



Government  
of Canada

Gouvernement  
du Canada

# **Risk Management Approach**

**for**

**Fuel Oil No. 2**

**Chemical Abstracts Service Registry Number  
(CAS RN):  
68476-30-2**

Environment Canada  
Health Canada

February 2015

**Canada**

## Summary of Proposed Risk Management

This document outlines the proposed risk management actions for Fuel Oil No. 2. In particular, the Government of Canada will focus on practices and technologies available for reducing the occurrence and impact of spills. This will include the proposed addition of Fuel Oil No. 2 to the *Environmental Emergency Regulations* under the *Canadian Environmental Protection Act, 1999*. As well, the Government will explore options for further reducing the occurrence of small spills associated with residential storage tanks for Fuel Oil No. 2.

The risk management options outlined in this risk management approach document may evolve through consideration of assessments and risk management options published for other Chemicals Management Plan substances as required to ensure effective, coordinated, and consistent risk management decision-making.

**Note:** The above summary is an abridged list of actions proposed to manage Fuel Oil No. 2. Refer to section 3 of this document for more complete details in this regard.

## Table of Contents

<b>Summary of Proposed Risk Management .....</b>	<b>ii</b>
<b>1. Context .....</b>	<b>1</b>
<b>2. Issue.....</b>	<b>1</b>
2.1 Final Screening Assessment Conclusion .....	1
2.2 Recommendation Under CEPA 1999.....	2
2.3 Public Comment Period on the Risk Management Scope.....	3
<b>3. Proposed Risk Management.....</b>	<b>3</b>
3.1 Proposed Environmental Objective .....	3
3.2 Proposed Risk Management Objective and Actions .....	3
<b>4. Background.....</b>	<b>4</b>
4.1 General Information on Fuel Oil No. 2.....	4
4.2 Current Uses and Identified Sectors .....	5
<b>5. Exposure Sources and Identified Risks.....</b>	<b>5</b>
<b>6. Risk Management Considerations .....</b>	<b>6</b>
6.1 Alternatives and Alternate Technologies .....	6
6.2 Socio-economic and Technical Considerations.....	6
<b>7. Overview of Existing Risk Management .....</b>	<b>7</b>
7.1 Related Canadian Risk Management Context .....	7
7.1.1 Federal Measures.....	7
7.1.2 Provincial, Territorial and Municipal Measures .....	8
7.1.3 Non-Regulatory Measures.....	9
7.2 Pertinent International Risk Management Context .....	10
7.2.1 United States .....	10
7.2.2 Europe.....	10
<b>8. Next Steps .....</b>	<b>11</b>
<b>9. References .....</b>	<b>12</b>

## 1. Context

The *Canadian Environmental Protection Act, 1999* (CEPA 1999) (Canada 1999) provides the authority for the Minister of the Environment and the Minister of Health (the Ministers) to conduct assessments to determine if substances are toxic to human health and/or the environment as set out in section 64 of CEPA 1999, and if so to manage the associated risks.<sup>1,2</sup>

Pursuant to the Act, the Ministers have conducted a screening assessment of Fuel Oil No. 2 (Chemical Abstracts Service Registry Number<sup>3</sup> 68476-30-2), which is included in Stream 3 of the Petroleum Sector Stream Approach (PSSA)<sup>4</sup> under the Government of Canada's Chemicals Management Plan.

## 2. Issue

### 2.1 Final Screening Assessment Conclusion

Health Canada and Environment Canada conducted a joint scientific assessment of Fuel Oil No. 2 in Canada. A notice summarizing the scientific considerations of

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<sup>1</sup> Section 64 of CEPA 1999: For the purposes of [Parts 5 and 6 of CEPA 1999], except where the expression "inherently toxic" appears, a substance is toxic if it is entering or may enter the environment in a quantity or concentration or under conditions that

- (a) have or may have an immediate or long-term harmful effect on the environment or its biological diversity;
- (b) constitute or may constitute a danger to the environment on which life depends; or
- (c) constitute or may constitute a danger in Canada to human life or health.

<sup>2</sup> A determination of whether one or more of the criteria of section 64 are met and whether risk management may be required is based upon an assessment of potential risks to the environment and/or to human health associated with exposures in the general environment. For humans, this includes exposures from ambient and indoor air, drinking water, foodstuffs and the use of consumer products. A conclusion under CEPA 1999 on the substances in the Chemicals Management Plan is not relevant to nor does it preclude an assessment against the hazard criteria specified in the Workplace Hazardous Materials Information System (WHMIS) *Controlled Products Regulations* for products intended for workplace use. Similarly, a conclusion based on the criteria contained in section 64 of CEPA 1999 does not preclude actions being undertaken under other sections of CEPA 1999 or other Acts.

