

SUPPORT DOCUMENT

to the

NOTICE OF INTENT

ON

CLEANER VEHICLES, ENGINES AND FUELS

Environment Canada

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EXECUTIVE SUMMARY

Introduction and Background

A comprehensive consultation process inviting all interested parties was initiated in April 2000 in order to set the government's agenda for going forward with regulations and other measures to reduce emissions from vehicles, engines and petroleum fuels over the next decade to further protect the health of Canadians and the environment. The following is a summary of the main action items respecting that agenda. Further details, including a summary of stakeholders views and departmental analysis of individual issues is found in the remainder of this document.

1) Action on On-Road Vehicles and Engines

Environment Canada intends to proceed with the development of regulations under Division 5 of CEPA, 1999 to align Canadian emission standards for on-road vehicles and engines with those of the U.S. EPA.. Specifically, the following items will be included:

Light-duty vehicles and light-duty trucks (cars, pickups, SUVs, etc.):

- Proposed regulations will be developed to align with U.S. Tier 2 standards to be phased-in starting in the 2004 model year;
- For model years 2001-2003, an interim Memorandum of Understanding with vehicle manufacturers will be developed to provide for introduction of vehicles meeting LEV (low emission vehicle) standards; and

Heavy-duty vehicles and engines:

- Proposed regulations will be developed to bring Phase 1 standards into effect for model year 2004 and Phase 2 standards into effect consistent with U.S. timing.

In developing future emission regulations for on-road vehicles and engines under CEPA, 1999, Environment Canada plans to ensure that the environmental performance of new vehicle fleets in Canada will be comparable to applicable U.S. program objectives. The details of future regulations, including possible corporate fleet-averaging standards or alternate mechanisms that achieve comparable results, will be developed in consultation with stakeholders during the regulatory development process.

2) Action on In-Use Vehicles and Engines

The Department intends to develop a Code of Practice for Heavy Duty Vehicle Inspection and Maintenance Programs in consultation with interested stakeholders.

3) Action on Off-Road Vehicles and Engines

The Department intends to proceed with the development of emissions control programs for off-road engines, under Division 5 of CEPA, 1999, aligned with the corresponding U.S. federal emissions control programs. These include:

- Development of proposed regulations corresponding to the U.S. EPA Phase 2 program for spark-ignition gasoline utility engines;
- Development of proposed regulations corresponding to the U.S. EPA Tier 2 program for compression-ignition off-road engines; and
- Development of proposed regulations corresponding to the U.S. EPA program for spark-ignition marine engines;

The Department will consider the development of:

- Tier 3 program for compression-ignition off-road engines when the full scope of the U.S. EPA program is available;
- Emissions control programs for large spark-ignition engines, recreational vehicles using gasoline engines, and stern drive and inboard gasoline-powered marine engines aligned with the U.S. EPA programs once these programs are finalized in the U.S.

The details of future proposed regulations, including self-certification, emissions credit systems and fleet averaging provisions, where effective and practical, will be developed through the regulatory process.

4) Action - Policy on International Alignment For Fuels with Other Jurisdictions

Environment Canada plans to continue its approach of generally aligning Canadian environmental fuel requirements with those of the U.S., while taking into consideration environmental standards developed by the European Union. There may be instances, however, where Canada takes additional action to protect the health of Canadians and the environment.

5) Action on Future Standards for Diesel Fuel

On-Road Diesel Fuel:

Environment Canada intends to align with the final U.S. level and timing for sulphur in on-road diesel fuel (i.e. 15-ppm sulphur limit starting June 1, 2006). The Canadian regulatory process will be initiated shortly with a discussion paper soliciting views from stakeholders on the need for and the form of “safety valve” provisions similar to those in the U.S. final rule.

Environment Canada also intends to establish a comprehensive database on diesel fuel composition in order to monitor fuel quality. Refiners and importers of diesel fuel will be requested to provide information on the levels of cetane, aromatics and PAHs in both on-road and off-road diesel starting in January 2001. If participation in this survey is inadequate, Environment Canada will consider mandatory reporting requirements.

Off-Road Diesel:

Environment Canada plans to recommend a regulatory limit for sulphur in off-road diesel. The limit would be established in the same time frame that the EPA plans for developing limits for sulphur in U.S. off-road diesel (expected to be in 2001). In preparation for this, Environment Canada will gather information on where off-road diesel is used, the effects of sulphur reduction on emissions, and the costs of reducing sulphur in diesel for use in all off-road engines and vehicles, including rail and marine applications.

The survey of diesel composition, discussed in the previous section on on-road diesel will also include off-road diesel.

6) Action on Future Standards for Fuel Oils

Environment Canada proposes to develop measures to reduce the level of sulphur in both light and heavy fuel oils used in stationary facilities. Environment Canada intends to commence studies in 2001 of the benefits to the health of Canadians and the environment as well as the cost of reducing sulphur in fuel oils, with the view to matching the requirements set by the European Union for sulphur in fuel oils which will be fully implemented by 2008. Complementary measures to regulations, such as economic instruments, will be examined to accelerate the introduction of low-sulphur fuel oils.

7) Action on Future Standards for Gasoline

There are a number of issues associated with gasoline where action is warranted. The various actions that will be undertaken are itemized separately for each issue.

Gasoline Composition as it Affects Emissions of Air Toxics:

Further analysis is required of the potential for additional controls on gasoline quality to reduce emissions of toxic substances from vehicles. Environment Canada plans to study the effect on emissions of toxic substances from vehicles of setting additional limits for gasoline composition. Possible action to implement more stringent controls on gasoline composition in order to reduce emissions of air toxics from gasoline-powered vehicles is a lower priority than addressing the quality of diesel and fuel oils used in stationary facilities.

Deposit Control Additives:

Environment Canada intends to examine the current usage patterns of deposit control additives in Canada and the costs of requiring their use at effective levels in all gasoline.

MTBE:

Environment Canada intends to recommend publication in the *Canada Gazette* a notice under paragraph 71(1)(b) of the *Canadian Environmental Protection Act, 1999* requesting information on the usage and releases of MTBE. This notice will generally apply to those persons handling MTBE or gasoline containing MTBE. Following a review of this information, Environment Canada will consider whether further action in respect of MTBE is warranted.

Ethanol:

The Department will continue to examine this issue in the context of its effects on emissions of greenhouse gases through participation in processes addressing Climate Change.

Driveability Index (controls on distillation):

In order to monitor Canadian gasoline quality in respect of the Driveability Index (DI), Environment Canada intends to ask refiners and importers of gasoline to voluntarily provide information on the input parameters to DI, specifically the distillation values of gasoline (T10, T50, T90) and the concentration of oxygen (by type of oxygenate) starting in July 2001. If participation in this voluntary program is poor, Environment Canada will consider mandating the reporting of the information.

8) Actions to Promote Early Introduction of Cleaner Fuels

Environment Canada will explore complementary measures to regulations, such as economic instruments and other measures, to promote the early introduction of cleaner fuels including low sulphur fuels. Environment Canada also intends to continue to explore with other federal departments the purchase of cleaner fuels for use in government vehicles and facilities. Environment Canada will assess measures to ensure that they should have the desired impacts.

INTRODUCTION

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The purpose of this document is to summarize the findings of the consultative process that Environment Canada entered into in order to set a future agenda for vehicles, engines and fuels and to set out that agenda.

The *Canadian Environmental Protection Act, (CEPA)*, 1999 was proclaimed on March 31, 2000, and includes new legislative provisions which broaden the federal government's ability to establish standards for vehicles engines and fuels in order to reduce emissions that adversely affect Canadian air quality. The provisions of *CEPA, 1999* enable the establishment of emission standards for a broader range of engines than was possible in the past but exclude the authority to set emission standards for engines used to propel aircraft, railway rolling stock and marine vessels. The scope of the Minister's agenda on cleaner vehicles, engines and fuels focuses on the types of engines which fall under the purview of *CEPA, 1999*.

BACKGROUND

Air pollution is a serious health problem. Across Canada, studies show that there are more than 5,000 premature deaths a year that can be attributed to air pollution. Air pollution is also associated with other health impacts including cardio-vascular ailments and respiratory distress and results in increased emergency hospital visits and hospital admissions for Canadians. Clearly, there is a need to continue taking strong actions to provide a healthier environment for Canadians.

The use of internal combustion engines to power vehicles and equipment and the combustion of fuel oils contribute significantly to air pollution in Canada, particularly in urban areas. Emissions of concern include nitrogen oxides (NO_x), volatile organic compounds (VOCs), sulphur oxides (SO_x), carbon monoxide (CO), greenhouse gases, fine particulate matter, benzene, 1,3-butadiene, formaldehyde, acetaldehyde and other toxic or potentially toxic substances. These emissions are primarily a function of vehicle/engine technology and the properties of the fuels. Since the performance of vehicle/engine emission control systems can be impaired without the right fuels, the development of effective policies and programs to reduce emissions must consider fuel standards and vehicle/engine emission standards as an integrated system.

The federal Minister of the Environment announced the federal government's integrated clean air strategy in the spring of 2000. A key component of the clean air strategy is the development and subsequent implementation of the federal government's agenda on cleaner vehicles, engines and fuels over the next decade.

As an initial step, on April 4th, 2000 the Deputy Minister of the Environment wrote to a wide range of stakeholders, inviting them to participate in the development of the agenda on cleaner vehicles, engines and fuels. Environment Canada also prepared a discussion paper entitled - "*Future Canadian Emission Standards for Vehicles and Engines and Standards for Reformulation of Petroleum-based Fuels*" and distributed this document to all parties who expressed an interest in participating in the process of developing the federal agenda, in response to the Deputy Minister's invitation. The purpose of the discussion paper was to set out the background on various issues and

initiate dialogue on what the next decade might hold in regards to new standards in these areas.

On May 25th and 26th, Environment Canada convened a multi-stakeholder workshop in Toronto to bring together leading experts on matters dealing with emissions from vehicles, engines and fuels, and to discuss future measures to reduce air pollution from these sources. The Vehicle and Fuels Workshop was attended by more than 125 representatives from federal departments, provincial and municipal governments, health and environmental groups, the petroleum refining industry, automotive and engine manufacturers and the alternative fuels sector. All parties were invited to make presentations at the Workshop and to provide written submissions which detailed their views on the measures that should be included in the cleaner vehicles, engines and fuels agenda. All Workshop presentations and submissions were subsequently distributed in July to stakeholders.

Following a thorough review and full consideration of stakeholder comments, the Minister of the Environment has developed a federal agenda of planned measures and future initiatives to reduce pollution from vehicles, engines and fuels. It is planned that the Minister will provide a formal notice of the Department's intent to implement this agenda by publishing a summary of the planned measures in the Canada Gazette Part I (Notice of Intent). Regulatory initiatives set out in the notice will be undertaken following established processes and will include consultation with stakeholders.

As indicated previously, the Notice of Intent is a key element of the government's integrated clean air strategy. Other elements include working with the provinces and territories to set Canada Wide Standards to reduce air pollution from mercury, benzene, ozone and particulate matter by 2010 or earlier, development of strategies to address key industrial sectors and negotiating an Ozone Annex with the United States to reduce transboundary air pollution. The initiatives set out in the agenda on cleaner vehicles, engines and fuels will help fulfill the objectives of the Canada-United States Air Quality Accord and complement actions under Canada's Climate Change Strategy.

This document supports the Minister's Notice of Intent as it provides background on the issues and summarizes input provided at the Workshop and through written submissions. The document includes analyses of the issues and the government's intended path forward.

1) FUTURE EMISSION STANDARDS FOR ON-ROAD VEHICLES AND ENGINES

Summary and Update of Discussion Paper

The Discussion Paper proposed to continue aligning Canadian federal emission requirements for on-road vehicles¹ with those of the U.S. EPA. In effect, the Department proposed to align future Canadian emission requirements with the following U.S. federal emission control programs for new on-road vehicles and engines, including applicable standards respecting exhaust emissions (conventional and off-cycle), evaporative emissions, refuelling emissions and on-board diagnostic systems:

- the U.S. EPA Tier 2 emission program for light-duty vehicles, light-duty trucks and medium-duty passenger vehicles to be phased-in beginning in the 2004 model year;
- the proposed U.S. EPA Phase 1 and Phase 2 emission programs for heavy-duty vehicles and engines to be phased-in beginning in the 2004 and 2007 model years, respectively; and
- the current U.S. EPA emission standards for motorcycles.

The Discussion Paper indicated that Environment Canada intends to align emission standards with the U.S. EPA as part of a new regulatory framework to be developed under CEPA, 1999. The framework would be, to the extent practical and appropriate, similar to that which existed for emissions under the Motor Vehicle Safety Act. It is believed that this approach would provide as seamless a transition as possible for Canadian manufacturers and importers of on-road vehicles. However, it was also stated that affected companies would have to accommodate the use of a new National Emissions Mark (NEM) under the new regulatory framework, as this mark forms the cornerstone of CEPA, 1999 legislative framework for controlling emissions from vehicles and engines.

Finally, the Discussion Paper noted that U.S. EPA emission control programs are relying increasingly on phase-ins, corporate fleet average standards and complex emission credit systems in order to provide companies with more compliance flexibility, to create incentives for the early introduction of new technology and to allow the adoption of more stringent emission standards than might otherwise be possible under a single standard. Consequently, the Department suggested that there may be a greater need than in the past to adopt and enforce corresponding fleet-average emission requirements and emission credit systems in future Canadian emission programs to ensure that emissions from the Canadian new vehicle/engine fleets will not be significantly compromised relative to the U.S. As part of the consultation process to develop the future federal agenda for cleaner vehicles, engines and fuels, stakeholders were asked to provide their views on how these issues (i.e. phase-in, fleet-average standards, emission credit systems) should be treated in the context of future Canadian emission control programs.

¹ On-road vehicles include the following general classes: light-duty vehicles (i.e. passenger cars), light-duty trucks (i.e. mini vans, pick-up trucks and sport-utility vehicles with a gross vehicle weight rating of up to 8,500 lb.), medium-duty passenger vehicles (i.e. a new class of vehicles created under EPA's Tier 2 program consisting primarily of passenger vehicles having a gross vehicle weight rating in the 8,500-10,000 lb. range), heavy-duty vehicles and engines (i.e. mostly trucks and buses) and motorcycles.

Following the publication and distribution of the Discussion Paper in April, 2000, the U.S. EPA took two major steps in finalizing its future Phase 1 and Phase 2 emission control programs for heavy-duty vehicles and engines and initiated the development of more stringent emission standards for on-road motorcycles. The following sections provide a summary of these recent EPA actions.

U.S. EPA's Final Phase 1 Program for Heavy-Duty Vehicles and Engines

On July 31, 2000, the U.S. EPA announced the completion of a final rule on the Phase 1 program requirements. In the final rule, the U.S. EPA reaffirmed that the combined standard for smog-causing oxides of nitrogen (NO_x) and hydrocarbons (i.e. NMHC+NO_x) of 2.4 g/bhp-hr for heavy-duty diesel engines² was technologically feasible and cost-effective for the 2004 model, without any changes to the formulation of diesel fuel. Accordingly, this standard will come into effect beginning with the 2004 model year. In addition, a new set of supplemental emission standards and test procedures were finalized which are designed to more closely represent the range of real-world driving conditions of heavy-duty diesel engines, thereby providing additional certainty that these engines will comply with emission standards under the operating conditions found in actual use. The new provisions include a steady-state test requirement to supplement the current Federal test procedures (FTP) and a Not-to-Exceed (NTE) test procedure for testing in-use engines. These new provisions will come into effect beginning in the 2007 model year. Finally, the Phase 1 program will require that on-board diagnostic systems be phased-in on heavy-duty diesel vehicles having a gross vehicle weight rating of up to 14,000 lb. beginning in the 2005 model year.

The Phase 1 final rule also includes several new requirements for Otto-cycle heavy-duty engines³ and vehicles. One of the major changes that will be made by the EPA's Phase 1 program is the manner in which a subset of the Otto-cycle heavy-duty category (spark-ignition), will be tested as the basis for future emission standards. Historically, the EPA's exhaust emission standards for heavy-duty vehicles have generally been based on the emission performance of the engine, as tested independently from the vehicle chassis, mainly because any given heavy-duty engine can be used in a range of different applications. While vehicle-based emission standards are defined in terms of the amount of emissions per distance driven (e.g. grams/mile), engine-based standards are expressed in terms of emissions per unit of work per unit of time (i.e. g/bhp-hr). Under this approach, emission standards for heavy-duty engines have not had to increase with vehicle weight because larger engines do not necessarily emit more per horsepower even though they tend to emit more per distance driven.

