Vol. 145, No. 25 — December 7, 2011

Registration

SOR/2011-261 November 17, 2011

CANADIAN ENVIRONMENTAL PROTECTION ACT, 1999

Regulations Amending the Off-Road Compression-Ignition Engine Emission Regulations

P.C. 2011-1315 November 17, 2011

Whereas, pursuant to subsection 332(1) (see footnote a) of the *Canadian Environmental Protection Act, 1999* (see footnote b), the Minister of the Environment published in the *Canada Gazette*, Part , on February 12, 2011, a copy of the proposed *Regulations Amending the Off-Road Compression-Ignition Engine Emission Regulations*, substantially in the annexed form, and persons were given an opportunity to file comments with respect to the Regulations or to file a notice of objection requesting that a board of review be established and stating the reasons for the objection;

Therefore, His Excellency the Governor General in Council, on the recommendation of the Minister of the Environment, pursuant to section 160 of the *Canadian Environmental Protection Act, 1999* (see footnote c), hereby makes the annexed *Regulations Amending the Off-Road Compression-Ignition Engine Emission Regulations*.

REGULATIONS AMENDING THE OFF-ROAD COMPRESSION-IGNITION ENGINE EMISSION REGULATIONS

AMENDMENTS

1. (1) The definitions "CFR" and "off-road engine" in subsection 1(1) of the *Off-Road Compression-Ignition Engine Emission Regulations* (see footnote 1) are replaced by the following:

"CFR" means chapter I of Title 40 of the *Code of Federal Regulations* of the United States as amended from time to time. (*CFR*)

"off-road engine" means an engine, within the meaning of section 149 of the Act, that

(*a*) is designed to be or is capable of being carried or moved; or

(*b*) is used or designed to be used in or on a machine. (*moteur hors route*)

(2) Subsection 1(1) of the Regulations is amended by adding the following in alphabetical order:

"CFR 89" means subchapter C, part 89, of the CFR. (*CFR 89*)

"CFR 1039" means subchapter U, part 1039, of the CFR. (*CFR 1039*)

"CFR 1068" means subchapter U, part 1068, of the CFR. (*CFR 1068*)

"crankcase emissions" means substances that cause air pollution and that are emitted into the atmosphere from any portion of the engine crankcase ventilation or lubrication systems. (*émissions du carter*)

"engine family" means an engine family as described in section 230, subpart C, of CFR 1039. (*famille de moteurs*)

"evaporative emissions" means hydrocarbons emitted into the atmosphere from an engine, other than exhaust emissions and crankcase emissions. (*émissions de gaz d'évaporation*)

"smoke emissions" means substances in exhaust emissions that prevent the transmission of light. (*émissions de fumée*)

"unique identification number" means a number, consisting of arabic numerals, roman letters or both, that the manufacturer assigns to the engine for identification purposes. (*numéro d'identification unique*)

"useful life" means the period of time or of use in respect of which an emission standard applies to an engine, as set out in section 104(a), subpart B, of CFR 89 or in section 101(g), subpart B, of CFR 1039. (*durée de vie utile*)

(3) Subsection 1(3) of the Regulations is amended by striking out "and" at the end of paragraph (*b*), by adding "and" at the end of paragraph (*c*) and by adding the following after paragraph (*c*):

(*d*) "phase-out" shall be read as "abandon progressif" in the French version of these Regulations.

2. The Regulations are amended by adding the following after section 2:

BACKGROUND

2.1 These Regulations set out

(*a*) the prescribed off-road compression-ignition engines for the purposes of the definition "engine" in section 149 of the Act;

(*b*) the requirements respecting the conformity of off-road compression-ignition engines with emission standards for the purposes of sections 153 and 154 of the Act; and

(*c*) other requirements for carrying out the purposes and provisions of Division 5, Part 7 of the Act.

3. Subsections 5(2) and (3) of the Regulations are replaced by the following:

(2) The engines referred to in subsection (1) do not include engines that

(*a*) are designed to be used exclusively for competition and bear a label to that effect;

(*b*) are regulated by the *On-Road Vehicle and Engine Emission Regulations*;

(*c*) are designed to be used exclusively in underground mines, may be used outside

underground mines and are certified by

(i) the Canada Centre for Mineral and Energy Technology (CANMET), or

(ii) the Mine Safety and Health Administration of the United States in accordance with Title 30, chapter I, subchapter B, part 7, subpart E of the *Code of Federal Regulations* of the United States;

(*d*) have a per-cylinder displacement of less than 50 cm^3;

(*e*) are designed exclusively to be used in military machines designed exclusively for use in combat or combat support and bear either a label to that effect or the U.S. emission control information label referred to in section 225(d), subpart C, of CFR 1068;

(*f*) are being exported and are accompanied by a written statement establishing that they will not be sold for use or used in Canada;

(*g*) are designed to be used in a vessel and have fuel, cooling and exhaust systems that are integral parts of the vessel;

(*h*) are used or designed to be used in or on machines designed and intended not to be moved and bear either a label indicating that those engines are stationary engines or the U.S. emission control information label referred to in section 20, subpart A, of CFR 1039; or

(*i*) are used exclusively to provide electricity for small communities in remote areas and that bear a label to that effect.

(2.1) For the purposes of paragraphs (2)(*a*), (*e*), (*h*) and (*i*), and for greater certainty, the label, other than the U.S. emission control information label affixed under CFR 89, 1039 or 1068, shall meet the requirements set out in section 8.

(3) Subject to subsection (4), for the purposes of section 152 of the Act, the prescribed engines are those referred to in subsection (1) that are manufactured in Canada, including those that have their manufacture completed by the addition of an emission control system at the time of installation in or on a machine.

(4) Section 152 of the Act does not apply to

(*a*) engines of a specific model year that are covered by an EPA certificate, that have their manufacture completed in Canada by the addition of an emission control system in accordance with the certificate and the installation instructions that accompany the engines under section 15.1, and that are sold concurrently in Canada and in the United States; or

(*b*) engines that are to be used in Canada solely for purposes of exhibition, demonstration, evaluation or testing.

4. Subsection 6(1) of the Regulations is replaced by the following:

6. (1) A company that intends to apply a national emissions mark in relation to an engine shall make a request to the Minister to obtain an authorization that is in the form set out in Schedule 1.

5. The heading before section 7 of the Regulations is replaced by the following:

NATIONAL EMISSIONS MARK AND LABEL REQUIREMENTS

6. (1) Subsection 7(1) of the Regulations is replaced by the following:

7. (1) The national emissions mark is the mark set out in Schedule 2.

(2) Subsections 7(3) to (5) of the Regulations are replaced by the following:

(3) A company that is authorized to apply the national emissions mark shall display the identification number assigned by the Minister in figures that are at least 2 mm in height, immediately below or to the right of the national emissions mark.

7. Section 8 of the Regulations is replaced by the following:

8. (1) The national emissions mark and any label required by these Regulations, other than a U.S. emission control information label, shall be located

(*a*) on or immediately next to the emission control information label referred to in paragraph 16(*d*); or

(*b*) if there is no emission control information label, in a visible or readily accessible location.

(2) The national emissions mark and any label required by these Regulations, other than a U.S. emission control information label, shall

(*a*) be permanently applied;

(*b*) be resistant to or protected against any weather condition; and

(*c*) bear inscriptions that are legible and indelible and that are indented, embossed or in a colour that contrasts with the label's background.

UNIQUE IDENTIFICATION NUMBER

8.1 (1) A unique identification number shall be applied to every engine.

(2) The unique identification number shall be legible and may be engraved or stamped on the engine or may be on a label that meets the requirements set out in section 8.

8. (1) Paragraphs 9(1)(*a*) and (*b*) of the English version of the Regulations are replaced by the following:

(*a*) in its operation, release a substance that causes air pollution and that would not have been released if the system had not been installed; or

(*b*) in its operation or malfunction, make the engine or the machine in which the engine is installed unsafe, or endanger persons or property near the engine or machine.

(2) Subsection 9(2) of the Regulations is replaced by the following:

(2) No engine shall be equipped with a defeat device as defined in section 107(b), subpart B, of CFR 89 or section 115(g), subpart B, of CFR 1039, as the case may be.

9. Section 10 of the Regulations is replaced by the following:

10. (1) Subject to sections 11.1 to 14, an engine of a given gross power category shall conform to,

(*a*) for the 2006 to 2011 model years,

(i) the exhaust emission standards set out in section 112, subpart B, of CFR 89 for those model years,

(ii) the crankcase emission standards set out in section 112(e), subpart B, of CFR 89 for those model years, and

(iii) the smoke emission standards set out in section 113, subpart B, of CFR 89 for those model years;

(*b*) for the 2012 to 2014 model years,

(i) subject to subsection (4), either the exhaust emission standards set out in sections 101(a), (b), (c), (e) and (f), or sections 102(a) and (b), subpart B, of CFR 1039 for those model years,

(ii) the crankcase emission standards set out in section 115(a), subpart B, of CFR 1039 for those model years,

(iii) the smoke emission standards set out in section 105, subpart B, of CFR 1039 for those model years, and

(iv) the evaporative emission standards for engines fuelled with volatile liquid fuels set out in section 107, subpart B, of CFR 1039 for those model years; and

(*c*) for the 2015 and subsequent model years,

(i) the exhaust emission standards set out in sections 101(a), (b), (c), (e) and (f), subpart B, of CFR 1039 for those model years,

(ii) the crankcase emission standards set out in section 115(a), subpart B, of CFR 1039 for those model years,

(iii) the smoke emission standards set out in section 105, subpart B, of CFR 1039 for those model years, and

(iv) the evaporative emission standards for engines fuelled with volatile liquid fuels set out in section 107, subpart B, of CFR 1039 for those model years.

