeshows, and meetings with NMMA and with individual manufacturers.

Based on the outreach efforts to small entities noted above, EPA identified a list of potential SERs in both the Small SI and Marine SI sectors. EPA also consulted with SBA Advocacy to identify potential SERs. EPA provided each of the potential SERs with EPA's fact sheets on the SBREFA process and background information on the nonroad SI engine rulemaking process. Once potential SERs were identified, we began having more discussions to better understand the needs of the small entities in more detail. Recently, EPA staff visited the facilities of two of the potential Small SI equipment manufacturer SERs to gain additional insight into the capabilities and needs of small entity equipment manufacturers.

Two outreach meetings were held with the current potential SERs on July 11, 2006. The first meeting covered the Small SI engine and equipment provisions and the second meeting covered the marine SI engine and vessel provisions.

6.2 Summary of EPA's Outreach Meetings with Potential Small Entity Representatives

EPA, in consultation with the Chief Counsel for Advocacy of the Small Business Administration, invited potential SERs to participate in a pre-Panel outreach meeting on the planned Control of Emissions from Nonroad Spark Ignition Engines Rule and the SBREFA process. On June 27, 2006, EPA mailed a package of background materials about the rulemaking to the potential SERs. A list of the materials shared with the potential SERs during the pre-Panel outreach meeting is contained in Appendix A. On July 11, 2006 EPA held an all day pre-Panel outreach meeting with the potential SERs and invited representatives from the Office of Advocacy of the Small Business Administration and the Office of Information and Regulatory Affairs within the Office of Management and Budget to the meeting. EPA presented an overview of the SBREFA process, an explanation of the planned rulemaking, and technical background on such information as options and costs. EPA also discussed previous alternatives used in past rulemakings and potential ways to modify those alternatives for the upcoming rulemaking, as well as the addition of new alternatives and flexibilities.

These outreach meetings were held to solicit feedback from the potential SERs on the upcoming rulemaking. The morning meeting focused on Small SI engines and equipment. The afternoon meeting focused on marine SI engine and vessels. A total of 14 of the potential SERs participated in the two meetings. EPA asked that the potential SERs provide feedback on the flexibilities provided in the previous rulemakings, and specifically, which flexibilities worked best for small entities (and which did not), and how the flexibilities could be made more useful. EPA asked potential SERs to provide these written comments by July 25, 2006. Comments raised during the July 11, 2006 outreach meetings and written comments submitted by the potential SERS are summarized in section 8 of this document.

6.3 Summary of the Panel's Outreach Meetings with Small Entity Representatives

The Panel members invited the SERs to participate in a Panel outreach meeting on the planned Control of Emissions from Nonroad Spark Ignition Engines Rule and the SBREFA process. On August 28, 2006, EPA mailed a package of background materials about the rulemaking and potential regulatory small business flexibility ideas to the SERs. A list of the materials shared with the SERs for the Panel outreach meeting is contained in Appendix A. On September 12, 2006 the Panel members held an all day Panel outreach meeting with the SERs. EPA discussed the small business flexibilities under consideration for the upcoming proposed rulemaking.

These outreach meetings were held to solicit feedback from the SERs on the list of recommended small business flexibilities. The morning meeting focused on Small SI engines and equipment. The afternoon meeting focused on marine SI engine and vessels. A total of 13 SERs participated in the two meetings. EPA asked that the SERs provide feedback on the flexibilities being considered for the proposed rulemaking. EPA asked SERs to provide written comments by September 26, 2006. Comments raised during the September 12, 2006 outreach meetings and written comments submitted by the SERS are summarized in section 8 of this document.

7. List of Small Entity Representatives

Tables 8 and 9 contain a list of the SERs that were invited to advise the Panel during the Panel process for Small SI engines and equipment and Marine SI engines and vessels, respectively.

Table 8: Small SI Engine and Equipment SERs

Company	Representative and Contact Information	Function	Justification/ Additional Comments
Wisconsin Motors LLC	Tom Wooding 2020 Fletcher Creek Drive Memphis, TN 38133 Ph: (901) 371-0353 Fax: (901) 372-2183	Engine Manufacturer	Certifies Class II gasoline engines

Company	Representative and Contact Information	Function	Justification/ Additional Comments
	tom.wooding@wisconsinmotors.com		
Tiger Truck LLC	Mike Felder/Mike Ward 9030 Premier Row Dallas, TX 75247 Ph: (214) 688-1778 Fax: (214) 905-3932 mfelder@tigertruck.com mward@tigertruck.com	Engine Manufacturer	Certifies Class II gasoline engines
Powertrain	Oneal Wood Jeffery Wood 137 2nd Street Golden, MS 38847 Ph: (662) 454-9237 Fax: (662) 454-3447 woodsale@bellsouth.net	Engine and Equipment Manufacturer	Certifies Class I and II engines and imports equipment
T W Enterprise	Dixon Scott 636 Logan Lane Billings, MT 59105 Ph: (406) 245-4600 Fax: (406) 245-4333 dixons@twegen.com	Engine Manufacturer	Certifies LPG engines
Walker Mowers	Bob Walker 5925 East Harmony Road Fort Collins, CO 80528 Ph: (970) 221-5614 Fax: (970) 221-5619 bobw@walkermowers.com	Equipment Manufacturer-Lawn and Garden Equipment	Produces Nonhandheld Equipment (uses Class II engines)
Moridge Manufacturing (Grasshopper Mowers)	Stan Guyer Box 810 Moundridge, KS 67107 Ph: (620) 345-6301 Fax: (620) 345-2301 sguyer@grasshoppermower.com	Equipment Manufacturer-Lawn and Garden Equipment	Produces Nonhandheld Equipment (uses Class II engines)
Voltmaster America/SML Industries	Bob Graham 2001 N. 17th Avenue Melrose Park, IL 60160 Ph: 1-800-730-3927 Fax: (708) 338-3395 rhgraham@flash.net	Equipment Manufacturer-Generators and Pumps	Produces Nonhandheld equipment (uses Class I and II engines)
Schiller-Pfeiffer Inc.	Jeff Marcinowski 1028 Street Road Southampton, PA 18966 Ph: (215) 357-5110 ext. 450 Fax: (215) 357-1701	Equipment Manufacturer-Lawn and Garden Equipment	Produces Nonhandheld and Handheld equipment (uses Class I, II, and IV engines)

Company	Representative and Contact Information	Function	Justification/ Additional Comments
	jmarcinowski@lwmantis.com		
Hustler Turf Equipment	Brian Nebel 200 South Ridge Road Hesston, KS 67062 Ph: (620) 327-1152 Fax: (620) 327-2828 bnebel@hustlerturf.com	Equipment Manufacturer-Lawn and Garden Equipment	Produces Nonhandheld equipment (use Class II engines)
Hoffco Inc.	John Pouder 358 N.W. F Street Richmond, IN 47374 Phone: (765) 966-8161 Fax: (765) 935-2346 jpouder@hoffcocomet.com	Equipment Manufacturer-Lawn and Garden Equipment	Produces Nonhandheld and Handheld equipment (uses Class I and IV engines)
Dutchland Plastics	Daven Claerbout 1026 DeMaster Road Oostburg, WI 53070 Ph: (920) 564-2356 Fax: (920) 564-3337 davenclaerbout@dutchlandplastics.com	Fuel Tank Manufacturer	Produces Small SI fuel tanks using the rotational and blow molding processes
Agri-Industrial Plastics	Geoff Ward 301 North 22nd Street Fairfield, IA 52556 Ph: (641) 472-4188 Fax: (641) 472-7120 geoff.ward@agriindustrialplastics.com	Fuel Tank Manufacturer	Produces Small SI fuel tanks using the blow molding process
Solar Plastics Inc.	Gary Engen 860 Johnson Drive Delano, MN 55238 Ph: (763) 972-5619 Fax: (763) 972-5601 gary.engen@solarplastics.com	Fuel Tank Manufacturer	Produces Small SI fuel tanks using the rotational molding process
SETI Group	Larry Fuehrer 8052 Armstrong Road Milton, FL 32583 Ph: (850) 981-4018 Fax: (850) 626-7322 lfuehrer@seti-group.com	Fuel Hose Manufacturer	Produces Small SI fuel hose

Table 9: Marine SI Engine and Vessel SERs

Company	Representative and Contact Information	Function	Justification/ Additional Comments
National Marine	John McKnight 444 North Capitol St. NW Suite 645	Trade Organization	Represents many small entity engine

Company	Representative and Contact Information	Function	Justification/ Additional Comments
Manufacturers Association	Washington, DC 20001 Ph: (202) 737-9757 Fax: (202) 628-4716 jmcknight@nmma.org		manufacturers, vessel manufacturers, and fuel tank manufacturers
Sterling Performance	Tim Cushing 54420 Pontiac Trail Milford, Michigan 48381 Ph: (248) 685-7811 Fax: (248) 685-8477 tcushing@sterlingperformance.org	Engine Manufacturer	Produces SD/I engines
KEM Equipment	Marty Herigstad P.O. Box 546 10800 S.W. Herman Road Tualatin, OR 97062 Ph: (503) 692-5012 ext. 224 Fax: (503) 692-1098 kempower@hotmail.com	Engine Manufacturer	Produces SD/I engines
Panther Airboat Corporation	Jay Vetzel 300 N. Wilson Ave. Cocoa, FL 32922 Ph: (321) 632-1722 Fax: (321) 632-6043 jayfsu3@aol.com	Engine and Vessel Manufacturer	Produces SD/I engines and airboats
Indmar Products	Dick Rowe 5400 Old Millington Road Millington, TN 38053 Ph: (901) 353-9930 Fax: (901) 358-4292 drowe@indmar.com	Engine Manufacturer	Produces SD/I engines
Ebbtide Boats	Tom Trabue 2545 Jones Creek Road White Bluff, TN 37187 Ph: (615) 797-3193 Fax: (615) 797-4889 ttrabue@aol.com	Vessel Manufacturer	Produces SD/I boats
Grady-White Boats	Jim Hardin P.O. Box 1527 Greenville, NC 27835 Ph: (252) 752-2111 ext. 270 Fax: (252) 752-4217 jhardin@gradywhite.com	Vessel Manufacturer	Produces Outboard Boats
Agri-Industrial Plastics	Geoff Ward 301 North 22nd Street Fairfield, IA 52556	Fuel Tank Manufacturer	Produces Marine SI fuel tanks

Company	Representative and Contact Information	Function	Justification/ Additional Comments
	Ph: (641) 472-4188 Fax: (641) 472-7120 geoff.ward@agriindustrialplastics.com		
Solar Plastics Inc.	Gary Engen 860 Johnson Drive Delano, MN 55238 Ph: (763) 972-5619 Fax: (763) 972-5601 gary.engen@solarplastics.com	Fuel Tank Manufacturer	Produces Marine SI fuel tanks
Kracor	George Kraemer 5625 West Clinton Avenue Milwaukee, WI 53223 Ph: (414) 355-6335 Fax: (414) 355-8782 gkraemer@kracor.com	Fuel Tank Manufacturer	Produces Marine SI fuel tanks
Inca Molded Products	Robert Porter 6400 Louisiana Avenue Nashville, TN 37209 Ph: (615) 350-7290 Fax: (615) 350-7293 rporter@incaproducts.com	Fuel Tank Manufacturer	Produce Marine SI fuel tanks
Trident Rubber	Bill Shields 585 Plum Run Road Canonsburg, PA 15317 Ph: (724) 745-9311 Fax: (724) 745-1709 wfshields@tridentmarine.com	Fuel Hose Manufacturer and Distributor	Produce Marine SI fuel hose
Novaflex	Doug Pierce 449 Trollingwood Road Haw River, NC 27259 Ph: (336) 578-2161 Fax: (336) 395-1060 dpierce@novaflex.com	Fuel Hose Manufacturer	Produces fillneck hose for marine vessels

8. Summary of Comments from Small Entity Representatives

8.1 Number and Types of Entities Affected

8.1.1 Comments from Small SI Engine and Equipment SERs

Though EPA did not receive specific comments on the number and types of potential entities that may be affected by the rulemaking, EPA believes that the SERs are in agreement with EPA on this matter. As stated previously in Section 5, EPA has identified 10 Small SI engine manufacturers, over three hundred equipment

manufacturers and 25 manufacturers that produce fuel tanks for the Small SI equipment market that qualify as a small business under SBA definitions.

8.1.2 Comments from Marine SI Engines and Vessels SERs

Though EPA did not receive specific comments on the number and types of potential entities that may be affected by the rulemaking, EPA believes that the SERs are in agreement with EPA on this matter. As stated previously in Section 5, EPA has identified one company that qualifies as a small business under the SBA definitions as a PWC. We have identified 28 small entities manufacturing SD/I marine engines. We have identified 15 marine fuel tank manufacturers (which include five rotational molders, two blow molders, seven aluminum fuel tank manufacturers, and two specialty fuel tank manufacturers) and we have only identified one small hose manufacturer that produces for the Marine SI market.

8.2 Potential Reporting, Record Keeping and Compliance

8.2.1 Comments from Small SI Engine and Equipment SERs

Specific comments on potential reporting and record keeping requirements have not been received. Two SERs submitted comments recommending that EPA allow a single certification for compliance with CARB's Tier 3 regulations and EPA's Phase 3 regulations. One SER submitted comments on EPA's draft cost analysis for the exhaust emission standards suggesting EPA underestimated the costs of control. A number of SERs provided comments on EPA draft cost analysis for the evaporative emission standards suggesting EPA underestimated the costs of control for small SI fuel tanks. A more detailed summary of the cost comments is included in *Appendices B* and *C* to this report.

8.2.2 Comments from Marine SI Engine and Vessel SERs

Specific comments on potential reporting and record keeping requirements have not been received. With regard to the exhaust emission standards, SERs expressed concern that that catalysts have not been demonstrated on high performance engines and that they may not be practicable for this application. SERs expressed some concern that an exhaust averaging, banking and trading (ABT) program could give a competitive advantage to large businesses. Specifically, there was an equity concern that if credits generated by traditional (≤373 kW) SD/I engines could be used for high performance (>373 kW) SD/I engines, that one large manufacturer could use these credits to meet the high performance SD/I engine standards without making any changes to those engines. One SER also expressed concern that ABT credits may not be available at a reasonable price.

With regard to evaporative emissions, SERs that manufacture rotationally-molded fuel tanks were divided in their opinion of when they would be ready to produce low-permeation fuel tanks. One manufacturer stated that they are already producing fuel

tanks with a low permeation inner layer that are used in small SI applications but not with their marine fuel tanks yet. Two other SERs that manufacture rotationally-molded 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. Finally, some SERs commented that there are industry-recommended practices for boat designs (i.e., ABYC) that must be met as a condition of membership in the National Marine Manufacturers Association (NMMA). They noted NMMA is working to update these recommended practices to include carbon canister installation specifications and a low-permeation hose designation. SERs suggested that the NMMA certifications could be used as documentation for EPA standards.

A number of SERs provided comments on EPA draft cost analysis for the evaporative emission standards suggesting EPA underestimated the costs of control for marine SI fuel tanks. A more detailed summary of the cost comments is included in *Appendices B* and *C* to this report.

8.3 Related Federal Rules

As discussed further in section 9, there are three other federal agencies that have regulations that relate to the equipment and vessels covered by the proposed rule. These agencies are the Consumer Product Safety Commission (CPSC), the United States Department of Agriculture (USDA), and the United States Coast Guard (USCG). CPSC has safety requirements that apply to walk-behind lawnmowers to protect operators of such equipment. USDA has design requirements intended to reduce the potential fire threat of small SI equipment. USCG has safety regulations for marine engine and fuel system designs. The technologies considered in EPA's proposed rule are being developed and considered within the context of the regulations by other federal agencies.

8.3.1 Comments from SERs

EPA did not receive any comments from SERs on related federal rules for Small SI engines and equipment or related federal rules for Marine SI engines and vessels.

8.4 Regulatory Alternatives

All comments received from the SERs on potential flexibility alternatives are detailed in section 9 and *Appendices B* through *D* to this report. In response to these comments, specific flexibility provisions are described in section 9.

8.4.1 Comments from Small SI Engine and Equipment SERs

As discussed in section 9 and *Appendices B* through *D* to this report, small SI engine and equipment SERs were generally supportive of the flexibility alternatives. In addition, one SER noted that industry is beginning the process of developing industry

standards to address potential heat-related hazards for exhaust systems on ground-supported equipment. They recommended that EPA not set the effective dates for the Class II standards until industry has finalized such standards. Another SER suggested pro-rating the timing and standards based on the number of units produced per year. Another SER commented that EPA should exempt low-volume applications from the new Phase 3 standards, especially for the evaporative emission requirements. Finally, one SER expressed support of design-based certification for metal fuel tanks. In addition, they recommended that multi-layer fuel tank with a continuous EVOH barrier be allowed to certify by design

8.4.2 Comments from Marine SI Engine and Vessel SERs

As discussed in section 9 and *Appendices B* through *D* to this report, marine SI engine and vessel SERs were generally supportive of the flexibility alternatives. In addition, for the exhaust emission standards, one SER, from a trade association which represents both small and large businesses, commented that an equal amount of lead time should be given to all SD/I engine manufacturers because small business boat builders use engines from both small and large manufacturers.

With regard to the evaporative emission standards, some SERs expressed concern that there is not an established low permeation technology used for rotationally-molded marine fuel tanks. These SERs requested that EPA conduct a review of the technology in a later year, after adoption of the standards, to reassess whether there is technology available and feasible for complying with the tank permeation standards. While they supported the concept of design based certifications for carbon canisters, SERs proposed that different canister sizes should be designated for boats normally trailered to the water for use versus boats normally stored in the water between uses. Finally, one SER expressed support of design-based certification for metal fuel tanks. In addition, they recommended that multi-layer fuel tank with a continuous EVOH barrier be allowed to certify by design.

9. Panel Findings and Discussions Regarding Issues Related to an IRFA

9.1 Number and Types of Entities Affected

For a complete description and estimate of the small entities to which the proposed rule will apply, see Section 5. This includes engine manufacturers, equipment manufacturers, and vessel manufacturers. It may also include fuel system component manufacturers if they choose to certify their fuel tank, fuel cap, and/or fuel hose products.

9.2 Potential Reporting, Record Keeping, and Compliance

For any emission control program, EPA must have assurances that the regulated products will meet the standards. Historically, EPA's programs for small SI engines and marine SI engines have included provisions placing engine manufacturers responsible for providing these assurances. The program that EPA is considering for manufacturers

subject to this proposal may include testing, reporting, and record keeping requirements for manufacturers of engines, equipment, and vessels, and may also include fuel system component manufacturers if they choose to certify their fuel tank, fuel cap, and fuel hose products. Testing requirements for some manufacturers may include certification emission (including deterioration factor) testing and production line testing. Reporting requirements would likely include emission test data and technical data on the engines and equipment including defect reporting. Manufacturers would likely have to keep records of this information.

9.3 Related Federal Rules

The Panel is aware of three other federal agencies that have regulations that relate to the equipment and vessels covered by the proposed rule. These agencies are the Consumer Product Safety Commission (CPSC), United States Department of Agriculture (USDA), and the United States Coast Guard (USCG). CPSC has safety requirements that apply to walk-behind lawnmowers to protect operators of such equipment. USDA has design requirements intended to reduce the potential fire threat of small SI equipment.

The USCG has safety regulations for marine engine and fuel system designs. These safety regulations include standards for exhaust system temperature, fuel tank durability, and hose designs, including specific requirements related to system survivability in a fire. The technologies considered in the proposed rule are being developed and considered within the context of the USCG regulations. Manufacturers will need to consider both EPA and other federal standards when certifying their products.