EPA's Phase 1 program introduces chassis-based testing and emission standards for "complete" Otto-cycle heavy-duty vehicles⁴ having a GVWR of 8,500-14,000 lb., similar to the approach that is currently used in the light-duty vehicle and light-duty truck program. The EPA's Phase 1 emission standards for this sub-category of heavy-duty vehicles are harmonized with the low-emission vehicle (LEV) standards for medium-

² Most diesel engines (i.e. compression-ignition) are powered by diesel fuel but can also be fueled with methanol or gaseous fuels.

³ Most Otto-cycle engines (i.e. spark-ignition) are fueled with gasoline but may also be powered by alternative fuels such as methanol or gaseous fuels.

⁴ Complete vehicles are essentially those that are manufactured with their primary cargo carrying container or device attached.

duty vehicles under California's LEV I program and will come into effect with the 2005 model year. These standards are summarized in the Table below:

GVWR (lb.)	NMOG (g/mile)	NOx (g/mile)	CO (g/mile)
8,500-10,000	0.280	0.9	7.3
10,000-14,000	0.330	1.0	8.1

Under the Phase 1 Otto-cycle vehicle-based program, the evaporative emission test procedures are changed in order to align them with those applicable to light-duty vehicles and light-duty trucks. In addition, the program will require that on-board refuelling and vapor recovery controls be phased in on all complete Otto-cycle heavy-duty vehicles up to 10,000 lb. GVWR during the 2005 and 2006 model years. As with diesel heavy-duty vehicles, the Phase 1 program phases-in OBD system requirements for Otto-cycle vehicles and engines up to 14,000 lb. GVWR starting in the 2005 model year. Finally, the Phase 1 program will retain an engine-based approach for incomplete Otto-cycle vehicles up to 14,000 lb. GVWR and all Otto-cycle vehicles above 14,000 lb. GVWR, including a combined NMHC+NOx standard of 1.0 g/bhp-hr beginning in the 2005 model year.

It is important to note that as a result of the statutory requirements of the U.S. Clean Air Act, the 2005 model year represents the earliest possible implementation of the new emission standards for Otto-cycle heavy-duty vehicles and engines in the U.S.. Nonetheless, EPA has incorporated a variety of incentive mechanisms that are designed to encourage manufacturers to meet tighter emissions standards as early as the 2003 or 2004 model year. This includes two voluntary compliance options that supplement the primary program for 2005 and optional averaging, banking and trading programs.

U.S. EPA's Final Phase 2 Program for Heavy-Duty Vehicles and Engines

On December 21, 2000, the U.S. EPA announced a final rule concerning Phase 2 of the Agency's emission control program for heavy-duty vehicles and engines. The EPA's Phase 2 program adopts exhaust emission standards that are up to 90% more stringent than those of the first phase. For engine-based testing, the final rule includes a tighter standard of 0.01 g/bhp-hr for particulate matter, a NOx standard of 0.20 g/bhp-hr, and a NMHC standard of 0.14 g/bhp-hr. For diesel engines, the PM standard will take full effect in the 2007 model year, while the NOx and NMHC standards will be phased-in during the 2007 to 2010 model years. In the case of gasoline-fuelled engines, the tighter NOx, PM and NMHC standards will be phased-in over the 2008 and 2009 model years.

The Phase 2 program also includes more stringent exhaust emission standards for complete Otto-cycle heavy-duty vehicles having a GVWR of up to 14,000 lb. In the case of NMHC, NOx and HCHO, the new standards are consistent with the CARB LEV II program standards for low-emission vehicles (LEVs). The numerical value of EPA's proposed PM standard for complete Otto-cycle heavy-duty vehicles under 14,000 lb. GVWR are more than 80% lower than the diesel PM standard for LEV category of medium-duty vehicles under CARB's LEV II program and is consistent with the stringent PM standard applicable to light-duty vehicles, light-duty trucks or medium-duty passenger vehicles certified to bins 7 or 8 under the Tier 2 emissions program. EPA

indicates that the new vehicle-based standards are comparable in stringency to the engine-based standards described above. The final vehicle-based standards, which will be phased-in over the 2008 and 2009 model years, are summarized in the following table:

GVWR (lb.)	NMHC (g/mile)	NO_x (g/mile)	PM (g/mile)	HCHO (g/mile)
8,500-10,000	0.195	0.2	0.02	0.032
10,000-14,000	0.230	0.4	0.02	0.040

The Phase 2 program also adopts new evaporative emission standards for heavy-duty gasoline-fuelled vehicles and engines to be phased-in over the 2008 and 2009 model years which represent more than a 50% reduction in the numerical value of the standards that are currently in place. Finally, the Phase 2 program makes a change to existing requirements respecting the control of crankcase emissions. Currently, the standards prohibit crankcase emissions from all on-road heavy-duty engines, with the exception of turbo-charged heavy-duty diesel engines. This exception was originally put in place as a result of concerns with fouling that could occur if diesel particulates were routed into the turbocharger and aftercooler. However, EPA indicates that these concerns have now been alleviated by newly developed closed crankcase filtration systems, specifically designed for turbo-charged heavy-duty diesel engines. Accordingly, the Phase 2 rule eliminates the current exemption for turbo-charged diesel engines and manufacturers of these engines will be required to control crankcase emissions beginning with the 2007 model year.

The Phase 2 rule incorporates several features to provide manufacturers with additional flexibility in meeting the stringent emission standards, including: a special emission credit program to encourage the introduction of clean engines and vehicles earlier than required by the regulation; the continuation of the basic structure of existing emissions averaging, banking and trading (ABT) programs for heavy-duty engines which allow manufacturers to certify engines at various specified emission levels above or below the standard, as long as they comply with the applicable standards when averaged across their product lines; and relaxed compliance levels for assessing in-use compliance with the Phase 2 emission standards through the 2011 model year to provide assurance to manufacturers that they will not face recalls if they exceed standards by a small amount during the transition to clean technologies.

Finally, the EPA believes that the application of high efficiency exhaust emission control technologies will be required for diesel engines, analogous to the introduction of catalytic converters on passenger cars in the 1970s. In order to meet the Phase 2 exhaust emission standards, the EPA expects that manufacturers will have to use a combination of catalyzed traps for the control of particulate matter and NO_x adsorber catalysts for the control of NO_x emissions. As the emission reduction performance of these devices is adversely affected by the sulphur level in diesel fuel, the EPA also finalized a rule to reduce the level of sulphur in on-road diesel in 2006 (see later section for details).

U.S. EPA's Planned Emission Standards for Future On-Road Motorcycles

On November 17, 2000, the U.S. EPA announced the pending publication of an Advance Notice of Proposed Rule Making (ANPRM) concerning future emission standards for on-road motorcycles. The U.S. EPA recognizes that current federal emission standards have essentially been in effect for 20 years and that opportunities exist to tighten the emission control requirements for this class of vehicle. While California's current emission standards for on-road motorcycles are more stringent than federal standards with respect to the control of hydrocarbons, California recently finalized considerably more stringent emission standards to be brought into force in two phases, namely in the 2004 and 2008 model years. For the first time, the future California emission standards for on-road motorcycles will require that companies comply with NO_x emission requirements, through the application of a combined NMHC+ NO_x standard.

In a pre-publication ANPRM, the U.S. EPA indicated that *"Given that California has recently put in place technologically challenging standards for Class III motorcycles in a time frame that we would be likely to consider for a possible federal program, we are likely to look very closely at the pros and cons of harmonizing the federal program with the recently finalized California standards"*. During their rule making process, it is expected that the EPA will address a number of issues related to the adoption of future emission standards for on-road motorcycles, including the appropriateness of the current scope of included vehicles, current test cycles and procedures and useful life requirements.

The following sections provide a summary of the comments which were raised by stakeholders on issues related to future Canadian emission standards for on-road vehicles, an analysis of these comments and a description of how Environment Canada plans to address the various issues.

1(a) Alignment with U.S. EPA Federal Standards

Summary of Stakeholder Comments

There is a general consensus among commenters that Canada's future emission standards for the various classes of new on-road vehicles and engines should be based on a principle of alignment with corresponding U.S. federal programs. Generally, commenters recognize that as a result of the highly integrated nature of the North American automotive industry and the aggressive national programs being put in place by the U.S. EPA to reduce emissions from new vehicles and engines, a policy of alignment with U.S. federal programs is a logical approach for Canada to achieve significant emissions reductions in a cost-effective manner.

In comments received from staff of the Greater Vancouver Regional District (GVRD), reference was made to a study which has been completed to compare the benefits of the U.S. EPA Tier 2 standards for light-duty vehicles and light-duty trucks with those of the California Air Resources Board's (CARB) LEV II program in British Columbia. Further, it was indicated that this study concluded that the U.S. national Tier 2 standards would be the most cost-effective. While generally supportive of the policy of aligning Canadian national emission standards with those of the U.S., the GVRD staff stated that the CARB LEV II standards covered vehicles up to 14,000 lb. (versus only 10,000 lb. for Tier 2) and that the CARB LEV II standards were more stringent for

particulate matter for the larger SUVs and other light-duty trucks. As the GVRD raised the importance of specifically focusing new emission standards on particulates, it was suggested that it may be appropriate for Environment Canada to evaluate which emission standard is most appropriate for Canada for this class of vehicle (i.e. GVWR 10,000 to 14,000 lb.).

Finally, the Manufacturers of Emission Controls Association (MECA) noted that emission standards for on-road motorcycles have been in place for 20 years (i.e. U.S. federal) and that there is an opportunity to substantially reduce emissions from this class of vehicle. On this basis, MECA recommended that Canada work with U.S. authorities to define new standards for motorcycles or, alternatively, to consider adopting the California standards approved in 1998.

Analysis

As pointed out by the GVRD, the new emission requirements under the Tier 2 program apply only to vehicles having a GVWR of up to 10,000 lb. (i.e. medium duty passenger vehicles) while CARB's LEV II emission program includes standards that extend to vehicles with a GVWR of up to 14,000 lb. (i.e. California medium-duty vehicles). Under CARB's LEV II program, medium-duty diesel vehicles will be subject to a diesel PM standard of 0.12 g/mile by the 2007 model year which applies to complete vehicles tested on a chassis dynamometer, similar to the way in which light-duty vehicles and light-duty trucks are tested. Gasoline-fuelled vehicles are not subject to particulate matter emission standards under the California program.

Under U.S. federal regulations, the category of vehicle addressed by the GVRD's comments (i.e. GVWR 10,000 to 14,000 lb.) fall in the heavy-duty vehicle class. As described above, the U.S. EPA Phase 1 program will introduce chassis-based testing and emission standards for "complete" Otto-cycle heavy-duty vehicles having a GVWR of 8,500 to 14,000 lb. and is consistent with the approach for controlling emissions from medium-duty vehicles in California. Further, EPA's Phase 1 emission standards for this sub-category of heavy-duty vehicles are harmonized with the low-emission vehicle (LEV) standards for medium-duty vehicles under CARB's LEV I program and will come into effect with the 2005 model year. In addition, the Phase 2 program will align the future exhaust emission standards for this class with CARB's LEV II program standards for low-emission vehicles (LEVs) and includes a PM standard with a numerical value that is 80% lower than the diesel PM standard in the CARB program. Finally, while EPA will retain engine-based standards and test procedures for heavy-duty diesel engines, the Phase 2 PM standard of 0.01 g/bhp-hr represents a 90% reduction over the current standard and is considered to be more stringent than the diesel PM standard applicable to medium-duty vehicles under CARB's LEV II program.

While motorcycles are a small contributor to the total emissions from transportation sources in Canada (i.e. typically less than 0.5 %), Environment Canada recognizes that further improvements are possible in the control of emissions from on-road motorcycles through the application of existing technology. As mentioned in a previous section, the U.S. EPA has recently initiated a process to develop more stringent emission standards for on-road motorcycles and will be examining the possibility of harmonizing with future standards that will come into effect in California in the mid-2000 time frame.

In view of the stringent national emission standards being put in place in the U.S. by the Environmental Protection Agency and the highly integrated nature of the North

American vehicle industry, Environment Canada believes that a policy of alignment with U.S. federal emission standards continues to be the most appropriate for Canada. This approach will continue to provide Canadians with significant emission reductions from on-road motor vehicles in a cost-effective manner.

Subsequent to the deadline for submitting comments on the development of the federal agenda on cleaner vehicles, engines and fuels, an issue has arisen with respect to future compliance with new supplemental test procedures for heavy-duty diesel engines which merits some discussion. In 1999, the U.S. Department of Justice and the U.S. EPA completed consent decrees with seven of the largest manufacturers of heavy-duty diesel engines to resolve claims by the U.S. government that the manufacturers had sold engines that did not meet standards respecting the use of defeat devices. As part of the settlement under the consent decrees, the majority of the manufacturers essentially agreed to produce 2003 and 2004 model years engines that meet new supplemental emission standards that provide assurance that engines are designed to achieve the expected level of emissions control over all expected in-use operations conditions. However as a result of timing limitations imposed by the Clean Air Act, the U.S. EPA has only incorporated the regulatory obligation for manufacturers to meet the new supplemental emission standards beginning in the 2007 model year, as part of its Phase 1 final rule. Consequently, it is expected that many of the heavy-duty diesel engines that will be sold in the 2005 and 2006 model years will effectively not be required to comply with the new supplemental emission standards under the terms of the consent decrees or the new regulations. Nonetheless, the U.S. EPA indicated in their Phase 1 rule that *“regardless of whether the CD provisions terminate after model year 2004, the Agency believes that the CD manufacturers will continue to manufacture engines for model years 2005 and 2006 which demonstrate compliance with the 2004 standards and satisfy the emission performance provisions of the Consent Decrees”*.

In November, 2000, the California Air Resources Board (CARB) announced that it planned to include the supplemental emission standards and test procedures as part of the California certification for 2005 and later model year heavy-duty diesel engines in order to ensure compliance with these standards in the 2005 and 2006 model years⁵. If California proceeds with the implementation of these requirements, more than a dozen states have announced their intention to follow California's lead as permitted under the Clean Air Act⁶. The CARB has indicated that, should this occur, the supplemental emission standards would in effect become de facto national regulations. This regulatory item was subsequently considered and approved by CARB on December 8, 2000 (CARB Resolution 00-53).

As indicated above, Environment Canada plans to develop a regulatory framework that is generally aligned with U.S. federal standards. Nonetheless, the Department plans to consider whether there is a need to pursue additional measures to ensure that heavy-duty diesel engines sold in Canada will be designed in a manner that achieves the desired in-use performance under the broader range of operating conditions.

Since the commencement of the process to develop the Notice of Intent, Canada along with several other countries, including the United States entered into an agreement (the “1998 Global Agreement”) establishing a process for development of world automotive standards. The *“World Forum for Harmonization of Vehicle Regulations (WP.29)”* was

⁵ California Air Resources Board, News Release 00-29, November 20, 2000.

⁶ State and Territorial Air Pollution Program Administrators, Association of Local Air Pollution Control Officials, News Release, November 20, 2000.

developed under the auspices of the United Nations Economic Commission for Europe. The agreement provides for the establishment of global technical regulations regarding the safety, emissions, energy conservation and theft prevention of wheeled vehicles, equipment and parts. The Agreement contains procedures for establishing global technical regulations by either harmonizing existing regulations or developing a new regulation.

In the coming months countries will be proposing that selected regulations be included in a list of preliminary recommendations of standards in prioritizing the development of global technical regulations. Consultations will follow which are anticipated, over time, to result in the adoption of world standard regulations which can form the basis of standards applicable in participating countries.

At the present time the newly structured World Forum is about to begin deliberations over priorities and therefore has not reached the stage of agreeing on world standards that could be adopted in Canada or more generally in North America, however, it is anticipated that this will occur either for safety related standards or emission standards over the longer term.

Intended Path Forward

Environment Canada plans to continue aligning Canadian emission standards for all classes of on-road vehicles and engines with those of the U.S. EPA and will consider the development of up-dated emission standards for on-road motorcycles in conjunction with the U.S. EPA.

In the longer term, in conjunction with Canada's participation in the World Forum for Harmonization of Vehicle Regulations (WP.29) consideration should be given to the applicability of world standards as they are developed.