(2) Subject to subsection (3), the standards referred to in subsection (1) apply for the useful life of the engine and include the test procedures, fuels and calculation methods set out in CFR 89 or CFR 1039, as the case may be, for the model year in question. For greater certainty, the certification standards described in section 120, subpart B, of CFR 89 or section 240, subpart C, of CFR 1039, as the case may be, apply to the model year in question.

(3) The in-use standards that apply for the useful life of engines of the 2012 and subsequent model years set out in the table to section 104(b), subpart B, of CFR 1039 are determined in accordance with that section.

(4) For the purposes of subparagraph (1)(*b*)(i), the applicable standards for interim Tier 4 engines that have a gross power category of 56 kW to less than 560 kW are the phase-out standards set out in tables 4 to 6, as applicable, to section 102, subpart B, of CFR 1039.

10.1 (1) Subject to subsection 13(3), an engine that is imported into or manufactured in Canada — other than an EPA-certified engine, an engine used in a transportation refrigeration unit referred to in section 11.1 and a replacement engine referred to in section 12 — shall bear a label that sets out

(*a*) the statement "THIS ENGINE CONFORMS TO ALL APPLICABLE STANDARDS FOR THE [*insert model year*] MODEL YEAR PRESCRIBED BY THE CANADIAN OFF-ROAD COMPRESSION-IGNITION ENGINE EMISSION REGULATIONS IN EFFECT ON THE DATE OF MANUFACTURE / CE MOTEUR EST CONFORME À TOUTES LES NORMES QUI SONT APPLICABLES À L'ANNÉE DE MODÈLE [*inscrire l'année de modèle*] EN VERTU DU RÈGLEMENT SUR LES ÉMISSIONS DES MOTEURS HORS ROUTE À ALLUMAGE PAR COMPRESSION CANADIEN EN VIGUEUR À LA DATE DE SA CONSTRUCTION";

(*b*) the model year of the engine;

(*c*) the date of manufacture of the engine;

(*d*) the gross power or gross power category of the engine;

(*e*) an identification of the emission control system;

(*f*) the name of the engine manufacturer;

(*g*) the engine family; and

(*h*) the engine displacement.

(2) Paragraph 10.1(1)(*a*) does not apply when a national emissions mark is affixed to the engine.

(3) Paragraph 10.1(1)(*e*) does not apply to a transition engine as referred to in subsection 13(1).

10. Subsection 11(1) of the Regulations is replaced by the following:

11. (1) In this section, "adjustable parameter" means a device, system or element of design that is capable of being physically adjusted and as a result can affect emissions or engine performance during emission testing or normal in-use operation, but does not include a device, system or element of design that is permanently sealed by the engine manufacturer or that is inaccessible with the use of ordinary tools.

11. The Regulations are amended by adding the following after section 11:

TRANSPORTATION REFRIGERATION UNIT

11.1 (1) The following definition applies in this section.

"transportation refrigeration unit" means a refrigeration system that is powered by an engine and that is designed to control the temperature of products that are transported in rolling stock, vehicles or trailers. (*dispositif frigorifique de transport*)

(2) The following engines that are used in a transportation refrigeration unit may, instead of conforming to the exhaust emission standards set out in subparagraphs 10(1)(*b*)(i) and (*c*)(i), conform to those set out in sections 645(a), (b), (d)(2), (d)(3), (e) and (f), subpart G, of CFR 1039:

(*a*) an engine of the 2012 model year that has a gross power of less than 37 kW; and

(*b*) an engine of the 2012 to 2015 model years that has a gross power of 37 kW to less than 56 kW.

(3) An engine referred to in subsection (2) shall bear either

(*a*) a label that sets out

(i) a statement, in both official languages, that the engine is to be used exclusively in a transportation refrigeration unit,

(ii) the model year of the engine,

(iii) the date of manufacture of the engine,

(iv) the gross power or gross power category of the engine,

(v) an identification of the emission control system, and

(vi) the name of the engine manufacturer; or

(*b*) the U.S. emission control information label referred to in section 645(d)(1), subpart G, of CFR 1039.

12. Paragraphs 12(3)(*a*) and (*b*) of the Regulations are replaced by the following:

(*a*) section 8 and that sets out

(i) a statement, in both official languages, that the engine is a replacement engine,

(ii) the model year of the engine or the emission standard according to which the engine was manufactured,

(iii) the date of manufacture of the engine,

(iv) the gross power or gross power category of the engine,

(v) an identification of the emission control system, and

(vi) the name of the engine manufacturer; or

(*b*) section 1003(b)(7), subpart K, of CFR 89 or section 240(b)(6), subpart C, of CFR 1068, as the case may be.

13. Sections 13 and 14 of the Regulations are replaced by the following:

13. (1) This section applies to an engine for which a company elects to apply a standard set out in subsection (2), hereinafter referred to as a transition engine, that

(*a*) is imported into or manufactured in Canada for the purpose of being installed in or on a machine; or

(*b*) is installed in or on a machine that is imported into Canada.

(2) Instead of the standards referred to in sections 9 to 11, a company may elect to apply one or more of the following standards to transition engines that fall within the following gross power categories if, in the case of an engine referred to in paragraph (1)(*a*), the engine is installed in Canada during the applicable time period for that standard or, in the case of an engine referred to in paragraph (1)(*b*), the engine is imported before the end of that same time period:

(*a*) in the case of transition engines that have a gross power of less than 19 kW, until December 31, 2014, the standards for Tier 2 engines set out in CFR 89 as referred to in paragraph 10(1)(*a*);

(*b*) in the case of transition engines that have a gross power of 19 kW to less than 37 kW,

(i) until December 31, 2014, the standards for Tier 2 engines set out in CFR 89 as referred to in paragraph 10(1)(*a*), and

(ii) until December 31, 2018, the standards for interim Tier 4 engines set out in Table 2 to section 102, subpart B, of CFR 1039;

(*c*) in the case of transition engines that have a gross power of 37 kW to less than 56 kW,

(i) until December 31, 2014, the standards for Tier 2 engines set out in CFR 89 as referred to in paragraph 10(1)(*a*), and

(ii) until December 31, 2018, the standards for interim Tier 4 engines set out in Table 3 to section 102, subpart B, of CFR 1039;

(*d*) in the case of transition engines that have a gross power of 56 kW to less than 75 kW,

(i) until December 31, 2018, the standards for Tier 3 engines set out in CFR 89 as referred to in paragraph 10(1)(*a*), and

(ii) during the period beginning on January 1, 2014 and ending on December 31, 2020, the phase-out standards for interim Tier 4 engines set out in Table 4 to section 102, subpart B, of CFR 1039;

(*e*) in the case of transition engines that have a gross power of 75 kW to less than 130 kW,

(i) until December 31, 2018, the standards for Tier 3 engines set out in CFR 89 as referred to in paragraph 10(1)(*a*), and

(ii) during the period beginning on January 1, 2014 and ending on December 31, 2020, the phase-out standards for interim Tier 4 engines set out in Table 5 to section 102, subpart B, of CFR 1039;

(*f*) in the case of transition engines that have a gross power of 130 kW to 560 kW,

(i) until December 31, 2017, the standards for Tier 3 engines set out in CFR 89 as referred to in paragraph 10(1)(*a*), and

(ii) during the period beginning on January 1, 2014 and ending on December 31, 2020, the phase-out standards for interim Tier 4 engines set out in Table 6 to section 102, subpart B, of CFR 1039; and

(*g*) in the case of transition engines that have a gross power of more than 560 kW,

(i) until December 31, 2012, the standards for Tier 1 engines set out in CFR 89 as referred to in paragraph 10(1)(*a*),

(ii) until December 31, 2017, the standards for Tier 2 engines set out in CFR 89 as referred to in paragraph 10(1)(*a*), and

(iii) during the period beginning on January 1, 2015 and ending on December 31, 2021, the standards for interim Tier 4 engines set out in Table 7 to section 102, subpart B, of CFR 1039.

(3) Subject to subsection (4), a transition engine shall bear either

(*a*) a label that sets out the information described in section 10.1 along with a statement, in both official languages, that the engine is a transition engine; or

(*b*) the U.S. emission control information label referred to in section 625(j)(1), subpart G, of CFR 1039.

(4) A transition engine that has a gross power of more than 560 kW to which a company has elected to apply the standards referred to in subparagraph (2)(*g*)(i) shall bear either

(*a*) a label that sets out the information described in section 10.1 along with a statement, in both official languages, that the engine is a transition engine; or

(*b*) the U.S. emission control information label referred to in section 102(i)(9), subpart B, of CFR 89.

13.1 (1) Subject to subsection (3), a company that elects to apply one of the standards set out in subsection 13(2) shall submit to the Minister an annual report, signed by a person who is authorized to act on behalf of the company, within 90 days after the end of the calendar year during which the engine is imported or manufactured.

(2) The annual report shall contain the following information:

(*a*) with respect to the company,

(i) its name, street address and, if different, mailing address, and

(ii) the business number assigned to it by the Minister of National Revenue;

(*b*) with respect to each transition engine referred to in paragraph 13(1)(*a*) that is intended for use or sale in Canada,

(i) the name of the manufacturer,

(ii) the power category,

(iii) the model year,

(iv) the emission standard referred to in subsection 13(2) according to which the engine was manufactured, and

(v) a statement as to whether the engine will be installed in a machine model that is sold concurrently in Canada and in the United States;

(*c*) with respect to each transition engine referred to in paragraph 13(1)(*b*) and installed in or on a machine that is intended for use or sale in Canada,

(i) the name of the engine manufacturer,

(ii) the power category,

(iii) the model year,

(iv) the emission standard referred to in subsection 13(2) according to which the engine was manufactured, and

(v) a statement as to whether at least one machine of the same model as the one in which the engine is installed is sold concurrently in Canada and in the United States;

(*d*) if the company referred to in subsection (1) also imports or manufactures an engine —

whether installed in or on a machine or not — that is intended for use or sale in Canada and that conforms to the standards referred to in section 9 to 11, 11.1, 12 or 14, with respect to the engine,

(i) the name of the manufacturer,

(ii) the gross power or gross power category,

(iii) the model year,

(iv) the emission standard according to which the engine was manufactured, and

(v) a statement as to whether the engine is installed in or on a machine; and

(*e*) if more than one engine referred to in paragraph (*b*), (*c*) or (*d*) share the characteristics referred to in subparagraphs (i) to (v) of that paragraph, the number of engines sharing those characteristics.