<sup>3</sup> The Chemical Abstracts Service information is the property of the American Chemical Society and any use or redistribution, except as required in supporting regulatory requirements and/or for reports to the Government of Canada when the information and the reports are required by law or administrative policy, is not permitted without the prior, written permission of the American Chemical Society.

<sup>4</sup> The PSSA includes approximately 160 substances identified as priorities for action through the categorization process, to be addressed in a sectoral approach. In order to conduct the screening assessments, each PSSA substance was placed into one of five categories ("streams"), depending on its production and uses in Canada. Stream 3 represents substances that are primarily used by industries and consumers as fuels.

the final Screening Assessment was published in the *Canada Gazette*, Part I, on February 21, 2015 (Canada 2015).

Based on the information available, the final Screening Assessment concludes that Fuel Oil No. 2 is toxic under paragraph 64(a) of CEPA 1999 as it is entering the environment in a quantity or concentration or under conditions that have or may have an immediate or long-term harmful effect on the environment or its biological diversity.

However, based on the information available, the final Screening Assessment also concludes that Fuel Oil No. 2 is not toxic under paragraphs 64(b) and (c) of CEPA 1999 as it is not entering the environment in a quantity or concentration or under conditions that constitute or may constitute a danger to the environment on which life depends, or that constitute or may constitute a danger in Canada to human life or health.

In the final Screening Assessment, a risk analysis of Fuel Oil No. 2 spills data indicates that there are on average approximately 12 spills per year during ship loading/unloading that are of sufficient size to be expected to be harmful to freshwater and marine organisms. In addition, Fuel Oil No. 2 is harmful to terrestrial organisms (invertebrates, plants) given the frequency and volume of spills to terrestrial habitats. Based on available information, there are an average of 200-300 spills per year to soil in the Atlantic provinces and 160-190 spills per year to soil in Ontario, of which at least half are expected to cause harm. The majority of these releases are associated with storage tanks for home heating fuel.

Of note, the proposed risk management options described in this document are preliminary and may be subject to change. For further information on the final Screening Assessment for Fuel Oil No. 2, refer to <http://www.ec.gc.ca/ese-ees/default.asp?lang=En&n=CA593523-1>.

## 2.2 Recommendation Under CEPA 1999

Based on the findings of the final Screening Assessment conducted as per CEPA 1999, the Ministers recommend that Fuel Oil No. 2 be added to the *List of Toxic Substances* in Schedule 1 of the Act.<sup>5</sup>

The Ministers have taken into consideration comments made by stakeholders during the 60-day public comment period on the draft Screening Assessment and risk management scope document. As the Ministers finalize the recommendation

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<sup>5</sup> When a substance is found to meet one or more of the criteria under section 64 of CEPA 1999, the Ministers can propose to take no further action with respect to the substance, to add the substance to the Priority Substances List for further assessment, or to recommend the addition of the substance to the *List of Toxic Substances* in Schedule 1 of the Act.

to add Fuel Oil No. 2 to Schedule 1, risk management instruments must be proposed and finalized within a set period of time, as outlined in sections 91 and 92 of CEPA 1999 (see section 8 for publication timelines applicable to Fuel Oil No. 2).

### **2.3 Public Comment Period on the Risk Management Scope**

The risk management scope document for Fuel Oil No. 2, which summarized the proposed risk management actions under consideration at that time, was published on June 1, 2013. Industry and other interested stakeholders were invited to submit comments on the risk management scope document during a 60-day comment period. Comments received on the risk management scope document were taken into consideration in the development of this document. A summary of responses to public comments received is available from <http://www.ec.gc.ca/ese-ees/default.asp?lang=En&n=A4D03268-1>.

## **3. Proposed Risk Management**

### **3.1 Proposed Environmental Objective**

Proposed environmental objectives are quantitative or qualitative statements of what should be achieved to address environmental concerns.

For Fuel Oil No. 2, the proposed objective is focused on addressing the risks outlined in section 5 of this document. As such, the proposed environmental objective for Fuel Oil No. 2 is to minimize environmental exposure to the greatest extent practicable.