9.4 Regulatory Flexibility Alternatives

As described above, EPA is developing standards for the engines and equipment to be addressed in this rulemaking. Because of the potential costs and technology challenges involved in meeting these standards, the Panel recommends that EPA consider and seek comments on the flexibility options described below. We believe that the following set of flexibility options, taken together, have the potential to significantly reduce compliance burden without compromising the environmental benefits of the program.

9.4.1 Small SI Nonhandheld Engine Exhaust Emissions

The Panel discussed several regulatory flexibility alternatives with SERs for small businesses that manufacture small SI nonhandheld engines and equipment. Panel recommendations on these approaches are discussed below.

9.4.1.1 Additional Lead Time for Nonhandheld Engine Manufacturers

Small business engine manufacturers generally have limited resources available for developing new engine designs to comply with new emission standards. As a result,

small manufacturers may need more time to meet new emission standards. For this reason, EPA believes it is appropriate to propose additional lead time for small business engine manufacturers under the Phase 3 program. The Panel recommends that EPA propose two additional years of lead time before the Phase 3 standards take effect for small business engine manufacturers. For Class I engines, the effective date for small business engine manufacturers would be 2014. For Class II engines, the effective date for small business engine manufacturers would be 2013.

One SER noted that industry is beginning the process of developing voluntary standards to address potential heat-related hazards for exhaust systems on ground-supported equipment. They recommended that EPA not set the effective dates for the Class II standards until industry has finalized such standards. EPA is aware of industry's effort to develop the aforementioned voluntary standards. However, EPA believes the implementation dates under consideration for the Phase 3 standards as well as the flexibilities that will be available to engine and equipment manufacturers (including those for small business described in this section) will provide adequate lead time for manufacturers to redesign their engines and equipment manufacturers to incorporate the new engines into their equipment in a safe manner. EPA normally would not consider compliance with voluntary standards within its lead time analysis.

One SER suggested pro-rating the timing and standards based on the number of units produced per year. EPA believes the level of the standards and the timing of the standards being considered, including the additional two years of lead time being recommended for small business engine manufacturers, are appropriate under the guidelines of the Clean Air Act which require EPA to set standards that result in the greatest emission reduction achievable while giving appropriate consideration to certain factors including available technology, cost, and lead time.

9.4.1.2 Assigned Deterioration Factors

Under EPA's regulations for small engines, manufacturers must demonstrate compliance with the exhaust emission standards by running an engine for a specified number of hours, ranging from 125 to 500 hours for Class I engines and ranging from 250 to 1000 hours for Class II engines, as part of the pre-production certification process. The manufacturer must demonstrate that the engine complies with the emission standards throughout this "useful life" period by testing the engine at low hours (after a few hour break-in) and at high hours (at the useful life period selected by the manufacturer). In order to reduce the testing burden on small business engine manufacturers, EPA suggested that small business engine manufacturers could use deterioration factors assigned by EPA instead of performing the extended testing. A manufacturer would apply the assigned deterioration factors (specified as a multiplicative factor) to its low hour emission level to demonstrate whether it complied with the Phase 3 emission standards. The Panel recommends EPA propose that small business engine manufacturers be allowed the option to use EPA-developed assigned deterioration factors in demonstrating compliance with the Phase 3 exhaust emission standards.

9.4.1.3 Production Line Testing Exemption

Under EPA's regulations for small engines, manufacturers must perform low hour emissions tests on a randomly selected set of engines pulled off of the production line. In order to reduce the testing and cost burden on small business engine manufacturers, EPA suggested that small business engine manufacturers be exempted from the production line testing. The Panel recommends EPA propose that small business engine manufacturers be exempted from the production line testing requirements for the Phase 3 exhaust emission standards.

9.4.1.4 Broader Definition of Engine Family

Testing burden could be reduced by using broader definitions of engine families. Typically in EPA programs, manufacturers are able to group their various engine lines into engine families for certification to the standards. For the small SI program, engines in a given engine family must have many 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. A manufacturer would then only perform emission tests on the engine in that family that would be most likely to exceed an emission standard. The Panel recommends that EPA propose allowing small business 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. Under such a provision, the engine manufacturer could group all of its Class I engines of a specified useful life into an engine family regardless of the other design criteria noted above. Similarly, the engine manufacturer could group all of its Class II engines that have the same useful life designation into an engine family regardless of the other design criteria noted above. Small business engine manufacturers could not include engines with different useful lives in the same engine family.

9.4.1.5 Simplified Engine Certification for Equipment Manufacturers

Generally, it has been engine manufacturers who certify with EPA for the Small SI exhaust emission standards. However, because the Phase 3 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 for equipment manufacturers to certify their own unique engine/muffler designs with EPA (but using the same catalyst substrate already used in a catalyzed muffler certified by the engine manufacturer). This situation would arise if the equipment manufacturer cannot get approval from the engine manufacturer for its engine/muffler design under an existing engine family. In such cases, the equipment manufacturer may come to EPA and request certification for a system similar to that of an existing certified system based on the data generated by the engine manufacturer and engineering judgment. The Panel recommends that EPA propose a simplified engine certification process for small business equipment manufacturers in such situations.

Under such a simplified certification process, the equipment manufacturer would need to demonstrate that it is using the same catalyst substrate as the approved engine manufacturer's 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 deterioration data generated by the engine manufacturer would be representative for the equipment manufacturer's configuration. The equipment manufacturer would need to have low hour emissions data for their own design. The equipment manufacturer could potentially apply the deterioration factor data from the engine manufacturer's comparable engine family to demonstrate compliance with the emission standard.

Two SERs submitted comments recommending that EPA allow a single certification for compliance with CARB's Tier 3 regulations and EPA's Phase 3 regulations. EPA intends to work toward the goal of a "harmonized" program with CARB's Tier 3 regulations, such that data collected to demonstrate compliance with CARB's emissions standards can be used in requesting certification from EPA. However, manufacturers will be required to certify with EPA if they wish to sell product in the United States outside of California.

9.4.1.6 Additional Lead Time for Small SI Equipment Manufacturers

Because the Phase 3 standards under consideration may result in both engine design changes and the use of catalysts, a number of equipment manufacturers have expressed their belief that many equipment models may need to be redesigned to incorporate the new engines. In order to redesign equipment, the equipment manufacturer will want early access to the new engine designs and will need to devote both engineering resources and time to incorporate the new engine/exhaust system into its equipment. The redesign process will be especially challenging for small volume equipment manufacturers who have fewer resources to devote to these tasks. Therefore, the Panel recommends that EPA propose a transition program that would allow small business equipment manufacturers to continue using Phase 2 engine designs (i.e., engines meeting the Phase 2 exhaust emission standards) during the first two years that the Phase 3 standards take effect. (For equipment using Class I engines, the provision would apply in 2012 and 2013. For equipment using Class II engines, the provision would apply in 2011 and 2012.) The equipment manufacturers could then devote their time during the first two years to redesigning their equipment models to accommodate the new Phase 3 engine designs. The Panel also recommends that EPA propose to allow small business equipment manufacturers to use Phase 3 engines without the catalyst during this initial two year period, provided the engine manufacturer has demonstrated that the engine without the catalyst would comply with the Phase 2 exhaust emission standards and labels it appropriately.

As noted above in section 9.4.1.1, the Panel is recommending that EPA propose two additional years of lead time before the Phase 3 standards take effect for small business engine manufacturers. Therefore, small business equipment manufacturers that use engines produced by small business engine manufacturers may need additional time

(beyond the two years available under the provision described here for small business equipment manufacturers) to incorporate these engines into their equipment models. If the two year period for small business equipment manufacturers has passed and they need additional time to incorporate the small business engine manufacturer's engines, EPA could consider providing additional time for the small business equipment manufacturer to redesign its equipment under the hardship provisions described below in section 9.4.4.

One SER commented that EPA should exempt low-volume applications from the new Phase 3 standards, especially for the evaporative emission requirements. The Clean Air Act, under which EPA has authority to regulate nonroad engines, does not give EPA the authority to exempt applications because they have low sales volume. While EPA cannot exempt applications with low sales volumes, EPA believes the flexibilities being considered for the Phase 3 standards, such as the ABT programs and early fuel tank incentives, will provide the possibility for equipment manufacturers to continue using existing fuel tank designs for certain numbers of their equipment for several years after regulations first become effective.

9.4.1.7 Eligibility for the Small Business Flexibilities

Under EPA's current Phase 2 regulations, EPA provided a number of flexibilities for small volume engine and equipment manufacturers. For the Phase 2 rule, the criteria for determining if a company was a small volume manufacturer was based on the annual production level of engines or equipment. For example, the criteria for determining if a company was a "small volume engine manufacturer" was based on whether the company produced less than 10,000 nonhandheld engines per year (excluding engines sold in California that are subject to the CARB standards). Similarly, the criteria for determining if a company was a "small volume equipment manufacturer" was based on whether the company produced less than 5,000 pieces of nonhandheld equipment per year that were subject to the EPA regulations.

Unlike EPA's small volume manufacturer criteria noted above, SBA defines which engine and equipment manufacturers are small businesses (and therefore should be considered under the SBAR Panel process) based on the number of employees. For example, SBA defines a small business engine manufacturer as those who have less than 1,000 employees. Similarly, SBA defines a small business equipment manufacturer as those who have less than 750 employees for construction equipment manufacturers and 500 employees for other types of equipment manufacturers.

EPA is considering retaining its current criteria for determining who is a small volume manufacturer and eligible for the flexibilities described above. It is relatively easy for a manufacturer to project and ultimately determine sales of nonhandheld engines or equipment, and EPA's analysis shows these volume cut-offs would include all but a very few entities that meet the SBA employee-based definition. 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 using SBA's employee-based definition. Based on data purchased by EPA from a company that tracks sales in the small SI equipment market, the 5,000 unit cut-off for equipment manufacturers would include nearly 95 percent of the small business equipment manufacturers using SBA's employee-based definition.

At the same time, experience has shown that determining the number of employees 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 can avoid these potential complications and still cover nearly all small businesses by continuing to use the nonhandheld engine/equipment sales criteria in the Phase 2 regulations for determining which entities qualify as a small volume engine or equipment manufacturer under the Phase 3 program.

If EPA adopts small volume engine and equipment manufacturer criteria based on production volumes instead of employees, the Panel recommends that EPA propose to allow engine manufacturers which exceed the production cut-off level noted above but have fewer than 1,000 employees, or equipment manufacturers which exceed the production cut-off level noted above but have fewer than 500 employees (or 750 employees if they produce construction equipment), to request treatment as a small volume manufacturer. 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 noted above. This would ensure that any company meeting these employee cut-off levels would be able to have the flexibilities offered to small volume manufacturers under EPA's Phase 3 program.

9.4.2 Marine SI Exhaust Emissions

The Panel discussed several regulatory flexibility alternatives with SERs for small businesses that manufacture sterndrive and inboard (SD/I) marine engines. SD/I marine engines are segregated as ≤373 kW (≤500 hp) and >373 kW (>500 hp). Panel recommendations on these approaches are discussed below.

9.4.2.1 Additional Lead Time for Small Business SD/I Manufacturers

One small business marine engine manufacturer is already using catalytic converters on some of its ≤373 kW production SD/I marine engines. These engines have been certified to meet standards adopted by CARB that are equivalent to those under consideration by EPA (as described in Section 3). This manufacturer stated that the implementation dates discussed in Section 3 provide sufficient lead time for producing

low emission engines equipped with catalysts. However, other small businesses producing SD/I engines have stated that they are not as far along in their catalyst development efforts. These manufacturers support the concept of receiving additional time for compliance, beyond the implementation date for large manufacturers. One SER, from a trade association which represents both small and large businesses, commented that an equal amount of lead time should be given to all SD/I engine manufacturers because small business boat builders use engines from both small and large manufacturers.

High performance SD/I engine manufacturers are typically smaller businesses than other SD/I engine manufacturers. For the purposes of this process, we define high performance marine engines as SD/I engines with a rated power greater than 373 kilowatts (500 horsepower). The majority of high performance engine manufacturers produce less than 100 engines per year for sale in the U.S., and some only produce a few engines per year. Due to these very low sales volumes, additional lead time may be useful to the manufacturers to help spread out the compliance efforts and costs.

The Panel recommends that EPA propose an implementation date of 2011 for ≤373 kW SD/I engines produced by small business marine engine manufacturers and a date of 2013 for small business manufacturers of high performance (>373 kW) marine engines. EPA expects to propose a 2009 implementation date for the remaining SD/I engine manufacturers (i.e., the large businesses) and believe a 2009 date provides appropriate lead time for large businesses producing SD/I engines. As discussed below, EPA is considering an alternative non-catalyst based standard for high performance SD/I marine engines. If EPA proposes an alternative non-catalyst based standard, EPA may consider an earlier implementation date than noted above.

9.4.2.2 Exhaust Emission ABT

One regulatory flexibility that is common among many of EPA's mobile source emissions control programs is averaging, banking, and trading (ABT) of emission credits. An ABT program allows manufacturer to generate positive emission credits from engines certified below the emission standard. These credits can be used to offset debits generated by engines certified above the emission standard. Credits are calculated as a function of the emission level, rated power of the engine, and useful life of the engine. Averaging refers to using positive credits to offset debits in a given year. Banking allows manufacturers to save emission credits for use in the future. Trading allows manufacturers to obtain credits from other manufacturers of similar engines. Typically, credits are only used within a specific category of engines. In the categories for which EPA has adopted ABT programs, many engine manufacturers have used the averaging and banking provisions. Trading of emission credits between different engine manufacturers has occurred very infrequently.

In the materials shared with SERs, EPA noted that it was considering an ABT program for the SD/I engine standards. SERs expressed some concern that ABT could give a competitive advantage to large businesses. Specifically, there was an equity

concern that if credits generated by traditional (≤373 kW) SD/I engines could be used for high performance SD/I engines, that one large manufacturer could use these credits to meet the high performance SD/I engine standards without making any changes to their engines. Should EPA decide to propose an exhaust emissions ABT program for SD/I marine engines, the Panel recommends that EPA request comment on the desirability of credit trading between high performance and other SD/I marine engines and the impact it could have on small business.

9.4.2.3 Early Credit Generation for ABT

As discussed above, manufacturers are at different stages in the development of catalysts for SD/I engines. Development stages range from having initial, limited product offerings on the market to only being in the early stages of work. Because it is clearly possible for some engine manufacturers to introduce catalyst-equipped engines earlier than the dates under consideration, potential environmental benefits are possible in an earlier time frame. One way to promote the early introduction of low emission technology is through an early credit program. Under this type of program, engine manufacturers could generate and bank credits before the standards go into effect. These credits could then be used or traded after the standards go into effect. In an early banking program, manufacturers may earn credits from their low-emission engines without having to account for debits from their other non-certified engines.

In the materials provided to SERs, EPA indicated that it was considering proposing an early banking program for SD/I marine engines. Under the early banking provisions, EPA would offer the ability to all engine manufacturers to generate "bonus" credits for the early introduction of engines meeting the anticipated emission standards. Bonuses would be in the form of a multiplier times the credits earned. The multiplier would be 2.0 for engines certified 3 years early, 1.5 for engines certified 2 years early, and 1.25 for engines certified 1 year early. For example, if a manufacturer certifies engines 1 year early and earns 1000 kilograms of credit, the manufacturer would earn additional bonus credits of 250 kg for a total of 1250 kg of credit ($1.25 \times 1000 = 1250$). The Panel supports EPA proposing an early banking program and believes that bonus credits will provide greater incentive for more small business engine manufacturers to introduce advanced technology earlier than would otherwise occur.

9.4.2.4 Assigned Emission Rates for High Performance SD/I Engines

One SER, representing a high performance SD/I engine manufacturer, commented that certification may be too costly to amortize effectively over their small sales volumes. One significant part of certification costs is engine testing. This includes testing for emissions over the specified duty cycle, deterioration testing, and not to exceed (NTE) zone testing. Even in the case where an engine manufacturer is using emission credits to comply with the standard, the manufacturer would still need to test engines to calculate how many emission credits are needed. One way of minimizing this testing burden would be to allow manufacturers to use, as a default, EPA assigned baseline emission rates for certification based on previously generated emission data.

Based on currently available test data, reasonable default baseline emission levels for high performance engines would be 30 g/kW-hr HC+NOx and 350 g/kW-hr CO. The Panel recommends that EPA propose to allow the use of default emission rates that could be used by small business high performance SD/I engine manufacturers as part of their certification.

9.4.2.5 Alternative Standards for High Performance SD/I Engines

SERs expressed concern that that catalysts have not been demonstrated on high performance engines and that they may not be practicable for this application. One SER also expressed concern that emission credits may not be available at a reasonable price. EPA shared with SERs that it was considering setting a standard for all high performance SD/I marine engines that could be met without the use of a catalyst, based on the technical and other circumstances related to these engines. Based on available data, levels of 16 g/kW-hr HC+NOx and 350 g/kW-hr CO were discussed. The Panel recommends EPA request comment on a non-catalyst based standard for high performance marine engines. If EPA implements a non-catalyst exhaust emission standard for high performance SD/I marine engines, it may reconsider the 2013 implementation date discussed above for these engines.

The NTE standards discussed above would likely require additional certification and development testing. In the materials shared with SERs, EPA explained that it was considering not applying the NTE standards for all high performance SD/I engines. The Panel supports proposing EPA's idea to exclude high performance SD/I engines from NTE requirements, as it would minimize the costs of compliance testing for small businesses.

9.4.2.6 Broad Engine Families for High Performance SD/I Engines

Testing burden could be reduced by using broader definitions of engine families. Typically in EPA engine and equipment programs, manufacturers are able to group their engine lines into engine families for certification to the standards. Engines in a given family must have many similar characteristics including the combustion cycle, cooling system, fuel system, air aspiration, fuel type, aftertreatment design, number of cylinders and cylinder bore sizes. A manufacturer would then only perform emission tests on the engine in that family that would be most likely to exceed an emission standard. The Panel recommends that EPA propose allowing small businesses to group all of their high performance SD/I engines into a single engine family for certification, subject to good engineering judgement.

9.4.2.7 Simplified Test Procedures for High Performance SD/I Engines

EPA testing requirements include detailed specifications for the calibration and maintenance of testing equipment and tolerances for performing the actual tests. For laboratory equipment and testing, these specifications and tolerances are intended to

achieve the most repeatable results feasible given testing hardware capabilities. For in-use testing, EPA uses different equipment than is specified for the laboratory and with arguably less restrictive specifications and tolerances. The purpose of separate requirements for in-use testing is to account for the variability inherent in testing outside of the laboratory. These less restrictive specifications allow for lower cost emission measurement devices, such as portable emission measurement units. For high performance SD/I engines, it may be difficult to hold the engine at idle or high power within the tolerances currently specified by EPA in the laboratory test prodedure. The Panel recommends that EPA propose less restrictive specifications and tolerances, for small businesses testing high performance SD/I engines, which would allow the use of portable emission measurement equipment. This would facilitate less expensive testing for these small businesses without having a negative effect on the environment.

9.4.2.8 Eligibility for the Small Business Flexibilities

For purposes of determining which engine manufacturers are eligible for the small business flexibilities described above for SD/I engine manufacturers, EPA is considering to propose criteria based on a production cut-off of 5,000 SD/I engines per year. If EPA adopts that approach, the Panel recommends EPA propose to allow manufacturers that exceed the production cut-off level noted above but have fewer than 1,000 employees to request treatment as a small business. In such a case, the manufacturer would provide information to EPA demonstrating that the manufacturer has fewer than 1,000 employees.

