PRODUCT INFORMATION BULLETIN

D/C # 19 **September 22, 2003**
Series Impact: D010, D187, E004, B024, E001, H177, K005, F006

TO: ALL HYSTER DEALER PRINCIPALS, SALES MANAGERS, & SALES REPRESENTATIVES

FROM: PETER SIESSEL – VICE PRESIDENT, HYSTER MARKETING

SUBJ: EPA Governmental Legislation for 2004 Emissions Standards

Beginning in January 2004 a new Governmental EPA regulation will go into effect for Emissions controls in the 50 states for all Large Spark Ignited (LSI) engines 25 HP and larger. It is referred to as their "Tier 1" program. The state of California (CARB - California Air Resources Board) will still require a separate certification as they do for the automotive industry.

In an effort to keep your dealership informed of the changes in emissions that concern Hyster products before the legislation actually comes into effect, attached are four documents for your reference.

The first document was developed for your **Dealership**. This document provides a detailed explanation of what the regulation means, why the standards are being adopted, what trucks it affects, changes in engine offerings and changes to new truck pricing. ***We recommend you distribute this document to the people in your organization who will likely be affected by this information.***

The second document was developed for you to provide to current and prospective Hyster **Customers**. This document was developed for the customer or end user. This document provides the customer/end user with a detailed explanation of what the regulation means and how it affects them, why the EPA is introducing the legislation, changes occurring to new trucks they purchase and changes in new truck pricing. ***We recommend you distribute this document to the people in your organization so they can provide to existing and prospective customers as appropriate.***

The third and fourth documents are copies of the actual EPA Regulatory Announcements detailing the Emission Standards for New Non-road Engines and Frequently Asked Questions from facility managers and other owners of industrial spark-ignition engines. ***We recommend you distribute this document to the people in your organization so they can keep a copy for their own reference as well as provide copies to existing and prospective customers as appropriate.***

These changes will affect eight series of Internal Combustion trucks in the Hyster Company product line. Four of the eight product offerings will have series changes, and all of the eight will have engine option number changes.

At this time we will be making ***LPG*** the ***standard*** engine option on all eight series involved, the Gasoline engine offering will become the option, where available. Dual fuel and CNG will no longer be offered. This decision was driven by volume, plus in the case of Dual fuel, an additional cost that would prohibit emissions engineering resources from certifying our higher volume engines.

For the 2,500 through 4,000# (Cushion & Pneumatic), and 4,000 through 6,500# (Cushion only) no Gasoline option will be offered ***(Refer to Product Information Bulletin D/C #18, dated September 10, 2003).*** This decision was also driven by volume and once again, an additional cost that would prohibit emissions engineering resources from certifying our higher volume engines. ***Please note that there are limited numbers of Gas engines available for the series of trucks involved that can be ordered so please check with Product Supply to ensure your order can be filled before you place it.***

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September 22, 2003

TO: ALL HYSTER DEALER PRINCIPALS, SALES MANAGERS, & SALES REPRESENTATIVES

FROM: DAVID O'DELL –PRESIDENT, HYSTER COMPANY

SUBJ: New EPA (Environmental Protection Agency) Emissions Regulations for Forklift Trucks in 2004

The purpose of this brief is to educate you on the new Governmental EPA regulations for forklift trucks. Beginning in January 2004 a new Governmental EPA regulation will go into effect for Emissions controls in the 50 states for all Large Spark Ignited (LSI) engines of 25 HP and larger. It is referred to as their "Tier 1" program. The state of California (CARB - California Air Resources Board) will still require a separate certification as they do for the automotive industry.

What does it mean?

- Engines built and supplied to Hyster in 2004 must be EPA & CARB compliant.
- These trucks will begin shipping in the January/February 2004 time frame.
- Due to these changes the options for Dual Fuel and CNG (Compressed Natural Gas) will no longer be available.
- Also at this time, due to very low volumes versus the high cost of EPA testing, we will no longer offer the Mazda Gasoline only 2.0L & 2.2L engines for the S25-40XM and S40-65XM cushion tire trucks or the H25-40XM pneumatic tire trucks. ***(Refer to Product Information Bulletin D/C #18, dated September 10, 2003).***

Why are these standards being adopted?