### **3.2 Proposed Risk Management Objective and Actions**

Proposed risk management objectives set quantitative or qualitative targets to be achieved by the implementation of risk management regulations, instrument(s) and/or tool(s) for a given substance or substances. The proposed risk management objective for Fuel Oil No. 2 is to reduce the occurrence and impact of spills.

To achieve the proposed risk management objective and to work towards achieving the proposed environmental objective, the proposed risk management actions being considered for Fuel Oil No. 2 will focus on practices and technologies available for reducing the occurrence and impact of spills. This will include the proposed addition of Fuel Oil No. 2 to the *Environmental Emergency Regulations* under CEPA 1999, which will enable emergency prevention,

preparedness, response, and recovery requirements to be put in place for fixed industrial facilities that store or use large quantities.

In March 2014, Environment Canada launched preliminary consultations on potential amendments to the *Environmental Emergency Regulations* under CEPA 1999. Fuel Oil No. 2 was included in the proposed list of substances to be added to the Regulations (Environment Canada 2014).

As well, in consultation with provinces/territories and stakeholders, the Government will explore options for further reducing the occurrence of small spills associated with residential storage tanks for Fuel Oil No. 2.

Following the publication of this risk management approach document, additional information obtained from the public comment period and from other sources will be considered, along with the information presented in this document, in the instrument selection and development process.<sup>6</sup> The risk management options outlined in this document may evolve through consideration of assessments and risk management options published for other CMP substances to ensure effective, coordinated, and consistent risk management decision-making.

## 4. Background

### 4.1 General Information on Fuel Oil No. 2

Fuel Oil No. 2 is a distillate fuel oil that is formed by vapourizing, condensing and blending petroleum components during a distillation process; it therefore has a boiling point range that excludes high-boiling components. It is produced in refineries and upgraders in Canada by refining crude oil or bitumen, with most being produced in eastern Canada. It is also imported into Canada.

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<sup>6</sup> The proposed risk management regulation(s), instrument(s) or tool(s) will be selected using a thorough, consistent and efficient approach and take into consideration available information in line with the Government of Canada's Cabinet Directive on Regulatory Management (TBS 2012a) and Red Tape Reduction Action Plan (TBS 2012b). Of note, the Government of Canada has introduced the "One-for-One" Rule and the Small Business Lens (TBS 2012b). The "One-for-One" Rule and the Small Business Lens apply only to regulations. Depending on the risk management instrument(s) selected for these substances, the "One-for-One" Rule and/or the Small Business Lens may apply.

The "One-for-One" Rule is designed to control the overall administrative burden on Canadian business. The Rule will reduce administrative burden in two ways: first, by removing an existing regulation if a new regulation introduces administrative burden and second, when a new regulation or amendment increases administrative burden, that an equal amount of administrative burden is reduced from an existing regulation.

The purpose of introducing a Small Business Lens is to ensure that the specific needs of small businesses are considered and that the least burdensome but most effective approach to addressing these needs is identified.

## 4.2 Current Uses and Identified Sectors

Fuel Oil No. 2 is combusted to generate heat. It is primarily used as a fuel source for home heating, but also in medium capacity commercial/industrial burners.

Of the  $4 \times 10^9$  L of light fuel oil (the majority of which is thought to be Fuel Oil No. 2) used domestically in 2006, the largest users were the residential (49% of total) and commercial (39%) sectors (Statistics Canada 2008b). As of 2007, only approximately 7.3% of Canadian homes used Fuel Oil No. 2 as their main heating source, due to the increase in natural gas use (42% of Canadian homes). Currently, domestic heating oil sales are concentrated in Eastern Canada, with Atlantic Canada accounting for 34% of sales, followed by Quebec (30%) and Ontario (28%) (Statistics Canada 2008a).

## 5. Exposure Sources and Identified Risks

Fuel Oil No. 2 can be released to the environment during its production, transportation, and use. Environment Canada's National Enforcement Management Information System and Intelligence System (NEMISIS) database and additional spill data provided by the province of Ontario were used to evaluate the overall frequency and volume of releases of Fuel Oil No. 2 (Environment Canada 2011).

An estimated 2.2 million litres were released from 2000-2009, in 6302 incidents. During that time period, there was a substantial decline in the number and volume of spills reported per year.

The data reflect a pattern of repeated, small quantities of Fuel Oil No. 2 released to the environment, with occasional large spills; in most cases, the repeated small quantity releases appear to be from industrial handling and operations or associated with consumer use. Of the releases to soil identified in NEMISIS, approximately 62-74% were associated with residential home fuel tanks.