(3) A person who is not a company and who imports five engines or less per calendar year is exempt from the obligation to submit to the Minister the report referred to in subsection (1).

14. (1) Engines of a given model year that are covered by an EPA certificate shall, instead of conforming to the standards referred to in sections 9 to 11, conform to the certification and in-use standards referred to in the EPA certificate, if at least one engine of the same engine family is sold concurrently in Canada and in the United States.

(2) For the purposes of subsection 153(3) of the Act, the provisions of the CFR that are applicable to an engine referred to in subsection (1), under the EPA certificate, correspond to the certification and in-use standards referred to in subsection (1).

(3) For the purposes of subsection 153(3) of the Act, the EPA is the prescribed agency.

14. The heading before section 15 of the Regulations is replaced by the following:

INSTRUCTIONS

EMISSION-RELATED MAINTENANCE

15. Subsection 15(1) of the Regulations is replaced by the following:

15. (1) Every company shall ensure that the first retail purchaser of every engine or machine is provided with written instructions respecting emission-related maintenance and that the instructions are consistent with the maintenance instructions set out in section 109(a), subpart B, of CFR 89 or section 125, subpart B, of CFR 1039, as the case may be, for the model year in question.

16. The Regulations are amended by adding the following after section 15:

INSTALLATION OF EMISSION CONTROL SYSTEM

15.1 (1) Every company shall ensure that every engine that is to be installed in or on a machine in Canada is accompanied by written instructions for installing the engine and emission control system, or the address of the place or the website where those instructions may be obtained.

(2) The instructions shall contain the following information:

(*a*) detailed installation procedures for the exhaust system, emission control system and any of their components; and

(*b*) an indication of any limits on the types of use for the engine to ensure that the

emission standards are conformed to.

(3) The instructions shall be provided in English, French or both official languages, as requested by the installer.

17. The heading before section 16 of the Regulations is replaced by the following:

RECORDS

EVIDENCE OF CONFORMITY

18. (1) The portion of section 16 of the Regulations before paragraph (*a*) is replaced by the following:

16. In the case of an engine referred to in subsection 14(1), evidence of conformity for the purposes of paragraph 153(1)(*b*) of the Act in respect of a company shall consist of

(2) Paragraph 16(*d*) of the Regulations is replaced by the following:

(*d*) a U.S. emission control information label that is permanently affixed in the form and location set out in section 110, subpart B, of CFR 89, section 135, subpart B, of CFR 1039 or, if applicable, section 645(d)(1) of that subpart for the applicable model year of the engine.

19. Sections 17 and 18 of the Regulations are replaced by the following:

17. (1) In the case of an engine other than one referred to in subsection 14(1), evidence of conformity for the purposes of paragraph 153(1)(*b*) of the Act in respect of a company shall consist of the following:

(*a*) with respect to a transition engine referred to in section 13 that is installed or will be installed in or on a machine of a model of which at least one machine is sold concurrently in Canada and in the United States,

(i) in the case of a transition engine referred to in paragraph 13(1)(*a*),

(A) a statement, dated and signed by the company or its duly authorized representative, certifying that the engine conforms to section 625(e), subpart G, of CFR 1039,

(B) a document demonstrating that at least one machine of the same model as the one in which the engine will be installed is sold concurrently in Canada and in the United States,

(C) a copy of the documentation submitted to the EPA under section 625, subpart G, of CFR 1039, and

(D) a copy of the label referred to in subsection 13(3) or (4), if applicable,

(ii) in the case of a transition engine referred to in paragraph 13(1)(*b*),

(A) a statement, dated and signed by the company or its duly authorized representative, certifying that the engine conforms to section 625(e), subpart G, of CFR 1039,

(B) a document demonstrating that at least one machine of the same model as the one in which the engine is installed is sold concurrently in Canada and in the United States,

(C) a copy of the documentation submitted to the EPA under section 625, subpart G, of CFR 1039, and

(D) a copy of the label referred to in subsection 13(3) or (4), if

applicable;

(*b*) with respect to an engine other than one referred to in paragraph (*a*), evidence of conformity shall be obtained and produced by a company in a form and manner that is satisfactory to the Minister and shall include a copy of the label referred to in section 10.1, 11.1, 12 or 13, as the case may be.

(2) For greater certainty, the company shall submit the evidence of conformity referred to in paragraph (1)(*b*) to the Minister before importing an engine or applying a national emissions mark to it.

17.1 For greater certainty, a company that imports an engine or applies a national emissions mark to it under subsection 153(2) of the Act is not required to submit the evidence of conformity referred to in subsection 17(1) to the Minister before importing it or applying a national emissions mark to it, but shall submit that evidence in accordance with subsection 153(2) of the Act before the engine leaves the possession or control of the company.

MAINTENANCE, RETENTION AND SUBMISSION OF RECORDS

18. (1) A company shall maintain records, in writing or in a readily readable electronic or optical form, that contain the following documents and retain the records for the following periods:

(*a*) a copy of the annual report referred to in section 13.1, for a period of eight years following the end of the calendar year in question; and

(*b*) the evidence of conformity referred to in section 16 or 17, as the case may be, for a period of eight years following

(i) if the engine is imported, the date of import, or

(ii) in any other case, the end of the calendar year that corresponds to the model year of the engine.

(2) If the records referred to in subsection (1) are retained on a company's behalf, the company shall keep a record of the name and street address and, if different, the mailing address of the person who retains those records.

(3) If the Minister makes a written request to the company for a record referred to in subsection (1) or (2), the company shall submit it to the Minister in either official language

(*a*) within 40 days after the day on which the request is made; or

(*b*) within 60 days after the day on which the request is made, if the record must be translated from a language other than English or French.

20. (1) The portion of subsection 19(1) of the Regulations before paragraph (*a*) is replaced by the following:

19. (1) Subject to subsections (1.1) and (2) and for the purposes of paragraph 153(1)(*b*) of the Act, any person importing an engine into Canada shall, before the importation, submit a declaration to the Minister, signed by that person or their duly authorized representative, that contains the following information:

(2) Paragraphs 19(1)(*b*) to (*d*) of the Regulations are replaced by the following:

(*b*) in respect of an engine that is not installed in or on a machine, the name of the manufacturer and the make, model and model year of the engine;

(*c*) in respect of a machine, the name of the manufacturer and the make, model and type of the machine, as well as the name of the manufacturer and the make, model and model year of the engine that is installed in or on the machine;

(*d*) the expected date of importation;

(3) Subparagraph 19(1)(*f*)(i) of the Regulations is amended by striking out "or" at the end of clause (B) and by adding the following after clause (C):

(D) the label referred to in section 10.1 showing that the engine conformed to these Regulations at the time of its manufacture, or

(4) Section 19 of the Regulations is amended by adding the following after subsection (1):

(1.1) A person who is not a company and who imports five engines or less per calendar year is exempt from the obligation to submit to the Minister the declaration referred to in subsection (1).

21. Section 20 of the Regulations is replaced by the following:

20. (1) The declaration referred to in paragraph 155(1)(*a*) of the Act shall be signed by the person referred to in that paragraph or their duly authorized representative and shall contain

(*a*) the information set out in paragraphs 19(1)(*a*) to (*d*) and, if applicable, subparagraph 19(1)(*e*)(i);

(*b*) a written statement that the engine will be used in Canada solely for purposes of exhibition, demonstration, evaluation or testing;

(*c*) the date on which the engine will be removed from Canada or destroyed or will conform to these Regulations; and

(*d*) the engine's unique identification number.

(2) The declaration shall be submitted to the Minister before the engine is imported or, in the case of a company that imports more than 50 engines, quarterly, at the option of the company.

(3) A copy of the statement referred to in paragraph (1)(*b*) shall accompany the engine.

22. The portion of section 21 of the Regulations before paragraph (*a*) is replaced by the following:

21. A company that imports an engine in reliance on subsection 153(2) of the Act shall, before the importation, submit a declaration to the Minister, signed by its duly authorized representative, that contains the information described in paragraphs 19(1)(*a*) to (*d*) and subparagraph 19(1)(*e*)(i), along with

23. (1) The portion of section 23 of the Regulations before paragraph (*a*) is replaced by the following:

23. A company applying under section 156 of the Act for an exemption from conformity with any standard prescribed under these Regulations shall, before manufacturing or importing the engine, submit the following information in writing to the Minister:

(2) Subparagraph 23(*f*)(ii) of the French version of the Regulations is replaced by the following:

(ii) entraverait la mise au point de nouveaux dispositifs de mesure ou de contrôle des émissions équivalents ou supérieurs à ceux qui sont conformes aux normes réglementaires,

(3) Section 23 of the Regulations is amended by adding "and" at the end of paragraph (*g*), by striking out "and" at the end of paragraph (*h*) and by repealing paragraph (*i*).

24. Subsection 24(1) of the Regulations is replaced by the following:

24. (1) In the case of a model of engine in respect of which the Governor in Council has, by order, granted an exemption under section 156 of the Act, the engine shall bear a label that meets the requirements set out in section 8.