9.4.3 Evaporative Emissions

SERs raised many of the same issues regarding evaporative emission standards for both small SI and marine applications. In fact, many of the SERs supply fuel system components to both industries. Therefore, the Panel recommendations on regulatory flexibility discussed below would apply to small SI equipment and to boats, except where noted.

Because the majority of fuel tanks produced for the small SI equipment and marine SI vessel market are made by small businesses, the details of the evaporative emissions program under consideration and the flexibility provisions shared by EPA with the SERs were noted as being available to all fuel tank manufacturers. Therefore, EPA is considering proposing the Panel recommendations on regulatory flexibility discussed below for small business fuel tank manufacturers for all fuel tank manufacturers.

9.4.3.1 Consideration of Appropriate Lead Time

SERs commented that they would need to make significant changes to their plastic fuel tank designs and molding practices to meet the tank permeation standards discussed in Section 3. 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 SER 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 markets.

SERs that rotationally-mold fuel tanks were divided in their opinion of when they would be ready to produce low-permeation fuel tanks. One manufacturer stated that they are 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. Two other SERs, 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.

The Panel recommends that EPA propose to implement the tank permeation standards in 2011 with an additional year (2012) for rotationally-molded marine fuel tanks. The extra year for marine tanks would give manufacturers time to address issues raised by SERs that are specific to the marine industry.

There was no disagreement on the technological feasibility of the marine SI diurnal emission standard EPA is considering. SERs 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. SERs commented that they would consider asking EPA to allow the use of low permeation fuel hose prior to 2009 as a method of creating an emission neutral flexibility option for providing extra time for canisters. The Panel recommends that EPA continue discussions with the marine industry and request comment on environmentally neutral approaches to provide more flexibility in meeting the potential diurnal emission standards.

9.4.3.2 Fuel Tank ABT and Early Incentive Program

As discussed above for exhaust emissions, an ABT program can provide implementation flexibility for manufacturers. With a fuel tank ABT program, equipment manufacturers could earn credits by using fuel tanks that are below the tank permeation standards. These credits could be used to offset emissions from fuel tanks that have permeation rates above the standards. The program presented by EPA would not have an emission rate cap on fuel tanks above the standards in the early years of the program. As discussed above, cross-trading of credits between the small SI and marine sectors would not be allowed. One SER commented that they would like to be able to use tank credits for service tanks (replacement tanks on in-use equipment). Also, SERs commented that they would value an early incentive program.

The Panel recommends that EPA propose an ABT program for fuel tank permeation. The Panel also recommends that EPA request comment on including service tanks in the ABT program. Finally, the Panel recommends that EPA request comment and on an early incentive program for tank permeation. In the early incentive program,

equipment manufacturers would be able to earn tank allowances by using low permeation fuel tanks before the fuel tank permeation standards begin. These tank allowances could be used to sell an equal number of uncontrolled fuel tanks once the standards become effective. Eventually, tanks would have to meet at least a family emission limit (FEL) cap specified within the ABT program.

9.4.3.3 Broad Definition of Evaporative Emission Family for Fuel Tanks

In its evaporative emission regulations for recreational vehicles, EPA specifies that fuel tank 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 may be grouped into the same emission family. Manufacturers therefore can broadly group similar fuel tanks into the same emission family and then only test the configuration most likely to exceed the emission standard. In determining the worst case configuration, manufacturers should consider wall thickness, barrier thickness, fuel cap design, and other factors that may affect permeation. The Panel recommends that EPA propose a similar broad emission family definition for small SI fuel tanks and for marine fuel tanks. Although small SI and marine fuel tanks would not be allowed in the same emission family, it may be possible to carry-across certification test data from one category to another.

9.4.3.4 Compliance Progress Review for Marine Fuel Tanks

While there is clearly a difference of opinion among the SERs involved in tank manufacturing, some SERs expressed concern that there is not an established low permeation technology used for rotationally-molded marine fuel tanks. These SERs stated that they are working on developing such technology, but do not have in-use experience to demonstrate the durability of low-permeation rotationally molded fuel tanks. These SERs requested that EPA conduct a review of the technology in a later year, after adoption of the standards, to reassess whether there is technology available and feasible for complying with the tank permeation standards.

Currently, one SER already sells multi-layer rotationally-molded fuel tanks used in small SI equipment and another manufacturer has certified a nylon rotationally-molded fuel tank in California. Because of this, EPA believes that the outcome of such a technology review could only be that technology is available for rotationally-molded fuel tanks to comply with the standard. Furthermore, the Panel is recommending a long lead time for the fuel tank permeation standards to give manufacturers adequate time to implement new tank designs. However, the Panel also recognizes that there is uncertainty associated with any new technology.

The Panel recommends that if a rule is implemented, EPA undertake a "compliance progress review" assessment with the manufacturers. In this effort, EPA would continue to engage on a technical level with rotationally-molded marine fuel tank

manufacturers and material suppliers to assess the progress of low permeation fuel tank development and compliance. If systematic problems were identified across the industry, this would give EPA the opportunity to address the problem. If problems were identified only for individual small businesses, this would give EPA early notice of the issues that may need to be addressed through economic hardship relief, as described below.

9.4.3.5 Design-Based Certification

As discussed in Section 3, EPA intends to propose diurnal emission standards for fuel tank used in gasoline-powered boats beginning in 2010. One diurnal emission control technology that is under consideration is a canister containing activated carbon which would be installed in the currently used fuel tank vent line. SERs commented that they would like to certify carbon canisters based on their design (and the emission reductions reasonably associated with such design) in lieu of performing emission tests to demonstrate reductions. In addition, SERs proposed that different canister sizes should be used for boats normally trailered to the water for use versus boats normally stored in the water between uses. They stated that fuel in boats stored in the water would experience less temperature variation than in trailered boats because of the cooling effect of the water and the generally larger volume and size of the fuel tanks. SERs recommended that trailered boats could simply be identified as all boats less than 26 feet in length. EPA considered the SER comments and developed canister size schedules for boats above and below 26 feet in length. This concept, which was based on test data, calls for a ratio of carbon volume (liters) to fuel tank capacity (gallons) of 0.04 liter/gallon for boats less than 26 feet in length, and 0.016 liter/gallon for larger boats. The Panel recommends that EPA propose design-based certification for carbon canisters using this approach.

In its evaporative emission program for recreational vehicles, EPA allows manufacturers using metal fuel tanks to 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. One SER expressed support of design-based certification for small SI and marine fuel tanks as well. In addition, they recommended that multi-layer fuel tank with a continuous EVOH barrier be allowed to certify by design. This technology has been widely used in automotive applications and demonstrated to be well below the tank permeation standard discussed in Section 3. The Panel recommends that EPA propose to allow design-based certification for metal tanks and plastic fuel tanks with a continuous EVOH barrier.

SERs commented that ABYC and SAE have industry recommended practices for boat designs that must be met as a condition of NMMA membership. NMMA is working to update these recommended practices to include carbon canister installation specifications and a low-permeation hose designation. SERs suggested that the NMMA certifications could be used as documentation for EPA standards. The Panel recommends that EPA propose to accept data used for meeting the voluntary requirements as part of the EPA certification. This data would need to be collected in a manner consistent with EPA certification requirements and made available to EPA if required.

9.4.3.6 Additional Lead Time for Small SI Fuel Hose Requirement

EPA is considering applying the fuel hose permeation requirements beginning with the 2008 model year for small SI equipment. The majority of large equipment manufacturers have indicated that they will be using low permeation hose in this timeframe as part of their current product plans. Small equipment manufacturers may not necessarily be planning on using low permeation fuel hose in 2008. The Panel recommends EPA propose a 2009 implementation date for low permeation fuel hose for small business equipment manufacturers producing small SI equipment.

9.4.4 General Hardship Provisions

EPA has adopted hardship provisions in a number of previous rules. EPA provided information on these existing provisions (included in the Code of Federal Regulations, Title 40, Part 1068, §1068.245 and §1068.250) to SERs. EPA has had significant experience in dealing with such hardship requests from around 30 refiners and 15 engine/equipment manufacturers.

For refiners, EPA began responding to requests for hardship relief in 2000. EPA approved hardship requests approved based on one refiner's short-term inability to raise capital needed for refinery improvements (economic hardship) to issues arising from another refiner's transfer of ownership (unusual circumstances). Of the 31 refiners that have submitted hardship requests, EPA has granted 30 of the requests. One hardship request was denied.

For engine/equipment manufacturers, EPA began responding to requests for hardship relief in 2003. EPA approved hardship requests based on one company's recent emergence from bankruptcy (economic hardship) to another company's inability to sell equipment because the engine supplier had not certified a compliant engine by the time the standards took effect (unusual circumstances). Of the 15 engine manufacturers and equipment manufacturers that have submitted hardship requests, EPA has granted 11 of the requests. Two of the requests are still pending, one request is on hold (per the request of the manufacturer), and one request was withdrawn by the manufacturer.

9.4.4.1 Unusual Circumstances Hardship

Under this provision, manufacturers would be able to apply for hardship relief if circumstances outside their control cause the failure to comply and if failure to sell the subject engines or equipment would jeopardize the company's solvency. An example of an unusual circumstance outside a manufacturer's control may be an "Act of God," a fire at the manufacturing plant, or the unforeseen shut down of a supplier with no alternative available. The terms and time frame of the relief would depend on the specific circumstances of the company and the situation involved. As part of its application for hardship, a company would be required to provide a compliance plan detailing when and how it would achieve compliance with the standards. The Panel recommends that EPA

propose a provision allowing for hardship relief under unusual circumstances for manufacturers covered by the proposed rule.

9.4.4.2 Economic Hardship

An economic hardship provision would allow small manufacturers to petition EPA for limited additional lead time to comply with the standards. A manufacturer would have to make the case that it has taken all possible business, technical, and economic steps to comply, but the burden of compliance costs would have a significant impact on the company's solvency. Hardship relief could include requirements for interim emission reductions and/or purchase and use of emission credits. The length of the hardship relief would be established during the initial review and would likely need to be reviewed annually thereafter. EPA anticipates that one to two years would normally be sufficient. As part of its application for hardship, a company would be required to provide a compliance plan detailing when and how it would achieve compliance with the standards. The Panel recommends that EPA propose economic hardship provisions for small businesses affected by this rule. This would be available to small business engine manufacturers, equipment manufacturers, vessel manufacturers, and fuel system component manufacturers.

Appendix A
List of Materials EPA Shared with Small Entity Representatives

1. Outreach Document for Small Entity Representatives Control of Emissions from Nonroad Spark-Ignition (NRSI) Engines and Equipment Rule.
2. Copy of Title 40, Code of Federal Regulations, Part 1068, section 1068.245 and section 1068.250
3. Issue: Small SI Engine Exhaust Standard Flexibilities for Engine Manufacturers and Equipment Manufacturers
4. Issue: Eligibility for the "Small Volume Manufacturer" Flexibilities under the Phase 3 Small SI Engine Exhaust Standards
5. Issue: Flexibilities for Evaporative Emissions for Small SI Engines and Equipment and Marine SI Engines and Vessels
6. Issue: Carbon Canister Design Specifications for Boats
7. Issue: Rotational-Molded Marine SI Fuel Tanks
8. Issue: Catalysts on SD/I Marine Engines (at or below 375 kW)
9. Issue: High Performance SD/I Marine Engines (above 375 kW)

Appendix B
Summary of Comments Received During EPA Outreach

Summary of Oral Comments – Pre-Panel Outreach Meetings July 11, 2006

The following are summaries of issues raised and oral comments provided by the potential SERs during the July 11, 2006 pre-panel outreach meeting.

Summary of Issues Raised

Small SI Engine and Equipment Manufacturers

One blow-molded tank manufacturer that participated stated that additional lead time may be necessary to facilitate converting to multi-layer fuel tanks. This manufacturer raised concerns about lost sales if roto-molded tanks have two extra years for compliance compared to blow-molded tanks. They also expressed interest in an averaging, banking, and trading (ABT) program for the tank permeation standards. They also believe EPA's cost estimates for multi-layer tanks are too low and said they would provide comments to support their view.

One engine/equipment manufacturer that participated noted they currently use catalysts and electronic fuel injection on their engines which would comply with the CARB Tier 3 standards EPA is considering.

Marine SI Engine and Vessel Manufacturers

The engine manufacturers that participated had a range of reactions to the standards EPA is considering. One engine manufacturer said they are already selling catalyst equipped engines that comply with the SD/I exhaust standards EPA is considering. The same engine manufacturer said EPA's estimated costs are too high compared to the cost they are charging. The representative from the trade organization noted that other SD/I engine manufacturers are not as far along in developing engines compliant with the standards EPA is considering.

One high-performance SD/I engine manufacturer raised concerns about having to rely on purchasing credits from other engine manufacturers to demonstrate compliance with the EPA standards and asked about the possibility of having less stringent standards for high performance engines. The representative from the trade organization also expressed similar concerns about having to rely on credits purchased from other engine manufacturers to comply with the standards.

The tank manufacturers that participated had a range of reactions to the standards EPA is considering. One manufacturer has developed a new process to meet the standards now with roto-molded tanks. Two other roto-mold tank manufacturers are not

sure they can meet the standards. The representative from the trade organization suggested that EPA conduct a technical review to ensure the standards are feasible. One manufacturer that produces blow-molded tanks said that additional lead time was needed. They suggested 2011 for marine SI tanks, especially because EPA was considering 2011 for roto-molded tanks.

One boat manufacturer recommended that EPA consider a smaller evaporative canister size design requirement for larger boats. They noted that large boats remain in the water and therefore the typical rise in fuel temperatures in the tank is smaller than for trailer boats. The representative from the trade organization also supported this approach.

Small SI Engines and Equipment

One engine manufacturer noted they make E85 capable products and asked if the test fuel be E85 or E10. EPA responded that it considers E10 to be an acceptable fuel for certification.

A fuel tank manufacturer noted they make blow molded fuel tanks and commented they have recently added the capability to manufacture multi-layer fuel tanks for ATVs to meet the permeation standards. Although the standards don't begin until 2008, the new blow-molding machine was purchased in 2004. This machine will be dedicated to the recreational vehicle market. One tank manufacturer stated that at least 2 years would be necessary from the time of ordering a machine to be able to sell multi-layer Small SI fuel tanks. This time includes 1 year to get the machine after the order, 6 months to get up and running, and then time to sample and test tanks. An executive order, similar to the CARB program, for multi-layer tanks would shorten this lead time because no permeation testing would be required.

The same manufacturer also stated that if roto-molded fuel tanks were given two years extra lead time beyond blow-molded fuel tanks, that they could lose some market share to roto-molders for those two years. Specifically, that products produced in annual batches of 15,000-20,000 units would be most vulnerable because the cost per part for roto-molding and blow-molding becomes comparable at low production volumes. A one year lead time difference would probably not be an issue.

Some discussion around the group was made on the cost tradeoffs between roto-molded and blow-molded fuel tanks. The oral comments from the potential SERs are summarized below.

> A fuel tank manufacturer stated that molds generally cost $5,000-6,000 for roto-molding. Cast aluminum molds are more expensive at $15,000-20,000. One SER stated that molds cost $30,000-60,000 for blow-molding. One SER said it uses about 500 tanks per year. Therefore the cost of a new mold affects them more than a larger manufacturer. Injection-molded high density polyethylene (HDPE) fuel tanks are used for their E85 capable equipment.

A SER expressed the desire to have an averaging program for fuel tank permeation. This would allow manufacturers to save money by overachieving on large product runs and not investing in low permeation technology for small production volume runs. EPA noted that this sort of program is included in the current regulations for recreational vehicles. EPA described ABT programs in general and expressed its openness to this type of flexibility.

An engine manufacturer who uses 35% HDPE tanks and 65% metal tanks inquired about whether they would be able to average between the metal and plastic tanks. EPA raised the concern of windfall credits.

A SER commented that the costs provided in the outreach package are low for multi-layer fuel tanks. The costs should include capital costs as well as material costs and believes that multi-layer fuel tank constructions are the most cost effective way to reduce permeation. Fluorination may make sense for very small tanks, but is more expensive for larger tanks, especially considering inventory and handling costs. This SER will submit written comments on the cost analysis and agreed to work with EPA on resolving these cost estimate issues. Although the EPA cost estimates seem low, they believe the core issue is lead time.

An engine manufacturer stated his company currently uses catalysts on their equipment. They do not see much of a temperature or efficiency difference of catalysts as a function of distance from the engine because catalysts generate their own heat. They also use electronic fuel injection (EFI). They use these technologies because they result in better products. Their engines/equipment have emission levels that will pass the California requirements. Also their designs minimize the risk of operator (or debris) contact with the catalyst. Tiger Trucks gained fuel economy benefits through the use of EFI.

The issue of how small businesses are defined for the purpose of applying flexibility options was raised by EPA and SBA. For example, should the definition be based on number of products made rather than number of employees in a company.

A SER suggested EPA consider basing the definition on total emissions from a company's products and would like to see a single certification apply in California and the rest of the United States.

Marine Engines and Equipment

Exhaust Emission Discussions

One marine engine manufacturer has recently begun selling inboard marine engines equipped with catalysts that will meet the California standard (5 g/kW-hr HC+NOx). They have sold 200 engines so far. They found some errors in the cost estimates for converting port-fuel injected engines to using catalysts. Specifically, the estimate of $356 in the contractor cost report for 5.7 liter engines is too high.

This marine engine manufacturer supports the not-to-exceed zone and reminded the group that they were involved in the development of this zone. The not-to-exceed limits for the zone should consider open loop operation at high power. At high power, the engines must operate rich to prevent the valves from overheating. This results in increased emissions, especially for catalyst-equipped engines.

A commenter suggested that smaller companies may not have the same purchasing power. In addition, at least one company has not yet begun any catalyst development work for their engines. The commenter also raised the issue of flexibilities for manufacturers of high-performance marine engines. They stated a credit program in which small businesses were only able to purchase credits from their competitors would not be workable.

A SER asked what would happen if a small high-performance engine manufacturer needed to purchase credits, but they were not available. EPA emphasized that it would consider adopting provisions that make it very likely that credits will be available from companies that do not compete directly with high-performance engine manufacturers. EPA would work to solve the problem if it came about and stated that hardship provisions could be included in the rule. The SER raised the possibility of separate, less stringent, emission standards for high performance engines.

A SER commented that a catalyst-based standard should be based on the results of the ongoing saltwater test program and expressed support of the hardship provisions.

One company stated they do not yet have a working model of a marine engine with catalysts; however they have started their development efforts.

Another SER stated that most of the companies are pretty far along, but others are not.

A SD/I manufacturer said it would take exception to allowing a company to claim hardship because they have not developed catalyst equipped engines on time. One company has less than 100 employees and makes less than 10,000 engines per year, but has developed catalyst-equipped engine already for half their 2007 model year models. 5,000 engines per year do not get them volume discounts.

Manufacturers have known about the California catalyst-based standards since they were published in 2001. One SER believes all of the companies have had sufficient lead time to develop catalyst technology for their engines. This SER expressed concern that other small marine engine manufacturers have the potential to sell to the same customers they sell to and is concerned that manufacturers using hardship provisions could undercut their price for an unfair market advantage. This company stated they saw the direction the government was headed and moved in the "right direction."

One SER raised three issues related to outboard motors: CO standards, not-to-exceed zone limits, and small lengths of hoses on these engines. EPA recognizes the importance

of these issues for the broader regulatory program, but noted that they were not small business issues and would be better discussed at another time.

Evaporative Emission Discussions

One SER noted that the draft EPA cost estimates presented in the outreach document to potential SERs understated the costs for multi-layer blow-molded fuel tanks and would give details in writing.