The nature, extent, and frequency of spills are key considerations in characterizing the ecological risks of Fuel Oil No. 2. Between 2000 and 2009, the NEMISIS database recorded incidents of Fuel Oil No. 2 spills that affected migratory birds, resulted in fish kills, oiled birds, or caused other wildlife damage and vegetation damage.

Fuel Oil No. 2 spills data indicate that there are on average approximately 12 spills per year during ship loading/unloading that are of sufficient size to be expected to be harmful to freshwater and marine organisms. Based on available information, there are an average of 200-300 spills per year to soil in the Atlantic provinces and 160-190 spills per year to soil in Ontario, of which at least half are expected to cause harm to terrestrial organisms (invertebrates, plants). The

majority of these releases are associated with storage tanks for home heating fuel.

For the purpose of characterizing risk to human health, potential exposures from the use of Fuel Oil No. 2 in residential heating applications, and from the storage of the fuel at bulk storage facilities, were considered.

A critical health effect for the initial categorization of Fuel Oil No. 2 was carcinogenicity, based primarily on classifications by international agencies. Benzene, a component of Fuel Oil No. 2, has been identified by Health Canada and several international regulatory agencies as a carcinogen, and was added to the *List of Toxic Substances* in Schedule 1 of CEPA 1999. As the predominant route of exposure to Fuel Oil No. 2 was determined to be inhalation, estimates of cancer potency for inhalation of benzene were used to characterize risk to the general population from evaporative emissions of Fuel Oil No. 2.

Based on limited data, residences using Fuel Oil No. 2 as a fuel source did not have ambient levels of marker volatile organic compounds that were elevated relative to residences using other types of home heating. In the event of a residential fuel storage tank leak, exposure of the general population was not identified as a concern for human health given leak mitigation measures in place, the limited duration of potential exposure, and the low acute toxicity of the fuel.

Additionally, inhalation exposure to individuals residing in the vicinity of a bulk storage facility was characterized. Margins of exposure between upper-bounding estimates of exposure and estimates of cancer potency were considered adequate to address uncertainties related to health effects and exposure.

## **6. Risk Management Considerations**

### **6.1 Alternatives and Alternate Technologies**

No alternative substances or technologies were identified that would minimize or eliminate the use of Fuel Oil No. 2. However, national construction standards and innovative technologies/practices exist for reducing releases of this substance. Examples include equipment selection options such as leak-proof valves and fittings as well as tanks with enhanced construction material.

### **6.2 Socio-economic and Technical Considerations**

Socio-economic factors will be considered in the selection and development of regulations, instrument(s) and/or tool(s) as identified in the *Cabinet Directive on Regulatory Management* (TBS 2012a) and the guidance provided in the Treasury

Board document *Assessing, Selecting, and Implementing Instruments for Government Action* (TBS 2007).

## 7. Overview of Existing Risk Management

### 7.1 Related Canadian Risk Management Context

An extensive regulatory regime for the management of Fuel Oil No. 2 exists in Canada, including measures related to its composition, storage, transport and use. Measures exist that apply to Fuel Oil No. 2 specifically, as well as more general measures applying to all petroleum hydrocarbons or petroleum sector facilities (SENES 2009).

#### 7.1.1 Federal Measures

Current risk management for Fuel Oil No.2 includes measures under federal Acts such as CEPA 1999, the *National Energy Board Act* (Canada 1985), the *Canada Shipping Act, 2001* (Canada 2001), and the *Transportation of Dangerous Goods Act, 1992* (Canada 1992).

Under CEPA 1999, the *Contaminated Fuel Regulations* (Canada 1991) prohibit the import of contaminated fuel except for destruction, disposal or recycling.

The National Energy Board is responsible for, among other things, pipelines that cross provincial and international boundaries. In 2013, the *National Energy Board Onshore Pipeline Regulations* (Canada 2013) were amended to strengthen requirements for management systems regarding safety, pipeline integrity, security, environmental protection and emergency management.

Among other things, the *Canada Shipping Act, 2001* deals with pollution prevention and response, including discharges of oil, response measures and penalties. Regulations made under the Act include the *Ballast Water Control and Management Regulations* (Canada 2011a) and *Vessel Pollution and Dangerous Chemicals Regulations* (Canada 2012).