25. (1) Paragraph 25(1)(*b*) is replaced by the following:

(*b*) a description of each engine in respect of which the notice is given, including the name of the manufacturer, the make, the model, the model year, the period during which the engine was manufactured and, if applicable, the EPA engine family identification;

(2) The portion of subsection 25(3) of the Regulations before paragraph (*a*) is replaced by the following:

(3) If a company submits an initial report under subsection (2), it shall submit, within 45 days after the end of each calendar quarter, a quarterly report to the Minister respecting the defect and its correction that contains the following information:

(3) Paragraph 25(3)(*d*) of the Regulations is replaced by the following:

(*d*) the total number or percentage of engines repaired by or on behalf of the company, including engines requiring inspection only.

26. (1) The Regulations are amended by adding the following after section 25:

TEMPORARY STANDARDS

25.1 (1) Despite section 14, an engine that is sold concurrently in Canada and in the United States and that bears the U.S. emission control information label referred to in section 625(j)(1), part 1039, of Title 40 of the *Code of Federal Regulations* of the United States must conform to the emission standards referred to in section 625, part 1039, of Title 40 of that Code instead of the standards set out in sections 9 to 11.

(2) For greater certainty, section 17 applies to an engine referred to in subsection (1).

(2) Section 25.1 of the Regulations, as enacted by subsection (1), is repealed.

27. The schedule to the Regulations is renumbered as Schedule 2.

28. The Regulations are amended by adding, before Schedule 2, the Schedule 1 set out in the schedule to these Regulations.

COMING INTO FORCE

29. (1) These Regulations, other than subsection 26(1), come into force 60 days after the day on which they are registered.

(2) Subsection 26(1) of these Regulations comes into force on the day on which these Regulations are registered.

SCHEDULE
(Section 28)

SCHEDULE 1
(Subsection 6(1))

MINISTERIAL AUTHORIZATION

Department of the Environment

Canadian Environmental Protection Act, 1999

Off-Road Compression-Ignition Engine Emission Regulations

Identification Number _____

Pursuant to the *Canadian Environmental Protection Act, 1999*,
I, _____, the Minister of the Environment, hereby authorize (*name and address*) to use and apply at its premises located at (*location*) the national emissions mark and this identification number on the following gross power categories of prescribed engines, provided that the engines conform to all applicable emission standards: (*list gross power categories*).

This authorization expires on (*date*).

Issued on (*date*).

_____
for the Minister of the Environment

REGULATORY IMPACT ANALYSIS STATEMENT

(*This statement is not part of the Regulations.*)

Executive summary

Issue: Emissions from off-road compression-ignition engines (hereinafter referred to as off-road diesel engines) contribute towards the problem of air pollution in Canada. Air pollution leads to health-related problems, such as cardiovascular ailments and respiratory distress, as well as acid rain, reduced vegetation productivity, and building soiling and corrosion. These emissions are currently regulated under the *Off-Road Compression-Ignition Engine Emission Regulations* (hereinafter referred to as "the Regulations").

Description: The objective of the *Regulations Amending the Off-Road Compression-Ignition Engine Emission Regulations* (hereinafter referred to as "the Amendments") is to further reduce emissions from off-road diesel engines in Canada by establishing more stringent Canadian off-road diesel emissions standards. The Amendments align Canadian emission standards with those of the United States Environmental Protection Agency (EPA). The EPA introduced Tier 4 emission standards in 2004 and began phasing in these standards for the 2008 to 2015 model years and beyond. The Amendments to the Regulations apply to off-road diesel engines used in machines such as tractors, excavators, log skidders and bulldozers.

The Amendments will reduce emissions from off-road diesel engines by setting new

standards for emissions of volatile organic compounds (VOCs), nitrogen oxide (NO_x), particulate matter (PM), and other pollutants listed as "toxic substances" (see footnote 2) in Schedule 1 of the *Canadian Environmental Protection Act, 1999* (CEPA, 1999). The Amendments continue to minimize the regulatory burden on manufacturers and importers by recognizing EPA certificates as evidence of compliance. Furthermore, the Amendments allow companies to use transition engine provisions based on the EPA's program for equipment-manufacturer flexibility. These provisions will also be available to companies that sell exclusively to Canada.

Cost-benefit statement: Based on the expectation from industry that Canada will continue to align with United States standards and the integrated nature of the North American off-road diesel engine market, there is already a large degree of penetration of Tier 4 engines in Canada similar to what is occurring in the United States.

The EPA NONROAD model was used to provide an indication of the possible emission reductions attributable to the Amendments. Relative to the status quo emissions, it is estimated that from 2012 to 2030, emissions reductions will total 2.7 kilotonnes (kt) of VOCs, 63.3 kt of NO_x, 9.5 kt of sulphur dioxide (SO_2), and 8.4 kt of $PM_{2.5}$.

Detailed atmospheric modelling of these emission reductions was not feasible, and as a result, the impacts of these reductions on ambient air quality, health, and the environment are uncertain. However, in an effort to provide order of magnitude estimates of the impacts of these air quality improvements, benefits have been extrapolated based on a study performed for Environment Canada (see footnote 3). Based on this extrapolation, the net benefits over the 19-year time frame are estimated to range from $107 million to roughly $213 million (present value).

Based on the assumptions discussed above, some incremental costs are estimated for importers of machines having engines meeting previous Tier standards, namely Tiers 2 and 3. The increased price of machines will result in total present value costs to importers of about $84.3 million, with total costs to Government of roughly $4.4 million for the training of enforcement officers, compliance promotion, regulatory administration, and testing. Therefore, the present value of all costs is estimated at $88.7 million.

With respect to distributional impacts, Ontario is expected to incur the largest proportion of total costs. In terms of firm size, and using imported units on an annual basis as indicator, firms which imported fewer than 500 units are expected to incur the largest proportion of total costs.

In conclusion, the net benefits of the Amendments are estimated to range from $18 million to $124 million under conservative estimates. The benefits are estimated to be 1.2 to 2.5 times the costs. The benefits of the Amendments are therefore estimated to exceed the costs over a broad range of scenarios.

Business and consumer impacts: As noted, the North American off-road diesel engine market is highly integrated. Therefore, the vast majority of costs for firms are assumed to occur under the status quo. For impacted importers of machines, the price increase as estimated by the EPA is expected to be less than 3% on average for most models.

Domestic and international coordination and cooperation: The Amendments will align Canada's emissions standards with similar requirements of the EPA in accordance with Canada's commitment under the Ozone Annex to the 1991 Canada-United States Air Quality Agreement.

Issue

Emissions from mobile sources such as off-road diesel engines, which are currently regulated under the *Off-Road Compression-Ignition Engine Emission Regulations*, (see footnote 4) are a significant contributor to air pollution in Canada. This pollution leads to numerous environmental and health related problems. As shown in Table 1, mobile sources are responsible for a significant share of Criteria Air Contaminant (CAC) emissions relative to the total national emissions inventory. CACs describe a group of air pollutants such as VOCs, NO_x and PM that cause smog and acid rain. Smog is a respiratory irritant and a major factor in numerous health related problems such as cardiovascular ailments and respiratory distress, while acid rain can have harmful effects upon plants and aquatic organisms and lead to reduced productivity of vegetation, as well as building soiling and corrosion.

Table 1: Estimated CAC emissions from off-road diesel engines in Canada in 2009 (see footnote 5)

s **NO_x**	**SO_2**	**$PM_{2.5}$**	**VOC**	**CO**	
Mobile emissions (kilotonnes)	1 132	95	61	510	6 606
Percentage contribution of mobile sources to National Inventory(see footnote *)	56%	6%	24%	29%	75%
Off-road diesel emissions (kilotonnes)	389	3	31	36	208
Percentage contribution of off-road relative to mobile sources(see footnote **)	34%	3%	51%	7%	3%

Emissions from off-road diesel engines represent a significant proportion of total emissions from the mobile sector in Canada, as shown in Table 1. In fact, since 1985, certain pollutant emissions from off-road diesel engines now represent a greater proportion of total mobile emissions of several CACs, including NO_x, VOCs and CO. In order to provide a healthier environment for Canadians, strong action is required on a continuous basis to reduce emissions from off-road diesel engines and machines.

Objectives

The objective of the Amendments is to protect Canada's health and environment by further reducing off-road diesel engine emissions of VOCs, NO_x, PM and other "toxic substances" listed on Schedule 1 of the *Canadian Environmental Protection Act, 1999* (CEPA, 1999).

The Amendments achieve this objective by establishing more stringent Canadian off-road diesel emission standards and aligning Canadian emission standards and test procedures with those of the EPA, as well as by allowing Canada to fulfill its commitments under the Canada-United States Air Quality Agreement (Ozone Annex). The Amendments strive to minimize the regulatory burden on companies, where possible, and allow companies to use the transition engine provisions. Transition engine provisions will also be available to those companies that sell exclusively to Canada.

Background

The Ozone Annex to the 1991 Canada-United States Air Quality Agreement (December 7, 2000) was introduced to reduce the trans-boundary flow of ground-level ozone and its precursors (VOCs and NO_x) between the United States and Canada. Under this agreement, Canada committed to develop and implement emission regulations under CEPA, 1999 for new non-road engines aligned with the United States federal emissions program.

In the spring of 1999, as a precursor to regulatory action, Memoranda of Understanding (MOUs) were initiated under CEPA, 1999 between Environment Canada and 13 major engine manufacturers. Under the terms of the MOUs, manufacturers voluntarily agreed to supply to Canada off-road diesel engines that met the applicable Tier 1 emission standards of the EPA.

In January of 2006, the Regulations under section 160 of CEPA, 1999 introduced standards to reduce smog-forming emissions from off-road diesel engines typically used in construction, mining, farming and forestry machines. The Regulations aligned Canadian requirements with the corresponding EPA emission standards, as per Canada's commitments under the Ozone Annex.