Another SER stated that cost estimates for carbon canisters would be larger for boats with larger fuel tanks and gave the example of one of their boats that has a 370 gallon fuel tank. They believe there could be packaging issues with large canisters. They have 31 sets of deck and liner tooling. If these needed to be modified, it could cost $30,000-60,000 each.

This same SER recommended that the ratio of carbon canister volume to tank volume be smaller for larger fuel tanks. These tanks are generally used in large boats that are stored in the water. Therefore, the fuel temperature more closely tracks water temperature than ambient air temperature and thus would have lower diurnal temperature fluctuations than smaller tanks in boats stored out of the water.

This same SER also stated that, of the 110 boat builders in North Carolina, only three have more than 500 employees (or are owned by a large company). His company makes a couple of thousand boats per year. Medium sized companies make 350-450 boats per year and the smallest companies only make 1-2 boats per year.

A SER stated there are approximately 3,000 boat builders in the United States. One trade organization has 400 boat builders as members.

A commenter stated most boat builders do not make their own fuel tanks. Typically they buy their tanks from fuel tank manufacturers. As a boat builder, his company does not want a burdensome reporting requirement and would prefer to purchase certified components.

One SER believes a simple certification would work best where the suppliers certify their tanks/hoses and supply them to the boat builder. The American Boat and Yacht Council (ABYC) has drafted a rewrite of SAE J1527 to update the hose permeation specifications to be consistent with the anticipated EPA requirement. The SER stated that if a design template were made available for carbon canisters, then tank manufacturers could sell them with the tanks. The SER stated that most boat builders buy their tanks from tank manufacturers.

A SER noted that it would not want to have to certify carbon canisters. They would support design requirements that they could meet for canisters, but would not want to be responsible for proper installation.

Another SER said its goal is to minimize the certification burden associated with fuel hoses and carbon canisters and stated that the ABYC and the Coast Guard are interested in developing canister installation guidelines. They believe that ABYC specifications could be used to simplify certification. For instance, hoses that meet permeation requirements could be marked as complying with an industry standard that includes the EPA permeation standard.

This SER reiterated the desire to have a different canister design for larger boats, which are typically stored in the water, than for smaller boats. The division could be made between trailer boats and non trailer boats. Boats with a beam of 8'6" or less are easily trailerable. State laws for moving a boat on a trailer generally include more requirements once a boat has a beam of 9'3"-9'6" or more.

One SD/I engine manufacturer noted that carbon canisters should be considered to be part of a system, including valves and other design aspects. Installation is not as simple as just plugging a canister into the vent line.

Another SER commented that tank manufacturers do not have control of material development. Therefore, they recommend a technical review in 2010 to make sure that materials become available from Exxon and others in time to meet the standards. This would give tank manufacturers security while still providing a date to give material manufacturers an incentive to make low permeation materials available. These comments were primarily focused on low permeation technology for roto-molded fuel tanks. EPA inquired into the value of a technology review given that one company is already making low permeation roto-molded fuel tanks using material from Arkema that is available to other tank manufacturers.

This comment was followed by a lengthy discussion on the feasibility of low-permeation roto-molded fuel tanks for use in the marine market. Statements made by several of the potential SERs are summarized below.

> One SER stated they are unable to use the Arkema technology without the use of a drop box. This drop box would require modification of the 700 molds in their inventory. This SER recently quoted the Arkema technology to a motorcycle manufacturer with a drop box cost in the $8,000-16,000 range. Another option would be to take the mold in and out of the oven, which they believe is a poor option. Ninety percent of their products are marine fuel tanks and that it is harder to make working tanks across a line of products than for a single design. They have tried technologies proposed by Arkema and others without acceptable results. This SER is unfamiliar with the process that one company uses and believes that the manufacturers should share technology with each other at this time. Two companies have been working on a permeation committee in the Rotomolders Association to identify a low permeation technology. One of those companies recommends that EPA talk to Exxon about supplying the manufacturers with a low permeation material for roto-molding.

A fuel tank manufacturer suggested that another company had problems with the one tank they supplied to the marine industry. This fuel tank manufacturer would want that company's fuel tanks to be demonstrated over the Coast Guard tests and in a boat in-use. The fuel tank manufacturer commented that the cost of multi-layer tanks using a drop box would be too high for a small business. Another technology that he is looking into is a nanotechnology used by the Nylon Corporation of America.

One SER is working with the Arkema technology to manufacture low permeation multi-layer roto-molded fuel tanks. Currently, their tanks have a 50% cost increase compared to traditional cross-link polyethylene (XLPE) fuel tanks. They do not use a drop box or take the mold out of the oven between layers. They consider their process proprietary and will not give away the development investment they have made by explaining it to their competitors. Although their process is proprietary, the Arkema material is available to all tank manufacturers. Other tank manufacturers have the same opportunity to learn how to work with the Arkema technology. This SER has made multi-layer fuel tanks that have passed all of the Coast Guard durability tests including the pressure pulse and fire tests. It has also been tested for low permeation by EPA. The SER has offered to make their tanks available to boat builders for testing and are currently supplying one boat builder. This SER is also supplying Small SI equipment manufacturers.

Another SER stated that if the cost of the low-permeation plastic tanks is too high, they would consider switching to aluminum fuel tanks. However, cost would also have to consider installation costs. For aluminum tanks, they put an access panel in the boat so that the tank can be removed if it corrodes. Tank replacement is planned based on a 10-12 year tank life. The access panel is not considered necessary with plastic fuel tanks which live longer.

One commenter blow-molds some PWC fuel tanks, but has not been in the marine market very long. The entire PWC market of 80,000-90,000 tanks per year would not be large enough to support a dedicated multi-layer blow-molding machine. The cost of a large machine like the one they use for recreational vehicle fuel tanks is about $4 million. They are looking into purchasing a smaller machine for making multi-layer tanks for the Small SI market. Only two companies have taken the risk of investing in multi-layer blow-molding machines for the offroad market.

This same commenter stated that a 2009 implementation date would not provide enough time to produce multi-layer tanks nationwide. They recommend 2010 for Small SI and 2011 for marine fuel tanks. They stated that a two stage approach, like the CARB tank permeation standards might help because manufacturers could fluorinate tanks in the early years. It may also give more time for a mono-layer solution to present itself. They stated that Selar technology is unattractive because it has a tight processing window that can result in high variation from tank to tank.

Summary of Written Comments Submitted by

Potential Small Entity Representatives

The following is a summary of the written comments submitted by the potential SERs.

Small SI Engines and Equipment

Exhaust Emission Standards

Based on thirty years of designing equipment, one SER stated its belief that the introduction of Small SI engines with catalysts into Small SI equipment applications will result in unforeseen technical challenges. They noted they are totally dependent on the engine manufacturers and/or muffler manufacturers for exhaust system packaging, engine emission application engineering, and emission compliance testing. Therefore, the time it takes them to introduce a new engine into their equipment designs is dependent on when the components and engineering services can be made available to them from the engine supplier and muffler supplier.

This SER had several suggestions for the rulemaking. First, they suggest allowing at least two years after the engine manufacturer and muffler manufacturer have supplied the necessary components before having to sell compliant equipment. Second, they suggest providing an exemption from the new requirements for low volume production. Finally, they support a 50-state program and believe it is needed for practical implementation as it relates to product manufacturing and distribution.

A trade organization representing lawn and garden equipment industry-related companies, submitted comments on behalf of its small business equipment manufacturers (all of which are potential SERs). The trade organization noted that small business equipment manufacturers lack the resources and understanding to evaluate the complex heat-related hazards associated with their products' catalyzed exhaust systems. In addition, they stressed the need to provide adequate time for small business equipment manufacturers to incorporate redesigned engines into their equipment models in a safe manner. Finally, they noted that small business equipment manufacturers do not have the expertise or resources to conduct extensive emission and related durability testing required under the EPA regulations.

The trade organization recommended that EPA include a number of provisions to help small business equipment manufacturers comply with the Phase 3 regulations. First, they recommended that the effective dates for the exhaust standards should be established after industry has finalized safety-related ANSI standards. Second, that EPA provide a program similar to the Transition Program for Equipment Manufacturers (TPEM) adopted for nonroad diesel engines which allows equipment manufacturers to install engines certified to the previous emission standards in a limited number of equipment over a period of time (a cumulative level of 80% over 7 years). Third, that hardship flexibility similar to that included in EPA's regulations in 40 CFR 1068.255 be made available to small business equipment manufacturers. Fourth, they recommended a

number of certification flexibilities similar to those adopted by EPA for large spark-ignition engines that would help small business equipment manufacturers certify equipment under the Phase 3 regulations. These ideas include design-based certification (based on a demonstration that the manufacturer is using a design similar to or superior to one that has been certified as meeting the standards), a broad engine family and evaporative family definition, waiving the Production Line Testing requirements, and allowing manufacturers to rely on assigned deterioration factors. Finally, they recommended that EPA provide reciprocity and accept the CARB exhaust certifications without requiring any re-testing or recertification.

They also submitted a number of comments on EPA's draft cost study, "Small SI Engine Technologies and Costs."

Evaporative Emission Standards

One nonhandheld equipment manufacturer had two suggestions for the rulemaking that apply to evaporative emissions. First, they suggest providing an exemption from the new requirements for low-volume production; they believe this is especially important for compliance with the evaporative emissions requirements. They noted an annual production level of 500 units as a possible low-volume cut-off. Second, they support a 50-state program and believe it is needed for practical implementation as it relates to product manufacturing and distribution.

A SER submitted comments recommending that EPA provide reciprocity and accept the CARB evaporative certifications without requiring any re-testing or recertification.

A SER submitted comments on the fuel tank requirements under consideration by EPA. To comply with the standards, they expect to convert from a single large tank to a multi-layer tank design. They commented that 2009 is too early of an implementation date for the new requirements. Based on an estimated final rule date of late 2007, the earliest date for which they believe the low permeation requirements can be met is model year 2011. Their lead time estimate is based on their experience with the low permeation requirements for recreational vehicles. They also stated its support for a phase-in approach based on a percent of total production, although they did not provide a suggested phase-in schedule. They also commented that a two year delay for roto-molded tanks is unacceptable. Allowing extra time for roto-molded tanks to comply represents a potential loss in business if they must compete in the market with unregulated roto-molded tanks. This SER also commented that EPA's cost estimates are too low. They estimate the cost for a multi-layer tank to be 40% to 50% above the cost of a current single layer tank.

This same SER also commented on the list of potential flexibilities highlighted in the EPA Outreach Package. A summary of their comments on each flexibility idea is presented below:

Broad engine families for certification: They support defining families by technology. For example, all multi-layer tanks manufactured at a specific supplier for a given equipment manufacturer would be a family. A broad family definition would minimize the amount of production capacity needed to produce sample tanks for testing.

Minimizing compliance testing requirements: They support this concept. Reduced testing requirements would also minimize the amount of production capacity needed to produce sample tanks for testing.

Design-based certification: Agri-Industrial Plastics supports design-based certification and believes sufficient information exists on coextruded multi-layer tanks to qualify.

Emission credits: They support a credit program. They believe the credits would be useful especially for low production volume lines.

Delay of standards: They support a two year delay in the applicable date for the standards. (See discussion above.)

Hardship provisions: Although they do not believe they will be affected, they believe small equipment manufacturers could benefit from hardship provisions if the manufacturer is allowed to continue selling single layer tanks.

Marine SI Engines and Vessels

Exhaust Emission Standards

Technological Feasibility for SD/I Engines

One SD/I engine manufacturer commented that they have already begun producing inboard engines with catalysts in June 2006. These engines meet the CARB standard of 5 g/kW-hr HC+NOx. They stated that they will produce about 5000 of these engines in the next year and sell them nationwide. One trade organization commented that even though this company has developed a catalyst system, other companies may have technical or resource challenges that will take time to overcome.

One SER commented that catalysts have not been tried on high-performance engines and that catalysts would not be practical due to the extreme flow volumes of exhaust gases. They raised several issues that would need to be addressed for 1500 hp engines including catalyst size, packaging in a boat, cooling needs, durability, and safety. They commented that electronic fuel injection could be used on these engines and is supplied upon customer request. However they commented that this technology would not offer many benefits for high performance engines and that the sales volume would be too small for most electronic fuel injection manufacturers to support. They also stated that EGR is not typically applied to high performance engines. They stated two high performance engines were emission tested by EPA at their facility. This test data showed

HC+NOx levels below the proposed default baseline level of 30 g/kW-hr. One SER cited this data as well and also commented on the difficulty of using catalysts on these engines because of the high exhaust flow rates.

Costs of Exhaust Emission Reduction

A SER said that costs of catalysts for SD/I engines were overstated in the draft cost report that EPA supplied to potential SERs on June 27, 2006. In their written comments, they stated that the increase in cost to their customers for catalysts is about $300. They referred to catalysts as a cost-effective technology.

Another SER asked what the costs would be to apply low emission technology to high performance engines. They stated that the high performance engines have very low production volumes and are not built up from automotive engine blocks like the SD/I engines discussed in the draft cost estimates supplied by EPA. Two SERS commented that, even in the case of an emissions credit trading program, EPA should evaluate the costs of purchasing, maintaining, and reporting emission credits and the costs of managing and certifying this sector.

Small Business Flexibility for Traditional SD/I Engines

A SER commented that the following flexibility concepts raised by EPA in the Outreach document were not necessary or fair: extra lead time, simplified certification, reduced compliance requirements, and hardship relief. They stated that these flexibilities were not necessary for several reasons. First, the Southwest Research Institute (SwRI) test programs funded by EPA and CARB demonstrate the technical feasibility of catalysts and provide much of the research and development for small businesses. They commented that, especially with CARB's SD/I regulation being in place since 2001, that manufacturers have had ample lead time to develop catalyst technology for their own products. They stressed that no business should be given a competitive advantage, through regulatory flexibility, for not meeting the requirements of the proposed law. They are concerned that companies using the flexibility options to delay the application of catalysts would have an unfair advantage in the market due to lower costs.

A trade organization commented that a credit averaging program should be made available to small and large businesses. In addition, they recommended that small manufacturers be able to purchase credits to meet the standard for a temporary program that would last for three years. They stated that it is important that the credit trading program be designed to create a cost burden equal to the costs incurred by companies that have developed low emission technology engines.

Small Business Flexibility for High Performance SD/I Engines

Two SERs stated that an ABT program for high-performance engines would give the one large manufacturer (Mercury) of these engines an advantage over the many small businesses that make these engines. Mercury would be able to average credits between

traditional SD/I engines and high performance SD/I engines. The other high performance engine manufacturers would have higher administrative costs because they would need to purchase credits from other companies. They recommended a default standard of 30 g/kW-hr HC+NOx that all high performance engines could be assumed to meet. In addition, they expressed their belief that a cost/benefit analysis focused solely on high performance engines would support the need for a small volume exemption for high performance SD/I engines.

One commenter stated that a small volume exemption would put a large business at a competitive disadvantage in the high performance engine market. Therefore, they recommended that a small volume exemption be considered in the context of the entire market.

Evaporative Emissions Standards

Technological Feasibility

One fuel tank manufacturer commented that when plastic fuel tanks were first introduced into the marine market there were recalls due to fuel tank expansion causing leaks. They stated that the process of converting to plastic tanks took many years so that installation issues could be addressed and that some of these issues did not appear during standard testing. Now, the marine industry uses XLPE as a material and there are a series of durability tests used by the industry including pressure, slosh, fuel soak, and fire testing. They commented that they use many custom processes that were developed over time to make marine fuel tanks and that this customization is what has made it difficult for other molders to enter the marine fuel tank market. Another SER commented that safe plastic fuel tanks were the result of a long trial and error process and noted that small tank manufacturers do not have the engineering staff and other resources needed to develop new technology. They identified a list of engineering challenges that will need to be addressed for new fuel tank designs including testing, material flows, and layer adhesion. In addition, they presented a list of concerns with epoxy coating including variability and cost of applying a coating with spraying or dipping approaches. Another SER commented that multi-layer fuel tanks have not been field proven in boats.

Two SERs commented that the low permeation fuel tank technologies raised by EPA in the draft cost report all have technological feasibility issues related to durability and cost. They stated that fluorination and sulfonation are not compatible with XLPE. They commented that a nylon barrier layer will not work with XLPE and that linear low polyethylene will not pass the fire test. They also commented that acetyl barrier layer would not be an effective material because it is too brittle and it delaminates from the outer layer. They also stated that an epoxy barrier would not work because it requires a fluorination process which is not possible with XLPE.

One SER submitted two test reports on Coast Guard durability testing performed at Imanna labs. One report was on a roto-molded XLPE fuel tank and the other was on a

multi-layer fuel tank made with a nylon inner layer and a XLPE outer layer. Both tanks passed the durability tests performed, including the fire test.

A vessel manufacturer commented that EPA should work with Phillips or Exxon to encourage them to develop a low permeation material that could be used in marine fuel tanks. A SER commented that EPA should work with material suppliers and tank manufacturers to outline EPA goals. The vessel manufacturer recommended a review of the material's cost, feasibility, and lead time necessary. A SER recommended a 2010 technology review with a 2012 implementation date for tank permeation standards and specified that it has three objectives: 1) no small businesses close or lay off workers due to lack of SBREFA flexibility, 2) a technologically feasible standard based on resin technology appropriate for marine use, 3) an affordable raw material be identified that allows tank manufacturers to meet the standard.

A SER commented that products are available to successfully apply carbon canisters to boats but that they would need to be tooled for use with roto-molded fuel tanks. Another SER stated that diurnal temperature swings of fuel in larger boats that remain in the water would be smaller than for smaller, trailerable boats. Therefore, the volume of carbon required for these boats would be smaller per gallon of fuel tank capacity.

A SER commented that multi-layer blow-molded fuel tanks could meet the anticipated EPA tank permeation requirements. Blow-molded fuel tanks are currently used in PWC. However, the entire PWC market would not be large enough to keep a blow-molding machine at full capacity. One SER's comments on the feasibility of mult-layer blow-molded fuel tanks were generally applicable to both Small SI equipment and boats. These comments are described in more detail above in the Small SI discussion.

Costs of Evaporative Emission Reduction

One SER commented that many of the known approaches for manufacturing low permeation roto-molded marine fuel tanks would result in large investments in tooling, machinery, and engineering beyond their resource availability. For the multi-layer approaches, Inca presented specific costs on materials drop boxes that were higher than the draft EPA estimates supplied to the potential SERs. (They claimed that Arkema's petroseal solution requires a 2-step drop box process.) They also commented that the addition of drop boxes would make the molds bigger and reduce the number of molds that could be processed at a time. Another SER stated that costs of multi-layer fuel tanks would include capacity of the machine with drop boxes added, longer load cycle time, additional material handling, scrap rates, and additional durability testing. They also stated that raw material costs have increased by 20% and fuel prices have increased by more than 30% over the past year.

A SER also commented that a recall of fuel tanks would put a fuel tank manufacturer out of business because of the high cost of replacing fuel tanks in a boat.

Another SER also commented that the costs of drop boxes and epoxy material are higher than the EPA estimate as well as shipping costs.

As discussed above in the Small SI section, a SER provided comments on the cost of multi-layer blow-molded fuel tanks.

A SER commented that the costs of a carbon canister would be higher than the EPA estimates because of additional system components that would be necessary. Another SER also commented that additional components would be required including additional hose, clamps, a more expensive fuel/air separator, and an access panel in the boat. They commented that the costs for canisters would be higher than the draft EPA estimate.

One SER commented that the hose lengths used in the draft EPA cost estimates were too low and that smaller companies would not be able to negotiate as good a price for components as larger companies.