1(b) Regulatory Program versus MOUs

Summary of Stakeholder Comments

While not always explicitly stated, it appears that most commenters support the alignment of Canada's emission standards with those of the U.S. through the development of a regulatory program under the authority of *CEPA, 1999*. On the other hand, the Association of International Automobile Manufacturers of Canada (AIAMC) suggested that Environment Canada consider the option of using a framework based on Memoranda of Understanding (MOU) rather than embarking on the development of a regulatory framework. The AIAMC indicated that previous MOUs have served the government and the industry well and that a future MOU framework would provide the government and industry with flexibility to deal with the potentially complex and fluid issues associated with implementing the vehicle and fuel requirement of the Tier 2 program. Finally, STOP stated that the development of voluntary measures, such as MOUs, must be as open and transparent as regulatory initiatives, and provide the same opportunity for public input as regulatory initiatives.

Analysis

Motor vehicles and engines are a major source of Canada's air pollution and it is essential to put in place an effective program to reduce emissions from these sources.

As indicated in the Discussion Paper, 86% of Canadians have indicated a high level of concern with the smog and air pollution resulting from transportation. In addition, Canadians are more inclined to favor a regulatory approach to controlling pollution over other alternatives (Environics, 2000). In this regard, the revised CEPA, 1999 provides the federal government with the enabling authority to implement a sound, flexible and enforceable regulatory program to reduce emissions from vehicles and engines. Consequently, Environment Canada believes that the development of a regulatory program to control emissions from vehicles and engines represents the most appropriate approach for Canada.

Notwithstanding the above, it is recognized that non-regulatory initiatives have been successfully used in the past in order to secure voluntary compliance with U.S. federal emission standards for new vehicle and engines. For example, Transport Canada implemented MOU with manufacturers and importers of light-duty vehicles (1994 to 1995 model years), heavy-duty vehicles and engines (1995 to 1997 model years) and motorcycles (1997 model year). These MOU were implemented as interim measures when the Canadian legislative authority under the MVSA did not permit the adoption of certain aspects of the U.S. regulatory program, pending legislative changes to the MVSA, or to expedite compliance with U.S. emission standards, pending the development of proposed regulations (i.e. motorcycles). More recently, Environment Canada also developed a number of MOU to control emissions from various classes of non-road engines, in anticipation of new legislative authorities under the revised CEPA, 1999 and the development of regulations in this regard.

Environment Canada believes that non-regulatory instruments can, in some instances, continue to play an important role in the area of controlling vehicle and engine emissions. In particular, Environment Canada believes that it would be beneficial to develop MOU to formalize a commitment by vehicle manufacturers to supply Canadians with the same low-emission vehicles as will be sold in the U.S. under the voluntary National Low-Emission Vehicle (NLEV) program. Under the U.S. NLEV program, vehicles are designed to comply with emission standards that are more stringent than current regulatory requirements (i.e. Tier 1 standards) but less stringent than the future Tier 2 standards that have been adopted by the U.S. EPA to be phased-in beginning with the 2004 model year. In effect, the U.S. NLEV program is a voluntary initiative designed to introduce a nationwide improvement in vehicle emission control for a three year period (i.e. 2001 to 2003), thereby bridging the gap between the regulated Tier 1 and Tier 2 regulatory emission standards. Environment Canada believes that a similar initiative in Canada would be a positive interim step as it would ensure that similar advances in emission control technology are brought to Canada, while allowing the Department's regulatory resources to be focused on developing the comprehensive and longer-term Tier 2 regulatory program for Canada.

Intended Path Forward

Environment Canada plans to develop a new regulatory framework under CEPA, 1999 to align Canada's national vehicle and engine emission standards with those of the U.S. Environmental Protection Agency. The proposed regulations will be developed through the normal regulatory process and will provide opportunities for stakeholder input.

As an interim measure, Environment Canada plans to develop a Memorandum of Understanding with Canadian vehicle manufacturers to ensure that Canadians receive the same low-emission vehicles as those sold in the U.S. under the Voluntary National

Low Emission Vehicle Program. Stakeholders will be provided an opportunity to provide their views on the MOU during its development.

1(c) Phase-ins, Fleet-Average, Emission Credit Systems

Summary of Stakeholder Comments

As indicated previously, there was a general consensus among commenters on the general policy of aligning emission standards for on-road vehicles with those of the U.S. EPA. Nonetheless, there were effectively two different views expressed by some stakeholders on the need for Canada to implement the same phase-in schedules, fleet-averaging requirements and emission credit systems as in the U.S.

The Canadian Petroleum Products Institute (CPPI) indicated that the structure of Canada's current vehicle emission regulations does not ensure that Canadian fleet emissions are equivalent to the U.S. fleet because the fleet is allowed to vary depending upon customers' reaction to the marketplace offerings. The CPPI suggested that under a regime where corporate fleet-average emission performance was regulated in Canada, vehicle marketers would have to adjust their sales programs to ensure that their vehicle and engine mix sold in the marketplace achieves the same fleet standard as required in the U.S. Accordingly, the CPPI recommended that, Canada should align, through regulation, its National Low-Emission Vehicle Program with that of the U.S., including fleet performance standards and compliance requirements for 2000 to 2003 as a high priority issue. For 2004 to 2009, the CPPI recommended as a high priority that Canada proceed with new regulations to align with the U.S. Tier 2 program, including compliance requirements, to ensure that Canadians receive the same fleet performance that will be in place in the U.S., on the same timetable.

Similarly, the staff of GVRD stated that in evaluating post-2004 on-road vehicle emission standards, Environment Canada should consider the EPA Tier 2 standards as a minimum, complete with relevant ABT (averaging, banking and trading) requirements. It was indicated that the ABT requirements would ensure that the "mix" of vehicles supplied to Canada provides the intended emission benefits.

In their comments, the Canadian Vehicle Manufacturers Association (CVMA) proposed another approach to aligning Canada's emission standards with those of the U.S. EPA. The CVMA believes that automakers have the responsibility to ensure that Tier 2 certification is achieved and indicated that the automotive industry is focused on providing Canadians with vehicle hardware compliant with the U.S. federal Tier 2 standards beginning with the 2004 model year. The CVMA supports the continued alignment of emissions hardware and timing alignment with U.S. EPA vehicle emissions certification as the approach provides Canadians with new vehicles equipped with state-of-the-art emission control technologies in the most cost-effective way. The CVMA indicated that in 1997, the government of Canada recognized that applying phase-in percentages, emission credit systems such as averaging, banking and trading and non-conformance penalties would limit vehicle model availability to Canadians and result in significant administrative costs to both government and industry without providing additional environmental benefits. Accordingly, the CVMA points out that the current regulations recognize that the vast majority of vehicles and heavy-duty engines sold in Canada have an equivalent model certified by the U.S. EPA and accepts the U.S. EPA certificate of conformity as meeting Canadian requirements.

The CVMA believes that continued product harmonization with the U.S. is essential given the integrated nature of the North American automotive industry and that this is critical with respect to the even more stringent Tier 2 emission requirements. The CVMA believes that a Tier 2 program which accepts the U.S. EPA certificate of conformity to demonstrate compliance would provide further emission reductions, especially with regard to NOx emissions, improve overall air quality and provide greater economies of scale for Canadians. Accordingly, the CVMA believes that it is absolutely essential that any new regulations proposed under CEPA, 1999 maintain this approach.

Similarly, Volkswagen endorses the harmonization of future Canadian emission standards with U.S. federal emission standards but believes that vehicles should not be subject to fleet average compliance requirements. Instead, Volkswagen proposes that future Canadian emission standards be harmonized such that vehicles produced and offered for sale in Canada have an equivalent model that is certified by the U.S. EPA and sold within the same model year in the U.S. Volkswagen suggests that the adoption of a phase-in strategy or corporate fleet average program will result in potential limitations in vehicle availability to consumers and a significant administrative burden for both government and industry while providing little additional air quality benefit.

Analysis

Environment Canada recognizes that when Canada's national emission standards were last amended, the federal government opted to not apply the same phase-in percentages that applied in the U.S. or to institute any applicable emissions averaging, banking and trading programs. As indicated in the Discussion Paper, past U.S. programs for averaging, banking and trading of emission credits were relatively limited in scope (i.e. primarily heavy-duty engines) and were optional for vehicle or engine manufacturers. In addition, phase-in requirements were viewed as a short-term mechanism (i.e. generally two model years) to provide flexibility in making the transition from an old standard to one of a more stringent nature. This being the case and since the automotive industry is highly integrated on a North American basis, it was felt that the proportion of cleaner vehicles and engines should not differ significantly between Canada and the U.S. using this approach. It was under those conditions that the government indicated that doing otherwise "*could limit vehicle model availability to Canadian consumers and result in significant administrative costs to both government and the industry while providing little additional environmental benefit*").

As in the past, the Department continues to believe that there would be limited value in requiring compliance in Canada with U.S. programs that are designed to provide short-term flexibility to companies in order to facilitate the transition to compliance with tighter standards. Programs such as phase-ins or voluntary averaging, banking and trading programs are designed primarily to allow companies to introduce improved emission controls over a longer period of time, as opposed to during a single model year. In this fashion, companies can have more flexibility in managing their product lines so that compliance with the new standards minimizes the disruption of their product introduction plans. Overall, the Department believes that continuing the current approach of requiring vehicles to meet the same emission standards for which they are certified for sale in the U.S., without implementing these types of short-term transition

programs in Canada can, for the most part, will achieve the overall objectives of the U.S. programs.

Unlike the above, the structure of the U.S. Tier 2 emission program is considerably different than the Tier 1 program that it will be replacing and creates a number of new considerations and potential implications. Under the Tier 1 program, all light-duty vehicles (i.e. passenger cars) are certified to the same emission standards. Similarly, all light-duty trucks of a given weight class are certified to the same specified emission standards. However, under the final emission standards of the Tier 2 program, vehicle manufacturers will have the flexibility of certifying any particular vehicle model to a range of eight different sets of emission standards (i.e. bins) of varying stringency, as long as the company complies with an annual fleet-average NOx emission standard of 0.07 g/mile. The following table provides a summary of the applicable emission standards for the various bins under the final Tier 2 program:

Bin #	NOx	NMOG	CO	HCHO	PM
8	0.20	0.125	4.2	0.018	0.02
7	0.15	0.090	4.2	0.018	0.02
6	0.10	0.090	4.2	0.018	0.01
5*	0.07	0.090	4.2	0.018	0.01
4	0.04	0.070	2.1	0.011	0.01
3	0.03	0.055	2.1	0.011	0.01
2	0.02	0.010	2.1	0.004	0.01
1	0.00	0.000	0.0	0.000	0.00

* Represent the average requirement under the Final Tier 2 program.

As can be seen from the above table, the NOx emission standards associated with the various available bins of the final Tier 2 emission standards range from 0.00 g/mile in the lowest bin (i.e. bin #1) to 0.20 g/mile in the highest bin (e.g. bin # 8). In addition, bin # 5 represents the annual fleet average that is required to be achieved by companies in any given model year under the final Tier 2 program which will be phased-in between 2004 to 2009 model years for all light-duty vehicles, light-duty trucks and medium-duty passenger vehicles (Note: light-duty vehicles and light light-duty trucks will achieve full phase-in by the 2007 model year).

In the absence of a Canadian fleet average program which corresponds to that of the U.S., the emission performance of the new Canadian vehicle fleet would depend largely on the future decisions of vehicle manufacturers on which vehicle models will be certified to which bins of emission standards for the U.S. market and on the future purchasing decisions of Canadians consumers. At this time, it is difficult to predict how these factors will ultimately combine to define the future Canadian fleet. It is possible that the emission performance of the new Canadian fleet could, on average, be as good or better than that of the U.S. even if the Canadian regulations do not specify a corresponding maximum corporate fleet average requirement. However, as a result of the much broader range of vehicle certification categories than in the past, there exists

a greater potential that, over the long term, the emission performance of the Canadian new light vehicle fleet could diverge from that of the U.S. market. The Department believes that incorporating a fleet average requirement in the Canadian regulations based on applicable U.S. programs would ensure that in the long term, the environmental performance of the new Canadian vehicle fleet will match the program objectives.

The incorporation of corporate fleet averaging programs also have other important benefits. For example, this approach would provide vehicle manufacturers with additional incentive to market advanced technology vehicles in Canada in order to generate emission credits for use in future model years or for sale to other companies. In the absence of a Canadian fleet average, companies may decide not to market some advanced technology vehicles as a result of the smaller Canadian vehicle market relative to the U.S. This approach would also set a level playing field for all companies selling vehicles in Canada and would reward those companies which do better than the fleet average requirements through the generation of emission credits.

The Department recognizes that comprehensive requirements for record-keeping and data submission would have to be developed and implemented in order to support the effective administration of Canadian fleet averaging programs. Nonetheless, the Department believes that this type of data collection would be necessary regardless of whether the fleet average requirements are implemented in Canada to allow the Department to effectively monitor the emission performance of the Canadian fleet.

Intended Path Forward

In developing future emission regulations for on-road vehicles and engines under CEPA, 1999, Environment Canada plans to ensure that the environmental performance of new vehicle fleets in Canada will be comparable to applicable U.S. program objectives. The details of future regulations, including possible corporate fleet-averaging standards or alternate mechanisms that achieve comparable results, will be developed in consultation with stakeholders during the regulatory development process.

1(d) Emission Certification and National Emission Mark

Summary of Stakeholder Comments

The CVMA indicated that Canada's current regulations recognize that the vast majority of vehicles and heavy-duty engines sold in Canada have an equivalent model certified by the U.S. EPA and accepts the U.S. EPA certificate of conformity as meeting Canadian requirements. The CVMA states that the use of the U.S. EPA certificate of conformity has served the government well over the past twelve years and has facilitated the free trade of both new and used vehicles between Canada and the U.S. In order to ensure an efficient use of resources for both government and industry, the CVMA advocates that a continuation of the principle of accepting vehicles with a U.S. EPA certificate of conformity be used as the method of determining compliance with the standards and that a parallel certification process could be used for those vehicles not sold in the U.S. with the acceptance of alternative evidence of conformity. The CVMA points out that the legislative authority to accept the certification by a foreign agency has been included in Division 5 of CEPA, 1999.

The CVMA also supports the need for a seamless transition from the *Motor Vehicle Safety Act* (MVSA) requirement to those under CEPA, 1999 and feels that it is essential that the regulatory framework of the established MVSR be maintained as it applies to emissions. In particular, the CVMA believe that it is essential that the concept of self-certification by a manufacturer be maintained under a new regulatory framework under CEPA, 1999.

Finally, the CVMA expressed concern about the emphasis being placed on a national emissions mark by Environment Canada. The CVMA believes that a national emissions mark would create complexity and costs, an unnecessary burden on manufacturers and would be a duplication of existing labelling requirements with no real environmental benefits. The CVMA felt that further discussions are warranted on the subject of the national emissions mark.

Analysis

Environment Canada recognizes that the automotive industry was previously subject to emission standards of a specific nature under the MVSA and that it continues to be subject to safety standards under that Act. The Department is committed to developing a sound and enforceable emission control program under CEPA, 1999 which, to the extent possible, provides as seamless a transition as possible for the automotive industry and which does not introduce any unnecessary burden or duplication for the industry.

Vehicle safety and emission standards in Canada have operated successfully under the MVSA based on a self-certification system since 1971. In addition, it is expected that the vast majority of vehicles sold in Canada will continue to be covered by a certificate of conformity issued by the U.S. EPA, to emission standards with which Environment Canada will be aligning the Canadian program. Accordingly, Environment Canada believes that the development of a regulatory framework under CEPA, 1999 which continues to be based on a self-certification system and which will continue to recognize a U.S. certificate of conformity as evidence of conformity to a specific set of emission standards (e.g. to a particular bin under the Tier 2 program) represents an appropriate approach for Canada.

The use of a national emissions mark (NEM) is an integral element of the legislative framework for controlling emissions from vehicles and engines under the authorities of Division 5, Part 7 of CEPA, 1999, and is analogous to the national safety mark under the MVSA. Section 152 of CEPA, 1999 states that "*No company shall Transport within Canada a prescribed vehicle, engine or equipment that does not have a national emissions mark applied to it*". Furthermore, section 153 prohibits any company from applying a national emissions mark to any vehicle, engine or equipment, selling any vehicle, engine or equipment to which a national emissions mark has been applied or importing any vehicle, engine or equipment unless a number of conditions are met, including compliance with prescribed emission standards. The NEM is therefore a central aspect of the operation of a self-certification vehicle emission program under the Act and as an enforcement mechanism for enforcing prescribed emission standards. Nonetheless, CEPA, 1999 provides some flexibility in determining the nature of the mark as the Act defines the national emissions mark as meaning "*a mark established by regulation for use in respect of emissions from vehicles, engines or equipment*". Consequently, the Department will consider any suggestions with respect to the manner

in which the mark could be defined so as to result in the least burden on the regulated industry and at the same time fulfill its important role.