- To reduce hydrocarbons (HC) and oxides of nitrogen (NOx) by 500,000 tons per year in our atmosphere. (Includes all types of LSI vehicles concerned).
- To combat the high levels of carbon monoxide (CO) in the atmosphere, plus other harmful compounds (benzene, etc) when operating in enclosed areas.
- The regulatory agencies believe by reducing these emissions, we will improve our working and living environments.
- To comply with the Federal Clean Air Act in reducing emissions into the atmosphere.

Who will be affected by these changes?

- This new legislation will only affect trucks delivered in early 2004 and beyond. It does not affect your existing Customer trucks, or your existing Rental fleets, etc.

What will change in engines and options offered?

- The fuel systems will be of a new "closed loop" design.
- It is anticipated that the new engines will have improved fuel economies.
- There will also be increased warranty coverage of specific fuel system components (up to 5 years/3500hours - whichever comes first).
- The fuel systems will consist of three main components; a three way catalytic converter, an engine control module (ECM) – an electronic device that receives input and sends control signals out – and an oxygen (O2) sensor in the exhaust system. The O2 sensor tells the ECM what the oxygen levels are, the ECM then sends a signal to the fuel system to adjust/correct the fuel / air mixture to obtain the optimum low emission level.
- There will be no loss of performance on these new trucks.

Will there be any change to truck pricing?

- Yes, there will be a price increase on the trucks for this new mandated fuel equipment, but this should have a positive impact on the environment and improve your working conditions.
- At this time, we will offer LPG as the standard engine with Gas and Diesel offered as options.
- Refer to the new price pages for each series effected.
- See also the EPA document (EPA420-F-02-041 dated September 2002) that outlines the changes.

Summary

- These changes should result in cleaner air.
- They should result in a safer and better working environment.
- They will give us more fuel efficient Forklift trucks.
- For further information on this subject, please refer to EPA's Office of Transportation and Air Quality website at: www.epa.gov/otaq/regs/nonroad/2002/cleanrec-final.htm

Hyster Company's heritage of continuous product refinement has been our commitment for over 70 years. With your help we can continue to create material handling equipment that exceeds customer expectations. As always, we appreciate the support of our distribution network and the sales organization.

Sincere Regards,

David A. O'Dell
President – Hyster Company

As a result of this EPA Legislation driven change, there are new truck price adjustments that will generally range from $500 net to $800 net, depending on truck model and engine selected. These new prices will go into effect on October 23, 2003 for all new orders. All orders **(except new Dealer stock and rental orders)** received by Product Supply prior to this date will be price protected. The price change is effective on new Dealer stock and rental orders placed on or after September 23. After October 23rd, the price adjustments will apply to every dealer and customer truck ordered.

NOTE: If you are able to order a pre-Emissions truck after October 23, 2003 your price will be based on the emission control pricing, which means that you may receive a unit at the revised pricing level.

Canada and Latin America are not governed by this EPA Legislation, however these areas will be receiving the same low emission units being supplied to the United States.

There will be a series code change affecting 4 of the 8 series announced. The following is a list of the models and old and new series codes for your reference.

MODEL	OLD SERIES CODE	NEW SERIES CODE
S70-120XM	E004	F004
S135-155XL2	B024	C024
H70-120XM	K005	L005
H135-155XL2	F006	G006

We recommend engine powered industrial forklifts be used only in well ventilated areas. Exhaust from any vehicle equipped with an internal combustion engine emits carbon monoxide. Operation in confined areas or areas with inadequate ventilation may pose serious dangers to the operator and others.

Please remember to refresh HERO by selecting the "completely reload tables" option in the download area of the price book thereby activating this change. New price page detail covering this change will be forwarded to your dealership for each model affected in the near future. Updated standard price pages as well as electronic copies of this Product Information Bulletin and the attachments will be available immediately through the dealer portal by visiting www.hysterusa.com.

Hyster Company's heritage of continuous product refinement has been our commitment for over 70 years. With your help we can continue to create material handling equipment that exceeds customer expectations. As always, we appreciate the support of our distribution network and the sales organization.