Small Business Flexibility for Evaporative Emissions

A SER commented that the majority of boat builders in the U.S. are small businesses and that the vast majority are probably not aware of the proposed regulations. Two SERS recommended that we use standard writing organizations such as ABYC to establish guidelines to simplify the compliance process. They stated that the ability of boat builders to simply purchase fuel system components that are labeled as meeting EPA's requirements would ease the burden on small boat builders. A SER recommended that EPA provide tank manufacturers with a list of compliant materials/processes and that the tank manufacturers would only need to label their tanks that they are using a certified technology. A commenter said that the use of certified components and reference standards would cut down on government required paperwork which is especially a burden to small businesses.

As discussed above in the Small SI section, one SER provided detailed comments on potential flexibility options for manufacturers of blow-molded fuel tanks. They stated that additional lead time would be necessary and recommended an implementation date of 2011 for the fuel tank permeation standards. Also, a SER commented that it is unacceptable for them if roto-molders were given longer lead time than blow-molders because it would put them at a competitive disadvantage for some of their products.

Two SERs commented that larger boats should have smaller carbon canisters per gallon of fuel tank capacity, than smaller, trailerable boats. They proposed that whether or not a boat is trailerable could be based on boat size because of exiting state requirements, based on boat size, for trailerable boats. One SER made specific recommendations for design-based canister specifications for trailerable and non-trailerable boats. Two SERs also stated that the use of carbon canisters could cause them to change their tooling to create access panels or to make space for the canister. They commented that flexibility should be created to allow sufficient time for boat builders to

update their tooling. They stated that tooling modifications for boats are expensive and that tooling is typically used for 5-7 years or longer.

A SER recommended that the burden of certifying to hose permeation standards be placed on the hose supplier. The supplier would test and certify to an industry standard such as ABYC H-24 or SAE J1527 (modified to include the EPA hose standard). Boat builders would then just need to use hose labeled by the hose supplier as meeting these requirements.

Appendix C
Summary of Comments Received During SBAR Panel

Summary of Oral Comments - Panel Outreach Meetings September 12, 2006

The following are summaries of issues and comments provided by the SERs during the September 12, 2006 Panel outreach meeting.

Small SI Engines and Equipment

Exhaust Emission Discussions

EPA presented a number of flexibility approaches, related to the potential exhaust emissions standards, for small manufacturers of small SI engines and equipment. SERs did not have any comments on these approaches during the meeting.

Evaporative Emission Discussions

EPA also presented a number of flexibility approaches related to the potential evaporative emission standards. The discussions on fuel tank permeation did not focus solely on small SI applications. The fuel tank manufacturer SERs which were present at the meeting produce fuel tanks for both the small SI and marine SI markets. A summary of the comments raised is present below.

One method of forming a nylon inner layer in a roto-molded fuel tank is to use drop bags containing nylon that melt at the appropriate temperature. A SER raised two issues with using drop bags stating that they may get stuck in corners or they may catch on inserts and rip open.

Another SER stated that nylon fuel tanks will pass the Coast Guard flame test; however, there is a concern with impact resistance. Nylon 6 is hygroscopic (absorbs water) which can affect its impact resistance. The SER commented that nylon 11 is not hygroscopic and therefore has higher impact resistance.

One company is working with a new material provided by Cyclics Corporation called CBT. This material can be used in roto-molding to create a permeation barrier within a

cross-link polyethylene (XLPE) fuel tank. The material separates itself from the polyethylene, so an inner layer can be formed without a drop box or drop bag.

This SER commented that the Cyclics technology looks promising, but there are still issues that need to be addressed. In their early testing, they found that the multi-layer tanks were not passing the 25,000 cycle pressure impulse test. In this testing, the tanks were formed with a thinner XLPE wall to offset the thickness of the CBT. Later tanks, made with the full XLPE wall thickness, passed the pressure impulse test.

In addition, this company was able to crack the fuel tank by hitting it with a ball peen hammer. They were not sure why the barrier affected the impact resistance of the fuel tank. Two suggestions were that it may have affected the cure of the XLPE or may have reduced flexibility. The SER stated that they are making progress and are planning on running more trials with this technology. These trials will include materials engineered for higher impact resistance and a lower barrier layer thickness.

Another SER commented that advances in flame retardant additives have resulted in a blow-molded HDPE fuel tank that has been certified to pass the Coast Guard flame test. They believe that they could offer 6-7 tank sizes that boat builders could choose from. The boat builders would then need to design their boats specifically to use one of these tank designs. They commented that they do not yet know if they will be able to produce multi-layer fuel tanks with the flame retardant. The primary issue is that it is difficult to flush materials out of multi-layer blow-molding machines and they would not want to contaminate later batches with the flame retardant. This flame retardant has a negative impact on impact resistance. They stated that their main point was that there are people working on blow-molding low permeation tanks for the marine market that pass Coast Guard tests.

One fuel tank manufacturer commented that many boat builders will need specialized tanks and will not have the production volumes needed for blow-molding.

One small volume manufacturer of small SI equipment stated they have four models with less than 500 units per year. This SER commented that it will take significant engineering to meet the potential standards, especially for the fuel system. They currently sell product into California with low permeation fuel hose. However, they are able to take advantage of a California exemption for fuel tanks with an annual production of less than 400 units. They buy tanks from Dutchland and use some roto-molded and some blow-molded tanks. The SER recommended an exemption for small sales volumes of fuel tanks.

A SER commented that they often need to make small volumes of service tanks to replace damaged fuel tanks on existing equipment. Due to the high setup costs for the multi-layer blow-molding machines, they would like to make these small production runs in the mono-layer machine. They recommended a provision in the regulations that would allow them to use credits to certify these tanks to the standard.

They commented that hardship provisions won't help a tank manufacturer because equipment manufacturers will go to another tank manufacturer to purchase low permeation tanks if they can't provide one.

Marine Engines and Equipment

Exhaust Emission Discussions

EPA presented a number of flexibility approaches, related to the potential exhaust emissions standards, for small manufacturers of SI marine engines and vessels. The following discussion summarizes the SER comments made in the meeting.

One SER indicated they have recently begun selling inboard marine engines equipped with catalysts that will meet the California HC+NOx standard of 5 g/kW-hr (the same HC+NOx standard under consideration by EPA). They believe that the rule should be the same for everyone and expressed strong opposition to differences in the program based on a company's sales volume.

One SER stated that their customer is the boat builder and that there is head-to-head competition between the large and small companies for that customer. If there is a transition period where some manufacturers are given an advantage, others could loose business. In addition, if a boat builder who buys thousands of engines changes engine suppliers, it could change who is defined as a large versus a small business.

The same SER commented that if there are any small businesses that cannot sell low emission SD/I engines in 2009, then those businesses should have to use hardship provisions such as those described by EPA.

The trade organization stated that there should be a delay in the standards for small businesses beyond the California standards and recommended an implementation date of 2011. They commented that this would give manufacturers 3 years of field experience to address any emissions or warranty issues. In addition, they stated that a tiered phase-in of the standards would be helpful because General Motors is changing the 4.3 and 8.1 liter engine blocks to new configurations.

A SER stated that before selling engines equipped with catalysts, they performed durability testing and engineering evaluations to make sure their engines would meet emission standards for 480 hours/3 years whether they were operated in fresh water or salt water. This SER recognizes that there is some uncertainty in what will happen to the engines once they get in the hands of the public, but delaying the standards until 2011 would not help with this issue. If the standard were delayed until 2011, then so would the field experience. Therefore, engine manufacturers would not gain in-use field experience by delaying the standard.

As an alternative, this SER suggested implementing the standard in 2009 without in-use enforcement for the 2009 and 2010 model years. This would get catalysts into the

field without imposing a compliance risk on the manufacturers. There was a discussion regarding how no in-use enforcement could be achieved either through no useful life or a very low hour value for the useful life. A Panel member noted that emission credits in an averaging, banking, and trading (ABT) program should be tied to useful life, so no emission credits could be earned without a useful life requirement.

One SER stated that they do not want any requirements in 2009 and that they support a delay for small businesses until 2011. A three year delay, beyond the California standards, would give small businesses more flexibility in how they develop and phase-in their products. They stated that they want the opportunity to make the best product possible and would need time for testing in different environments. More time would give them the ability to learn more about catalysts and reduce the risk of in-use problems. Because they are a small business, they commented that they are at a disadvantage to large businesses and need regulatory flexibility.

A trade organization commented that there are hundreds of shops that rebuild engines and make high performance marine SD/I engines.

One SER manufactures about 150 high performance marine SD/I engines per year and is concerned about the availability of emission credits for certifying their product. Also, they consider a credit program to be just an accounting exercise without real pollution reductions.

High performance engines are tuned to run rich for power and to keep them from failing due to high temperatures. They are not tuned for smooth idling. A SER commented that they would prefer a reasonable standard that they can meet without the use of a credit program. This SER expressed concern that an ABT program would give a competitive advantage to large manufacturers. For instance, one company would have enough ABT emission credits from their other SD/I engines (i.e., their engines that are not high performance SD/I engines) to allow them to continue selling high performance SD/I engines in their current configurations.

A SER stated that they would prefer a standard of 16 g/kW-hr HC+NOx to a 5 g/kW-hr standard with credit trading. This comment was predicated on the assumption that they could meet this standard through calibration. They commented that they would need to collect more test data and perform a review of all available data to know, for sure, what emission standard would be feasible for them.

Evaporative Emission Discussions

EPA also presented a number of flexibility approaches related to the potential evaporative emissions standards. Much of the discussion on fuel tank permeation standards was covered in the morning meeting with small SI manufacturers (and summarized earlier in section 8.3.1). The same fuel tank manufacturers were represented in both the small SI and marine SI meetings. The following discussion summarizes the SER comments made in the afternoon meeting.

One SER commented that, just because a low permeation tank technology works for one industry, it does not mean that it will work for another industry.

A trade organization stated that we should continue to study fuel tank permeation technologies for another year, and then decide if a program review is necessary. They commented that the preamble for the proposed rule should discuss the concept of a program review. Another SER expressed support of this comment.

The trade organization supported the idea of separate carbon canister design requirements for trailer boats and boats stored in the water. However, they expressed concern for EPA's concept of basing the carbon canister size only on fuel tank size with diminishing additional carbon needed for larger fuel tanks. They noted under EPA's concept that a boat with two 200 gallon fuel tanks would need more carbon canister volume than a boat with one 400 gallon fuel tank.

The trade organization recommended a slightly different approach for carbon canister sizing based on the length of the boat. They recommended defining trailer boats as those below 26 feet in length and having one carbon canister size curve for those boats. For non-trailer boat (defined as those above 26 feet in length), they recommended a different curve using smaller carbon canister volumes per fuel tank volume. EPA stated that it would revisit its carbon canister size calculations and consider basing the carbon canister size calculation on both boat length and fuel tank volume.

A SER commented that the production life for their boat molds is on the order of 6-7 years and that it would be costly to change mold designs outside of this schedule to make room for carbon canisters. They commented that it would be difficult to find room for a 4 liter canister on their boats. All of their boats that are 30 feet and longer have two fuel tanks ranging from 150 to 200 gallons each.

One marine SI fuel hose manufacturer commented that they are offering low permeation marine fuel hose today and labeling it "J1527 A1-15" in anticipation of the new SAE specification for low permeation marine hose.

One SER stated that even Sierra and Goodyear are switching to low permeation fuel hose in anticipation of permeation standards.

Summary of Written Comments Submitted by Small Entity Representatives

The following section summarizes the written comments submitted by the SERs after the September 12, 2006 Panel outreach meeting. A copy of each of the comments submitted by the SERs is included in Appendix D.

Small SI Exhaust Emissions

One small volume equipment manufacturer stated they have less than 5,000 units/year and that they would be able to comply with the program presented by EPA. They expressed support for allowing small businesses an additional 2 years to use Phase 2 engines, design-based certification, and the economic hardship provisions

An engine manufacturer commented that they already use catalysts and therefore can meet the potential exhaust emission standards. They suggested pro rating the timing and the standards based on the number of units produced in a year. They also expressed support of defining small businesses based either on the number of employees or the number of products sold.

Marine SI Exhaust Emissions

SD/I Marine Engines ≤373 kW

A trade organization expressed support of the concept to allow small businesses an additional two years to comply with the potential exhaust emission standards for SD/I marine engines. However, they also commented that, because small businesses manufacturing boats may use engines produced by large engine manufacturers, all engine manufacturers should get the same implementation date of three years after the publication of the final rule. Another SER expressed support of this recommendation.

One SER commented that they are confident that catalysts can be used on SD/I engines operated on fresh water, but some of their members are concerned about catalyst durability with operation on salt water. Two SERs stated that three years should be sufficient time to properly evaluate catalyst performance. However, they also expressed concern that the Southwest Research Institute (SwRI) saltwater test program has not been completed and claimed there is no public information on the viability of catalysts in saltwater applications.

High Performance SD/I Marine Engines (> 373 kW)

A trade organization commented that the use of catalysts is not technically feasible for high performance SD/I marine engines. They recommended that the standard be based on test data collected from several small businesses manufacturing high performance engines. They stated that this standard should set at an average baseline level intended only to prevent backsliding. In addition, they recommended a streamlined certification process.

This trade organization expressed opposition to the credit program suggested by EPA for high performance engines. They stated that this would give the one large business in the market a competitive advantage because they could transfer credits from one business division to another and not have to make any changes to their high performance engines. In contrast, small businesses would have to purchase credits from other businesses. They claimed that an emission credit program would create a disadvantage for small businesses without achieving an environmental benefit.

Evaporative Emissions Standards

Technological Feasibility

One SER commented that they are currently making multi-layer blow-molded fuel tanks that will meet the potential fuel tank permeation standards. In addition, they discussed fluorination as an alternative technology that may be used to reduce permeation. However, they expressed concern that the tank permeation standard would need to be relaxed somewhat before they would feel confident using fluorination.

Another SER currently supplies rotational molded fuel tanks for the small SI and marine markets. They stated that they are capable of producing low permeation tanks that will meet the potential tank permeation standards presented by EPA. One company tested one of their low permeation fuel tanks and found that it passed the Coast Guard flame test. This company commented that further testing and development is underway such as cold temperature testing and mid-sized marine fuel tank design. They stated that low permeation rotationally-molded fuel tanks exist today.

One SER expressed their belief that fuel tank manufacturers will be able to meet the tank permeation standards. However, two SERs commented that it will require development of new technology. The same two SERs commented that they would not consider one company's fuel tanks, or any other new technology, to be feasible for marine use until they are presented with durability test data. Because of the relatively small production volumes in the marine industry, the two SERs expressed concern that the development of new materials for marine fuel tanks would not likely be a priority for large chemical companies. One of the SERs commented that EPA should work with chemical companies to get them to develop new materials.

One SER commented that they have not identified a material that would work for low permeation fuel tanks for their equipment.

A SER commented that any fuel tank technology must be thoroughly evaluated and field tested in boats. They commented that they are in the process of performing trials on several approaches for reducing permeation for rotationally molded fuel tanks. However, at this time, they have not identified an approach that they consider feasible and cost effective. Another SER stated that there are several company durability tests that the tank would need to pass including impact testing and that more time is needed to evaluate low permeation technologies. Two SERs commented that a technical review is needed to allow the industry to properly assess any new technologies that are introduced. One SER recommended a provision be included in the proposal that would allow EPA to adjust the requirements, if needed, as the result of a comprehensive review and technical evaluation.

One SER expressed their support of carbon canisters as a feasible technology for reducing diurnal emissions from boats. Two SERs commented that the primary issue

would be packaging the canisters into the boats. One SER provided recommended design sizes for canisters based on boat length and tank size. This SER commented that canister sizes should be smaller, per gallon of fuel tank capacity, for non-trailerable boats and recommended defining non-trailerable boats as those 26 feet and longer, consistent with 50 CFR §86.12. Another SER expressed support of the canister size recommendations and also stated that many of their boats have dual fuel tanks and that canister size should be based on total fuel capacity of the boat rather than on individual fuel tank capacities.

One SER commented that they would be affected by a standard that required carbon canisters because they would need to design their vent fittings to accommodate the canister. Although fittings for use with a canister are available from automotive suppliers, they commented that they would need to adapt the fittings to make sure they work with rotationally molded fuel tanks. They stated that these fittings would need to be carefully designed, tested, and produced.

Two SERs commented that it may be possible to certify and use fuel feed hoses earlier than 2009 as an approach to delay the implementation of other evaporative emission requirements.

Costs of Evaporative Emission Reduction

One fuel tank manufacturer commented that the material cost for a multi-layer blow-molded fuel tank is approximately $0.25-0.40 per pound higher than for HDPE. They stated that would result in a 40-50% increase in tank price for tanks in the 10-15 gallon range. They also commented that the marine market may not be large enough to support a single blow-molded machine and that they would need to combine capacity with other applications. This SER commented that it has already adsorbed most of the R&D costs associated with multi-layer tanks, but the cost of providing sample tanks for testing could be as high as $5,000. They estimated capital costs for multi-layer blow-molding machines of $3 million for small SI fuel tanks and $4 million for marine fuel tanks. Finally, they stated that they would need to pass any increased costs on to their customers.

A SER commented that the small SI market is so large that it could overwhelm current fluorination capacities and this market would be better suited for multi-layer tanks. They did not present costs on fluorination, but commented that logistical costs would need to be considered such as shipping and handling.

A SER commented that the tooling and equipment of their technology for low permeation rotationally molded fuel tanks is reasonable and they estimate a 50% cost increase compared to current fuel tanks.

A SER stated that they could not give a good estimate of cost for producing low permeation rotationally molded fuel tanks because they have not identified a feasible technology. However, they commented that a technology that increases mold cycle time or material costs would increase their part costs. Also, the cost of tank failures could be

high. Inca estimated that the cost for replacing a fuel tank in a boat could be as high as $3,000-$6,000. In addition, they would have to consider product liability insurance costs. Finally, they stated that they would need to pass any increased costs on to their customers. If the cost were too high, Inca expressed concern that their customers would switch to using aluminum fuel tanks.

One SER commented that the fuel tank standards could be very expensive if they had to amortize new mold and testing costs over small production volumes. They gave an example of a cost increase of $208 per tank if a $60,000 mold plus $5,000 of testing costs were to be spread over 500 tanks.

A vessel manufacturer commented that boat molds may be used for several years without changes. If they were not able to fit a canister into their current boat design, then they may need to create a plug and build a new mold which could cost more than $100,000. The SER stated that boat molds can be modified, but these modifications can negatively affect the lifespan of the molds.

One engine manufacturer commented that the fuel line permeation requirements would increase costs by about $2-$3 per piece of equipment.

Small Business Flexibility for Evaporative Emissions

One fuel tank manufacturer expressed support of several of the small business flexibility provisions discussed with the SERs. They commented that broad emission families and minimized compliance testing would be very helpful and would minimize the number of sample tanks that would need to be produced. In addition, they recommended that design-based certification apply to multi-layer fuel tanks with an EVOH barrier, in addition to metal fuel tanks because such multi-layer fuel tanks have been demonstrated to have very low permeation emissions.

A SER also expressed support of an ABT program in which credits could be earned by low emitting fuel tanks to be used to offset debits incurred from higher emitting tanks. They also stated that they would also like to use these credits for service fuel tanks. Because service fuel tanks are only used when a tank in an existing product needs to be replaced, they commented that service tanks are typically produced in short production runs making it more cost effective to produce them on mono-layer machines. Two SERs commented that they would support an ABT program, but one trade organization stated that it would provide little relief for small businesses.