On April 26, 2007, the Government of Canada re-affirmed its commitment to reduce smog-forming emissions from vehicles and engines through alignment with the EPA rules, with publication of the *Notice of intent to develop and implement Regulations and other measures to reduce air emissions* (see footnote 6) (October 2006) and the associated *Regulatory Framework for Air Emissions*. (see footnote 7)

Description

The Amendments align Canadian emissions standards with those of the EPA for off-road diesel engines as established under Title 40, Part 1039 of the *Code of Federal Regulations* (CFR). The EPA introduced Tier 4 emission standards in 2004 and these standards came or will come into effect for different power categories between the 2008 and 2015 model years and beyond. In some instances, provisions from Title 40, Part 89 will also continue to apply. Also, requirements related to labelling, from Title 40, Part 1068, are included in the Amendments.

With the Amendments, new Canadian emission standards apply to diesel engines of 2012 and later model years that are manufactured on, or after, the coming into force date. The Amendments apply to off-road diesel engines such as those found in construction, some mining, farming and forestry machines. This includes tractors, excavators, log skidders and bulldozers.

In addition to setting new standards, the Amendments also include new requirements with regard to installation instructions for after-treatment systems; requirements relative to maintenance manuals and procedures; updates to the transition engine provisions; optional alternate standards for engines used in transportation refrigeration units; new labelling requirements, including new labelling requirements for stationary engines, as well as other miscellaneous changes to improve the clarity and enforceability of the Regulations.

New standards for exhaust, crankcase and evaporative emissions

The Amendments incorporate the EPA's steady-state and transient emission standards for exhaust, crankcase, and evaporative emissions for 2012 and later model years. The allowable emission levels from individual engines are significantly reduced from current standards, including reductions of 37% of combined non-methane hydrocarbons (NMHCs) (see footnote 8) and NO_x emissions, and from 50% to 95% reductions of PM emissions.

Crankcase emissions and evaporative emission standards

In addition, turbocharged diesel engines, like all engines, can no longer release crankcase emissions, and an evaporative emission standard is introduced for off-road diesel engines fuelled with volatile liquid fuels (i.e. fuels that easily evaporate such as methanol).

Installation instructions, maintenance manuals and procedures

The Amendments include requirements for maintenance manuals and installation instructions for emission control systems. The content of the manuals is consistent with the instructions set out in CFR 1039.

Updates to the transition engine provisions

The Amendments update the transition engine provisions based on the EPA program for equipment-manufacturer flexibility outlined in Title 40, Part 1039. The transition engine provisions, available during specified time frames, allow for the manufacture and the import of engines meeting the transition engine specific standards. The quantity of these transition engines will not be limited but will be monitored through annual reporting. Environment Canada will be assessing the proportion of transition engines manufactured or imported into Canada in comparison to the proportion in the United States. If the use of the transition engine provisions, in comparison to their use in the United States, becomes excessive, Environment Canada will consider modifying the provisions.

Engines powering transportation refrigeration units

The Amendments incorporate the optional alternate emissions standards for engines used in transportation refrigeration units (TRUs), as outlined in CFR 1039. A TRU is a refrigeration system that is powered by an engine and that is designed to control the temperature of products that are transported in rolling stock, vehicles or trailers.

New labelling requirements

The labelling requirements in the Amendments have been updated, and in most cases, EPA labels are accepted. For those cases where the engine does not have an EPA label, the Amendments specify the information that must be on the label. These requirements are aligned with the information required by the EPA for the corresponding label. The Amendments also require that engines have a unique identification number.

In addition, engines excluded from the emission requirements due to the nature of their uses will require a label indicating that the engines are only to be used for the specific applications for which they are excluded from the application of the Amendments.

Requirements for stationary engines

While stationary engines continue to be exempt from the emission requirements, the Amendments will require that these engines bear a label. This will help improve compliance verification, as well as the enforceability of the Regulations.

Engines certified by the EPA

Tier 4 engines that have EPA certification and are available for sale in Canada and the United States will be required to meet the emission standards specified on the EPA certificate for that engine.

Use of the national emissions mark

The national emissions mark (NEM) will be required for engines that are manufactured and for sale in Canada. This includes engines that have emission control systems installed in Canada for which the installation does not correspond to the EPA certificate for that engine.

Importation documentation

To improve the administration of the Regulations, the Amendments require that importers submit an importation declaration document to the Minister instead of to the Canada Border Services Agency (as previously required in the Regulations) prior to importation of the engines or machines. The Amendments also provide the possibility of submitting bulk declarations in certain cases to reduce the burden to industry and government.

The Canadian off-road compression-ignition engine industry

There is no known production of off-road diesel engines in Canada. The Canadian off-road diesel engine and machine market is mainly supplied by established manufacturers, either multinationals or North American.

It is estimated that in 2007, roughly 160 000 engines with a value of $880 million were imported into Canada. However, domestic demand for off-road diesel engines and machines was impacted by the recent recession. By 2009, approximately 56 000 engines were imported having a value of about $330 million. These engines were imported for installation in new diesel machines, or to replace engines in existing machines.

Likewise, in 2007, an estimated 67 000 off-road diesel machines were imported into Canada, with an approximate value of $5.9 billion. The impact of the recession was also observed in the machine market and in 2009 the sector imported roughly 28 000 machines with an estimated value of $2.7 billion.

The market for off-road diesel machines is comprised of firms in the following sectors: agriculture; construction; some mining, forestry, general industrial; lawn and garden; material handling; pumps and compressors; and welders and generators. Off-road diesel machines represent an essential part of operative assets of these sectors.

In terms of quantity, about 96% of imported machines are shipped from countries which have incorporated Tier 4 or similar standards or are significant manufacturers of Tier 4 compliant machines. In 2007, the majority of imports were shipped from the United States (65%), the European Union (19%) and Japan (12%).

Regulatory and non-regulatory options considered

Several regulatory and non-regulatory measures have been considered, and descriptions of each are provided below.

Status quo

Under the status quo, most imported off-road diesel engines are expected to be compliant with the Tier 4 standards in the United States. However the option of retaining the current standards does not take full advantage of the opportunity for continued reductions in off-road diesel engine emissions, as the Canadian market would remain open to increasing use of Tier 2 and Tier 3 engines and machines. Maintaining the status quo would also be inconsistent with Canada’s commitment to align Canada’s emission standards with those of the United States as outlined in the Ozone Annex. This option was therefore rejected.

Regulations aligning Canadian standards with those of the United States

Given the highly integrated North American engine and machine industry and the progressive nature of United States federal emission standards, there has been broad support from stakeholders (i.e. industry, other government departments, and environmental non-governmental organizations) for the policy of aligning Canada’s emission standards with those of the United States. This support was evidenced throughout the consultation process on the regulatory development of the four on-road and off-road vehicle and engine emission regulations that are in effect under CEPA, 1999. Aligning with EPA rules allows for reductions in emissions by preventing the potential importation of higher emitting engines, is cost-effective for companies and consumers and creates a level North American market.

Industry stakeholders are supportive of aligning Canadian regulations with U.S. standards because this reduces their administrative burden. They are also supportive of incorporating

provisions similar to the U.S. flexibility provisions in the amendments in order to help off-set the cost and performance differences between the earlier standards and the Tier 4 engines. Engines designed to meet the new standards are more expensive due to increased production costs as well as the addition of emission control technologies such as diesel particulate filters.

Major industry stakeholders have called for the quick implementation of the Tier 4 standards to maintain a level playing field in the North American market and to ensure that companies offering engines that meet the new standards do not lose market share to less expensive but more polluting engines.

Alignment with EPA emission standards represents the most cost-effective option for Canada to achieve its desired environmental objectives, and was therefore chosen.

Benefits and costs

Summary

From 2012 to 2030, the Amendments are estimated to reduce emissions of several CACs including 63.3 kt of NO_x, 9.5 kt of SO_2, 8.4 kt of PM2.5 and 2.7 kt of VOCs. While precise air quality modeling was not available, extrapolation from similar studies suggests that the socio-economic value of these emission reductions ranges from $107 to $213, in net present value, using a 3% discount rate. However, to the extent that the proportion of compliant machines is reduced in the base case, the benefits would increase accordingly.

The costs of the Amendments during this same period were also discounted using a 3% social discount rate. It is estimated that the total discounted costs of the Amendments are around $88.7 million including about $84.3 million to importers of off-road diesel machines and about $4.4 million to government. The net benefit of the Amendments is therefore estimated to range from $18 million to $124 million. The benefits are estimated to be 1.2 to 2.5 times the costs. The benefits of the Amendments are expected to exceed the costs over a broad range of scenarios.

Benefits

Emission reductions

The Amendments further reduce CACs and smog-forming emissions from off-road diesel engines in Canada. Tier 4 compliant engines will be phased in over several years as they gradually replace the existing higher-emitting engines, allowing for progressively greater emission reductions of air pollutants from the off-road diesel fleet. Tier 4 engines are assumed to enter the engine fleet via imports and manufacturing of new machines, as well as through the replacement of older engines in existing machines.

To provide an indication of the possible emission reductions which may be achieved, Environment Canada forecast emissions from off-road diesel engines for several benchmark years between 2012 and 2030 using the EPA NONROAD (see footnote 9) model with Canadian input data. While recognizing that the absence of a comprehensive data set which accurately captures the stock and flow of off-road diesel engines in Canada creates uncertainty with respect to these scenarios, they depict a plausible and directionally representative forecast of emission trends.