Sincere Regards,

Peter M. Siessel
Vice President of Marketing – Hyster Company

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Class IV and V Emissions Change Summary

- A new EPA regulation will go into effect (beginning January 2004) for emissions controls in the 50 states for all Large Spark Ignited (LSI) engines 25 HP and larger. It is referred to as their "Tier 1" program.
- There are new truck prices that will range from $500 net on 2.0-liter Mazda engine units to $800 net on 3.0 and 4.3-liter GM engine units.
- Hyster price increases are effective 9-23-03 on all NEW dealer stock and rental orders.
- Hyster price increases are effective on all customer orders placed on, or after, 10-23-03.
- If you are able to order a pre-Emissions truck after October 23, 2003, your price will be based on the emission control pricing, which means that you may receive a unit at the revised pricing level.
- LPG is now the standard engine option on all eight Hyster I.C series.
- For the S25-40XMS and S40-65XM series, and the H25-40XMS series, no Gasoline option will be offered.
- Dual fuel and CNG options will no longer be available.
- Letters of explanation from David O'Dell to dealer personnel and dealer customers are attached to this communication.
- Copies of the actual EPA Regulatory Announcements detailing the Emission Standards for New Non-road Engines and "Frequently Asked Questions" from facility managers and other owners of industrial spark-ignition engines will be sent via e-mail and made available on the Hyster Website.
- Please contact your Hyster Regional Product Manager for questions or clarification of these changes.

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September 22, 2003

To: Our Valued Hyster Customers

Subject: New EPA (Environmental Protection Agency) Emissions Regulations for Forklift Trucks in 2004

The purpose of this brief is to educate you on the new Governmental EPA regulations for forklift trucks. Beginning in January 2004 this regulation will go into effect for Emissions controls in the 50 states for all Large Spark Ignited (LSI) engines of 25 HP and larger. It is referred to as their "Tier 1" program. The state of California (CARB – California Air Resources Board) will still require a separate certification as they do for the automotive industry.

What does this mean to you?

- Forklift trucks using engines built in 2004 must be EPA & CARB compliant.
- These trucks will begin shipping in the January/February 2004 time frame.
- At this time we will no longer offer the options of Dual Fuel or CNG (Compressed Natural Gas) on our trucks.

Why is the EPA doing this?

- To reduce hydrocarbons (HC) and oxides of nitrogen (NOx) by 500,000 tons per year in our atmosphere.
- To combat the high levels of carbon monoxide (CO) we have in the atmosphere, plus other harmful compounds (benzene, etc) when operating in enclosed areas.
- The regulatory agencies believe by reducing these emissions, we will improve our working and living environments.

How will this affect you?

- This new legislation will only affect trucks delivered in early 2004 and beyond. It does not affect your existing trucks.

What will change for any new truck you may buy?

- The fuel systems will be of a new "closed loop" design.
- It is anticipated that the new engines will have improved fuel economies.
- There will also be increased warranty coverage of specific fuel system components (up to 5 years/3500hours - whichever comes first).
- The fuel systems will consist of three main components; a three way catalytic converter, an engine control module (ECM) – an electronic device that receives input and sends control signals out – and an oxygen (O2) sensor in the exhaust system. The O2 sensor tells the ECM what the oxygen levels are, the ECM then sends a signal to the fuel system to adjust/correct the fuel / air mixture to obtain the optimum low emission level.
- There will be no loss of performance on these new trucks when compared to your existing trucks.

Will there be any change to truck pricing?

- Yes there will be an increase in price on the trucks with this new mandated fuel equipment, but this should have a positive impact on the environment and improve your working conditions.
- See also the EPA document (EPA420-F-02-041 dated September 2002) that outlines the changes.

Summary

- These changes should result in cleaner air.
- They should result in a safer and better working environment.
- They will give us more fuel efficient Forklift trucks.
- For further information on this subject please refer to EPA's Office of Transportation and Air Quality website at: www.epa.gov/otaq/regs/nonroad/2002/cleanrec-final.htm

We thought it was important for you to have "the facts" regarding the new Federal engine guidelines. Hyster Company's heritage of continuous product refinement has been a commitment that has allowed us to provide customers like you with outstanding quality and services for over 70 years.