Intended Path Forward

Environment Canada will develop a regulatory framework which continues to be based on a self-certification system and which recognizes a U.S. certificate of conformity as evidence of conformity to a specific set of emission standards that apply to a vehicle or engine. Also, the Department will work with stakeholders to define the national emissions mark in a manner which will result in the least burden on the regulated industry.

Path Forward Summary - On-Road Vehicles and Engines

Environment Canada intends to proceed with the development of regulations under Division 5 of CEPA, 1999 to align Canadian emission standards for on-road vehicles and engines with those of the U.S. EPA. Specifically, the following items will be included:

Light -duty vehicles and light-duty trucks (cars, pickups, SUVs, etc.):

- Proposed regulations to align with U.S. Tier 2 standards to be phased-in starting in the 2004 model year.
- For model years 2001-2003, an interim Memorandum of Understanding with vehicle manufacturers will be developed to provide for introduction of vehicles meeting LEV (low emission vehicle) standards; and

Heavy-duty vehicles and engines:

- Proposed regulations will be developed to bring Phase 1 standards into effect for model year 2004 and Phase 2 standards into effect consistent with U.S. timing.

In developing future emission regulations for on-road vehicles and engines under CEPA, 1999, Environment Canada plans to ensure that the environmental performance of new vehicle fleets in Canada will be comparable to applicable U.S. program objectives. The details of future regulations, including possible corporate fleet-averaging standards or alternate mechanisms that achieve comparable results, will be developed in consultation with stakeholders during the regulatory development process.

2) PROGRAMS FOR IN-USE VEHICLES AND ENGINES

Summary of Discussion Paper

From the vehicle perspective, Environment Canada's discussion paper focused largely on developing a new agenda for future Canadian emission standards. Nonetheless, a number of comments were received from stakeholders concerning other programs related to on-road vehicles and engines. The following sections provide a summary of these comments, an analysis of these comments and a description of how Environment Canada plans to address the issues.

2(a) Vehicle Inspection and Maintenance Programs

Summary of Stakeholder Analysis

The CPPI indicated that continuing to roll-out and enhance programs such as Inspection and Maintenance (I& M) that will ensure that the in-use car and truck fleet vehicles achieve their intended emissions levels is a high priority area for federal leadership. Similarly, while recognizing that regulation of the operator and mechanic falls under provincial jurisdiction, STOP encourages Environment Canada to continue to provide technical and policy assistance with regard to motor vehicle inspection and maintenance programs in Canada.

Analysis

The monitoring and control of emissions from the in-use vehicle fleet is a critical support to tighter emissions standards for new vehicles, this is increasingly important in the area of heavy duty vehicles due to their long term useful life expectancy.

Even the most advanced On-Board Diagnostic (OBD) systems currently in use do not repair malfunctioning systems. Further, it is clear that the “*check engine*” or “*service engine*” warning lights can and are ignored by the vehicle operators. These vehicles continue to be driven producing high emissions. The need for mandatory vehicle emissions inspection programs will continue to be required until such time as advanced OBD technology has the potential to disable a vehicle, degrade performance or emit electronic signals when actual emissions levels exceed permitted levels.

Mandatory I&M programs for light duty vehicles are currently in operation in BC (AirCare in Vancouver and Lower Fraser Valley) and in Ontario (Drive Clean in Toronto and Hamilton Wentworth Region).

BC’s AirCare Program has been in operation since 1992 for light duty vehicles. Under the current system, vehicles within the program area are required to pass an emissions test every year. However, the AirCare program is presently going through some changes and will be implementing a transient test for newer vehicles (to be tested every two years) and a revised test fee structure. BC’s program is operated as a centralized program, with the test centers being independent from the repair centers. Analysis of the data from the BC Program has repeatedly demonstrated the effectiveness of the program to reduce emissions.

In spring of 1999, Ontario implemented phase I of their Drive Clean program. All light-duty vehicles (4 to 19 years old) are required to pass an emissions test every other year. The Drive Clean program is operated as a decentralized (or hybrid) program, with testing being performed by privately owned certified test and repair centers or privately owned independent test centers.

Both BC and Ontario have also implemented mandatory emissions testing for heavy-duty diesel vehicles. BC’s AirCare OnRoad program consists of performing road side smoke opacity tests on vehicles that are viewed as being possible high emitters. The roaming test vehicles operate mainly in the Lower Fraser Valley, but can stop any heavy duty vehicle regardless of its origin. BC is currently studying the option of issuing fines to high emitters. Ontario’s heavy duty vehicle test program is applied province

wide and consists of an annual smoke opacity test performed at certified test centres. Ontario also performs road side spot checks throughout the province on vehicles that are viewed as being possible high emitters and may issue fines to any vehicle failing the spot check.

Other provinces are continuing to study and assess the implementation of similar I&M programs. The Quebec provincial government tasked the environmental group "*l'Association Québécoise pour la lutte contre la pollution atmosphérique (AQLPA)*" to study the issue of light duty vehicle inspection and maintenance programs within the province. AQLPA conducted a two year pilot project, "*Un air d'avenir*", with a number of partners from the automotive industry, which was directed to the motoring public. A report detailing the results of the pilot program, as well as the recommendations of the steering committee were submitted to the provincial ministry in June 1999. To date there have been no decisions made by the Quebec government to implement a mandatory program. In September 2000, AQLPA launched a second phase to the pilot project "*Un air d'avenir*", this time focusing on the heavy duty diesel vehicle sector.

The province of New Brunswick has shown some interest in the issue of inspection and maintenance, but has not moved forward in this area. For a number of years now, the New Brunswick Lung Association has been very active in the area of vehicle inspection and maintenance and have hosted a number of voluntary Vehicle Emissions Inspection Clinics throughout the province with the assistance of Environment Canada.

The authority to implement I&M programs is within provincial jurisdiction. However the federal government does have a role in terms of standardization and coordination of provincial programs especially in the area of heavy duty vehicles due to their extensive use in inter-provincial freight movements.

Intended Path Forward

The Department developed and issued a Code of Practice for Light Duty Vehicle Inspection and Maintenance Programs through the CCME and has recently updated the publication to recognize changes in testing equipment, test procedures and process. The Department will continue to monitor developments in I&M with the view to updating the Code of Practice as necessary. The Department will continue to work with Provincial authorities to assist and promote the development of additional programs.

The Department intends to develop a Code of Practice for Heavy Duty Vehicle Inspection and Maintenance Programs in consultation with interested stakeholders. A background document reviewing current programs, testing issues and potential program formats has been prepared. The document has been circulated to interested parties for feedback and will be posted on the department's web site. The intention is to form a steering committee and initiate the drafting of the Code of Practice. Consideration is also being given to organizing a Workshop to expand discussion on the role and potential impact of heavy duty I&M, including the need for harmonizing provincial I&M programs and possible extension to cross-boarder (Canada-USA) harmonization with U.S. State programs.

2(b) Heavy-Duty Engine Retrofit Programs

Summary of Stakeholder Analysis

The CPPI indicated that considering the evaluation and introduction of diesel retrofit programs, beginning with PM improvements now, followed by NOx improvements once enabling fuel is available, should be a high priority area for federal leadership. Furthermore, the CPPI suggested that diesel engine retrofit programs appear to be cost-effective and would maximize the benefits associated with the introduction of an ultra low sulphur diesel fuel. Similarly, STOP stated that emissions from the existing diesel bus fleet could be reduced on a cost-effective basis through the imposition by Environment Canada of a mandatory retrofit requirement with “U.S. EPA Certified” after-market parts. STOP urged Environment Canada to follow the advice of its consultant’s report “Proposed Bus Engine Rebuild Program - A Canadian Alternative” (October 1999).

Analysis

Heavy duty engine retrofit programs have been underway in the USA for many years and many programs are recognized under State Implementation Plans for PM attainment. The Department recently contracted out a study on USA bus engine retrofit programs and their potential for application in Canada. The report considered costs associated with a potentially subsidized Canadian program which differs from USA programs which mandate engine and equipment upgrading.

The issue of high emissions levels from older equipment can be addressed through approaches other than a retrofit program, whether subsidized or mandated. Vehicle scrappage programs, voluntary or mandatory, and increased capital cost allowance to encourage faster turn over of the vehicle fleets could also be considered.

Intended Path Forward

The Department will continue to study the need to reduce emissions levels from older vehicles, both light duty and heavy duty, and will continue to assess the potential for various program approaches to address this area of emissions.

2(c) Transportation Infrastructure

Summary of Stakeholder Analysis

The Medical Officer of Health for Toronto indicated that in order to reduce the number of vehicles on Toronto’s roads, the provincial and federal governments must share in funding public transit to increase its capacity and service in the Greater Toronto Area. Friends of the Earth stated that the road map on vehicles and fuels should be extended to support a green infrastructure program, recommending that Environment Canada lead federal efforts in identifying opportunities to move toward more environmentally benign systems for mobility to achieve health as well as climate change objectives.

Analysis

The infrastructure which supports our transportation system has a significant impact on demand or need for transportation. Appropriate modifications to the infrastructure can be used as a powerful tool to address the environmental impact of transportation.

Transportation infrastructure is a shared responsibility among the levels of government; federal, provincial, regional and municipal governments. The sharing of responsibility has made it difficult to develop a common vision or action plan to address this major investment area, especially during times of reduced government funding resources.

Environment Canada has studied many aspects of transportation infrastructure and has worked with many different groups (Canadian Urban Transit Association, Transport 2000, Federation of Canadian Municipalities, municipal governments, and ENGOs) to better understand the total impact and the needs of this area of the transportation system. It is clear from our investigations that there is very little regulatory role for Environment Canada in this area and any progress will have to occur through joint cooperation with other groups and public education.

Intended Path Forward

The department will continue to work jointly with other groups and will increase efforts to educate the public and to build cooperation among the various parties involved in transportation infrastructure.

Many aspects of our current transportation system, such as road expansion, urban design, aging bus population, congestion, and etc., could be improved to significantly reduce the environmental impacts of transportation related-activities. A better appreciation of the impact of current practices and implementation of modifications can be used as a powerful tool to promote positive change.

Transportation infrastructure is a shared responsibility among the different levels of government: federal; provincial; regional; and municipal governments. Work is underway at all levels to address these issues. The provinces are working with municipalities to develop better design requirements and increased awareness of the need for public transit. The federal government has recently announced major funding under the Infrastructure Support Program. The Climate Change Action Fund - Public Education and Outreach Program has been extended by three years and increased funding has been made available under the “*Moving on Sustainable Transportation*” (MOST) Program of Transport Canada. All of these initiatives are providing a better understanding of the problems and will assist in implementing solutions aimed at addressing the impact of transportation on the environment.

Intended Path Forward

The department will continue to co-operate with other jurisdictions and promote better understanding of the problem through public education/awareness initiatives.

3) FUTURE EMISSION STANDARDS FOR OFF-ROAD ENGINES

Summary of Discussion Paper

The off-road⁷ sector covers a broad range of vehicle, engine and equipment applications, such as small engines used to power lawn and garden care equipment through to much larger engines used to power agricultural, construction and forestry equipment. This sector also includes engines used to power recreational equipment such as snowmobiles and all terrain vehicles, etc. There are currently no emissions control regulations for the off-road sector.⁸

There are some unique characteristics associated with the off-road sector as compared with the on-road sector. For example, the same engine can be used in widely varying equipment applications (e.g. an engine used in a piece of construction equipment could also be used in agricultural equipment) and therefore the operating characteristics can be quite different. Also, there is a lack of vertical integration within many categories of the off-road sector. In many instances, engine manufacturers design engines for sale to original equipment manufacturers for installation into specialized equipment.

The U.S. EPA begun establishing emissions standards for non-road engine categories starting in the 1990's. Environment Canada recently entered into voluntary agreements, also known as Memoranda of Understanding (MOUs), with manufacturers of outboard engines and personal water craft, small handheld and non-handheld utility engines and off-road diesel engines. These agreements seek the early introduction of the applicable classes of off-road engines designed to comply with the first stage of U.S. federal emissions standards.

As noted in the Discussion Paper, Environment Canada proposes to develop and implement emissions standards aligned with those of the U.S. EPA, where authority exists under Division 5 of CEPA, 1999. Specific U.S. federal emissions control programs that have been developed and implemented include:

- The U.S. EPA Phase 2 emissions standards for small spark-ignited utility engines which is being phased-in between 2001-2007 (U.S. Code of Federal Regulations, Title 40 Part 90). These emissions standards, for the most part, cover engines less than 1 litre in displacement rated at or below 19Kw. Typical examples of engines within this category, which are referred to as "handheld" and "non-handheld" engines, include small gasoline powered utility engines such as those used in lawn and garden care equipment, pumps, generators, and handheld equipment;
- The U.S. EPA Tier 2 and 3⁹ emissions standards for non-road heavy-duty compression-ignition engines (U.S. Code of Federal Regulations,

⁷ The terms "off-road" and "non-road" are used interchangeably within the ensuing discussion.

⁸ Although not considered within this document, locomotives, aircraft and marine vessels can also be considered as categories of non-road engines. The authority to regulate these categories of engines and equipment rests with Transport Canada.

⁹ Tier 3 emissions standards have been established for engine power categories ranging from 37 through to 560 kW. These are scheduled to commence in the U.S., depending on the engine power rating, beginning with the 2006 model-year. However, the EPA has not as yet finalized a more stringent Tier 3 particulate standard. A feasibility review, expected in 2001, will consider Tier 3 particulate standards

Title 40 Part 89). Tier 2 emissions standards will be phased-in by engine horsepower rating from 2001 through 2006. This category of non-road engines primarily covers diesel engines used in most land-based applications as well as marine engines rated below 37 kW. Examples of engines within this category include engines used to power construction, agricultural and forestry equipment as well as industrial equipment such as cranes, generators etc.; and

- U.S. EPA emissions standards for outboard engines and personal water craft (U.S. Code of Federal Regulations, Title 40 Part 91). These standards establish progressively more stringent emissions standards that are being phased-in over the course of a nine-year period and will be fully implemented in 2006.

The U.S. EPA is currently in the process of developing emissions standards for large spark-ignited engines such as those used for industrial applications, as well as for recreational vehicles using spark-ignition engines (e.g. snowmobiles, off-road motor cycles, all-terrain vehicles) and for gasoline powered in-board and stern drive marine engines as well as for recreational marine diesel engines. These engines have not as yet been regulated for emissions at the federal level in the U.S.¹⁰ In an Advance Notice of Proposed Rule Making (November, 2000), the EPA announced that it was seeking input on its plan to propose a national emissions control program for the aforementioned categories of engines. Final rule makings are expected in the coming years. Environment Canada anticipates developing Canadian programs for these categories of off-road engines once the U.S. federal rules are finalized.

As with the case for the on-road sector, the U.S. federal non-road programs provide for averaging, banking and trading (ABT) of emissions credits along with phase-in provisions for certain engine categories thereby providing industry with flexibility to meet the prescribed standard. As a consequence, an engine family in a manufacturer's production line could be certified to an emissions level in excess of the applicable standard provided it would be offset by an engine family certified below the applicable standard. The banking and trading provisions permit an engine manufacturer generating emissions credits to retain those credits for use in future model-year averaging or for trading with other engine manufacturers. The ABT provisions, along with the graduated phase-in of certain non-road engine emissions standards permit a manufacturer to determine their optimal approach to comply with the applicable emissions standard.

Stakeholders were asked to provide their views on the development of Canadian off-road engine emissions standards aligned with those in the U.S. and their views on the issue of phase-ins, emissions credits and the use of the national emissions mark.

along with the appropriateness of the Tier 2 standards for engines rated under 37 kW and Tier 3 standards for engines rated between 37 and 560 kW.

¹⁰ California has established emissions control programs for off-road motorcycles and all-terrain vehicles as well as for large spark-ignition engines.

3(a) Alignment with U.S. EPA Federal Emissions Standards

Summary of Stakeholder Comments

The general consensus from comments received support the alignment of off-road engine emissions standards with the U.S. federal programs. Generally, commenters identified the integrated nature of the North American economy and the implementation of aggressive national programs for non-road engines by the U.S. EPA to reduce emissions from new non-road engines as two key elements supporting a policy of alignment with U.S. federal programs as a logical approach for Canada to achieve significant emissions reductions in a cost-effective manner.

There is also support for the development of off-road engine emissions control programs for engine categories where U.S. emissions control programs are under development. The Canadian Council of Snowmobile Organizations, the International Snowmobile Manufacturers Association and the Canadian All Terrain Vehicle Distributors Council supported the concept of aligning Canadian emissions standards with the U.S. federal program once it becomes known.