The following two emission forecast scenarios were modeled: a baseline scenario in which there is zero penetration of Tier 4 off-road diesel engines in Canada; and, a regulatory scenario, in which 100% compliance with Tier 4 standards is assumed. A linear growth rate between benchmark years was also applied to estimate total annual emissions from 2012 to 2030. Given the limitations on data, this is viewed as an imperfect but reasonable method to extrapolate overall emission reductions.

Based on the assumption that 96% of off-road diesel machines entering the Canadian marketplace will be compliant under the status quo over the following 19 years, the analysis only attributes 4% of the total emission reductions to the Amendments. Table 2 shows that the more stringent Tier 4 standards for off-road diesel engines result in reduced emissions of several CACs and toxics over the next 19 years. Table 2 also demonstrates that the Amendments will reduce emissions of other substances on the list of toxic substances. While the Amendments do not enforce specific limits for these toxic substances, the application of Tier 4 technology will offer co-benefits for human health and the environment in terms of their reduced emissions.

Table 2: Estimated emission reductions from off-road diesel engines, 2012 to 2030

Total Estimated Emission Reductions (kt)	
2012–2030	
VOCs	2.7
NO_x	63.3
$PM_{2.5}$	8.4
SO_2	9.5
NMHC	2.4
Benzene	0.05
Formaldehyde	0.40

Health and environmental benefits

The upgrade to Tier 4 emissions standards for off-road diesel engines provides significant benefits in terms of improved air quality and reduced exposure to air pollutants and toxic substances. The potential impacts on the health and environment of Canadians include changes in mortality and morbidity, impacts on agriculture such as improved crop productivity and yield due to less ground-level ozone, and improved visibility by reducing haze formation. Other potential benefits such as reduced corrosion and soiling of buildings and infrastructure associated with deposition of air pollutants, and benefits for forests and ecosystems are also expected but are not included in this analysis.

By ensuring the emission reductions through a regulatory framework, the Amendments will further improve air quality and reduce exposure to air pollutants and toxic substances, as identified in Table 2. Although the estimated emission reductions are large enough to have significant health and environmental benefits, they make up only a small fraction of total sector emissions. This, combined with the operational timelines, meant that thorough atmospheric modelling of the emission changes was not practical. As a result, it is not possible to provide a precise estimate of the impact that these emissions will have on ambient air quality. Ambient air quality is the main determinant of human health and environmental impacts. It is, therefore, not possible to provide a precise estimate of the likely health or environmental impacts of these emission reductions.

While precise estimates are not possible, extrapolation of impacts, based on similar studies, can provide a rough estimate of the likely health and environmental benefits of these emission reductions. A 2007 study (see footnote 10) conducted for Transport Canada examined the health and environmental impacts of air pollution from the Canadian transportation sector as a whole, and from particular modes of transport. The air pollution emission changes examined in that study have some key differences with the emission changes expected from these Regulations. The magnitude of the emissions changes, the regional distribution of the emissions, and the ratio of different pollutants in the emission mix are all different between that study and these Regulations. In particular, the source of emissions in the 2007 study were predominantly from heavily populated areas, while these Regulations will tend to reduce emissions more in less populous areas. However, while these differences are important, the two scenarios have enough in common that extrapolation

of results from that study to these Regulations may provide a rough yet reasonable estimate of the benefits of the above emission reductions.

The 2007 study contained estimates of the human health and environmental benefits of emission reductions from the transportation sector, by pollutant (VOC, NO_x, $PM_{2.5}$, and SO_2). Health impacts included both increases in premature mortality risk and increased rates of illness (morbidity). Environmental impacts included agricultural impacts (lost production yields for crops) and changes in visibility (haze). The estimates in that report have been extrapolated for use in the Regulatory Impact Analysis Statement for the *Passenger Automobile and Light Truck Greenhouse Gas Emission Regulations*. (see footnote 11) Key estimates from the Transport Canada report have also been recently updated to adjust for inflation. (see footnote 12)

Taking the updated value estimates by pollutant from the 2007 study, and applying them directly to the emission reductions found in Table 2 yields a present value of benefits of about $323 million from 2012 to 2030. However, as already noted, the emission reductions likely to occur as a result of these Regulations are most likely to occur in less populated areas than the emission reductions used to develop the benefits estimates in the 2007 study. Therefore, the benefits derived from improved air quality under these regulations and corresponding affects on human health and the environment would likely be less than the full sum of $323 million. In order to gauge the possible value of benefits, the larger proportion of off-road diesel engines used in less populated areas is accounted for by assuming that roughly 33% to 66% of the estimated $323 would result from these Regulations. Under these assumptions, the total present value of benefits would range from $107 million to $213 million.

Benefits to industry

The Amendments will ensure a level playing field for companies supplying the Canada-United States market for off-road diesel engines. At the domestic level, it will ensure that all manufacturers, importers and distributors operating in this competitive market comply with the same standards.

Furthermore, given that the emission certification process for engines is complex and costly for manufacturers and governments, aligning Canada's emission standards with those of the EPA will allow Canada to benefit from the EPA's emission certification program. This will result in cost savings for Canadian companies and the federal government.

Benefits to Canada

The Amendments will enable Canada to meet its commitment under the Ozone Annex to the 1991 Canada-United States Air Quality Agreement and under the Regulatory Framework for Air Emissions in regard to emissions from this sector.

Costs

Costs to importers

All engines imported into Canada for the domestic manufacturing of off-road diesel machines are assumed to be compliant with the Amendments. Therefore, the Amendments do not result in incremental costs for manufacturers of machines.

The vast majority of costs for importers of machines are also assumed to be incurred under the baseline scenario, given that imports from the United States, the European Union and Japan represent almost 96% of total imports. Therefore, the costs of the Amendments are incurred by the importers of the remaining 4% of off road diesel machines which are imported from countries with production that is assumed to be non-compliant with the EPA rules.

The EPA estimated in its Regulatory Impact Analysis (RIA) that the upgrade to Tier 4 engines would result in average price increases for off-road diesel machines of about 2.9% in the near-term. (see footnote 13) Using import data from Statistics Canada, it was estimated that Canadian importers of off-road diesel machines will pay about $5.3 million in higher prices in 2012. The present value of these costs to industry from 2012 to 2030 is estimated to be $84.5 million.

Costs to consumers

Machine manufacturers are expected to pass some or all of the direct compliance costs (machine redesign) and indirect costs (increased engine costs) to application market producers, who will then pass on costs to final application markets. The US EPA RIA estimated that the average price of goods and services produced using machines and fuel affected by the rule would increase by about 0.1%. As noted earlier, most of these consumer costs are incurred under the baseline scenario and are not incremental to the Amendments. The Amendments are therefore not expected to adversely impact overall output and the price of goods produced by these sectors.

Costs to the Government

The federal government will incur incremental costs related to regulatory administration, compliance promotion, compliance verification, laboratory upgrades to allow for emissions testing of off-road diesel engines, and enforcement activities. These costs supplement the existing program of integrated initiatives. With respect to enforcement costs, a one-time amount of about $200,000 will be required for the training of enforcement officers. Following this, the annual cost to government associated with an effective program to implement the Amendments will vary from year to year and is estimated to be up to $380,000 per year during the initial years of implementation. The present value of costs to government from 2012 to 2030 is estimated to be about $4.4 million.

Distributional impact

With respect to distributional impacts, Ontario is expected to incur the largest proportion of total costs as it currently imports roughly 40% of engines assumed to be non-Tier 4. The Pacific and Yukon region is also expected to be impacted as roughly 26% of the value of imported engines to this region is assumed to be non-Tier 4.

In terms of firm size, using the number of imported units on an annual basis as an indicator, in 2007, firms which imported fewer than 500 units accounted for almost 57% of total imports from non-Tier 4 jurisdictions; while firms importing more than 10 000 units accounted for 3% of those imports.

Competitiveness implications

As the majority of engines and machines sold in Canada are designed for both the United States and Canadian markets, implementing harmonized regulations with the United States will actually ensure a level playing field for companies and support the competitiveness of the Canadian manufacturing industry and that of Canadian distributors of these engines and machines.

Conclusion

The Amendments are estimated to result in benefits that exceed the costs when accounting for the range of benefits in the analysis above ($107 million to $213 million). The net benefit of the Amendments is estimated to range from about $18 million to $124 million as illustrated in Table 3.

Table 3: Summary of cost-benefit statement

	Base year:	**Final year:**		**Average**

Cost-benefit statement		**2012**	**2030**	**Total**	**annual**
A. Quantified impacts in $ millions at 3% discount rate, present value					
Benefits					
	33% (see footnote 14)	$2.0	$7.3	$107	$5.9
Costs	Importers	($5.3)	($3.7)	($84.3)	($4.7)
	Government	($0.4)	($0.2)	($4.4)	($0.2)
	Total costs	($5.7)	($3.9)	($88.7)	($4.7)
Net benefit					
	33%	($3.7)	$3.4	$18.3	$1.0
B. Qualitative impacts					
Environment	The Amendments will help reduce CAC emissions, the formation of ground-level ozone, and toxics, which are shown to cause injury to forests, ecosystems and physical structures.				
Health	The Amendments reduce emissions of several toxins such as benzene and formaldehyde, which are linked to numerous health effects.				
Industry	The Amendments help level the playing field for Canada's machine manufacturers.				
International commitments	Amending the Regulations will allow Canada to align with the EPA rules and meet its commitments under the Ozone Annex.				
Consumers	The price of off-road diesel machines is expected to increase by less than 3% on average for most models.				

The combustion of fuels to power engines such as off-road diesel contributes significantly to air pollution, resulting in adverse impacts on the environment and on the health of Canadians. This includes impacts such as restricted activity days, hospital admissions, work-loss days, and premature mortality, as well as environmental damage to crops and other vegetation. An assessment of alternatives to manage these risks shows that maintaining the status quo would not take advantage of the opportunity to use readily accessible technologies to further reduce emissions. Under the status quo it is assumed that most imported engines and machines would comply with the EPA Tier 4 standards. However, Canada would be vulnerable to increasing imports of non-compliant engines with corresponding impacts on the health and environment of Canadians.