Sincere Regards,

David A. O'Dell
President – Hyster Company

United States Environmental Protection Agency | Air and Radiation | EPA420-F-02-037 September 2002

Office of Transportation and Air Quality

EPA

Regulatory Announcement

Emission Standards for New Nonroad Engines

The U.S. Environmental Protection Agency (EPA) is adopting emission standards for several types of currently unregulated nonroad engines and vehicles. These standards apply only to newly manufactured products. This fact sheet gives an overview of the new standards. See the fact sheets and other documents referenced below for additional information.

Which engines and vehicles are covered?

We are adopting new standards for emissions of oxides of nitrogen (NOx), hydrocarbons (HC), and carbon monoxide (CO) from several groups of previously unregulated nonroad engines. Even though these different kinds of engines are combined into one rulemaking, the new requirements reflect differences in the way each type of engine is designed and used.

- Large Industrial Spark-Ignition Engines: Spark-ignition nonroad engines powered by gasoline, liquid propane gas, or compressed natural gas rated over 19 kilowatts (kW) (25 horsepower). These engines are used in commercial and industrial applications, including forklifts, electric generators, airport baggage transport vehicles, and a variety of farm and construction applications.
- Recreational Vehicles: Snowmobiles, off-highway motorcycles, and all-terrain-vehicles.
- Diesel Marine Engines: Diesel engines over 37 kilowatts (kW) (50 horsepower) used in recreational boats, such as yachts and cruisers.

Why is EPA regulating these engines?

The engines covered by this rule are a significant source of air pollution. They currently account for about 9 percent of HC emissions, 4 percent of CO emissions, 3 percent of NOx emissions, and 2 percent of PM emissions from mobile sources. If left uncontrolled, by 2020 these engines will contribute 24 percent of national HC emissions, 6 percent of CO emissions, 9 percent of NOx emissions, and 5 percent of PM emissions from mobile sources. HC and NOx emissions form smog and contain toxic compounds such as benzene, so reducing them will benefit our health and environment, especially in terms of respiratory impairment and related illnesses. Some of these engines also emit high levels of CO, which is especially problematic for people who work with or are otherwise active near these engines. Many engines operate in warehouses, ice-skating rinks, or other enclosed areas, where personnel who work with or near the equipment can experience increased exposure. The new standards are expected to reduce HC emissions by 71 percent, NOx emissions by 80 percent, and CO emissions by about 57 percent from these sources.

These new emission standards continue the process of establishing requirements for low-emitting engines as required by Congress. In the Clean Air Act, Congress directed us to study emissions from all nonroad engines and vehicles and to set emission standards if the these sources cause or significantly contribute to air pollution and, more specifically, if the emissions of CO, NOx or HC contribute significantly to ozone and carbon monoxide pollution. In 1991, we published the Nonroad Engine and Vehicle Emission Study. Following that study, we completed a public process in 1994 to conclude that nonroad engines contribute significantly to air quality problems related to ozone, CO, and other pollutants. Since then we have set emission standards for most nonroad engines, including those used in farm and construction equipment, locomotives, commercial marine vessels, and lawnmowers. This final rule sets emission standards for additional categories of nonroad engines and vehicles for which we have not yet set emission standards.

What are the New Requirements?

The new requirements vary depending on the kind of engine or vehicle, taking into account environmental impacts, usage rates, the need for high-performance models, costs and other factors. The emission standards apply to all new engines sold in the United States and any imported engines manufactured after these standards begin. The requirements for each type of engine include the following:

Large industrial spark-ignition engines

These are spark-ignition nonroad engines rated over 19 kW used in a variety of commercial applications (we refer to these as Large SI engines); most use liquefied petroleum gas, with others operating on gasoline or natural gas. These engines contribute to ozone formation and ambient CO and PM levels in urban areas. In addition, many engines operate in warehouses, ice-skating rinks, or other enclosed areas, where personnel who work with or near the equipment can experience increased exposure.