A commenter stated that the primary issue for producing low permeation blow-molded fuel tanks is the implementation date. They recommended an implementation date of 2011 for all fuel tanks. In their comments, they presented details on the time needed to install a multi-layer blow-molding machine and concluded that it would take two years to be ready for production after ordering a new machine. They also responded that a phase-in, based on percent of total per unit sales, would be helpful.

Two SERs expressed support for giving one year of additional lead time to rotationally molded marine fuel tanks. In contrast, one SER expressed their opposition to giving additional time for rotationally molded fuel tanks to comply. This SER commented that this would give equipment manufacturers an incentive to switch from blow-molded to injection-molded tanks.

One SER expressed support for an early incentive program for low permeation fuel tanks.

Two SERS expressed support of a design certification provision for meeting the potential diurnal standards with carbon canisters. The SERs commented that it could be a challenge to install canisters in all boats by 2010 because many boat builders would have to redesign their hull and deck configurations to accommodate a carbon canister. One SER stated that a canister phase-in should consider the product life cycle of boat molds and recommended waiting three years after publication of the final rule before implementing the diurnal emission requirements for boats that would use carbon canisters. Another SER recommended a 2012 implementation date for the canister requirements.

A trade organization stated that it is working with the Coast Guard and American Boat and Yacht Council to develop canister installation instructions. They stated that these instructions will be included in ABYC H-24 which boat builders must certify to as a condition of their membership. They requested that this industry certification serve as documentation that the boat builders comply with the potential EPA diurnal emission standard.

A trade organization commented that SAE standards and designations are being developed for low permeation marine fuel hose and that these standards would need to be met for ABYC certification. They recommended that the hose suppliers be required to label the EPA compliant hose using the SAE designations of SAE J1527 A1-15 or B1-15. A SER expressed support of the trade organization's comments on certification and labeling of fuel hose.

General Flexibility

One SER expressed support of the economic hardship provisions presented by EPA. A trade organization expressed support of both the economic and unusual circumstances hardship provisions.

Another SER commented if equipment manufacturers were to use economic hardship provisions to continue to use HDPE fuel tanks, then they could lose business.

Appendix D
Written Comments Submitted by Small Entity Representatives
(see separate file)

Appendix D
Written Comments Submitted by Small Entity Representatives

HOFFCO|COMET
industries inc. a TENAX company

358 N. W. F Street
Richmond, IN 47374

September 25, 2006

Ms. Joan Crawford,

I apologize for being unavailable for the Small Business Advocacy Review Panel meetings previously. I have reviewed the material supplied with your 9/25 email and generally believe that Hoffco|Comet can comply with proposed process. As I understand the proposal, Hoffco|Comet , a small equipment manufacturer with volume of less than 5,000 units would have two (2) extra years to utilize Phase 2 engines, Design based certification and Economic Hardship per Title 40 CFR Part 1068. Hoffco|Comet would be capable of meeting all three of these requirements. Is the requirement to meet all three or any one of the three??

This appears to be a good plan to permit Small Business Entities to continue to market Small Spark Ignition powered Outdoor Power Equipment. If have questions or require additional information please feel free to contact me.

Very truly yours,

John Pouder
Vice President Engineering
Hoffco|Comet Industries, Inc.

HOFFCO OUTDOOR POWER EQUIPMENT

COMET INDUSTRIES

INDUSTRIAL cab

INCA
MOLDED PRODUCTS, INC.

6400 Louisiana Avenue
Nashville, TN 37209
615-350-7290 Fax: 615-350-7293
www.incaproducts.com

September 25, 2006

Mr. Alexander Cristofaro
c/o Ms. Joan Crawford
1200 Pennsylvania Ave N.W.
MC1803A
Washington DC 20460

Dear Alexander Cristofaro:

INCA Molded Products is pleased to the provide the following comments regarding the Environmental Protection Agency's plan to propose regulations to control evaporative emissions from spark-ignited vessels and small off-road engine equipment.

Inca is a small business that manufactures rotationally molded fuel tanks for the Marine Industry and other small off-road equipment. Approximately 85% of our fuel tank business is Marine, 10% small off-road equipment fuel, and 5% other custom components. So 95% of my business will be affected by this proposed rule. We consider ourselves a "fuel tank specialist." Some of the proposals and products I have seen require huge investments in tooling, machinery, and engineering. Inca does not have these kinds of resources available. Currently we have 50 employees, and I expect continued increase. We provide competitive wages, opportunity for advancement, and excellent health insurance to all employees.

Overall Response to the Flexibilities

1. The concepts that are being provided are, first 1 extra year of lead–time, which means the program begins in 2012. The second and third relate to "Economic Hardship" (title 40, part 1068, sec. 1068.250), and "Unusual Circumstances Hardship" (1068.245). A technical review has been declined.

The EPA has presented a few "solution scenarios." I have and still am trialing any and all of the EPA's recommendations as well as other material possibilities. There has been data presented and reported on some materials that meet EPA permeation test 1051.515. Although there is performance testing the tank must withstand as well (slosh, vacuum pressure, and UV exposure), there are many application- based fuel tank integrity tests that are not being considered, such as; U.S Coast Guard CFR 33 183.510 (a), ABYC H-24, SAE J1241 motorcycle. These tests are vital to the integrity of the fuel tank. Impact is very critical and seems to be one of the major challenges of all the proposed materials. Some of these integrity tests are voluntary, but are adopted based on the industry organization's set of standards SAE, ABYC. Some of the integrity tests are company based, and were designed based on reducing the potential for fuel tank failure for our specific industry.

The challenge that we continue to face is finding a material that we can consistently manufacture that performs to the level of integrity that is required by the existing product applications.

2. Today, it is simply not technically feasible to manufacture low permeation roto-molded fuel tanks without lowering the integrity, quality, and reliability of today's roto-molded cross-link polyethylene fuel tanks. Extra time is of benefit. However, I believe that a "technical" review is definitely needed to allow the industry's fuel tank companies to properly access the integrity performance of the product or products that are candidates for introduction. I believe a process like this would allow the molders an opportunity to verify that their applications' ability to meet CARB standards will not jeopardize the current level of safety to the industry that they serve.

3. The level of the standard may make the rule more feasible, however by not having a material to rotationally mold that meets our application standards, it is hard for me to give a definitive answer.

4. I want to move forward and I fully accept and agree to the clean air act, which requires us to lower permeation on marine and small engines. Inca has been and will continue to contact and research potential material suppliers. Once we make contact then we have and will continue to work with them, opening up our resources (engineers, production workers, equipment, testing equipment, etc).

Level of the Evaporative Standards

1-3. There have been three sources identified to reduce evaporative emissions in the marine and small SI engines: the hose, diurnal emissions, and the fuel tank. There will be significant progress made in adopting low perm hose, and passing a rule that requires a carbon canister. I cannot quote the exact reduction. We as fuel tank manufacturers will be affected by the carbon canister rule, because we will be designing our vent fittings to provide for the best possible performance of the canister. I know some of the fittings are already available through automotive suppliers, but they must be designed and adapted so they provide a tight safe seal to the roto-molded tank (which will require a change from the proven design that has been used for many years). This change in itself will need to be carefully designed, tested, and produced. So with all that said, the EPA would be making great impact in both small SI and marine industries. Material suppliers and tank molders need evaporative standard levels that also uphold and or improve the level of fuel tank integrity. To date there is none that exists.

Cost of Compliance and Lead Time

I cannot accurately comment on cost at this time, because I do not have access to the technology that "some company" is using to manufacture its XLPE/nylon multilayer products and to my knowledge, neither is Exxon Mobil, the supplier of crosslink, aware of this. I do know that the raw materials that are being considered and tested as a monolayer or multilayer are 5 to 10 times more expensive per pound. The average Marine Fuel Tank weighs 35lbs and the average Small SI weighs about 12lbs. Although the multilayer solutions are attempting to lay down small amounts of the permeation barrier material it is still unknown the wall thickness needed to meet standards, as well as the inner layer thickness may vary from mold to mold due to tool design (we have 800 molds), and it can affect the impact integrity of the tank.

Rotational molding requires that a mold be heated inside a large oven for a designated period of time. The multi layers that I have trialed require additional time in the oven and

increase the cycle time as much as 36%. This would not only increase the piece part cost significantly, but it would also increases the energy cost by the same factor (36%).
In addition, it takes more time and energy (fans, water) to cool the part. One of the test technologies required a nitrogen purge during the heating cycle, to keep moisture out of the material during processing. This requires additional hardware to be supplied with each mold, and a large volume of on-hand nitrogen.

The problem with giving firm estimates of cost is there is no technically feasible solution that has given us the opportunity to accurately predict cost estimates, because there have been integrity failures (impact issues) that lead to additional proposed ingredients or processes where costs are unknown, and the majority of the time the potential material supplier never comes back with a new program.

The cost to replace a tank in the marine industry can be very high. I have seen bills from $3,000 to $6,000 to replace one tank. If we small fuel tank manufactures have any failures of significant size, it would be devastating to our company. The automotive companies might be able to absorb these kinds of events; they are much larger and the cost of replacement is nowhere near $3,000.

Product Liability Insurance is another factor. If we can get coverage, our premiums will increase due to not having experience with a new material.

As you stated, you expect we would pass on added cost. We would have to or we would not be able to stay in business. When all factors are added the price of our tanks will definitely increase to a point much higher than aluminum, and if boat companies chose to shift back to aluminum then Inca's sales would be extremely affected, because 95% of our sales are roto-molded fuel tanks.

Respectfully Submitted,

Robert Porter
President
INCA MOLDED PRODUCTS

Cc: Glenn Passavant
Mike Samulski
Philip Carlson

September 26, 2006

Mr. Alexander Cristofaro
c/o Ms. Joan Crawford
U.S. Environmental Protection Agency
1200 Pennsylvania Ave. NW
MC 1803A
Washington DC 20460

RE: Control of Emissions from Non-Road Spark Ignited Engines and Equipment
NMMA Recreational Marine SBREFA Comments

Dear Mr. Cristofaro:

Our company is a small business manufacturer of Spark-Ignition Marine Engines for over 50 years and a member of the National Marine Manufacturers Association (NMMA). Our Crusader engines brand manufactures gasoline inboards specifically for the Saltwater Cruiser and Sportfishing markets, and the majority of our products are used in saltwater environments. We are writing in support of NMMA's letter to you dated September26, 2006 regarding the above referenced marine SBREFA comments.

We specifically support NMMA's recommendation that all inboard and stern drive manufacturers be allowed three years following the publication of the final rule to install catalyst systems. We believe that three years should be sufficient time to properly evaluate catalyst performance, but we continue to be very concerned with the progress of the ongoing Saltwater Catalyst Test Program. We continue to have extreme concerns regarding the potential durability challenges that could inevitably lead to serious safety issues when operating catalyst designs in salt water. Currently, there is no data in the public domain that supports the viability of catalysts on marine engines in a saltwater environment. NMMA has yet to receive any reports from SwRI on the saltwater catalyst test project.

Thank you for the opportunity to provide comment. If you have any questions, please do not hesitate to contact me at 803-34501337 ext. 101.

Sincerely,

Chuck Thurman
President

CC: John McKnight, Director Environmental Safety and Compliance
National Marine Manufacturers Association

National Marine Manufacturers Association

September 26, 2006

Mr. Alexander Cristofaro, Chairman
Small Business Advocacy Panel
c/o Ms. Joan Crawford
U.S. Environmental Protection Agency
1200 Pennsylvania Ave. NW
MC 1803A
Washington DC 20460

RE: Control of Emissions from Non-Road Spark Ignited Engines and Equipment
NMMA Recreational Marine SBREFA Comments

Dear Mr. Cristofaro:

The National Marine Manufacturers Association (NMMA) is pleased to provide the following comments on behalf of our small business members regarding the Environmental Protection Agency's (EPA) plan to propose regulations to control exhaust and evaporative emissions from marine spark ignited (SI) engines and vessels.

NMMA is the nation's leading recreational marine industry association, representing over 1,500 boat builders, engine manufacturers, and marine accessory manufacturers. NMMA members collectively produce more than 80 percent of all recreational marine products made in the United States. With nearly 13 million registered boats and 72 million boaters nationwide, the recreational boating industry contributes $30 billion annually to the U.S. economy.

NMMA members that would be directly affected by this rule include recreational marine SI inboard manufacturers, small business boat builders and companies that supply plastic fuel tanks, hoses and fuel system related equipment. Outboard, personal watercraft and stern drive engine manufacturers will also be affected, but they are large businesses.

In our July 26, 2006 SBREFA written comments which are attached, NMMA identified, recommended and supported several flexibilities and approaches that could be incorporated into the final rule for small businesses. During the September 12, 2006 SBREFA Review Panel Outreach Meeting in Ann Arbor, Michigan, EPA provided NMMA with a summary of its proposed small business flexibilities. NMMA appreciates EPA staff's careful consideration of these important flexibilities and offers the following comments that either support or challenge these EPA proposals. NMMA is also providing EPA with additional recommendations that are a result of our discussions during the September 12, 2006 meeting.

444 North Capitol Street, NW, Suite 645
Washington, D.C. 20001
202.737.9750 Fax 202.628.4716
nmma.org

Plastic Fuel Tanks

At our first SBREFA meeting on July 11, 2006 in Ann Arbor, Michigan, EPA presented one company Solar plastics that claimed it had teamed with Arkema Plastics Company and was currently manufacturing a low permeation multi-layer XLPE marine fuel tank. NMMA has contacted this company, which is an NMMA member, and asked them if they would consider providing us with the results from any testing they had done. To date, NMMA has not received any information from them. NMMA is not disputing that Solar Plastics has developed a suitable replacement material for marine plastic fuel tanks, but rather we are not in a position to support this technology until it has been properly evaluated and determined to be an affordable, durable, and safe replacement for current marine plastic fuel tanks.

Furthermore, in the small universe of marine plastic fuel tank manufacturers, INCA Molded Products, Kracor and Moeller Marine are fully aware and, in virtually all cases, have tested potential replacement materials. As EPA is aware, these small business plastic tank manufacturers are raw material processors, with no research and development capabilities.

Based on these challenges, NMMA supports the EPA SBREFA concepts proposed during September 12, 2006 meeting with the following changes or additional recommendations:

- Provide 1- year additional lead time for all roto-molded marine fuel tanks (i.e. begin in 2012)
    - Include Averaging, Banking and Trading (ABT) program.

  NMMA supports the EPA concept of providing additional lead time and recommends that the implementation date be proposed as four years after publication of the final rule. NMMA also supports an ABT program for plastic fuel tanks, although we believe that an ABT program will provide little or no relief for small businesses. The general rule when purchasing most raw materials in the plastics industry is that the cost of a material or barrier layer will be in a large part based on volume. Thus, it is critical from a technical perspective that the new material be tested and proven to meet the performance and durability requirements and from an economic perspective that it be available and affordable. Once a material is developed that achieves these criteria then it will be a suitable substitute to be universally employed in the manufacture of marine plastic roto-molded fuel tanks.

- Provide “Economic Hardship Provision to “Small Business” marine fuel tank manufacturers based on provisions of title 40 Code of Federal Regulations, Part 1068, section 1068.250. Provide “Unusual Circumstances Hardship” provision based on Part 1068 for all marine fuel tank manufacturers.

  NMMA supports the EPA concept of providing an economic hardship provision for small businesses in all rulemakings. However, in this specific case the inclusion of an economic hardship provision for all businesses clearly demonstrates that EPA staff recognizes the need for more research and development and added protections for marine plastic tank

manufacturers. This is because EPA is not simply imposing a requirement that plastic fuel tank manufacturers transfer available material technology, but rather EPA is proposing a regulation that would force the development of new material technology. This requirement is unique and burdensome for two primary reasons. First, the development of this new technology is being placed on the small businesses that only process the material, not the large chemical companies that produce the material. Second, the volume of material used in the marine industry and profit from the sale of this material is so small that the chemical companies see little or no incentive to invest in the development of new material technology.

NMMA is optimistic that our plastic tank manufacturer members will be able to meet this extremely challenging requirement. As EPA staff is aware, our members have been working very hard, partnering with various chemical companies to test and evaluate new materials as they become available and are openly communicating their successes and failures with EPA staff. With that said, NMMA recommends that a special provision needs to be included in the final rule that provides EPA with a mechanism, after a comprehensive review and technical evaluation, to either extend the implementation date or reconsider the requirement, if a suitable alternative material is not available. NMMA will work closely with the EPA to suggest language that will provide this protection, while also fully supporting the EPA's objective.

Carbon Canisters

NMMA supports the use of carbon canisters as a feasible technology for reducing diurnal emissions from boat fuel systems. NMMA concerns have been correctly identified in the EPA background paper as:

- Packaging issues with fitting large carbon canisters into boats
- Larger boats should have a smaller ratio of canister to fuel volume
    - Distinguish between trailer and non-trailerable boats based on boat size.
    - Use a canister design table for boats by total fuel capacity and boat type.

NMMA recognizes several challenges that will be faced by both small business boat builders and EPA when this rule is implemented. These are outlined below.

First, EPA needs to seriously consider how it plans to enforce this rule, both at the manufacturing level and at the point of sale. NMMA currently has approximately 400 boat builder members. These boat builders manufacture approximately 80% of the boats sold in the United States. According to U.S. Coast Guard there are over 3,000 registered boat builders in the United States, and NMMA believes the 2600 non-NMMA members are all small businesses. Many of these small businesses build boats with gasoline powered engines and onboard fuel tanks. The burden of informing these approximately 2600 non-NMMA member boat builders and insuring that these boat builders install these fuel systems in a safe manner needs to be coordinated between the EPA and the US Coast Guard. Early in the discussions regarding carbon canisters, the U.S. Coast Guard discussed amending ABYC H-24 to include canister installation standards. Once a canister standard and an installation requirement is included in ABYC H-24, all NMMA

boat builders will be required to comply with this standard as a condition of NMMA membership. NMMA recommends that this certification serve as documentation that these boat builders are in compliance with the EPA regulatory requirement.

For the approximately 2600 non- member, predominately small business boat builders, NMMA can work with EPA to assist them in reaching these companies, but has no recommendation as to how EPA can equitably enforce this rule. NMMA is concerned that the certification and enforcement provisions be fairly applied both to NMMA small businesses that generally sell their boats through dealerships and at commercial boat shows versus those 2600 boat builders that generally sell their boats directly through word-of-mouth private sales.

Second, in addition to insuring that safe USCG approved canister installation standards are developed in time for implementation of this rule, NMMA is greatly concerned that the boat builders have sufficient room to fit the canister(s) in the space allotted by their current designs. Once a boat builder has to redesign his hull and deck, the cost for the plug and tooling could make this rulemaking extremely burdensome for small businesses.

NMMA recommended the following canister specification and definition of a non-trailerable boat in our July 25, 2006 written comments. These proposed sizes were based on the canister testing performed by NMMA contractor Harold Haskew during the summer of 2005. NMMA believes that small business boat builders will have a much easier time relating a specific canister size to a vessels total fuel capacity rather than having to refer to a graph.

- 1.0 L Canister 12 to 24 gallons total fuel capacity
- 1.5 L Canister 25 to 45 gallons total fuel capacity
- 3.0 L Canister 46 to 120 gallons total fuel capacity
- 4.0 L Canister 121 gallons and larger total fuel capacity

For non-trailerable boats designed to spend the summer season in the water, NMMA recommends the following canister specifications

- 1.5 L Canister 25 to 120 gallons total fuel capacity
- 3.0 L Canister 121 gallons and larger total fuel capacity

Further, NMMA recommends that the EPA adopt the US Fish and Wildlife Service definition for non-trailerable, transient boats found in 50 CFR Part 86.12. This defines these non-trailerable vessels as 26 feet and longer.