The *Transportation of Dangerous Goods Act, 1992* is focused on the prevention of incidents when dangerous goods are imported, handled, offered for transport, or transported. Petroleum fuels, including Fuel Oil No. 2, are included in Class 3: Flammable Liquids of the associated *Transportation of Dangerous Goods Regulations* (Canada 2011b).

Storage of Fuel Oil No. 2 is managed by the National Fire Code of Canada (NRC 2010a) and the *Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations* (Canada 2008). In addition, the National

Building Code of Canada (NRC 2010b) requires that oil tanks and fuel lines be installed according to the Canadian Standards Association “Installation Code for Oil-Burning Equipment (B139-09)” (CSA Group 2009) (details under Non-regulatory Measures) in the absence of appropriate provincial or territorial requirements.

### **7.1.2 Provincial, Territorial and Municipal Measures**

Each province and territory has adopted the federal *Transportation of Dangerous Goods Regulations*, with various exceptions and additions.

Several provinces require that Fuel Oil No. 2 meet the Canadian General Standards Board (CGSB) standard “Heating Fuel Oil” (CGSB 2011) (details under Non-regulatory Measures).

Measures addressing the storage of Fuel Oil No. 2 include provincial fire codes, as well as more targeted regulations in many provinces and territories. Examples include Manitoba’s *Storage and Handling of Petroleum Products and Allied Products Regulation* (Manitoba 2001), New Brunswick’s *Petroleum Product Storage and Handling Regulation* (New Brunswick 1987), Newfoundland and Labrador’s *Heating Oil Storage Tank System Regulations, 2003* (Newfoundland and Labrador 2003), Ontario’s *Regulation 213/01* (Ontario 2001), Prince Edward Island’s *Petroleum Storage Tanks Regulations* (Prince Edward Island 2007) and *Home Heat Tanks Regulation* (Prince Edward Island 2012), and Yukon’s *Storage Tank Regulations* (Yukon 1996).

Many of these storage measures, including those in Manitoba, Newfoundland and Labrador, Ontario, and Prince Edward Island, include requirements for the construction, installation, maintenance, or repair of residential storage tanks for Fuel Oil No. 2. In other provinces and territories, including British Columbia (British Columbia 2010), the Northwest Territories (Northwest Territories 2010), Nova Scotia (Nova Scotia 2014), and Nunavut (Nunavut 2011), guidance regarding residential heating fuel storage is available for homeowners.

Some municipalities have bylaws requiring permits and inspection for the installation, removal or repair of home heating oil systems (SENES 2009).

Provincial facility operating permits may also incorporate requirements from the Canadian Council of Ministers of the Environment (CCME) Environmental Guidelines for Controlling Emissions of Volatile Organic Compounds from Aboveground Storage Tanks (CCME 1990), the CCME Environmental Code of Practice for Measurement and Control of Fugitive VOC Emissions from Equipment Leaks (CCME 1993), and/or the CCME Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products (CCME 2003) (details under Non-regulatory Measures). Additionally, existing provincial/territorial occupational

health and safety legislation may specify measures to minimize occupational exposures to employees and some of these measures also serve to reduce general population exposures.

### **7.1.3 Non-Regulatory Measures**

The CGSB standard “Heating Fuel Oil” includes requirements for flash point, pour point, sulphur content, and other properties of Fuel Oil No. 2.

The CCME Environmental Guidelines for Controlling Emissions of Volatile Organic Compounds from Aboveground Storage Tanks promote consistency, uniformity, and compatibility in the implementation of VOC controls for tanks storing volatile organic liquids, including Fuel Oil No. 2. The CCME Environmental Code of Practice for Measurement and Control of Fugitive VOC Emissions from Equipment Leaks details considerations for the measurement and control of VOC emissions from equipment leaks in petroleum refineries and organic chemical plants.

The CCME Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products sets out recommendations concerning design, installation, operation, maintenance, and withdrawal from service of storage tank systems.

Other non-regulatory measures (e.g., guidelines, best practices, principles and methods) are also in place at many petroleum sector facilities to reduce releases. Such control measures include appropriate material selection during the setup and design process, regular inspection and maintenance of storage tanks, piping and other process equipment, the implementation of leak detection and repair or other equivalent programs, the use of floating roofs in aboveground storage tanks to reduce the internal gaseous zone and the minimal use of underground tanks, which can lead to undetected leaks (SENES 2009). The industry-proposed National Framework for Petroleum Refinery Emission Reductions (NFPRER), developed cooperatively by all levels of government, industry, and non-governmental environmental and health organizations, provides principles and methods for various jurisdictions to establish facility emission caps for air pollutants (CCME 2005).