The Manufacturers of Emissions Controls Association (MECA), while supportive of harmonizing to the maximum extent possible, commented that it believes further emissions reductions can be achieved in certain engine categories. Specifically, the Association indicated that it believes it is technically feasible to meet more stringent emissions standards than those that are currently established under the U.S. program for the off-road diesel and the non-handheld spark-ignited engine categories.

The Alberta Farm and Research Centre (AFRC), commenting on the specialized and unique operating characteristics of agricultural machinery, proposed establishing engine emissions targets for agricultural machinery in units that reflect the actual use of the equipment, for example weight per unit area covered, since the equipment is used to perform a specific task over a defined area. Additionally, AFRC proposed considering agricultural power equipment emissions based on a production or an annual basis since such equipment is usually only used at specific periods during the annual production process.

Analysis of Comments

Commenters generally supported the development of off-road emissions standards for Canada aligned with the U.S. federal program.

The introduction of non-road engine emissions programs in Canada aligned with those in the U.S. would, in addition to subjecting these categories of products to emissions standards for the first time in Canada, permit the industry to achieve an economy of scale within the North American context, particularly in the case of low volume and niche applications.

Given the objective of developing a Canadian program aligned with the U.S. federal emissions program, implementation of the existing U.S. federal program serves as a useful first step. Therefore, it would seem appropriate, noting the overall benefits of an aligned program, to dialogue with the U.S. EPA, engine manufacturers and other interested parties to work towards more stringent standards for a later date.

With regard to the development of emissions targets for agricultural machinery in units that reflect the actual use or application of the equipment, the off-road engine sector covers a diverse spectrum of equipment applications with engines supplied by a limited number of manufacturers. Compliance with engine emissions standards is demonstrated by the engine manufacturer on a mass per brake specific power basis. The current structure of the off-road industry facilitates this approach -- there are a limited number of engine manufacturers supplying engines for a wide range of often customized equipment applications. Consequently, the development of customized emissions measures depending on the sector or activity would significantly expand the complexity of the regulations and the burden for compliance.

The Department has learned that the present definitions within Division 5, Part 7 of CEPA, 1999 exclude marine engines from its regulatory authority. The terms “steamer, steamship and tug” as defined under section 2 of the Canada Shipping Act encompass any marine vessel of any size or type that is propelled by an engine. Work is underway to address this situation.

Intended Path Forward

The Department intends to proceed with the development of emissions control programs for off-road engines, under Division 5 of CEPA, 1999, aligned with the corresponding U.S. federal emissions control programs. These include:

- Development of proposed regulations corresponding to the U.S. EPA Phase 2 program for spark-ignition gasoline utility engines;
- Development of proposed regulations corresponding to the U.S. EPA Tier 2 program for compression-ignition off-road engines; and
- Development of proposed regulations corresponding to the U.S. EPA program for spark-ignition marine engines.

The Department will consider the development of:

- Tier 3 program for compression-ignition off-road engines when the full scope of the U.S. EPA program is available; and
- Emissions control programs for large spark-ignition engines, recreational vehicles using gasoline engines, and stern drive and inboard gasoline-powered marine engines aligned with the U.S. EPA programs once these programs are finalized in the U.S.

3(b) Emissions Credit Systems

Summary of Stakeholder Comments

There were few direct comments received on this matter. Comments pertaining to fleet averaging and emissions credit systems centered around whether ABT provisions, required under the U.S. program, should be required in Canada. A few commenters raised the issue of phase-ins, averaging and emissions credit systems, particularly in the context of the off-road engine MOUs that the department recently concluded with members of the industry.

The Canadian Marine Manufacturers Association (CMMA) commented that it favors a regulatory approach which harmonizes certification and equipment standards with the U.S. federal program but which allows for an individual Canadian solution to matters surrounding administration and support. The Association pointed out that given the relative market sizes, all production planning for North America focuses almost entirely on the U.S. market.

In response to the discussions raised during the workshop regarding the off-road engine MOU's, and in particular, those for smaller engines, the GVRD commented that it favored regulations with similar ABT provisions as are enacted by the U.S. EPA. The GVRD pointed out that without ABT provisions manufacturers are not under any constraint to offset "dirty" engines with "clean" engines.

The Outdoor Power Equipment Institute (OPEI), commented that the emission regulations should include comparable emissions standards to the U.S. program providing manufacturers with the option of relying on averaging, banking and trading.

Analysis of Comments

Written comments on this issue, were in part, stimulated by discussions during the May workshop concerning the off-road engine MOUs which do not incorporate the averaging provisions required under the U.S. federal program. Some parties have expressed concerns that without ABT provisions, there is no effective control over the engines supplied to Canada.

The fleet averaging provisions and emissions credit system under the U.S. programs provide a flexible approach for manufacturers to develop and introduce products while respecting overall emissions reduction objectives. This permits a market-based approach leaving manufacturers to develop a mix of products to meet a given environmental objective, and thereby facilitate the transition to more stringent emission standards. The three U.S. non-road engine emissions programs under consideration for Canada at this time include emissions credit provisions. However, given these programs are still within the phase-in stages in the U.S., the long-term intentions of engine manufacturers with respect to the emissions credit provisions are not certain at this time.

Sections 160 and 162 of CEPA, 1999 contain provisions to establish a system of emissions credits. The adoption of an emissions credit scheme in Canada would provide an incentive to maximize the low-emitting engine product offerings in this country as is intended for these programs in the U.S. It should be noted that there is no certainty that the overall engine-family mix for Canada would mimic that of the U.S. For instance, there already exist differences between product mixes within Canada and the U.S. The CMMA, in its comments, noted differences in sales and model mixes between both countries, with Canadians tending to buy, on average, lower power rated outboard engines than their counterparts in the U.S.

Environment Canada is also cognizant of the niche applications and the relatively limited market size for certain off-road engine applications. There is also the issue of the increased regulatory burden and costs upon engine manufacturers and distributors. It is uncertain what impact the imposition of an emissions credit system would have

upon the market-place given the limited comments received by the Department on this subject.

Intended Path Forward

In developing the regulatory framework under CEPA, 1999, Environment Canada plans to consider incorporating an emissions credit system for the various off-road engine sectors to ensure these programs achieve the long-term objectives of the corresponding U.S. programs. Environment Canada will consider comments on an emissions credit system during the regulatory development process.

3(c) Emissions Certification, Labeling and the National Emissions Mark

Summary of Stakeholder Comments

There were a limited number of comments received which directly addressed the issue of emissions certification and labeling. Those comments directly addressing the issue of emissions certification and labeling were supportive of an approach which would recognize engine and emissions certification and labeling requirements applied under the U.S. federal program for Canada under a harmonized regime. Generally, proponents indicated their preference for an aligned system whereby a manufacturer could produce a single engine family that could be tested once, certified once and sold in either Canada or the U.S. Some commenters suggested that any additional information required by the regulations be provided in the operator's manuals.

The Federation of Ontario Cottages Association and the Georgian Bay Association, citing the example of the marine engine MOU [a voluntary program], commented that an emissions label could infer a product is "*environmentally friendly*".

There were no direct comments received regarding the National Emissions Mark as it would pertain to off-road engines.

Analysis of Comments

The acceptance of U.S. certification is an element of the existing off-road engine MOU's. The Department is, in essence, employing the concept of self certification under these agreements since manufacturers have the option of demonstrating compliance through a U.S. certificate of conformity or via provision of emissions test results. This approach facilitated the introduction of cleaner engines under the MOU's. Environment Canada is of the opinion that the development of a regulatory framework under CEPA, 1999, which will continue to be based on self certification and which will recognize a U.S. certificate of conformity as evidence of conformity to a specified emissions standard represents an appropriate approach for Canada.

Most of the industry noted their preference for the use of a common emissions label, similar to the emissions labeling requirement called for under the off-road MOUs. The emissions control information label applied to engines or equipment pursuant to the MOU provides engine and emissions information in accordance with U.S. emissions rules. As previously noted in the Vehicle Section of this document, the national emissions mark is an integral element of the legislative framework for controlling emissions under the authority of Division 5 of CEPA, 1999. The Department also

recognizes the concern expressed by the Portable Power Equipment Manufacturers Association (PPEMA) regarding the limited surface area of many handheld products for labeling such equipment .

The Department will consider suggestions with respect to the manner in which the mark could be defined so as to result in the least burden on the regulated industry while at the same time fulfilling its important role.

Intended Path Forward

Environment Canada will develop a regulatory framework which continues to be based on a self-certification system and which recognizes a U.S. certificate of conformity as evidence of conformity to a specific set of emission standards that apply to a vehicle or engine. Also, the Department will work with stakeholders to define the national emissions mark in a manner which will result in the least amount of burden on the regulated industry.

3(d) Timing / Effective Date of Canadian Standards

Summary of Stakeholder Comments

While there was general consensus to align Canadian off-road engine emissions standards with the applicable U.S. federal emissions program, a few parties provided some comments generally proposing to delay the time frame to implement a regulated Canadian program.

In its comments, the CMMA proposed an assessment of the [marine engine] MOU program prior to regulation. The CMMA noted that feedback from the MOU will take approximately two to three years. In the interim the Canadian public is benefiting from the MOU.

The PPEMA, in its comments, recommended a phase-in schedule be adopted for the standards that should mirror the phase-in schedule under the U.S. federal Phase 2 rule with the target years adjusted to match the delay between implementation of the Phase 2 rule in the U.S. and Canada . This would provide for a gradual reduction of emissions levels.

In its comments, the GVRD proposed that the small engine sector should be one of the first targets for regulation in view of the comments raised during the workshop concerning the small engine MOU.

Analysis of Comments

The off-road engine MOU's represent a first step to address emissions from selected off-road sectors which have previously not been subject to emissions control. The Department agrees that feedback from the MOU program, including information that would assist the Department in determining overall mix of engines provided to Canada under the MOU program would be helpful within the context of developing the appropriate regulatory program.

The U.S. has already finalized its second level of emissions control standards for various non-road sectors. Low-emitting technologies designed to meet the U.S.

standards are being introduced into the U.S. whilst no corresponding framework exists to facilitate their introduction into Canada. Accordingly, the Department believes that the implementation of a regulatory framework and standards will facilitate the introduction of low-emitting engines into Canada. Furthermore, this approach would support the industry objective to rationalize product offerings and achieve economy of scale.

The proposed delay with the phase-in of the Canadian standards could serve to delay the implementation of a Canadian program and consequently, the implementation of low-emitting technologies. The U.S. Phase 2 rules for utility engines have already established a four-year phase-in schedule for each affected class of engine with the industry working towards this objective.

Intended Path Forward

Environment Canada plans continue to develop emissions standards for off-road engines. The effective date for the Canadian standards will be considered during the normal regulatory process.

Path Forward Summary - Off-Road Vehicles and Engines

The Department intends to proceed with the development of emissions control programs for off-road engines, under Division 5 of CEPA, 1999, aligned with the corresponding U.S. federal emissions control programs. These include:

- Development of proposed regulations corresponding to the U.S. EPA Phase 2 program for spark-ignition gasoline utility engines;
- Development of proposed regulations corresponding to the U.S. EPA Tier 2 program for compression-ignition off-road engines; and
- Development of proposed regulations corresponding to the U.S. EPA program for spark-ignition marine engines.

The Department will consider the development of:

- Tier 3 program for compression-ignition off-road engines when the full scope of the U.S. EPA program is available; and
- Emissions control programs for large spark-ignition engines, recreational vehicles using gasoline engines, and stern drive and inboard gasoline-powered marine engines aligned with the U.S. EPA programs once these programs are finalized in the U.S.

The details of future proposed regulations, including self-certification, emissions credit systems and fleet averaging provisions, where effective and practical, will be developed through the regulatory process.

4) POLICY ON INTERNATIONAL ALIGNMENT FOR FUELS WITH OTHER JURISDICTIONS

Summary of Stakeholders' Comments

Numerous stakeholders (the Canadian Petroleum Products Institute, Imperial Oil, Petro-Canada, Sunoco, North Atlantic Refining, Husky Oil, Alberta, the Greater Vancouver Regional District, the Engine Manufacturers Association, the Canadian Vehicle Manufacturers Association, the Manufacturers of Emission Controls Association) recommended to a greater or lesser degree that Environment Canada adopt a policy of aligning Canadian environmental fuel requirements with U.S. national fuel requirements. Some stakeholders further advocated that Environment Canada should also incorporate European standards (Petro-Canada, Sunoco), accommodate unique Canadian circumstances (Petro-Canada), or align Canadian fuel specifications with those of our major trading partners (CPPI).

Analysis

The Discussion Paper states:

In some cases, vehicle emission control systems cannot operate properly without the right fuels – vehicles and fuels therefore must be viewed as one system. As a minimum, Environment Canada ensures that Canadian fuels do not adversely affect the operation, performance, or introduction of vehicle engine technology or emission control equipment. Where warranted to protect the health of Canadians and the environment, further measures and/or earlier implementation will also be taken to improve fuel quality.

Another consideration is the environmental requirements for fuels enacted by other progressive jurisdictions, particularly our major trading partners: Europe and the U.S. In general, Canada should ensure that it does not fall behind the environmental fuel standards of progressive jurisdictions. Studies have shown that the competitive impacts on Canadian refiners may be minimized where there is alignment of requirements. This avoids Canada falling behind in refinery technology and level of investment in our refineries, and will help prevent the “dumping” of poor-quality fuels into Canada. In summary, progressive environmental regulations that align with those of our major trading partners are good for the environment and the health of Canadians; they can also promote the competitiveness of Canadian refiners and will minimize potential risks of trade sanctions by countries with more stringent requirements. (pp. 22-23)

As indicated above, alignment with fuel standards of other progressive nations is generally good for Canada. However, there may be instances where those nations have not taken action on an issue, are acting too slowly, or are acting in only parts of their country. Under such circumstances, Environment Canada may take (and in the past has taken) more progressive actions. For example, because of concern regarding emissions of benzene from vehicles and the gasoline distribution system, Environment Canada passed the *Benzene in Gasoline Regulations*, which generally align with the standard in the European Union and parts of the U.S. (the U.S. does not have a national “1%” standard for benzene and has recently proposed an individual refinery “freeze” of benzene at 1998-1999 levels for the areas that currently do not have a limit on benzene). Similar action by Canada may be required for fuel oils because where the European Union has pan-national standards, the U.S. has different regional standards.

Intended Path Forward

Environment Canada plans to continue its approach of generally aligning Canadian environmental fuel requirements with those of the U.S., while taking into consideration environmental standards developed by the European Union. There may be instances, however, where Canada takes additional action to protect the health of Canadians and the environment.

5) FUTURE STANDARDS FOR DIESEL FUEL

5.1 On-road Diesel Fuel

Summary of Discussion Paper

The Discussion Paper summarized international activities in regards to improving the quality of diesel for use in on-road vehicles, specifically the binding directive of the European Union and activities in the United States. It is clear that much of the focus is on reducing the level of sulphur in on-road diesel to very low levels. This has certainly been borne out by subsequent events.

Since the publication of the Discussion Paper, a number of significant events have occurred. The most notable is the publishing by the U.S. EPA in December 2000 of its final rule for Heavy-duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements. In regards to diesel composition, the EPA has regulated a maximum of 15 ppm starting June 1, 2006 - a 97% reduction from the current limit of 500 ppm. The EPA has determined that the new heavy-duty vehicle emissions standards "*will not be feasible without the fuel change*". As a "safety valve" to reduce concerns regarding supply of diesel, the final U.S. rule allows up to 20% of on-road diesel to continue to meet the current 500-ppm limit until 2010. It further allows for a credit banking and trading scheme to increase the flexibility for refiners and importers of diesel.

Other notable events include California requiring that diesel fuel used in urban buses have a maximum sulphur level of 15 ppm starting in 2002, and rapidly growing pressure within the European Union to change its 2005 sulphur standard from 50 ppm to 10 ppm (or alternatively to require 10 ppm by 2007). California Air Resources Branch staff have also recommended that California adopt a sulphur limit of 15 ppm for on-road diesel starting June 2006 and further evaluate the effects of lowering aromatics, PAHs and density on diesel PM emissions.

The Texas Natural Resources Conservation Commission is proposing to cap sulphur in on-road and off-road diesel for use in eastern and central Texas at a maximum of 30 ppm in May 2004 and of 15 ppm in May 2006. In addition, Texas proposes to require on-road and off-road diesel to meet California requirements (500 ppm sulphur, 10% aromatics) starting in May 2002.