The Amendments are the best option to address this risk and further mitigate the impacts of off-road diesel engines in Canada. The Amendments will also provide the necessary flexibility for manufacturers and importers to transition to the new emissions standards. The regulatory framework provides a level playing field, ensuring that no single company can place other companies under competitive pressure by manufacturing or importing engines or machines that do not meet the established standards.

Under the assumptions discussed above, some incremental costs are estimated for importers of machines having non-Tier 4 engines. The increased price of machines is expected to result in total present value costs to importers of about $84.3 million, with total costs to Government of roughly $4.4 million for the training of enforcement officers, compliance promotion, regulatory administration, and testing. Therefore, the net costs amount to $88.7 million (present value).

The Amendments were developed in consultation with industry, including engine and machine manufacturers, importers and industry associations, as well as provincial and territorial governments, environmental non-governmental organizations and other government departments who all showed support for the policy of alignment with EPA federal emission requirements.

Coordination and cooperation

Under the Ozone Annex, Canada committed to develop and implement emission regulations for new off-road engines under the CEPA, 1999 that are aligned with the EPA federal emissions program. Environment Canada is also currently coordinating joint initiatives with the EPA in the areas of administration of regulations and compliance promotion in order to allow for efficiencies in the delivery of the regulatory programs. Coordinating efforts will increase the breadth and depth of monitoring and verification, allowing for more effective use of resources (avoiding duplication of efforts for both the regulated community and regulators) and show industry that governments are working to reduce industry burden while improving regulatory oversight and performance monitoring.

Consultation

In recent years, several regulations have been adopted based on a policy of alignment with EPA standards, including the *On-Road Vehicle and Engine Emission Regulations*, the *Off-Road Small Spark-Ignition Engine Emission Regulations*, the current *Off-Road Compression-Ignition Engine Emission Regulations* and the recently published *Marine Spark-Ignition Engine, Vessel and Off-Road Recreational Vehicle Emission Regulations*. In the development of these regulations, Environment Canada consulted with industry, provinces, territories, municipalities, and federal departments, as well as environmental and health groups. The consultations associated with the development of each of these regulations revealed a broad consensus that Canada's regulatory emission standards for on-road and off-road vehicles and engines should be based on alignment with corresponding United States federal requirements. Stakeholders have generally identified that the integrated nature of the Canada/United States economy, and the implementation of aggressive national programs for on-road and off-road vehicles and engines by the EPA, are two key elements supporting a policy of alignment with EPA federal programs as a logical approach for Canada to achieve significant emission reductions in a cost-effective manner. Specific to the development of these Amendments, Environment Canada carried out two consultations described below, as well as had on-going discussions with a wide cross section of stakeholders.

Pre-*Canada Gazette* consultation following the distribution of draft proposed Amendments (October 2009)

On October 26, 2009, a discussion document presenting draft proposed Amendments outlining the planned approach was released by Environment Canada to interested parties. The objective of this consultation was to provide stakeholders with detailed information and solicit input on the draft proposed Amendments. Comments were received from two industry associations and four companies. The specific comments and concerns raised are presented below, along with Environment Canada's responses.

Timelines:

Stakeholders expressed concerns about the draft proposed Amendments skipping critical interim standards. Environment Canada modified the approach in the proposed Amendments to allow for interim standards.

Stakeholders suggested that any divergence from EPA timelines would result in significant costs and logistical issues. Environment Canada is providing guidance to companies relative to this issue.

Definitions:

Stakeholders noted the discrepancy between some definitions in the draft proposed Amendments and corresponding EPA definitions. Environment Canada recognizes the differences, although no change has been made since these definitions are consistent with other Environment Canada regulations and in line with CEPA, 1999. Also, they do not directly affect the implementation and requirements of the Amendments.

Concerns were raised about the revised definition of an "off-road engine" in the draft proposed Amendments. The definition included stationary engines which are then exempt from the emission standards if they are appropriately labelled. To address this concern, Environment Canada kept stationary engines within the definition but modified the labelling requirements to allow for the use of the EPA label for stationary engines.

Labelling requirements:

Since there is limited suitable space for labels on engines, stakeholders voiced concerns about the additional labelling requirements in the draft proposed Amendments. In response, Environment Canada updated the proposed Amendments to allow for the use of EPA labels.

Reporting forms:

Stakeholders requested samples of standardized reporting forms or letters to simplify reporting requirements. Environment Canada plans to develop the sample documents and they will likely be posted online.

Transition engine provisions:

Stakeholders raised concerns over the effect that the transition engine provisions in the draft proposed Amendments would have on their businesses. Environment Canada is working toward ensuring any impacts are minimized by aligning the requirements more closely to the EPA corresponding rules.

Minor changes and corrections:

Stakeholders requested changes to references in the draft proposed Amendments for clarity. Additionally, stakeholders highlighted a section where EPA language could be used to provide clarity and consistency. Environment Canada agrees and where possible has made the appropriate modifications.

It was suggested that references should not be made to specific subsections of the CFR, since an amendment to the EPA standards would cause the reference to be incorrect. Environment Canada agrees and where possible has made the appropriate adjustments.

Finally, stakeholders sought clarification on some technical aspects and language of the draft Amendments. As a result, Environment Canada made some minor changes to the wording to provide clarity.

Consultations following the publication of the proposed Amendments in the *Canada Gazette*, Part □, on February 12, 2011

Publication of the proposed *Regulations Amending the Off-Road Compression-Ignition Engine Emission Regulations* in the *Canada Gazette*, Part □, on February 12, 2011, initiated a 60-day public consultation period where stakeholders were invited to submit their views on the proposed Amendments. The Department posted the proposed Amendments on the CEPA Environmental Registry and advised more than 2 500 stakeholders through a mail-out. The Department received approximately 60 written comments from a variety of stakeholders, including Canadian importers of machines and engines, foreign engine and machine manufacturers, industry associations and Canadian machine manufacturers.

Transition engine provisions:

Most of the comments submitted were in regard to the transition engine provisions. The transition engine provisions in the proposed Amendments were structured in a similar manner to the EPA's

program for equipment-manufacturer flexibility outlined in Title 40, Part 1039 and included the same emission standards, time-frames and similar reporting requirements. The provisions for transition engines were structured differently from the EPA program to reflect that the amendments will apply to importers (see footnote 15) and Canadian engine manufacturers, rather than machine manufacturers, which is the case in the U.S. The transition engine provisions only included the "percent of production" allowance (based on imports) adapted to account for the expected coming into force of the final Amendments. The proposed Canadian Amendments did not include the EPA's "small volume allowance" which is useful for machine manufacturers.

Comments received from stakeholders contained new information demonstrating that Tier 4 engines and machines would not be available for all applications during the entire transition period. This information provided evidence that having a "percent of production" limit on Canadian importers would have led to significant market restrictions on imports for which Tier 4 engines are not yet available. Imposing this limit would have resulted in many engines and machines offered for sale in the U.S. through the EPA's flexibility program allowances on the equipment manufacturer to not be allowed into Canada.

Accordingly, Environment Canada updated the transition engine provisions to allow engines meeting the transition engine specific emission standards to be imported into or manufactured in Canada during specified time frames. These time frames continue to match the EPA time frames. The quantity of the engines will not be limited, but will be monitored through annual reporting. These changes will ensure that engines that are available for sale and imported to the U.S. are also available to the Canadian market. Environment Canada held a workshop and Web conference in June 2011 to share the updated approach with stakeholders, who supported the new provisions. The updated approach is reflected in the Amendments.

While it is expected that some companies will take advantage of the interim flexibility provisions, the analysis of the costs and benefits carried out for the Amendments does not specifically take these provisions into account. In fact, it is not expected that the use of these provisions will significantly affect the costs and benefits over the analysis period as these provisions are time-limited and reflect the same standards as those in the EPA program. Furthermore, based on information obtained during consultations with a variety of stakeholders, it is expected that the proportion of transition engines in Canada will be equivalent to the proportion of transition engines in the U.S. During consultations, information that these proportions have historically been equivalent was presented to Environment Canada.

Furthermore, stakeholders expressed concerns in regard to placing the accountability of limits on the Canadian importer. In comparison, the EPA's program for equipment-manufacturer flexibility primarily applies to machine and engine manufacturers that design engines and machines, incorporate technology and plan their production to meet the various requirements of the EPA program. In Canada, the Regulations, including the Amendments, apply primarily to importers without any control over engine design and production. Consequently, establishing a limit in Canada based on imports that would correspond to the EPA limits based on manufacturing, while ensuring that a comparable product mix would be available in Canada, as in the United States, presented many challenges and risked having unintended market consequences. In addition, the administration of such a program was also determined to be a major regulatory burden without commensurate environmental benefits.

Alternate NO_x standards:

Some stakeholders requested that Environment Canada reference the alternate NO_x standards outlined in CFR 1039. These standards are part of the EPA's phase-in and phase-out standards. Environment Canada referenced the least strict Phase-out standards, which also include the alternate NO_x standards. Therefore, engines designed to the alternate NO_x standards will be allowed into Canada. Therefore, no change to the Amendments relative to this comment has been made.

Definitions:

Some stakeholders expressed concerns that our current definition of off-road engines may include engines intended for stationary uses, and more specifically engines used to provide prime power to remote communities. Environment Canada agrees and has modified the Amendments to bring further clarification.