A major issue which has been raised by our small business boat builders and was discussed at our September 12, 2006 meeting is the issue of being able to find an appropriate location to install the canister. For some boats this may not be a problem, but it appears that many of the hull and deck liner molds would have to be modified to make accessible space for the canisters. This can be especially challenging because

the US Coast Guard regulations found in 33 CFR Section 183.554 require that all fuel system fittings be accessible.

The current EPA plan would require boat builders to install canisters by 2010. The problem is that this would require many small business boat builders to redesign and retool their hull and deck configurations well in advance of normal model changes. The combination of retooling design costs and the construction of the plug and tooling could total close to a half a million dollars per design.

In light of this problem, NMMA recommends that EPA consider a canister phase-in that considers the boat builders average product life cycle and phases in the rule to accommodate these changes. EPA also needs to consider that there are currently no companies manufacturing marine grade carbon canisters. This is a business where the manufacturing capacity and distribution channels still need to be developed. This is not a requirement where boat builders can use an automotive design canister or even an automotive type carbon.

The US Coast Guard has identified the necessity of developing installation standards. In addition, there is a strong likelihood that many small business boat builders will be forced to redesign and retool their molds. Given the fact that no company has yet to design, produce and begin distributing marine carbon canisters, and most importantly, the necessity for EPA to reach out and inform and educate the potentially 2600 small business non-NMMA member boat builders that there is this new requirement, NMMA recommends that EPA allow three years for implementation of carbon canisters following publication of the final rule.

Fuel Hoses

It is our understanding that EPA does not intend to regulate fill and vent hoses based on the results of the NMMA test program. For fuel feed hoses, NMMA recommends that similar to plastic tanks and carbon canisters, the burden of certifying and labeling be placed on the hose supplier. The hose supplier would test and certify that this hose meets the requirements based on ABYC H-24 and SAE J1527 amended test procedures. The hose would then be labeled as A1-15 (A1 which is the marking required for the USCG fire resistance test and 15 for EPA 15 g/m2 permeation standard). For hoses, such as those found on outboard engines where fire resistance material is not required, the hose would be marked B1-15. The boat builder would then be required to install EPA/ABYC compliant hose.

NMMA is interested in discussing an early implementation of low permeation fuel hoses as an emissions offset that would allow more time for the implementation of other requirements.

Small business inboard catalyzed engines

As outlined by EPA at the September 12, 2006 meeting, NMMA supports the EPA concept that small business inboard manufacturers are provided an additional two years lead time for compliance. Taking this concept even further, EPA needs to consider that the two large businesses, Mercruiser and Volvo Penta sell their engines to small business boat builders. The engineering staffs at PCM / Crusader, Indmar and the other small business engine manufacturers have the same level of confidence along with the same concerns regarding catalyst durability as those engineers at Mercruiser and Volvo Penta. EPA needs to recognize that if for some reason a catalyst fails in a new boat, it will be the small business boat builder's image and business that will suffer as much or more than the engine manufacturer. NMMA recommends that all inboard and stern drive manufacturers be allowed three years following the publication of the final rule to install catalyst systems. By providing this necessary time, engine manufacturers will have three years to evaluate and, if necessary, correct any problems that could occur in the three years following the 2008 California rule.

NMMA believes that three years should be sufficient time to properly evaluate catalyst performance, but our members continue to be very concerned with the progress of the ongoing Saltwater Catalyst Test Program. Since this program began, NMMA members which have donated the vessels and the US Coast Guard which has assisted in the funding of this project have been told that they would receive weekly progress reports. These weekly progress reports were distributed to EPA, CARB and NMMA throughout the fresh water test program and during last summer's salt water test, prior to Hurricane Katrina. NMMA also received a report that documented catastrophic catalyst failure when the boats were checked prior to winter storage.

.

When the salt water test program was restarted this summer, the agreed upon communication stopped. NMMA has learned that Southwest Research Institute (SwRI) has continued to have operational problems in salt water and have, in fact, failed one engine. Further, two of the three test boats have virtually no hours on them and the third boat has less than half of the 480 hours necessary to complete the testing.

NMMA member engine manufacturers are confident that a catalyst system can be designed to operate in fresh water. However, engine manufacturers continue to have concerns regarding the potential durability challenges that could inevitably lead to serious safety issues when operating their catalyst designs in salt water. Currently, there is no data in the public domain that supports the viability of catalysts on marine engines in a salt water environment. NMMA has yet to receive any reports from SwRI on the saltwater catalyst test project. .

NMMA will continue its opposition to the granting of an EPA waiver for California to enforce a catalyzed marine engine emission rule until the SwRI test has clearly demonstrated that marine catalyst technology is feasible, durable and safe enough for salt water operation. NMMA members will continue to work with EPA to introduce catalyst on a national level providing that adequate lead time is provided.

High Performance SD/I Marine Engines (>375 kW)

NMMA recognizes the challenge that EPA faces with developing a program to regulate high performance SD/I engines. The challenge is to develop an equitable rule where the is one large business that manufacturers a small volume of these engines and approximately 100 small businesses that collectively manufacture less than 500 engines. This coupled with the problem that the technology being required in the SD/I sector is not technically feasible for marine high performance engines.

The emission credit concept that EPA has proposed is simply not equitable. The one large business, Mercury Racing, can simply transfer credits from one engine division to another, while none of the small business high performance engine manufacturers have business sectors that generate credits. The small businesses would have to purchase credits from marine engine manufacturers, while the one large business would have to perform an internal accounting function. An emission credit program for this sector creates an economic disadvantage for small businesses for no environmental benefit.

The other concept that EPA has proposed is to set two standards in the rule. One would be catalyst based (5 g/kW-hr) and the other non-catalyst based for engines >375 kW and the other would be a 16 g/kW-hr HC + NOx standard.

In addition the rule would:

- set a CO standard of 350 g/kW-hr .
    - a cap based on tests from five engines
- not include NTE requirements
- set up an ABT program for HC+ NOx within the SD/I market (CO ABT would apply for high performance SD/I engines).
- Allow manufacturers to use an assigned default baseline level of 30 g/kW –hr HC+NOx for certification and use SD/I ABT credits to demonstrate compliance with the 16 g/kW HC+NOx rule.

NMMA believes that EPA is facing the same issue with high performance marine engines that it faced in the 1996 when it first looked at regulating SD/I marine engines in the outboard personal watercraft rulemaking. At that time, if EPA staff had considered proposing catalyst technology they would have probably determined that it was either not developed enough for marine application and/ or requiring it on SD/I would have placed a huge cost burden on this sector of the industry -- a burden that could have resulted in consumers choosing outboards over four stroke SD/I engines.

In this 1996 rulemaking, the SD/I manufacturers recommended that EPA set a standard based on data that would prevent backsliding. The SD/I manufacturers would then test their worst case engine using inexpensive hand held type emission monitors and provide EPA with what at that time was described as a streamlined certification process (known as post card certification). The baseline standard for SD/I engines in 1996 was 22 g/kW-hr.

NMMA can support an average baseline standard that is derived from actual data collected from several small business high performance marine engine manufacturers. NMMA supports the development of cleaner operating high performance engines, while at the same time this sector of the industry needs to have a standard where they can still meet the unique needs of their customer. EPA must recognize in its setting of a default standard at 30 g/kW-hr that these engines can not achieve a 16 g/kW-hr HC+NOx emission standard.

By setting a feasible average standard, EPA will potentially achieve a greater emission reduction. Manufacturers will have to consider this baseline average level when calibrating their engines, rather than using a default value and then buying credits. Thus, the high performance program should be based on the ideas generated in the 1996 OB / PWC EPA rulemaking and as decided in 1996 for SD/I.

NMMA believes that this is the equitable method to consider small businesses in this rulemaking. If EPA determines that an average baseline does not achieve an emission reduction, then EPA should determine, as it did with SD/I in 1996, to not regulate this sector.

Thank you for the opportunity to be part of the SBREFA process and to provide comment on this important rulemaking. If you have any questions, please contact me at 202-737-9757 or jmcknight@nmma.org.

Sincerely,

John McKnight, Director
Environmental & Safety Compliance

Cc: Glenn Passavant, USEPA
Michael Samulski, USEPA
Keith Holman, SBA

Joan Crawford/DC/USEPA/US

09/27/2006 11:01 AM

To: Alexander Cristofaro/DC/USEPA/US@EPA, Ken Munis/DC/USEPA/US@EPA, keith.holman@sba.gov, Joseph.Johnson@sba.gov, David_Rostker@omb.eop.gov,

cc:

bcc:

Subject: SER COMMENTS: Response to Questions / Exhaust and Evaporative Emissions Control / Small SI Engines and Marine SI Engines and Vessels

Joan Crawford
SBREFA Team Leader
Regulatory Management Division
202 564-6568; Mail code 1806A

----- Forwarded by Joan Crawford/DC/USEPA/US on 09/27/2006 11:01 AM -----

Gary Engen <gary.engen@solarplastics.com>

09/26/2006 01:45 PM

To: Joan Crawford/DC/USEPA/US@EPA

cc:

Subject: Response to Questions / Exhaust and Evaporative Emissions Control / Small SI Engines and Marine SI Engines and Vessels

Mr.. Alexander Cristofaro
c.o. Joan Crawford
1200 Pennsylvania Avenue, NW
MC 1803
Washington, DC 20460

In response to questions listed in the August 27th, 2006 small entity outreach document:

Solar Plastics, Inc. is a custom rotational molder supplying fuel tanks for small SI equipment and the marine industry. Research and development efforts over the past three years have resulted in our being able to manufacture permeation resistant fuel tanks that meet the evaporative emission standards proposed in the outreach document. Development continues, and testing is underway to further evaluate cold temperature impact and midsize marine fuel tanks.

Solar Plastics has no interest in delaying the implementation, and encourages incentives based on early compliance.

Tooling and equipment costs are reasonable. With minor modifications, current tooling can used to produce a permeation resistant fuel tank approximately 1.5 times the cost of a standard tank.

In closing, I would point out that Solar Plastics, Inc. is somewhat unique in our industry and occasionally are at odds with competitors regarding this issue. But it must be recognized that rotational molding solutions exist today. We are open to requests from the EPA for additional information and test results when they become available.

Gary Engen
Vice President of Corporate Engineering & Development
Solar Plastics, Inc.
860 Johnson Drive
Delano, Minnesota 55328-8612
E-mail gary.engen@solarplastics.com
Ph. 763-972-5619
Fax 763-972-5601

September 26, 2006

Mr. Alexander Cristaro
C/o Ms. Joan Crawford
1200 Pennsylvania Ave. NW
MC 1803 A
Washington DC 20460

Dear Mr. Cristaro:

Grady-White Boats has participated in the SBEFRA panel's discussions concerning the Environmental Protection Agency's (EPA) plan to propose regulations to control evaporative emissions from boats/vessels. Grady-White is a privately owned, small business entity that manufactures fiberglass coastal sport fishing boats from 18' to 36'. Grady-White currently employs about 435 people. In our July 25, 2006 SBREFA written comments (which are attached) we identified several possible flexibilities. I was unable to participate in the September 12, 2006 SBREFA Review Panel Outreach Meeting in Ann Arbor, Michigan but I asked Joe Hunter to call in and participate in my absence. Grady-White Boats would like to follow up our verbal comments from the September 12th meeting with these written comments.

Plastic Fuel Tanks

At the first SBREFA meeting on July 11, 2006 in Ann Arbor, Michigan Solar Plastics claimed to have the capacity to manufacture low permeation multi-layer XLPE marine fuel tanks. We have yet to see any data or field-testing of tanks manufactured by Solar. Grady-White can not commit to using an unproven and untested technology for fuel tank construction. It may meet all performance requirements, but we are not in a position to support this technology until it has been thoroughly evaluated and field tested. Durability and safety are of vital importance with fuel systems- field failures would very likely result in explosions and deaths. In testing of I/O catalysts in the saltwater environment, it has become very apparent that the only true test of durability and useful life span is a real world test in the field. EPA must allow sufficient time for new materials to be properly developed and proven with extensive in-field usage/testing.

The development of new tank construction materials that will meet the proposed permeation standards is totally dependant upon the large material suppliers such as Phillips and Exxon. The volume of material used in the marine tank market is so small that boat manufacturers and tank molders yield very little leverage or importance to the

material manufacturers. It is imperative that the EPA push the development of acceptable materials by these companies.

We still believe it is wise to include some provision to review the progress of new technology or material development as a part of this rule. The material does not exist today and needs to be developed; if development does not occur in time to meet the implementation dates, some kind of technology status review would make sense in order to consider extending the date or the feasibility of the requirement. We support the flexibility of providing additional lead time (four years from publication of the final rule) for all roto-molded marine fuel tanks. We also support an ABT program for these tanks.

Carbon Canisters

EPA has correctly identified our concerns regarding the packaging issues communicated during the July SBRERA meeting related to the proposed carbon canisters. We would like to comment on this subject to further clarify our stance. One very crucial unanswered question affects all of the canister requirements. What size will the required canisters be? It is almost impossible to thoroughly estimate the feasibility and implications of canisters without having a firm understanding of the size that will be required. Comments are offered based upon current proposals.

We support the NMMA's written comments regarding canister sizing differentiation based on trailerable versus non-trailerable and endorse use of the USFWS's definition of a non-trailerable boat as 26' and larger (50 CFR Part 86.12). We also support the establishment of a table defining required canister sizes.

The EPA's concept of adjusting the test procedures and standards to reflect the fact that larger boats with larger fuel capacities have smaller diurnal temperature swings has our support. Data collected clearly demonstrates this fact. EPA proposes to adjust the 72-96^{0}F to 50% for < 100 gallons and to 20% for > 400 gallons. What should the percentage be for capacities between 100 gallons and 400 gallons? This is the capacity range for all of the tanks we install in vessels over 22'.

The boats in our market segment (Outboard Powered Coastal/Saltwater Fishing Boats from 18' to 36') carry large fuel capacities. Most boats less than 22' use a single fuel tank. Most boats between about 22' and 26' in our market have dual fuel tanks, and almost all boats over 30' have dual fuel tanks. Dual tanks are used for various reasons. Many boats in this size range are designed with the capacity to travel up to100 miles or more offshore. Large outboard engines require large gas capacities. Dual tanks provide safety features - a second tank becomes a back-up in case of contamination of the first tank and dual tanks provide the safety feature of redundancy. Design considerations also come into the decision process. Dual tanks can make better use of available space, improve weight distribution, and improves access for future serviceability. Tank construction costs are also controlled by use of dual tanks versus a large single tank.

Due to the fact that many of our models have dual tanks, we would request that the specifications dictating canister size reference total fuel capacity of a vessel, not "tank size". Our dual tank configurations usually have the tanks mounted adjacent to one another in the same space below the deck. The diurnal temperature swings of two adjacent tanks should be very close to a single tank of like capacity. Consider two vessels. Vessel "A" is a 36' and is built with one very large tank- 400 gallons. Vessel "B" is also a 36' and is constructed with twin tanks of 150 gallons each. If the regulation requires a 3 liter canister for each tank 121 gallons or more, Vessel "A" needs one 3 liter canister, while vessel "B" would be required to have a total of 6 liters of carbon. It doesn't seem that a vessel holding 25% less fuel should require 100% more carbon when both vessels meet the definition of non-trailerable. Using total fuel capacity to establish canister volume also helps to reduce the cost of compliance by almost one half over what would be needed for dual tank systems under the current proposal.

Probably the most challenging aspect of the proposed canisters for the boat builders is going to involve location of, and access to, the canister(s). Using total fuel capacity to dictate canister size helps to alleviate packaging problems. Space is always at a premium onboard any size vessel. Finding the space to locate the canister(s) that is accessible and appears aesthetically pleasing is especially difficult when it has not been designed into the vessel from the beginning. Molds for boats do not get redesigned every year as one observes in other manufacturing segments such as automotive. Boat molds are usually used to produce parts for many model years before being redesigned or replaced. Flexibility must be built into the time frame to implement canister use. The expense of creating new tooling designed to accept canisters in too short a time frame would prove catastrophic to the solvency of many small businesses. Creating a plug and building a new mold usually cost a minimum of $100,000 for each model and this often is much more. Molds can be modified, but generally, such modifications greatly decrease the mold's durability and useful lifespan. Flexibility should be allow a long phase-in period for redesign or replacement of tooling.

The proposed date requiring canisters by 2010 is too soon. Although it is late September of 2006 we are shipping 2007 model year product. Current designs for the 2008 model year are well into the plug design and plug construction phase. The 2008 models will begin shipping to retail dealers in July 2007. This design cycle time is fairly typical for smaller boat builders who do not have the volume to support shorter design cycles (such as plug construction using five-axis routers). The proposed 2010 implementation date effectively allows only two years to modify or redesign all existing tooling to accept canisters. This time frame could financially strain small businesses to the point of hardship. A phase-in system that allows sufficient time to design and/or redesign models is needed. This phase-in period is also needed to allow design and scale-up time for marine grade carbon canister production facilities to get started. Requiring all 2012 model year boats to be shipped with canisters would assure that the changeover would be complete by mid to late 2011 and allow flexibility to small businesses. This would really give boat manufacturers the four year implementation period that the EPA "appears" to be offering with the current 2010 date.

Fuel Hoses

We support the NMMA's comments regarding the certification and labeling of the marine fuel hoses. We also agree that an earlier implementation date for hose permeation should be considered as a factor to allow more time for implementation of other requirements.

Thank you for the opportunity to comment and participate in the SBREFA process. Please feel free to contact me if you have any questions or need any clarification of the above comments. I can be reached at 252 752 2111 or via email at jhardin@gradywhite.com .

Sincerely,

Jim Hardin
Compliance Manager
Grady-White Boats, Inc.

Response from Mike Felder, Tiger Truck

Overall Response to Potential Small Entity Flexibility Ideas

1. If you can institute both number of employees and or the number of units built. This should be an (either, or) rulemaking to assist as many small business's as possible.
2. No
3. Timing and standard could be pro rated as to the number of units produced in any fiscal year.
4. Again, pro rating would be good for all concerned. If you look at the pie chart that was supplied, you could regulate the emissions according to percentage of the pie.

Level of the Exhaust Standards

1. Yes
2. It will not affect us at this time
3. No

Costs of Compliance and Lead Time

1. Your question is very open, do you mean exhaust, or fuel hose permeation, or Fuel tank permeation.
    A. Exhaust will not be a problem as we already use a catalyst.
    B. Fuel lines will add $2-$3 dollars per unit.
    C. Fuel tank permeation could outrageous. I will give you an example of what the impact would be to our company.

Number of units sold per year 500
Cost of mold $60,000.00
Testing $5,000.00 ????
.

The cost increase just for fuel the tank would be $208.00 per unit. This cost does not include any engineering time or expense. The next problem is what manufacturing company will run only 500 units.

2. Answered above.
3. First we would have to identify what material will qualify. It is my understanding that has not been achieved.
4. Can not answer at this time.
5. Yes
6. This all depends on volume of units. Tanks at 10,000 units would be a small impact. Tanks at 500 units will be a large impact.

Mike Felder

Executive Vice President
Tiger Truck

geoff ward <geoff.ward@agriindustrialplastics.com>

09/26/2006 03:23 PM

To Joan Crawford/DC/USEPA/US@EPA

cc

bcc

Subject RE: REMINDER: SER COMMENTS ARE DUE TOMORROW: Control of Emissions from Nonroad Spark-Ignition (NRSI) Engines and Equipment - Small Business Advocacy Review Panel Outreach Materials for Small Entity Representatives

History: This message has been forwarded.