A large U.S. refiner, Tosco, recently announced that it will be producing 15-ppm diesel at its two California refineries by 2003 – three years ahead of the proposed EPA rule. It is also investing in its Washington state and Irish refineries to meet a sulphur limit of 15 ppm. BP (Arco) has also indicated its support for California's proposal.

In regards to cetane, the Ozone Transport Commission in the U.S. northeast is proposing a summertime minimum cetane level of 50 in order to help reduce pollution.

Summary of Stakeholders' Comments

There is nearly universal support by stakeholders for Environment Canada to regulate sulphur in on-road diesel at the same level as the final U.S. requirement. Stakeholders supporting this include the Canadian Petroleum Products Institute (CPPI), Imperial Oil, Sunoco, Petro-Canada, North Atlantic Refining, the Greater Vancouver Regional District (GVRD), the Manufacturers of Emission Controls Association (MECA), Toronto Board of Health, Canadian Trucking Alliance (CTA), and the Canadian Vehicle Manufacturers' Association (CVMA). A few stakeholders want sulphur levels to be lower than 15 ppm (e.g., Volkswagen and Friends of the Earth). Husky Oil, while supporting harmonization with U.S. fuel standards and timing, noted that it is "*unable to meet the contemplated 15 ppm sulphur in diesel mark without making significant capital investment*", and recommends a level of 50 ppm.

In addition to a limit on sulphur, CVMA also recommended a minimum cetane level of 55 for on-road diesel fuel.

Analysis

Given the international movement to reduce sulphur levels in on-road diesel to 10 to 15 ppm and the nearly universal support of stakeholders in matching the U.S. standards for on-road diesel, Environment Canada can see no justification to delay requiring reductions in Canadian on-road diesel, and considers the proposed U.S. levels and timing to be satisfactory in respect of allowing vehicle emission control technologies to operate as intended. Providing early notice of required changes to sulphur in on-road diesel will allow refiners the maximum time to plan, design and install the required desulphurization equipment.

Environment Canada is of the view that there is insufficient evidence at this time regarding the effects on emissions, engines and emission control equipment of parameters other than sulphur (e.g., cetane, aromatics, PAHs, and density) to justify setting requirements for these parameters. Environment Canada will continue to closely monitor the results from fuel programs to understand the effects of such parameters on emissions and to analyze data from such programs. The Department will also continue to undertake its own tests on Canadian diesel.

Environment Canada considers it prudent to gather more information on the composition of Canadian diesel fuel (both for on-road and off-road diesel), particularly on cetane, aromatics and PAH levels (information on sulphur and density levels is already collected under the *Fuels Information Regulations*). This information is important in order to assess the effect of potential fuel controls that might be considered in the future. The successful voluntary Survey of Benzene, Aromatics and Olefins in Gasoline, which was carried out by Environment Canada from 1994-1998 can serve as a model for the data collection process.

Intended Path Forward

Environment Canada intends to align with the final U.S. level and timing for sulphur in on-road diesel fuel (i.e. 15-ppm sulphur limit starting June 1, 2006). The Canadian regulatory process will be initiated shortly with a discussion paper soliciting views from stakeholders on the need for and the form of “safety valve” provisions similar to those in the U.S. final rule.

Environment Canada also intends to establish a comprehensive database on diesel fuel composition in order to monitor fuel quality. Refiners and importers of diesel fuel will be requested to provide information on the levels of cetane, aromatics and PAHs in both on-road and off-road diesel starting in January 2001. If participation in this survey is inadequate, Environment Canada will consider mandatory reporting requirements.

5.2 Off-Road Diesel

Summary of Discussion Paper

The Discussion Paper noted the growing support to reduce sulphur in off-road diesel, particularly in the U.S., but that no specific level or timing has yet been established. Since the publication of the Discussion Paper, California Air Resources Board staff have recommended that California adopt a sulphur limit of 15 ppm for off-road diesel starting June 2006. Furthermore, there are firm indications that the EPA will propose a rule on sulphur in off-road diesel in 2001.

The Texas Natural Resources Conservation Commission is proposing to cap sulphur in on-road and off-road diesel for use in eastern and central Texas at a maximum of 30 ppm in May 2004 and of 15 ppm in May 2006. In addition, Texas proposes to require on-road and off-road diesel to meet California requirements (500 ppm sulphur, 10% aromatics) starting in May 2002.

Summary of Stakeholders' Comments

There is universal agreement by stakeholders that sulphur in off-road diesel is too high and must be reduced. Many stakeholders recommend that Canada align with whatever standard emerges in the U.S. (CPPI, Imperial Oil, Engine Manufacturers Association), while others recommend that the sulphur limit be the same as that of on-road diesel (Toronto Board of Health, STOP). Husky Oil recommends a limit of 500 ppm, while Friends of the Earth recommends that off-road diesel (and all fuels) be “*sulphur free*” by 2010.

CPPI recommended a study to assess where off-road diesel is used and the impacts of sulphur reductions on air quality. The Canadian Trucking Alliance was of the view that diesel used by locomotives should be included in any specifications for off-road diesel.

Analysis

Environment Canada considers that the level of sulphur in off-road diesel is too high and must be reduced. However, the Department notes that substantially lower volumes of high-sulphur diesel are being produced for off-road use since the coming into force of the 500-ppm limit for on-road diesel under the *Diesel Fuel Regulations*. Environment

Canada understands that the Canadian fuel distribution system is poorly equipped to handle two grades of diesel. Consequently, considerable quantities of 500-ppm diesel are consumed by off-road engines and vehicles. Because of the potential higher cost differential between diesel types, this situation may not continue once the limit for on-road diesel becomes more stringent. At present, several levels for sulphur in off-road diesel seem to be open for consideration in the U.S.: namely, 15, 50, 350 and 500 ppm.

Intended Path Forward

Environment Canada plans to recommend regulation of a limit for sulphur in off-road diesel. The limit is to be established in the same time frame that the EPA plans for developing limits for sulphur in U.S. off-road diesel (expected to be in 2001). In preparation for this, Environment Canada will gather information on where off-road diesel is used, the effects of sulphur reduction on emissions, and the costs of reducing sulphur in diesel for use in all off-road engines and vehicles, including rail and marine applications.

The survey of diesel composition, discussed in the previous section on on-road diesel will also include off-road diesel.

6) Future Standards for Fuel Oils

Summary of Discussion Paper

The Discussion Paper detailed the pan-national requirements in the European Union for sulphur in fuel oils, as well as the patchwork of requirements in North America. It also noted that large reductions in emissions of sulphur dioxide could be realized by reducing sulphur in fuel oils: specifically, up to 200,000 tonnes per year, primarily in eastern and central Canada – areas with acidic deposition problems. Fuel oils are used in stationary applications such as residential heating and electrical generation.

Summary of Stakeholders' Comments

CVMA considers that the federal agenda should address sulphur in fuel oils. CPPI recommends that, since the issue is related to the program to reduce acid deposition (Acid Rain), Canada and the U.S. should act in concert when setting sulphur requirements. CPPI also states that it will “*support aligning with standards that may emerge in the USA and Europe*”.

Analysis

Provincial Governments are currently in the process of committing to new caps on emissions of sulphur dioxide. These new caps are expected to represent up to a 50% reduction from the current caps, depending on the province. Despite these significant reductions, it is expected that critical loads for acidic deposition will continue to be exceeded in many areas. Action to reduce sulphur in fuel oils would assist in reducing exceedances of the critical loads, as well as assist provinces in meeting their caps. Such action would also assist in reduction ambient levels of fine particulate matter (specifically fine sulphate particles), which would improve the health of Canadians.

Although the U.S. has a patchwork of state and local requirements for sulphur in fuel oils, no national standard has emerged and none is expected in the foreseeable future. Nevertheless, heavy fuel oil with a sulphur content less than 1% wt. is a commercially available product in the U.S., where it commands an average price premium of 1 to 3 Canadian cents per litre over higher sulphur fuel oil. International standards for fuel oils have emerged in Europe: namely, 1% wt. for heavy fuel oil starting in 2003 and 0.2% wt. for light fuel oil since 1998, reduced to 0.1% wt. starting in 2008. There is no other progressive international standard for fuel oils that would logically be adopted in Canada.

At present, sulphur appears to be the only issue of concern regarding the composition of fuel oils. Given the potential for reducing fine particulate matter, the expected continued exceedances of the critical loading for acidic deposition and the potential substantial reductions of sulphur dioxide and sulphates that might be achieved, action to reduce the level of sulphur in both light and heavy fuel oils appears warranted.

Intended Path Forward

Environment Canada proposes to develop measures to reduce the level of sulphur in both light and heavy fuel oils used in stationary facilities. Environment Canada intends to commence studies in 2001 of the benefits to the health of Canadians and the environment as well as the cost of reducing sulphur in fuel oils, with the view to matching the requirements set by the European Union for sulphur in fuel oils which will be fully implemented by 2008. Complementary measures to regulations, such as economic instruments, will be examined to accelerate the introduction of low-sulphur fuel oils.

7) FUTURE STANDARDS FOR GASOLINE

7.1 General Comments

The Discussion Paper outlined a number of gasoline reformulation issues: MTBE, emissions of air toxics (benzene, 1,3-butadiene, formaldehyde, acetaldehyde, PAHs, acrolein), near-zero sulphur, MMT, deposit control additives, Driveability Index (controls on distillation), aromatics, and summer vapour pressure.

Over the past decade there has been considerable effort by government and industry directed towards providing cleaner gasoline for Canadians. Initiatives include the removal of lead and reductions of summer vapour pressure, benzene, and sulphur levels. Given the considerable progress that has been made to improve the environmental quality of gasoline, Environment Canada considers that actions to improve the quality of diesel and fuel oils are higher priorities.

7.2 Emissions of Air Toxics

Update to Discussion Paper

In August, the EPA proposed a national refinery-specific freeze of benzene in gasoline at 1998-1999 refinery levels. The EPA stated that this proposal will have only minimal cost for refiners. Because the freeze tends to penalize those refiners that already have

low benzene levels and allows refiners currently at high levels more flexibility, there is not universal acceptance of this proposal within the petroleum industry.

Summary of Stakeholders' Comments

CPPI indicated that it would support expanding the use of the Benzene Emissions Number (BEN) in the *Benzene in Gasoline Regulations* to become the Toxics Emissions Number (TEN). It recommended, however, that research should be done “to determine whether any significant additional toxics reductions may be achieved through fuel reformulation in conjunction with Tier 2 [vehicle] technology”.

Analysis

As discussed in the Discussion Paper, the introduction of the Tier 2 vehicle emissions standards and the turnover of the Canadian fleet will significantly reduce emissions of air toxics from gasoline-powered vehicles. Nevertheless, improvements in gasoline quality can play a part in obtaining further reductions in emissions of these toxics. Environment Canada considers that further action may be warranted to reduce the emissions of air toxics from gasoline-powered vehicles through more stringent controls on gasoline composition.

Controls on the Benzene Emissions Number (BEN) were developed with the view that, when other substances emitted by gasoline-powered vehicles were declared toxic, the concept could be expanded to include those toxic substances, in line with the Complex Model used by the U.S. EPA. The *Benzene in Gasoline Regulations* set an annual average limit for BEN of 59.5. Two Shell and two Petro-Canada refineries have alternative (higher) BEN limits based on their historical levels.

An expanded Toxics Emissions Number (TEN) would address additional toxic substances, with a limit on the sum of the modelled toxics emissions. Possible limits for a TEN would be established by aligning with the level allowed in U.S. Phase 2 reformulated gasoline or California Phase 2 or Phase 3 reformulated gasolines. It should be noted that alternative limits for BEN were only considered to be a temporary measure and would not be continued for controls on a TEN.

Intended Path Forward

Further analysis is required of the potential for additional controls on gasoline quality to reduce emissions of toxic substances from vehicles. Environment Canada plans to study the effect on emissions of toxic substances from vehicles of setting additional limits for gasoline composition. Possible action to implement more stringent controls on gasoline composition in order to reduce emissions of air toxics from gasoline-powered vehicles is a lower priority than addressing the quality of diesel and fuel oils used in stationary facilities.

7.3 Deposit Control Additives

Update to Discussion Paper

No new developments.

Summary of Stakeholders' Comments

Both CVMA and CPPI call on Environment Canada to make the use of deposit control additives mandatory, in line with the requirements in the U.S. Lubrizol notes the beneficial environmental effects of a particular additive.

Analysis

The use of deposit control additives improves engine performance and reduces emissions from vehicles. Because of these beneficial effects, in 1995 the Task Force on Cleaner Vehicles and Fuels recommended that the Canadian General Standards Board (CGSB) require the addition of deposit control additives in its commercial standard for gasoline. The CGSB acted on this recommendation, and since 1996 the commercial standard for gasoline requires addition of deposit control additives. The CGSB standard largely addresses the same additive requirements as do the EPA's regulations. However, the U.S. regulation requires extensive administrative and record keeping (including product transfer documentation and mass-balance records) necessary to demonstrate that the additives are present in the gasoline at the effective levels.

Given the beneficial effects of deposit control additives on engine performance and emissions, Environment Canada believes that all Canadian gasoline should contain deposit control additives. It is Environment Canada's understanding that most gasoline in Canada now contains these additives. Consequently, government intervention to introduce requirements for deposit control additives would affect only a small portion of Canadian gasoline. Environment Canada's understanding is that this portion would be largely (probably exclusively) gasoline sold by smaller independent marketers.

Because the environmental benefits of these additives have been largely (but not totally) realized already, action on deposit control additives is a lower priority than action on sulphur in diesel and fuel oils.

Intended Path Forward

Environment Canada intends to examine the current usage patterns of deposit control additives in Canada and the costs of requiring their use at effective levels in all gasoline.

7.4 MTBE

Update to Discussion Paper

On May 24, 2000 the Governor of New York signed a bill to ban the use and sale of gasoline containing MTBE starting January 1, 2004 (a year and a day after California's ban starts). This was shortly followed on June 1 by Connecticut passing a similar ban in line with that in New York. New Jersey (a key state because of its pipeline network) is also considering whether such a ban should be in place in that state.

Altogether, ten states have banned or are phasing out MTBE in the 2002 to 2004 time frame: Arizona, California, Colorado, Connecticut, Iowa, Michigan, Minnesota,

Nebraska, New York, and South Dakota. The country of Denmark has also proposed to phase out use of MTBE through the use of a differential tax program.

Summary of Stakeholders' Comments

Friends of the Earth believes a coordinated phase out of MTBE use is required. On the other hand, CPPI indicated that there was no need for any regulatory action at this time, since its member companies "*do not plan to produce MTBE or blend it into gasoline at their refineries beyond 2002*". CPPI further indicated that, if in the future the U.S. imposed a national ban, CPPI would support a similar regulation in Canada.

Analysis

It is clear that the use of MTBE in the U.S. has resulted in considerable concern about contamination of drinking water. While the use of MTBE in Canada is considerably lower than it is in the U.S., there is still considerable public awareness of the issue in Canada. Although Environment Canada is aware of only one instance of MTBE being found in Canadian groundwater (at very low levels in the Abbotsford Aquifer, B.C.), there may be other incidences. To date there has been very little testing of MTBE in groundwater in Canada, however B.C.'s ministries of environment and health have initiated a program to analyze groundwater at 60 sites in B.C. including about 25 sites where there have been previous hydrocarbon spills. One of the parameters to be analyzed is MTBE. Environment Canada believes that it is imperative that detailed information be gathered on the use and releases of MTBE in Canada.

Intended Path Forward

Environment Canada intends to recommend publication in the Canada Gazette of a notice under paragraph 71(1)(b) of CEPA, 1999, 1999 requesting information on the usage and releases of MTBE. This notice will generally apply to those persons handling MTBE or gasoline containing MTBE. Following a review of this information, Environment Canada will consider whether further action in respect of MTBE is warranted.

7.5 Ethanol

Update to Discussion Paper

No new developments.

Summary of Stakeholders' Comments

The Canadian Renewable Fuels Association recommended that ethanol be a part of the federal clean fuels strategy.

Analysis

Since 1992, ethanol has been granted a favourable tax status, with the ethanol portion of gasoline blended with ethanol being exempt from the federal excise tax. In addition, properly blended ethanol-gasoline blends are currently the only fuels eligible to carry the "EcoLogo" designation of the Environmental Choice program.