We are adopting two tiers of emission standards for Large SI engines (see Table 1). The first tier of standards, scheduled to start in 2004, are based on a simple laboratory measurement using steady-state procedures. The Tier 1 standards are the same as those adopted earlier by the California Air Resources Board for engines used in California.

The Tier 2 standards starting in 2007 are based on transient testing in the laboratory, which ensures that the engines will control emissions when they operate under changing speeds and loads in the different kinds of equipment. We are including an option for manufacturers to certify their engines to different emission levels to reflect the fact that decreasing NOx emissions tends to increase CO emissions (and vice versa). Manufacturers may generally meet a less stringent CO standard if they certify an engine with lower HC+NOx emissions. This approach adds an incentive for manufacturers to reduce HC+NOx emissions below the standard, without taking away the option of producing engines with very low CO levels for customers concerned about exposing individuals to exhaust emissions. In addition to these exhaust-emission controls, manufacturers must take steps starting in 2007 to reduce evaporative emissions, such as using pressurized fuel tanks.

Table 1: Emission Standards for Large SI Engines*

Tier/Year	HC+NOx	CO
Tier 1 starting in 2004	4.0 g/kW-hr	50 g/kW-hr
Tier 2 starting in 2007	2.7 g/kW-hr	4.4 g/kW-hr

*See 40 CFR part 1048 for additional information about alternate standards and field-testing standards.

We are also adopting requirements to ensure that engines control emissions during all kinds of normal operation in the field. Tier 2 engines must have engine diagnostic capabilities that alert the operator to malfunctions in the engine's emission-control system. The rule also includes special standards and procedures to allow for measuring emissions without removing engines from equipment.

Nonroad recreational engines and vehicles

These recreational applications include snowmobiles, off-highway motorcycles, and all-terrain-vehicles (ATVs). These vehicles contribute to ozone formation and ambient CO and PM levels. They can also contribute to regional haze and other visibility problems in our national and state parks. Table 2 shows the exhaust emission standards that apply to recreational engines. In addition, we are finalizing standards that will minimize fuel lost through the walls of plastic fuel tanks and rubber hoses (permeation). These standards are presented in Table 3.

Table 2:
Recreational Vehicle Exhaust Emission Standards

Vehicle	Model Year	Emission standards		Phase-in
		HC g/kW-hr	CO g/kW-hr	
Snowmobile	2006	100	275	50%
	2007 through 2009	100	275	100%
	2010	75	275	
	2012*	75	200	
		HC+NOx g/km	CO g/km	
Off-highway Motorcycle	2006	2.0	25.0	50%
	2007 and later	2.0	25.0	100%
ATV	2006	1.5	35.0	50%
	2007 and later	1.5	35.0	100%

*or equivalent per § 1051.103

Table 3: Permeation Standards for Recreational Vehicles

Emission Component	Implementation Date	Standard	Test Temperature
Fuel Tank Permeation	2008	1.5 g/m²/day	28°C (82°F)
Fuel Hose Permeation	2008	15 g/m²/day	23°C (73°F)

Recreational marine diesel engines

These are marine diesel engines over 37 kW that are used in yachts, cruisers, and other types of pleasure craft. Recreational marine engines contribute to ozone formation and PM levels, especially in marinas, which are often located in areas with air-quality problems. The standards are phased in, beginning in 2006, depending on the size of the engine. Table 4 shows the new standards and implementation dates.

Table 4:
Recreational Marine Diesel Emission Standards and Implementation Dates

Engine Size (based on displacement in liters per cylinder)	Implementation Date	HC+NOx g/kW-hr	PM g/kW-hr	CO g/kW-hr
0.5 L/cyl ≤ displ. < 0.9 L/cyl	2007	7.5	0.40	5.0
0.9 L/cyl ≤ disp. < 1.2 L/cyl	2006	7.2	0.30	5.0
1.2 L/cyl ≤ disp. < 2.5 L/cyl	2006	7.2	0.20	5.0
disp. ≥ 2.5 L/cyl	2009	7.2	0.20	5.0

How Will the Standards Affect These Engines and Vehicles?