Dear Joan:

I have no additional comments since my response to the first meeting, which I have attached for reference. I am happy to see the proposed dates moved out to the more recent proposal, as well as the added flexibilities that are being considered.

Thank you for allowing me the opportunity to participate in this important process.

Sincerely,

Geoffrey T. Ward, Ph.D.
Engineering Manager
Agri-Industrial Plastics Co.
(641) 472-4188
(641) 472-7120 (FAX)

-----Original Message-----
From: Crawford.Joan@epamail.epa.gov [mailto:Crawford.Joan@epamail.epa.gov]
Sent: Monday, September 25, 2006 2:35 PM
To: tom.wooding@wisconsinmotors.com; mfelder@tigertruck.com; mward@tigertruck.com; woodsale@bellsouth.net; bobw@walkermowers.com; sguyer@grasshoppermower.com; rhgraham@flash.net; jmarcinowski@lwmantis.com; gpeters@hustlerturf.com; jpouder@hoffcocomet.com; davenclaerbout@dutchlandplastics.com; geoff.ward@agriindustrialplastics.com; gary.engen@solarplastics.com; lfuehrer@seti-group.com; jmcknight@nmma.org; tcushing@sterlingperformance.org; kempower@hotmail.com; jayfsu3@aol.com; drowe@indmar.com; ttrabue@aol.com; jhardin@gradywhite.com; gkraemer@kracor.com; rporter@incaproducts.com; wfshields@tridentmarine.com; dpierce@novaflex.com; dixons@twegen.com
Subject: REMINDER: SER COMMENTS ARE DUE TOMORROW: Control of Emissions from Nonroad Spark-Ignition (NRSI) Engines and Equipment - Small Business Advocacy Review Panel Outreach Materials for Small Entity Representatives

Good afternoon Small Entity Representatives. Please send your written comments to Joan Crawford via email (crawford.joan@epa.gov) by COB tomorrow, September 26, 2006. Thank you!

----- Forwarded by Joan Crawford/DC/USEPA/US on 09/25/2006 03:30 PM -----

Joan Crawford/DC/USEPA/US 08/28/2006 05:31 PM	To	tom.wooding@wisconsinmotors.com, mfelder@tigertruck.com, mward@tigertruck.com, woodsale@bellsouth.net, bobw@walkermowers.com, sguyer@grasshoppermower.com, rhgraham@flash.net, jmarcinowski@lwmantis.com, gpeters@hustlerturf.com, jpouder@hoffcocomet.com, davenclaerbout@dutchlandplastics.com, geoff.ward@agriindustrialplastics.com,

gary.engen@solarplastics.com,
lfuehrer@seti-group.com,
jmcknight@nmma.org,
tcushing@sterlingperformance.org,
kempower@hotmail.com,
jayfsu3@aol.com,
drowe@indmar.com,
ttrabue@aol.com,
jhardin@gradywhite.com,
gkraemer@kracor.com,
rporter@incaproducts.com,
wfshields@tridentmarine.com,
dpierce@novaflex.com,
dixons@twegen.com

cc

Subject
Control of Emissions from Nonroad Spark-Ignition (NRSI) Engines and Equipment - Small Business Advocacy Review Panel Outreach Meeting Invitation and Materials for Small Entity Representatives

Good Afternoon, Small Entity Representatives (SERs).

Please see the attachments below for the Control of Emissions from Nonroad Spark-Ignition (NRSI) Engines and Equipment rule.

The first attachment is a letter from Alex Cristofaro, the Chair of the SBREFA Panel, to all of you who are Small Entity Representatives (SERs). The other attachments are the supplemental information (outreach material) referred to in the letter from the Chair.

The Panel looks forward to your participation in the Tuesday, September 12th, outreach meeting and conference call from 10:00 am to 12:00 pm (EST) for small spark-ignition engine and equipment manufacturers and 1:00 pm to 3:00 pm (EST) for marine spark-ignition engine and vessel manufacturers. The toll-free number for the meeting is 866-299-3188; the conference code is 202-564-1550, which is entered after the operator asks for the conference code.

You may join in the meeting via conference call or in-person in Ann Arbor, Michigan. Please see the cover letter and enclosures for more details. As the cover letter states, the Panel requests your written comments by COB Tuesday, September 26th.

If you need a paper copy of the attached information, contact me via e-mail (crawford.joan@epa.gov) or telephone (202-564-6568).

(See attached file: Letter to SERsfromChair.pdf)

(See attached file: PanelOutreachDocForSERs.pdf)(See attached file: Small SI Exh Flexs.pdf)(See attached file: Small Vol Criteria for Small SI.pdf)(See attached file: Evap Flexs.pdf)(See attached file: Title 40, Code of Federal Regulations, Part 1068.pdf)(See attached file: SER Issue Carbon Canisters.pdf)

(See attached file: SER Issue Rotomolded Tanks.pdf)(See attached file: SER Issue SDI Catalysts.pdf)(See attached file: SER Issue High Performance.pdf)

Joan Crawford
SBREFA Team Leader
Regulatory Management Division
202 564-6568; Mail code 1806A

SER Response 7-25-06.doc

Potential Small Entity Representative (SER) Response to Initial Outreach Document:

Exhaust and Evaporative Emissions Control from Small SI Engines and Equipment and Marine SI Engines and Vessels

Geoffrey T. Ward, Ph.D.
Engineering Manager
Agri-Industrial Plastics Company
Fairfield, Iowa

July 25, 2006

Executive Summary

- Agri-Industrial Plastics Company (AIP) is a small custom blow molder, who supplies fuel tanks for both the Small SI Engine and Marine SI Engine markets. Thus, the areas of concern for AIP are based on the proposed standard for permeation from fuel tanks. In response to the EPA permeation standard for Recreation Vehicles, AIP purchased a multi-layer fuel tank machine, and as such has good experience regarding cost and lead time requirements for meeting such a standard.

- The primary issue that will affect AIP is the proposed implementation date of MY2009 for both engine categories. While the technology exists to meet this implementation date, the capacity does not. We would propose that a date of MY2011 would be a more realistic implementation date, given an estimated publication date for the finalized rule of the end of CY2007.

- The proposed gap of two years between implementation of general fuel tanks and rotational molded fuel tanks is considered to be unacceptable by AIP. This presents a potential loss of business issue, in that existing customers using blow molded fuel tanks will most certainly consider redesigning for rotational molding, simply because of the benefit of delaying compliance for two years.

- The estimated cost of implementation as presented is considered to be extremely low, even by conservative standards. Our experience to date suggests that a typical monolayer fuel tank in these markets, currently in the $10-$20 price range, will likely increase by about 40-50% when moving to a multi-layer construction.

- Additional details regarding these issues will be provided as responses to the detailed questions presented in the Outreach Document.

Detailed Responses to Questions for Potential SERs

1A – How useful would each of the small flexibility ideas discussed be for your business in meeting the applicable standards?

Broadening the definition of engine families for certification
This would be very useful in terms of reducing the number of different sample fuel tanks required to be provided for certification testing. We would propose that for evaporative emission, families could be defined by the technology used for certification. For example, all multi-layer fuel tanks manufactured at a specific supplier for a given OEM would be considered a family. Thus, a single tank could be tested, with the emission level applied across the entire family. This would minimize the amount of available production capacity that would be used up to produce sample tanks for testing.

Minimizing compliance testing requirements
Again, this would be very useful, based on the capacity reasons noted above.

Design-based certification
This would also be very useful. While the current Recreational Vehicle standard allows for design-based certification of steel fuel tanks, the CARB standard extends this to co-extruded multi-layer plastic fuel tanks. Given the extensive use of this proven technology in automobiles at a much lower evaporative emissions limit, we would suggest that substantial data exists to justify a design-based standard for this technology. This would further decrease the demand against the limited production capacity that is available. As an option, an OEM could still choose to test a fuel tank in the multi-layer family for the potential purpose of defining a Family Emission Limit to be used in an averaging calculation with other technology families.

Use of emission credits
This would be extremely useful, in fact almost critical when considering the options for providing service fuel tanks for obsolete products. The low number of service tank requirements makes it impractical to break into normal production on a limited capacity multi-layer machine to provide service parts. The ability to apply credits from active production years would allow for different options to provide these service parts at a higher emission limit.

Delay of the implementation date of the standards
This is not only useful, it will be necessary if AIP is to be able to continue to provide fuel tanks to these markets. This also extends beyond AIP, as it is questionable as to whether the necessary capacity exists anywhere in the industry. This point will be expanded in the next question.

Hardship provisions
This is not likely to affect AIP, as this appears to be aimed primarily to target small OEMs. We do have some small customers with low EAU products that we cannot serve with the multi-layer machine. If these companies were granted hardship provisions that

would enable them to continue to take monolayer product, this may prevent or delay a loss of business with these customers.

Limited temporary exemptions for small boat builders
This would not affect AIP.

2A – Can you comment on the length of a potential delay option?
Based on our experience in working to comply with the Recreational Vehicle standard, it was necessary to order a multi-layer machine in May, 2004 in order to meet a MY2008 implementation date. Based on current orders to meet this standard, as well as the CARB Small SI Engine standard, the capacity on this machine is full. There is currently not enough of this type of machine to meet the full capacity requirements for these existing standards. In addition, many of the machines that are available are too large to produce the smaller fuel tanks in the Small SI Engine market.

The current lead time for a new machine is at least 12 months for delivery. With machine assembly and break-in period, this lead time increases to nearly 18 months, after which time sample tanks for certification and qualification will need to be produced. Given the testing time, we estimate that a new machine would be ready for production approximately 2 years after placing the order.

It would not be prudent to order a machine to meet a standard until that standard is finalized. With an estimated publication date for the final rule approaching the end of CY2007, this leads to a production start-up date at the end of CY2009. For some models, this would be sufficient to meet MY2010 production. However, some OEMs begin their model year much earlier, thus a practical implementation date would be MY2011 for Small SI Engine fuel tanks.

Regarding Marine SI fuel tanks, the numbers published in the supplementary reports show a range of approximately 80,000-90,000 PWC vehicles sold domestically per year. Each of the fuel tanks in this market is currently blow molded. It would take this entire market worth of fuel tanks to come close to filling a multi-layer machine, although there would still be some remaining capacity. It is not a practical business case to purchase a dedicated machine of this type in anticipation of serving an entire market segment. The timeline given above would suggest that capacity could be available by MY2011, however the lack of a business case suggests that it would be risky to assume that this capacity will be purchased solely for that purpose. Thus, machine capacity currently earmarked for other markets will need to be utilized, or different technologies will likely need to be employed.

Other technologies, such as thermoforming, may be able to assist in the capacity, however not many of these machines exist, either. In addition, this would result in a loss of business for AIP if our current customers were forced to find an alternate technology.

3A – Do your answers to these questions differ based on the level of the standard and/or timing of the program implementation date?
They may. If the standard was relaxed initially with time for multi-layer capacity to become available, it may be possible to introduce a different technology, such as fluorination with some level of confidence. Even so, the shear numbers of fuel tanks in the Small SI Engine market may overwhelm the ability of fluorination capacity to become available by MY2009 production. Even this may require a delay to at least MY2010.

4A – Do you have suggestions for other potential small entity flexibility options, or any additional suggestions on the flexibility options discussed?
We would strongly endorse an averaging program to allow OEMs to take advantage of low emissions levels from a strong technology such as multi-layer construction, and average these results with other tanks made with a barrier that may not meet the standard. This would benefit AIP from the sense that we could continue to provide low EAU tanks for our existing customers without using up valuable multi-layer machine capacity that is required to meet their higher volume orders. Understanding that this averaging approach is included in the Recreational Vehicle standard, this may already be under consideration for the proposed standard.

1B – 3B: Level of Exhaust Standards questions - Not applicable to AIP

1C – Can you comment on the evaporative emission standards under consideration for Small SI engines and equipment or Marine SI engines and vessels?
From a technology standpoint, the technology certainly exists to meet this level of standard for currently blow molded tanks. However, the primary concern is that the capacity does not exist to fulfill the entire market, nor will it exist in time to meet an implementation date of MY2009, as noted above. While the CARB standard for the Small SI engines begins in MY2008, many of our customers are not planning on transitioning their entire fleet of engines to comply with this standard at that time. Thus, it is not a matter of recertifying existing barrier fuel tanks to a different standard.

2C – Specifically, how would this affect your businesses?
Based on our research in response to the Recreational Vehicle standard, the most reliable and cost effective way to meet this proposed evaporative standard is to begin supplying multi-layer co-extruded fuel tanks. This would require at least one additional multi-layer blow molding machine at a large capital expense, with a long lead time before a payback period would begin. This machine could likely be justified for the Small SI Engine market, however as noted above, the business case is much more difficult to justify for the Marine SI market.

For the Marine SI market, the basic options for AIP would be: a) Purchase yet another machine, anticipating that enough additional business from the Recreational Vehicle and/or Small SI Engine markets would fill the excess capacity, b) Attempt to fit as much of the existing Marine SI business into the current machine and the potentially purchased Small SI machine, or c) Inform our existing Marine SI customers that we will not be able to supply multi-layer tanks for this market. The first option comes with a very high financial risk for a small company. The second option comes with a risk of overselling the available capacity or a potential loss of business for the products that would not fit in the existing capacity. The last option would result in a potential loss of business situation, if we could not provide them with monolayer tanks that were subsequently treated in some manner. Thus, all likely scenarios resulting from a Marine SI Engine standard contain a potential level of risk that would normally be considered unacceptable from a business standpoint.

3C – Would the new standards require changes to your engine, equipment, vessel, or fuel system components?
As a fuel tank supplier, the direct answer from our perspective is no. However, it should be noted that for much of the Small SI Engine market, and possibly all of the PWC market, current fuel tanks are supplied in a natural resin color to allow for translucency. Most, if not all, of the viable barrier solutions for blow molded fuel tanks will result in opaque fuel tanks, which in many cases will result in the need for some type of fuel level gauge or sensor. Many OEMs are either not aware of this or are fighting it.

1D – What do you estimate would be the per unit variable and/or fixed costs for your businesses to meet the standards EPA is considering?
Raw material cost increase from a monolayer HDPE resin to a multi-layer recipe is currently estimated to be in the $0.25 - $0.40 range on a per pound basis, depending on the HDPE resin price at the time and the acceptable regrind contribution. In addition to the base material price, variable scrap costs may also incur based on the amount of excess material required as a function of tank design.

Given the above material cost in addition to increased overhead rates for multi-layer equipment, our experience in the Recreational Vehicle market suggests a per unit sell price will increase in the range of 40-50% over the cost of an equivalent monolayer fuel tank. Thus, current fuel tanks selling in the $10-$20 range will increase to $15-$30 on the average. This price will increase further if some type of fuel gauge or sensor will need to be added to the tank design to move from a natural color to a black multi-layer tank.

In addition to these direct costs, it is important to consider that with a single machine available to meet all demands, typical lean manufacturing principles designed to minimize run lengths and increase inventory turns do not apply very well. In fact, we anticipate the need to potentially hold finished inventory for up to several months for low EAU applications.

Our cost studies conducted when researching 5-15 gallon fuel tanks in the Recreational Vehicle market showed that the markup for a multi-layer fuel tank was at the low end when compared to other viable options. As some Small SI fuel tanks are smaller than this, other options may become more cost competitive as the more costly monolayer materials make up less of the total cost, and the batch process of fluorination can treat more tanks at the same price.

The cost of a blow mold designed for a multi-layer fuel tank may add up to a few thousand dollars to add certain recommended design features to ensure integrity of the fuel tanks made with this process. In addition, a common approach for molding fuel tanks is to utilize an injection molded fill neck and/or other components. These components are commonly insert-molded into the blow mold and captured during the molding process. Due to differences with the multi-layer extrusion process, for certain applications it may be necessary to add a secondary welding operation to the overall process. The tooling cost for welding these features can easily reach up to tens of thousands of dollars, depending on the application and welding approach employed.

In the case of fluorinated fuel tanks, the logistical costs associated with additional shipping, and multiple handling of the tanks, as well as the transfer of assembly operations that may otherwise be completed in-line during the molding cycle have not yet been estimated by AIP. These costs have been cited by many customers when concluding that the overall cost of fluorination is not competitive with the multi-layer option, despite a lower price estimate when only considering the direct cost of fluorination added to the price of a monolayer tank.

Much of the R&D costs at AIP have already been absorbed during the process of evaluating different options to meet the Recreational Vehicle standard. However, as recent advancements in monolayer barrier solutions become increasingly viable, additional R&D expenses will be required to evaluate these options in order to provide the necessary flexibility to meet the needs of the entire industry. The level of R&D costs associated with this is difficult to predict at this time. In addition, with the current certification testing requirement in the proposed standard, the cost to provide each set of sample fuel tanks for testing can reach up to $5000.

Additional confidential details outlining the potential per unit price increase are provided in the Appendix of this response report.

2D – If applicable, what types of hardware, capital equipment and/or operational changes would you potentially require?

The capital cost for a new multi-layer machine of the size required for much of the Small SI Engine fuel tanks currently produced at AIP is likely to approach $3 million, including auxiliary equipment to support the production line. For a larger machine to support the PWC market, this would increase to about $4 million. This capital cost is magnified when considering the cost of money required to purchase a machine that would not

produce production fuel tanks for up two years after placing the order. In addition, it may become necessary to purchase secondary equipment to support any welding operations that are not currently performed, as discussed above.

3D – How long would these operational changes take (i.e. from initial planning to construction and start-up)?
As stated above, we anticipate a lead time to production of up to two years. Barring any reason to purchase additional equipment based on existing demand, this timeline would not begin until the final rule is published.

4D – How useful would delays for small businesses be and how long would such delays need to be to be beneficial?
These delays would be very useful, as discussed earlier.

5D – Would a phase-in, perhaps based on percent of total per unit sales, be helpful?
Yes, extremely helpful.

6D – Based on your experience with earlier EPA standards, does the expectation of manufacturers to pass on the added costs to consumers seem reasonable?
Whether it is reasonable or not, this will be a necessary condition for us to be able to supply fuel tanks. We simply cannot afford to absorb these costs.

Appendix – Detailed Cost Assumptions

Raw Material Costs:

Current monolayer HDPE cost	$0.65 - $0.75 per pound
Multi-layer recipe cost*	$0.90 -$1.05 per pound
Resulting material upcharge	$0.25 - $0.40 per pound

*Assumes 6 layer construction with 45-60% regrind allowance with no scrap

Machine Overhead:

Typical monolayer fuel tank machine	$1 million capital cost
Small SI fuel tank machine	$3 million capital cost
Marine SI fuel tank machine	$4 million capital cost

Based on increase in capital investment, as well as additional utility costs to operate and skilled resources to setup and maintain, we have applied an overhead rate of approximately $80/hour over a standard machine for the larger multi-layer machine, which is similar to what was purchased for the Recreational Vehicle standard. For the smaller machine, this rate would likely be about $60 above the standard machine.

At a machine cycle producing 15-20 fuel tanks per hour, this results in a per unit cost increase of $4-$5.30 for the larger machine, and $3-$4 increase for the smaller machine.

Examples:

1) - 3 pound lawn tractor fuel tank

Assume $0.35 increase per pound = $1.05 material increase
Assume 20 tanks per hour on small machine = $3 overhead increase
Total increase in cost = $4.05

At 20% sale margin, sell price increase = $5.06

2) – 10 pound PWC fuel tank

Assume $0.35 increase per pound = $3.50
Assume 16 tanks per hour on large machine = $5 overhead increase
Total increase in cost = $8.50

At 20% sale margin, sell price increase = $10.63

Note that this is only a basic calculation, and many other indirect and/or tooling cost increases may also apply as noted in the main body of the report.