Ethanol-blended gasoline results in reductions of certain vehicle emissions (CO, hydrocarbons) but also results in increases of other pollutants (NO_x, acetaldehyde). As vehicle standards become more stringent, the magnitude of emissions impacts (both increases and decreases) from use of ethanol are becoming increasingly small. The primary advantage of ethanol in terms of environmental performance is its considerable potential to reduce emissions of greenhouse gases. The increased use of ethanol in transportation fuels was studied in the context of climate change by the Transportation Issue Table under the Climate Change Issue Tables, with subsequent analysis by governments in this context. Close links will be made between the Cleaner Vehicles and Fuels agenda and the climate change process as appropriate.

Intended Path Forward

The Department will continue to examine this issue in the context of its effects on emissions of greenhouse gases through participation in processes addressing Climate Change.

7.6 Driveability Index (controls on distillation)

Update to Discussion Paper

No new developments.

Summary of Stakeholders' Comments

CVMA recommended that Environment Canada address this issue, as outlined in the World-wide Fuel Charter.

Analysis

From evidence provided by the auto manufacturers in the technical background to the World-wide Fuel Charter, it appears that a DI higher than their recommended range results in poor driveability (i.e., drivers notice poorer engine performance) and higher emissions. The CGSB standard for gasoline specifies requirements for the Driveability Index (DI) that are generally within the range of 550 to 575°C recommended by the World-wide Fuel Charter for most of the year, except during the summer. It is not known whether actual levels of DI in Canada are near the standard or well below it.

Environment Canada is not considering regulatory action to control the driveability index at this time. The Department will maintain close contact with international programs examining the issue of the Driveability Index, and will continue to analyze data from such programs. In addition, Environment Canada considers it prudent to gather information on the input parameters to DI, specifically the distillation values of gasoline (T10, T50, T90) and the concentration of oxygen (by type of oxygenate). The successful voluntary Survey of Benzene, Aromatics and Olefins in Gasoline, which was carried out by Environment Canada from 1994-1998 can serve as a model for the data collection process.

Intended Path Forward

In order to monitor Canadian gasoline quality in respect of the Driveability Index (DI), Environment Canada intends to ask refiners and importers of gasoline to voluntarily provide information on the DI and distillation values of gasoline (T10, T50, T90) and the concentration of oxygen (by type of oxygenate) starting in July 2001. If participation in this voluntary program is poor, Environment Canada will consider mandating the reporting of the information.

7.7 Sulphur

Update to Discussion Paper

In regards to sulphur in gasoline, a recent development is that the Texas Natural Resources Conservation Commission is considering requiring a 15-ppm limit for gasoline in major urban areas in Texas effective May 2004 as a way of attaining and maintaining the ozone standard. Another development is that in Britain a tax incentive for low-sulphur gasoline (less than 50 ppm) of 1 pence per liter (2.2 cents per litre) came into effect in October. Finally, Irving Oil has completed installation of its desulphurization equipment and is currently producing 30-ppm gasoline at its refinery in Saint John, New Brunswick.

Summary of Stakeholders' Comments

Several stakeholders (CVMA, Volkswagen, Friends of the Earth) called on Environment Canada to reduce sulphur in gasoline to near zero levels.

Analysis

The federal *Sulphur in Gasoline Regulations* were passed in 1999 and come into effect in mid 2002, with 30-ppm gasoline required in 2005. (It is expected that due to the 2002-2004 interim averaging provisions, considerable quantities of 30-ppm gasoline will be available by mid-2003). Although it is expected that in time sulphur levels well below 30 ppm (probably near 5 ppm) will be required for allowing continued improvements in vehicle emissions control technologies, it is not clear when this low level of sulphur will be required.

Intended Path Forward

No additional regulatory action to further reduce sulphur in gasoline is being considered at this time. Environment Canada will closely monitor international programs examining the issue of sulphur, and will continue to analyze data from such programs.

7.8 MMT

Update to Discussion Paper

No new developments.

Summary of Stakeholders' Comments

CVMA wants Environment Canada to ban MMT and all heavy metal additives from use in transportation fuels. CPPI suggests that current information “*supports the continued use of MMT*”, and recommends that any new information be given a thorough and independent review. Ethyl supports the use of MMT in gasoline. GVRD recommends that the federal government resolve this issue.

Analysis

There remains considerable debate surrounding the continued use of MMT in Canadian gasoline. The federal government position regarding MMT remains that which was communicated in the July 20, 1998 news release¹¹ on this matter.

The July, 1998 federal government announcement relating to MMT indicated that the government would initiate a third-party review of all data concerning MMT, in consultation with the provinces and stakeholders, when the results of tests currently under way in Canada and the U.S. become available. If subsequent federal action is warranted, it would be taken under the *CEPA, 1999*. There has been no new information submitted as a result of the workshop that would warrant initiating the independent review process at this time.

Intended Path Forward

No specific action on MMT is proposed at this time. Environment Canada, in conjunction with Health Canada, will continue to monitor new information that becomes available on MMT. The matter of an independent third-party review will be considered once new information is judged sufficient to warrant such a step.

7.9 Aromatics and Olefins

Update to Discussion Paper

No new developments.

Summary of Stakeholders' Comments

CVMA recommended that Environment Canada address these issues, as outlined in the World-wide Fuel Charter.

Analysis

The *Benzene in Gasoline Regulations* include controls on the Benzene Emissions Number (BEN). These controls indirectly constrain the levels of aromatics in Canadian gasoline. Expanding the BEN to a Toxics Emissions Number (TEN) would probably result in indirect restrictions on both aromatics and olefins (olefins levels are related to emissions from vehicles of 1,3-butadiene). However, such indirect restrictions would

¹¹ Government of Canada, 1998. *Government to Act On Agreement On Internal Trade Panel Report On MMT. News Release, July 20, 1998.*

not likely achieve the levels for aromatics and olefins proposed in the World-wide Fuel Charter.

At present, it is not clear what additional environmental benefits could be achieved by explicit controls on aromatics and olefins, nor is it known what components might replace the aromatics and olefins in the gasoline if reductions were mandated for those substances. Environment Canada therefore believes that it is premature to initiate any actions on controlling aromatics and olefins beyond the possible indirect controls through a limit on TEN (as discussed above).

Intended Path Forward

At present, Environment Canada is not considering regulatory action to control the level of aromatics or olefins in Canadian gasoline at this time. Environment Canada will closely monitor international programs examining issues related to aromatics and olefins, and will continue to analyze data from such programs.

7.10 Summer Vapour Pressure

Update to Discussion Paper

No new developments.

Summary of Stakeholders' Comments

No comments were received on this issue.

Analysis

As a result of recommendations by the Canadian Council of Ministers of the Environment (first under the 1990 NOx/VOCs Management Plan and later under the 1995 Task Force on Cleaner Vehicles and Fuels), summer vapour pressure in areas of ozone concern have been significantly reduced through provincial regulations.

Intended Path Forward

At present, Environment Canada is not considering regulatory action to control the vapour pressure of Canadian gasoline at this time. The Department encourages provincial governments to continue their efforts to control volatility of gasoline and to assess whether further reductions in summer vapour pressure are warranted.

8) GENERAL COMMENTS - FUELS

Numerous stakeholders provided comments of a general nature on fuels issues. These comments fall into two broad groups: early introduction of clean fuels and mandating comprehensive fuel standards.

8.1 Early Introduction of Cleaner Fuels

Summary of Stakeholders' Comments

Several stakeholders (CVMA, Friends of the Earth and North Atlantic Refining) recommended that Environment Canada promote the early introduction of clean fuels. CVMA and Friends of the Earth recommended the use of a differential excise tax for fuels based on environmental performance. Friends of the Earth also recommended that fuels should be labelled at retail outlets based on the performance of the refinery that produced the fuel. In keeping with the theme of the public's right to know, Friends of the Earth recommended that any report provided by refiners and importers under regulation should be in the public domain. It further recommended that the federal government only purchase fuels "*certified to be sulphur-free, MMT-free and MTBE-free*". North Atlantic Refining recommended that governments award contracts for fuels based on fuel quality, in addition to price.

Analysis

Using a differential excise tax to promote the early introduction of clean fuels has considerable merit. As noted in the Discussion Paper, such programs have been used extensively and very successfully in Europe. Environment Canada notes with considerable interest these successes in Europe in regards to the introduction of clean fuels. In fact, the federal government has used such programs for fuels in the past: a one cent tax disincentive on leaded gasoline was put in place in 1989 and there is presently an excise tax exemption for ethanol. Federal authority for tax policy on fuels rests with Finance Canada.

In regards to the federal government purchasing clean fuels as a way to provide an impetus for the introduction of clean fuels, Environment Canada is examining this as an option for introducing clean fuels into federal facilities in Atlantic Canada¹². The program is being discussed with Correctional Services and the Department of Defence.

Making information on fuel quality available to Canadians would enable consumers to factor in environmental quality in their purchasing decisions. Environment Canada supports the public's right to know what is in fuel that is offered for sale. As a result of a number of recent requests under the *Access to Information Act*, information provided by refiners and importers on gasoline composition and fuel additives is now in the public domain. It must be noted, however, that all information submitted to Environment Canada by a third party, including reports required by regulation, are subject to the provisions of the *Access to Information Act*. That Act requires that all requested information provided to the government by another party be released, unless the party can justify the withholding of the information according to the conditions prescribed in the Act. Consequently, the Act requires that the third party be consulted regarding the release of information that it has provided, and that the third party has the opportunity to make a case for the information to be withheld. Therefore, Environment Canada cannot routinely release to the public reports that are submitted pursuant to regulations; the Department must follow the process detailed in the Act.

Labelling of fuels at retail outlets could provide consumers information on fuel composition that could be used in making purchasing decisions. However, labelling to

¹² Environment Canada, Atlantic Region: *Use of Heavy Fuel Oil by Federal Departments in Atlantic Canada*. EPS-5-AR-99-8, April 1999.

reflect the composition of each delivery to a retail outlet could be an onerous requirement. Labelling based on average composition of fuel produced by a refinery would be less onerous, but would provide less useful information as composition can vary considerably between batches, as well as seasonally and year to year.

Nevertheless, there are some instances of voluntary labelling of fuels in the Canadian marketplace. Labels for gasoline containing ethanol are an example of this. Another example of labelling of gasoline is illustrated by the Auto Makers' Choice program. Irving Oil and MacEwen Petroleum have committed to meet the specifications for Auto Makers Choice Gasoline, and they post the Auto Makers' Choice label at pumps dispensing that type of gasoline.

Intended Path Forward

At present, Environment Canada will explore complementary measures to regulations, such as economic instruments and other measures, to promote the early introduction of cleaner fuels such as low sulphur fuels. Environment Canada also intends to continue to explore with other federal departments the purchase of cleaner fuels for use in government vehicles and facilities. Environment Canada will assess those measures to ensure that they should have the desired impacts.

8.2 Mandating Comprehensive Fuel Standards

Summary of Stakeholders' Comments

CVMA recommended that Environment Canada use the World-wide Fuel Charter as the basis for developing the vehicles and fuels agenda. CPPI and the Canadian General Standards Board proposed that the National Fuel Mark provisions under CEPA, 1999 be used to mandate the compositional requirements of CGSB's commercial standard for gasoline.

Analysis

Both the CGSB standard and the World-wide Fuel Charter involve a considerable number of technical specifications for fuels – many of which are important environmental requirements but also many of which are not linked to the environmental performance of the fuel. Although both the CGSB standard and the Charter are “consensus documents”, the specifications in the Charter are a consensus of auto manufacturers (with little input from the petroleum industry) and those in the CGSB standard are a consensus of refiners, additive manufacturers and some government officials (the auto manufacturers no longer participate in the CGSB process). Environmental, health and consumer groups and the general public have not had any input into either standard.

Nevertheless, the CGSB standard or the World-wide Fuel Charter could be candidates for adoption as a national standard using the National Fuel Mark provisions. Such an approach could specifically address fuels that are imported or cross inter-provincial boundaries. In addition, if the provisions for the National Fuel Mark were used to adopt, for example, the current CGSB standard, the specifications would have to be updated

as the CGSB standard evolves. On the other hand, if regulations for the National Fuel Mark allowed for amendments to an adopted standard, then the authority for federal standard setting would be transferred from elected officials to a non-governmental body. Environment Canada considers this to be an inappropriate abrogation of responsibility.

Intended Path Forward

Environment Canada is not considering action to mandate the specifications of CGSB standards or the recommended specifications of the World-wide Fuel Charter at this time.

9) EMISSION MODELS AND AIR QUALITY DATA

Summary of Discussion Paper

Environment Canada's Discussion Paper provided general information respecting the contribution of vehicles and fuels to total Canadian emissions based on 1995 inventories. The Discussion Paper did not directly address the issue of the development of emission forecasts or the models or processes to develop them.

Summary of Stakeholder Comments

The CPPI stated that it is essential that federal and provincial governments ensure that the most recent and accurate data is available concerning transportation emissions and air quality, including estimates of current emission inventories and air quality, historic trends and future forecasts. It was indicated that the current Canadianized version of the Mobile 5 emission model contains outdated vehicle emission factors and vehicle fleet data and very seriously overestimate future emissions. CPPI noted that it is expected that improved models will be developed and tested in the U.S. due to the significant resourcing required to undertake such a task and that Canada should use the same models as the U.S., customized to reflect Canadian conditions and vehicle types. On this basis, the CPPI recommended that models used to forecast future vehicle emissions and future urban air quality need to be updated for use in policy evaluation and should be a high priority for early action. Furthermore, the CPPI stated that the federal government must lead the effort to ensure credible and accurate modeling results are developed, with opportunity for stakeholder input. Finally, CPPI also recommended that trend analyses of air quality data must be kept more current with a high priority for early action. Similar comments on the need to improve emissions modeling and air quality trend analyses were made by Alberta Environment and Petro-Canada.

Analysis

Given the importance of the vehicles and fuels sector to emissions, it is desirable that a great deal of attention be paid to emissions forecasting and that a broad range of expertise and the latest estimation techniques be applied to the subject. The participation of experts from industry, governments and the public is also desirable both in order for the most credible results to be developed as well as to promote common understanding of the key variables that go into the forecasting and the uncertainty over

future outcomes. Since limited resources are available both in terms of time and money participation and support from outside Environment Canada is welcomed.

Intended Path Forward

Environment Canada intends to put greater efforts in provision of better documented forecasts developed in a transparent manner with support and participation from interested parties.

APPENDIX A

Ottawa, Ontario
K1A 0H3

To: Organizations and individuals interested in cleaner vehicles, engines and fuels

Dear Sir/Madam:

I am pleased to invite you to participate in developing the federal government's approach to cleaner vehicles, engines and fuels and its agenda over the next decade. Your input will help to identify key issues with regard to cleaner vehicles, engines and fuels. In particular, we wish to explore which issues should be a priority for action, which should be monitored and which will need further research.

A workshop is scheduled for May 24 and 25 in Toronto to review the issues and to receive your preliminary views on them. A discussion paper and details on the workshop will be sent to you after you return the attached fax back sheet and indicate your interest to participate in this process. There will be an opportunity at the workshop for you to give a presentation. All parties will also be able to provide their full views and recommendations in writing. Please see the enclosed document for details.

Over the last five years, Canada has made considerable progress in improving the environmental performance of on-road vehicles and fuels. Federal and provincial governments have put various measures in place to reduce vehicle emissions. The most recent measures include vehicle inspection and maintenance programs in two provinces, vapour pressure limits for gasoline in most provinces, implementation of new national vehicle emission standards for 1998 and subsequent model years, and federal regulations to reduce the sulphur content in diesel fuel and the levels of sulphur and benzene in gasoline.

.../2

- 2 -

Despite this progress, the use of vehicles is expected to remain the largest source of emissions in urban areas. At the same time, our understanding of the adverse effects of air pollution on human health, even at low levels, has grown and points increasingly to the need to reduce Canada's pollution levels. It is clear that efforts must be made to further reduce emissions from vehicles. Later this year, the Minister of the Environment intends to publish a notice in the *Canada Gazette*, outlining the Department's planned agenda to improve the environmental performance of vehicles, engines and fuels over the next decade.

The Department recognizes that, from an emissions perspective, vehicles, engines and their fuels are an integrated system. Accordingly, these issues will be considered in a co-ordinated manner. In addition to on-road vehicles and their fuels, it is expected that the agenda will cover the emissions performance of internal combustion engines used in a broad range of non-road applications, such as marine pleasure craft, utility equipment, and construction and farming equipment. Further, it is expected that the agenda will also include consideration of the future quality of light fuel oil (mostly used in residential furnaces) and heavy fuel oil (used in larger industrial boilers, electrical generation facilities, and refineries). Considerations for future vehicle, engine and fuel requirements include effects on human health and the environment; new and emerging vehicle, engine and refining technology; vehicle/fuel compatibility; competitiveness of applicable Canadian industries; and relevant actions taken, or soon to be taken, by other jurisdictions in North America and Europe.