The standards will require manufacturers to apply existing engine technologies in varying degrees, depending on the type of engine. These technologies would include modified two-stroke engine technology (such as recalibrating, clean carburetion, fuel system upgrades), changing from two-stroke to four-stroke engine technology, modified four-stroke technology (such as recalibrating, fuel system upgrades), or improved diesel combustion and aftercooling.

Benefits

When the emission standards for recreational vehicles, recreational marine diesel engines, and industrial spark-ignition engines are fully implemented, we expect an overall 72-percent reduction in HC emissions from these engines, an 80-percent reduction in NOx emissions, and a 56-percent reduction in CO emissions in 2020. These controls will help reduce ambient concentrations of ozone, CO and fine PM. In addition, they will reduce personal exposure for people who operate, work with or are otherwise close to these engines and vehicles. They will also improve visibility in national parks.

The human health benefits of this rulemaking include avoiding approximately 1,000 premature deaths, preventing 1,000 hospital admissions, reducing 23,400 cases of asthma attacks, and reducing 200,000 days of lost work. In monetary terms, we estimate these health benefits to be roughly $8 billion in 2030. There are additional health and welfare benefits we are unable to quantify.

Costs

Estimated costs for manufacturers to design, certify, and build their products to meet the new emission standards are expected to range from $50 to $900 per snowmobile, less than $100 on average for an ATV, less than $200 on average for off-highway motorcycles, and about $600 for each recreational marine diesel or Large SI engine. These costs would in many cases be offset by savings from reduced fuel consumption or engine maintenance (or both) resulting from the technology improvements to control emissions. We estimate that nationwide fuel savings will eventually be greater than 800 million gallons annually in the United States as a result of these new technologies. Taken in total, this fuel savings more than exceeds the costs of the rule in any given year.

Where Can I Get More Information?

You can access the final rule and related documents on the Office of Transportation and Air Quality Web site at:

www.epa.gov/otaq/regs/nonroad/2002/cleanrec-final.htm

You can also contact us at:

U.S. Environmental Protection Agency
Office of Transportation and Air Quality
Assessment and Standards Division
2000 Traverwood Drive
Ann Arbor, MI 48105
Voice-mail: (734) 214-4636
E-mail: asdinfo@epa.gov

See additional fact sheets:

- Environmental Impacts of Newly Regulated Nonroad Engines (EPA420-F-02-033)
- Frequently Asked Questions from ATV Riders (EPA420-F-02-038)
- Frequently Asked Questions from Off-Highway Motorcycle Riders (EPA420-F-02-039)
- Frequently Asked Questions from Snowmobile Owners (EPA420-F-02-040)
- Frequently Asked Questions from Owners of Recreational Boats with Diesel Engines (EPA420-F-02-042)
- Frequently Asked Questions from Facility Managers and Other Owners of Industrial Spark-ignition Engines (EPA420-F-02-041)
- How to Maintain or Rebuild Engines Certified to EPA Standards (EPA420-F-02-035)
- Blue Sky Series Engines (EPA420-F-02-036)
- Emission Regulations for Stationary and Mobile Engines (EPA420-F-02-034)

United States Environmental Protection Agency | Air and Radiation | EPA420-F-02-041 September 2002

Office of Transportation and Air Quality

EPA

Regulatory Announcement

Frequently Asked Questions from Facility Managers and Other Owners of Industrial Spark-ignition Engines

The U.S. Environmental Protection Agency (EPA) has adopted new emission standards for nonroad spark-ignition engines used in forklifts, generators, aerial lifts, and many other kinds of farm, construction, and industrial equipment. This fact sheet addresses questions we have heard from concerned parties.

Why is EPA adopting emission standards for Industrial Spark-Ignition Engines?

Nonroad spark-ignition engines over 19 kilowatts ("Large SI engines") currently emit about 500,000 tons of hydrocarbons (HC) and oxides of nitrogen (NOx) each year across the United States. These pollutants combine to form smog. The engines can also emit high levels of carbon monoxide (CO) and toxic compounds such as benzene, which is especially problematic for engines operating in areas with limited access to fresh air. Reducing these emissions will benefit our health and environment. In the Clean Air Act, Congress requires us to set emission standards that address these problems. These environmental impacts are described in more detail in the fact sheet referenced below.