Labelling requirements:

Stakeholders had various concerns with the labelling requirements. In some instances, the issue was raised that it was not feasible to request that certain information be found on the label; namely the unique identification number and the name of the importer. Environment Canada recognized these difficulties and has removed these requirements from the labelling requirements. Stakeholders also requested that the requirement to label competition engines be removed. Environment Canada disagrees as the labelling of these engines will facilitate compliance verification and enforcement; therefore, these labelling requirements will remain.

Reporting requirements:

Stakeholders had some administrative concerns with the reporting requirements relative to import declarations, as well as in regards to the annual reporting of transition engines. Specific to the import declarations, with the exception of sending the information to the Minister of the Environment as opposed to a customs office, there has been no change to the information required for these declarations. No changes have been made to the information required. Environment Canada will provide additional information in the guidance document for companies that import 50 or more engines in one year. In regards to annual reporting for transition engines, stakeholders requested that the timeline for submitting the report be aligned with the EPA timeline for submitting flex engine information. Environment Canada agrees and has made the change in the Amendments.

Test engine provisions:

Stakeholders requested that Environment Canada allow test engines to be brought into compliance within Canada, as opposed to being forced to export or destroy these engines. Environment Canada agrees and has made the change in the Amendments.

Lead time for coming into force:

Stakeholder requested some lead time for the coming into force of the Amendments after their publication. Environment Canada agrees and a lead time of 60 days has been added.

Environment Canada will be updating the current Guidance Document to include the requirements outlined in the Amendments. Compliance promotion materials will also be developed in a manner that will assist smaller companies with less technical capacity to be aware and understand the requirements of the Regulations and the Amendments.

Implementation, enforcement and service standards

Implementation

For the purpose of implementing the Regulations, including the Amendments, Environment Canada will undertake a number of compliance promotion activities. These activities will be targeted toward raising awareness and encouraging the regulated community to achieve a high level of overall compliance as early as possible during the regulatory implementation process. This will include the following:

- continued development of a comprehensive database of regulatees with regular updates;
- developing and distributing compliance promotion materials including a general mail-out or email including the Regulations and a detailed guidance document which identifies requirements concerning compliance with the standards, evidence of conformity and other required information;
- maintaining a Web page related to the Regulations on Environment Canada's CEPA Environmental Registry to make information widely available; and
- responding to inquiries and delivering information sessions, as required.

Environment Canada administers a comprehensive program to monitor compliance with vehicle and engine emission standards. Engine manufacturers and importers are responsible for ensuring that their products comply with the Regulations and are required to maintain and produce evidence of such conformity. Environment Canada's program to monitor compliance includes

- authorizing and monitoring the use of the national emissions mark;
- monitoring machine and engine importation;
- reviewing company evidence of conformity;
- monitoring data submitted in the annual reports for the use of transition engine provisions;
- registering company notices of defects affecting emission controls;
- inspection of test engines and vehicles and their emission-related components; and
- laboratory emissions tests of sample new engines and vehicles that are representative of products offered for sale in Canada.

If an engine or vehicle is found to not comply with the Regulations, the engine manufacturer or importer will be subject to the enforcement provisions of CEPA, 1999. Environment Canada is coordinating efforts with the EPA by sharing information to increase program efficiency and effectiveness. Coordination and cooperation opportunities also exist to partner with organizations outside Environment Canada to perform compliance promotion activities such as identifying regulatees and delivering key messages.

Compliance promotion activities will be revisited from time to time to ensure that the Regulations are implemented in the most effective and efficient manner.

Service standards

For the Regulations, including the Amendments, in its administration of the regulatory program, Environment Canada will provide these services in a timely manner:

- reviewing applications and preparing authorizations to use the national emissions mark;
- reviewing notices of defect;
- assessing company's declarations for temporary importations; and
- assessing requests for exemptions from the Amendments.

In addition, the Department will audit evidence of conformity for engines and machines and provide to manufacturers an acknowledgement of its receipt and whether it is presented "in a form and manner that is satisfactory" based on a set of criteria established by the Department. The Department intends to update the current guidance document, describing the required evidence of conformity and the procedures to be followed when submitting required documentation, in line with the Amendments.

Enforcement

The Amendments are made under CEPA, 1999; therefore, enforcement officers will, when verifying compliance with the Regulations and the Amendments, apply the Compliance and Enforcement Policy (see footnote 16) for CEPA, 1999. This Policy sets out the range of possible responses to alleged violations, including warnings, directions, environmental protection compliance

orders, ticketing, ministerial orders, injunctions, prosecution and environmental protection alternative measures (which are an alternative to a court prosecution after the laying of charges for a CEPA, 1999 violation). In addition, the Policy explains when Environment Canada will resort to civil suits by the Crown for cost recovery.

To verify compliance, enforcement officers may carry out inspections. An inspection may identify an alleged violation, and alleged violations may also be identified by Environment Canada's technical personnel, through information transmitted to the Department by the Canada Border Services Agency or through complaints received from the public. Whenever a possible violation of the Regulations or the Amendments is identified, enforcement officers may carry out investigations.

When, following an inspection or an investigation, an enforcement officer discovers an alleged violation, the officer would choose the appropriate enforcement action based on the following factors:

- *Nature of the alleged violation*: This includes consideration of the damage, the intent of the alleged violator, whether it is a repeat violation, and whether an attempt has been made to conceal information or otherwise subvert the objectives and requirements of the Act;
- *Effectiveness in achieving the desired result with the alleged violator*: The desired result is compliance within the shortest possible time and with no further repetition of the violation. Factors to be considered include the violator's history of compliance with the Act, willingness to cooperate with enforcement officers, and evidence of corrective action already taken; and
- *Consistency*: Enforcement officers would consider how similar situations have been handled in determining the measures to be taken to enforce the Act.

Performance measurement and evaluation

The Regulatory Framework for Air Emissions is a government-wide initiative designed to improve the health of Canadians and their environment through measurable reductions in both greenhouse gas and air pollutant emissions in all sectors of the Canadian economy. The Amendments are an element of the Government's Regulatory Framework for Air Emissions and contribute to meeting the Government's commitment to reduce air pollutant emissions in the Transportation sector.

The Amendments include provisions designed to facilitate Environment Canada's verification that compliance with the Amendments is achieved. Various compliance-related activities such as submitting annual end-of-year reports detailing a company's use of transition engine provisions (if used), auditing evidence of conformity, and verification of emissions levels through testing will be carried out. Monitoring of compliance with the Amendments will be done on an ongoing basis. Reporting of the incidences of non-compliance by enforcement officers is expected to provide indicators of this achievement.

The Amendments will be administered by Environment Canada's Transportation Division and will be evaluated as part of the program evaluation under the Regulatory Framework for Air Emissions. Follow-up evaluations will be scheduled as per the department's evaluation planning cycle.

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Footnote a
S.C. 2004, c. 15, s. 31

Footnote b
S.C. 1999, c. 33

Footnote c
S.C. 1999, c. 33

Footnote 1
SOR/2005-32

Footnote 2
Schedule 1 of CEPA, 1999 includes the following air pollutants, which are typically emitted from engines and vehicles: acetaldehyde; acrolein; benzene; 1,3-butadiene; formaldehyde; nitric oxide; nitrogen dioxide; respirable particulate matter with a diameter of less than 10 micrometers; sulphur dioxide; and volatile organic compounds that participate in atmospheric photochemical reactions.

Footnote 3
John Lawson, *Technical Report on Analysis of Proposed Regulation of Passenger Automobile and Light Truck Greenhouse Gas Emissions* (Environment Canada, 2010).

Footnote 4
Off-Road Compression-Ignition Engine Emission Regulations, Canada Gazette, Part □, February 23, 2005, SOR/2005-32, available at www.ec.gc.ca/lcpe-cepa/eng/regulations/detailReg.cfm?intReg=88.

Footnote 5
National Pollutant Release Inventory, available at www.ec.gc.ca/inrp-npri/default.asp?lang=En&n=4A577BB9-1.

Footnote *
Without open and natural sources (i.e. excluding dust from roads, mine tailings, and forest fires).

Footnote **
Mobile sources include heavy duty diesel/trucks, light duty vehicles/diesel/ trucks, marine transportation, etc.

Footnote 6
Notice of intent to develop and implement regulations and other measures to reduce air emissions, *Canada Gazette*, Part □, October 21, 2006, Vol. 140, No. 42 at page 3351, available at

www.gazette.gc.ca/archives/p1/2006/2006-10-21/pdf/g1-14042.pdf.

Footnote 7
Regulatory Framework for Air Emissions, April 26, 2007, available at www.ecoaction.gc.ca/news-nouvelles/20070426-1-eng.cfm.

Footnote 8
It should be noted that NMHCs consist of NOx and VOCs.

Footnote 9
The NONROAD model and supporting documentation is available at www.epa.gov/otaq/nonrdmdl.htm.

Footnote 10
Marbek Resource Consultants and RWDI Inc., *Evaluation of Total Cost of Air Pollution Due to Transportation in Canada* (Transport Canada, 2007).

Footnote 11
Environment Canada, *Passenger Automobile and Light Truck Greenhouse Gas Emission Regulations*, 2010.

Footnote 12
John Lawson, *Technical Report on Analysis of Proposed Regulation of Passenger Automobile and Light Truck Greenhouse Gas Emissions* (Environment Canada, 2010).

Footnote 13
Final Regulatory Analysis: Control of Emissions from Nonroad Diesel Engines, Executive Summary, available at www.epa.gov/nonroad-diesel/2004fr/420r04007a.pdf.

Footnote 14
The 33% benefits scenario reflects a conservative estimation of the known distribution of off-road compression-ignition engines in Canada by sector.

Footnote 15
Importers refers to importers of engines and importers of machines including engines.

Footnote 16
Environment Canada's Compliance and Enforcement Policy is available at www.ec.gc.ca/alef-ewe/default.asp?lang=En&n=AF0C5063-1.

Date Modified: 2012-01-06