I encourage you to use this opportunity to share your vision of an appropriate agenda for Canada's vehicles and fuels at this early stage of the development process. I am enclosing an outline of the process to develop this agenda and a preliminary list of the issues planned to be addressed. I look forward to hearing your views on these important issues. You can provide your perspective in writing either at the workshop or following it (or both). Please return the attached fax-back sheet by April 17 so that we can send you the follow-up material, including the details on the workshop.

Yours sincerely,

Alan Nymark

Enclosure

FAX-BACK SHEET

Fax back to the consultation coordinator, Phillip Nicholson of
Policy Management Consultants Inc. at fax number 613-238-1272

Development of a Federal Agenda for Cleaner Vehicles and Fuels

Issues cover future requirements for gasoline-powered vehicles, diesel-powered vehicles, off-road engines, and the composition of gasoline, diesel, and light and heavy fuel oils. If you have questions, please contact:

*Consultation issues & logistics: Phillip Nicholson 613-238-4184
e-mail: nicholson@cyberus.ca
For detailed questions on vehicle issues: Ross White 819-953-1120
For detailed questions on fuel Issues: François Lalonde 819-953-2267*

- Yes, I would like to participate in this process. Please send me the follow-up documents. At the present (subject to the finalization of the agenda, dates and location of the workshop tentatively scheduled to be held in Toronto in May):
- I plan to attend the workshop.
- I plan to present my views at the workshop.
- I do not plan to attend the workshop.
- Sorry, I am unable to participate in this process, but please send me materials and keep me informed.
- I am not interested in this initiative. Please remove my name from the mailing list.

Name: _____

Organization: _____

Telephone: _____ Fax: _____

e-mail: _____

Please use a copy of this fax-back sheet for any additional participants from your organization.
In order to receive further material related to this process, please indicate above that you would like to participate and return this sheet by March 31, 2000. (Fax to 613-238-1272)

Development of a Federal Agenda for Cleaner Vehicles and Fuels

The process of developing the federal agenda for cleaner vehicles and fuels will follow the course outlined below:

- Parties interested in participating should return the attached fax-back sheet by the date indicated on the bottom of that sheet.
- Within two weeks of the above date, Environment Canada will distribute background documentation to those parties that indicate they are interested in these issues.
- A two-day workshop will be convened in May in Toronto to review and discuss the issues. A preliminary agenda will be distributed to interested parties along with the background information. Please note that parties will be invited to present their views at this workshop.
- Following the workshop, parties will be invited to provide written comments on the issues. Copies of the comments received will be distributed to all interested parties.
- Environment Canada will consider the comments received in developing the future agenda for cleaner vehicles, engines and fuels.
- Environment Canada plans to publish this agenda in the *Canada Gazette* later this year, in order to notify all stakeholders.

Preliminary List of Issues

VEHICLES AND ENGINES

How should Canada align its national emission control programs for new vehicles and engines with those of the United States? Possible issues include the treatment of phase-in requirements for the new standards, corporate fleet-averaging requirements, and emission credit systems in the context of corresponding Canadian programs for:

On-Road Vehicles and Engines

- light-duty vehicles (LEV and Tier 2)
- light-duty trucks (LEV and Tier 2)
- heavy-duty vehicles
- motorcycles

Non-Road Vehicles and Engines

- off-road compression-ignition/diesel engines (e.g., construction, farm and industrial equipment)
 - spark-ignited utility engines (e.g., lawn and garden equipment)
 - spark-ignited marine engines (e.g., pleasure craft)

FUELS

Should there be requirements (new or revised) for any of the parameters of fuels listed below? Are there other requirements that should be placed on the composition of fuels?

If yes for any of the parameters, what level should be set and when should the requirement come into force?

Note: parameters are listed in alphabetical order. Some of these issues will require earlier attention than others.

Diesel

- aromatics
- CEPA-toxics, such as polycyclic aromatic hydrocarbons (PAH's), particulate matter and other CEPA-toxics (e.g., benzene, 1,3-butadiene, and several aldehydes)
- cetane
- density
- distillation characteristics
- sulphur in off-road diesel (currently regulated in a few municipalities only)
- sulphur in on-road diesel (beyond the maximum of 500 ppm presently regulated through the federal *Sulphur in Diesel Regulations*)

Gasoline

- aromatics
- benzene (below the level presently regulated through the *federal Benzene in Gasoline Regulations*)
- CEPA-toxics (e.g., particulate matter, 1,3-butadiene, benzene, several aldehydes) – possible through a toxics emissions number that would be defined based on the sum of modelled emissions of toxic substances
- deposit control additives
- distillation characteristics (e.g., driveability index)
- methylcyclopentadienyl manganese tricarbonyl (MMT)
- methyl *tertiary*-butyl ether (MTBE) and other oxygenates
- olefins
- sulphur (below the levels required in the federal *Sulphur in Gasoline Regulations* commencing in 2002 and 2005)
- vapour pressure (below the levels presently regulated by most provinces)

Light and Heavy Fuel Oils

- sulphur

APPENDIX B

Ottawa, Ontario
K1A 0H3

To: Organizations and individuals who expressed interest in the Vehicles and Fuels Agenda

Dear Sir/Madam:

Further to Deputy Minister Nymark's letter of April 4th, I am pleased to send you a copy of a background document on *Future Canadian Emissions Standards for Vehicles and Engines and Standards for Reformulation of Petroleum-Based Fuels* prepared by Environment Canada. This document will help facilitate discussion on issues which will be raised at the Vehicles and Fuels Workshop on May 25th-26th in Toronto. I have also enclosed a preliminary agenda for the Workshop.

I look forward to your participation in developing the federal government's agenda on cleaner vehicles, engines and fuels both at the Workshop and through your written submissions which are due by June 22, 2000. Please send your submissions to:

Roy Begin
Air Pollution Prevention Directorate
Environment Canada
10th Floor
351 St. Joseph Blvd.
Hull, Québec
K1A 0H3
Tel: (819) 953-9749
E: Mail: roy.begin@ec.gc.ca

Yours sincerely,

Jean-Pierre Gauthier
A/Assistant Deputy Minister
Environmental Protection Service

Attachments

Vehicles and Fuels Workshop

Toronto
The Marriott Courtyard Hotel - (416) 924-0611
May 25-26, 2000

PRELIMINARY AGENDA

Thursday, May 25, 2000

Day 1

8:30 Welcome Address

8:45 Keynote Speaker

9:15 Health Effects of Conventional Pollutants

10:00 Break

10:15 Particulate Matter in Diesel Exhaust

11:00 Progress on Reducing Emissions in Canada

11:30 Vehicle Emissions Trends in Canada

12:00 Lunch (Provided)

1:00 U.S. Vehicle Emissions Standards for 2004-2009

1:45 European Union Vehicle Emissions Standards

2:15 International Activities on Fuels

3:00 Break

3:15 Emerging Engine Technologies

4:00 Refinery Technologies

4:45 Links to Climate Change

Vehicles and Fuels Workshop

Toronto
The Marriott Courtyard Hotel - (416) 924-0611
May 25-26, 2000

PRELIMINARY AGENDA

Friday, May 26, 2000

Day 2

8:30 Vehicles and Engines Program - CEPA Division 5

9:00 Potential Fuel Improvements

9:30 Presentations from Stakeholders

- Canadian Vehicle Manufacturers' Association and Automobile Companies
- Engine Manufacturers - On-road/off-road
- Canadian Petroleum Products Institute and Petroleum Refiners/Companies
- Health Associations
- Environmental Groups

12:00 Lunch (Provided)

4:00 Closing Remarks

APPENDIX C

LIST OF PRESENTERS

Vehicles and Fuels Workshop

May 25-26, 2000

Toronto, Ontario

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APPENDIX D

WORKSHOP ATTENDEES

Development of a Federal Agenda for Cleaner Vehicles & Fuels

May 25 and 26, 2000

Toronto

Last Name	First Name	Company/Organisation	Title
		Tecumseh Products Co.	
		Hill & Knowlton Canada Ltd.	
		University of British Columbia	
		BMW Canada Inc.	
		Environment Canada - Transportation Systems Branch	
		Environment Canada - Minister's Office	
		Environment Canada	
		Environment Canada - Oil, Gas and Energy Branch	
		Environment Canada - Air & Inventories Division, Ontario Region	
		Communaute Urbaine de Montreal - Division des permis, inspections et projets speciaux	
		Chevron Canada Limited	
		Motorcycle and Moped Industry Council / Canadian All-Terrain Vehicle Distributors Council	
		Petro-Canada - Refining, Supply and Integration	
		Alchemy Consulting Inc.	
		Yamaha Motor Canada Ltd.	
		Imperial Oil	
		Imperial Oil - Products and Chemicals Division	
		JPN Consultants	
		Comcept Canada Inc.	
		Suzuki Canada Inc.	

	Dunaway & Cross Attorneys at Law	
	Environment Canada - Transportation Systems Branch	
	Ethyl Corporation	
	Canadian Marine Manufacturer's Association	
	Ultramar Ltd.	
	Natural Resources Canada	
	Canadian Auto Workers Union	
	European Union - Delegation of the European Commission in Canada	
	Engine Manufacturers Association	
	Sunoco Inc.	
	Environment Canada - Ontario Region	
	Shell Canada Products Limited	
	Federation of Canadian Municipalities	
	Natural Resources Canada	
	Irving Oil Limited	
	The Lubrizol Corporation	
	Environment Canada - Environmental Technology Centre	
	John Deere - Worldwide Commercial & Consumer Equipment Division	
	Outdoor Power Equipment Institute	
	Ontario Ministry of the Environment - Air Policy & Climate Change Branch	
	Ethyl Canada Inc.	
	DSS Management Consultants Inc.	
	Irving Oil Limited - Refining Division	
	General Motors Corporation - Renaissance Centre	
	Ontario Ministry of Economic Development and Trade	
	New Brunswick Lung Association	
	Transport Canada	
	PetroTech Consulting	
	Ontario Federation of Agriculture	
	Nissan Canada Inc.	
	Volkswagen of America, Inc.	
	Petro-Canada - Refining, Supply and Integration	

		Environment Canada	
		Environment Canada - Transportation Systems Branch	
		Canadian Renewable Fuels Association	
		Ontario Ministry of Energy, Science and Technology	
		Kubota Engine American Corporation	
		Environment Canada - Oil, Gas and Energy Branch	
		Environment Canada - Transportation Systems Branch	
		GFI Control Systems Inc.	
		Gouvernement du Quebec, Ministere de l'Environnement	
		Husky Oil Operations Limited	
		Health Canada - Environmental Health Directorate	
		North Atlantic Refinery	
		New Brunswick Lung Association	
		Oxygenated Fuels Association	
		Environment Canada - Clean Air Agenda Office	
		Ontario Ministry of the Environment	
		Canadian Petroleum Products Institute	
		Environment Canada - Oil, Gas and Energy Branch	
		Federation of Ontario Cottagers' Association	
		CRESTech	
		Manufacturers of Emission Controls Association (MECA)	
		Ethyl Petroleum Additives Inc.	
		Natural Resources Canada	
		Imperial Oil - Products and Chemicals Division	
		Environnement et Hygiene Industrielle	
		Nissan Canada Inc.	
		John Deere - Worldwide Commercial & Consumer Equipment Division	
		Georgian Bay Association	

		Environment Canada	
		Greater Vancouver Regional District	
		Environment Canada - Environmental Protection Services	
		Friends of the Earth	
		Ontario Ministry of Transportation	
		Ford Motor Company of Canada	
		UPI Inc.	
		Toronto Public Health - Environmental Protection	
		Ressources naturelles Canada	
		Toyota Canada Inc.	
		Stihl Limited	
		IFP North America Inc.	
		Industry Canada	
		Natural Resources Canada - Office of Energy Efficiency	
		General Motors of Canada Limited	
		General Motors of Canada Limited	
		Transport Canada - Programs and Divestiture	
		Robbin Fuels	
		General Motors of Canada Limited	
		Ethyl Petroleum Additives Inc.	
		DCL International Inc.	
		Transport Canada	
		Natural Resources Canada Transportation Energy Technologies	
		Business Development Consortium	
		United States Environmental Protection Agency	
		International Truck and Engine Corporation - Engine Group	
		Ford Motor Company of Canada	
		Friends of the Earth	
		GE Transportation Systems	
		Bodycote Materials Testing Canada Inc.	
		Canadian Vehicle Manufacturers Association	

		Petro-Canada	
		Ontario Ministry of Transportation	
		Honda Canada Inc.	
		Alberta Farm Machinery Research Centre	
		Environment Canada - Oil, Gas and Energy Branch	
		Detroit Diesel Corporation	
		STOP	
		Association of International Automobile Manufacturers of Canada	
		Yanmar Diesel America Corp.	
		Pollution Probe - Toronto Environmental Alliance	
		Environment Canada - Transportation Systems Branch	
		Friends of the Earth	
		K.Winn & Associates	
		Environment Canada - Ontario Region	
		Ford Motor Company of Canada	
		ProtectAir	

APPENDIX E

Vehicles and Fuels Consultation Process / Processus de consultation sur les véhicules et les carburants

Toronto, Ontario

May 25th - 26th, 2000 Les 25 et 26 mai 2000

Written Submissions Received

1. Alberta Environment - *David Spink*
2. Alberta Farm Machinery Research Centre - *Reed Turner*
3. Association of International Automobile Manufacturers of Canada / L'Association des fabricants internationaux d'automobiles du Canada - *Bob Armstrong*
4. Ballard Power Systems Incorporated - *Paul Lancaster & Ric Pow*
5. Canadian All-Terrain Vehicle Distributors Council / Conseil canadien des distributeurs de véhicules tout terrain - *Adrian Coleman*
6. Canadian Council of Snowmobile Organizations / Conseil canadien des organismes de motoneige - *Michel Garneau*
7. Canadian General Standards Board (GGSB) Petroleum Committee - *Ken Mitchell*
8. Canadian Marine Manufacturers Association (CMMA) / Association canadienne des manufacturiers de produits nautiques (ACMPN) - *J.A. Currie*
9. Canadian Petroleum Products Institute (CPPI) / Institut canadien des produits pétroliers (ICPP)
10. Canadian Renewable Fuels Association
11. Canadian Trucking Alliance / Alliance canadienne du camionnage - *David H. Bradley*
12. Canadian Vehicle Manufacturers' Association / Association canadienne des constructeurs de véhicules - *Mark A. Nantais*
13. Concerned Citizens of Southwestern Ontario - *Catherine Cave*
14. Engine Manufacturers Association (EMA) - *Glenn Keller*
15. European Union - *Dr. Paul Greening*
16. Ethyl Canada Incorporated - *J.D. Hanes*
17. Federation of Ontario Cottagers Association Inc. (FOCA) - *Margaret Casey*
18. Friends of the Earth / Les Ami(e)s de la Terre - *Beatrice Olivastri*

19. Greater Vancouver Regional District (GVRD) - *John Newhook*
20. The Georgian Bay Association (G.B.A.) - *Mary Muter*
21. Husky Oil Operations Ltd., Prince George Refinery - *David W. Long*
22. Imperial Oil - *Alan G. Chesworth*
23. International Snowmobile Manufacturers Association (ISMA) - *Ed Klim*
24. Manufacturers of Emission Controls Association (MECA) - *Bruce I. Bertelsen*
25. Mikhail Mourad, M.Sc - Consultant en Environnement et Hygiene Industrielle
26. Motorcycle & Moped Industry Council (MMIC) / Le conseil de l'industrie de la motocyclette et du cyclomoteur - *Adrian Coleman*
27. Natural Resources Canada (NRCan) / Ressources naturelles Canada - *Robert Lyman*
28. North Atlantic Refining Incorporated - *Gunther Baumgartner*
29. Outdoor Power Equipment Institute (OPEI) - *Bill Guerry, Counsel*
30. Oxygenated Fuels Association
31. Petro-Canada - *Michel Charbonneau*
32. Portable Power Equipment Manufacturers Association (PPEMA) - *J. L. Cigler*
33. Shell Canada Products Limited - *Darwin Rounding*
34. STOP, non-profit citizens' environmental organization - *Bruce Walker*
35. Sunoco Incorporated
36. Toronto Community & Neighbourhood Services - *Dr. Sheela V. Basrur* , Medical Officer of Health
37. Volkswagon of America, Incorporated - *Leonard W. Kata*
38. West Coast Environmental Law (WCEL) - *Chris Rolfe*