The Underwriters’ Laboratories of Canada “Standard for Aboveground Steel Tanks for Fuel Oil and Lubricating Oil” (ULC 2007) covers the design and construction of aboveground steel non-pressure tanks for the storage of heating fuel and/or generator fuel and lubricating oil. It covers single wall tanks, tanks with secondary containment and double bottom tanks, having a maximum capacity of 2500 litres.

The Canadian Standards Association “Installation Code for Oil-Burning Equipment (B139-09)” provides the minimum requirements for installing or

altering oil-burning appliances, equipment and components. In addition to stationary and portable oil-burning equipment, the code also covers the ancillary equipment including aboveground storage tanks with maximum individual capacities of 2500 litres, or maximum aggregate capacities of 5000 litres.

## 7.2 Pertinent International Risk Management Context

As in Canada, international jurisdictions have also implemented regulatory regimes to manage exposures of the environment and the public to Fuel Oil No. 2. Selected international risk management measures are discussed below.

### 7.2.1 United States

In the United States, several regulations pertaining to refineries have been developed under the National Emission Standards for Hazardous Air Pollutants (NESHAP) program of the *Clean Air Act*.

Transportation of substances that may pose a flammability or explosion hazard is covered under the US Department of Transportation's *Hazardous Materials Regulations* (CFR 2005).

The *Oil Pollution Prevention* regulations require owners or operators of facilities with a total aboveground oil storage capacity of more than 1320 gallons (approximately 5000 litres), or a single aboveground tank with an oil storage capacity of more than 660 gallons (approximately 2500 litres), to prepare and comply with written, site-specific, spill prevention plans (CFR 2014).

Underground tanks for the storage of heating oil to be used on the premises are excluded from federal underground storage tank regulations. However, state or local regulatory agencies may regulate these tanks (US EPA 2012).

### 7.2.2 Europe

In Europe, the Directive on Industrial Emissions (Integrated Pollution Prevention and Control) (EU 2010), which entered into force in 2013, sets out the main principles for the permitting and control of installations based on an integrated approach and the application of best available techniques. Operators of industrial installations conducting activities covered by the Directive (including refineries) are required to obtain an environmental permit from the national authority in their country.

Transportation of Fuel Oil No. 2 in Europe is addressed by the *European Agreement Concerning the International Carriage of Dangerous Goods by Road* (UN 2009), the *Regulations Concerning the International Carriage of Dangerous*

*Goods by Rail* (OTIF 2006), and similar measures for other modes of transportation.

The *Control of Pollution (Oil Storage) (England) Regulations 2001*, the *Water Environment (Oil Storage) (Scotland) Regulations 2006*, and the *Control of Pollution (Oil Storage) Regulations (Northern Ireland) 2010* include requirements for construction and operation of home heating oil tanks in England, Scotland, and Northern Ireland, respectively (UK 2001, 2006, 2010).

## 8. Next Steps

### 8.1 Public Comment Period

Industry and other interested stakeholders are invited to submit comments on the content of this risk management approach document or other information that would help to inform decision-making. Please submit additional information and comments prior to April 22, 2015.

Comments and information submissions on the risk management approach document should be submitted to the address provided below:

Environment Canada  
 Gatineau, Quebec K1A 0H3  
 Tel: 1-888-228-0530 | 819-956-9313  
 Fax: 819-953-7155  
 Email: [Substances@ec.gc.ca](mailto:Substances@ec.gc.ca)

Companies who have a business interest in Fuel Oil No. 2 are encouraged to identify themselves as stakeholders. Stakeholders will be informed of future decisions regarding Fuel Oil No. 2 and may be contacted for further information.

Following the public comment period on the risk management approach document, the Government of Canada will initiate the development of the specific risk management instrument(s), where necessary. Comments received on the risk management approach document will be taken into consideration in the selection or development of these instrument(s). Consultation will also take place as instrument(s) are developed.

### 8.2 Timing of Actions

Actions	Date
Electronic consultation on the risk management approach document	February 21, 2015 to April 22, 2015

Publication of responses to public comments on the risk management approach document	No later than February 2017
Publication of the proposed instrument(s)	
Consultation on the proposed instrument(s)	60-day public comment period starting upon publication of each proposed instrument
Publication of the final instrument(s)	No later than August 2018

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