Does my current Large SI engine need to meet these regulations?

No. Engine manufacturers must ensure that each **new** Large SI engine sold meets the new emission standards. The standards apply only to new engines produced after January 1, 2004. Unless manufacturers choose to sell clean engines earlier, anything manufactured before then is not affected by this regulation. Note that similar requirements already apply in California.

As an owner of a Large SI engine, how does this affect me?

You may **not** disable any emission controls installed on your engine. Manufacturers explain in their owner's manual what type of emission controls exist for each model. Manufacturers may also specify some minor maintenance you must do to keep emission controls working properly over the life of the engine.

What kind of emission controls is EPA requiring?

We don't tell manufacturers how to comply with the regulations, but we generally expect them to meet the new standards by adding technologies that have been used in cars for many years, including electronic fuel systems and three-way catalytic converters. The expected technologies for nonroad engines, however, do not include the latest improvements automotive companies have made to meet the more stringent emission standards that apply to passenger cars and other highway vehicles.

How much will these controls cost?

We are projecting that manufacturers will see increased costs of about $600 per engine. This will vary somewhat based on the size of the engine and the type of fuel that it burns. However, we expect operators to experience a net savings from these new engines, as described below.

How will these controls affect performance and safety?

These technologies should not only reduce emissions, but substantially improve engine performance. Engines that are already operating with the expected emission-control technologies have much better fuel effi-

ciency, need less adjustment, and have less down time for maintenance. We estimate that fuel consumption will decrease by 20 percent compared with engines that have no emission controls. We expect these fuel and maintenance savings to be much greater than any extra costs to produce the cleaner engines. The expected emission controls generally raise no safety concerns; in fact, reduced CO emissions from the new engines provide a great safety advantage.

How do the emission standards protect individuals from exposure to exhaust emissions?

We are aware that forklifts, ice-surfacing machines, sweepers, and other types of equipment operate in areas that may expose people to high levels of exhaust emissions. Carbon monoxide emissions from engines that are not certified to emission standards can be particularly high, which can endanger operators or others who are around the equipment. This is true whether the engines use gasoline, natural gas, or liquefied petroleum gas.

Low-emitting engines can help ensure that pollutant concentrations are at safe levels in enclosed areas, but they are not automatic solutions. Continued monitoring of local air quality and attention to ventilation will always be an important responsibility of operators and owners. Nevertheless, in the long term, we expect manufacturers to reduce CO emissions by 90 percent or more.

Starting in 2007, engines will have additional features, such as improved calibrations and diagnostic controls, that help to make sure that each engine's emission-control system is working over its lifetime. In addition, we added provisions that give manufacturers flexibility to produce engines specifically to provide extra protection for applications where there is a greater concern for individual exposure to exhaust emissions. For example, manufacturers may sell Blue Sky Series engines, which have been certified to be cleaner than the standards for other engines. In addition, the long-term standards encourage manufacturers to tailor their emission controls based on particular needs for different applications.

Will these regulations affect where I can use my equipment?

No. These regulations do not include any specific restrictions about where you can use your equipment.

Where can I get more information?

You can access documents on Large SI engines on the Office of Transportation and Air Quality Web site at:

www.epa.gov/otaq/largesi.htm

You can also contact us at:

U.S. Environmental Protection Agency
Office of Transportation and Air Quality
Assessment and Standards Division
2000 Traverwood Drive
Ann Arbor, MI 48105
Voice-mail: (734) 214-4636
E-mail: stout.alan@epa.gov

See additional fact sheets:

- Emission Standards for New Nonroad Engines— Large Industrial Spark-ignition Engines, Recreational Marine Diesel Engines, and Recreational Vehicles (EPA420-F-02-037)
- Environmental Impacts of Newly Regulated Nonroad Engines (EPA420-F-02-033)
- Emission Regulations for Stationary and Mobile Engines (EPA420-F-02-034)
- How to Maintain or Rebuild Engines Certified to EPA Standards (EPA420-F-02-035)
- Blue Sky Series Engines (EPA420-F-02-036)