Environment Canada Environnement Canada

Consultation Document

on the proposed Risk Management for

2,4,6-tri-*tert*-butylphenol (2,4,6-TTBP)

under the Chemicals Management Plan

Chemical Abstracts Service Registry Number (CAS RN): 732-26-3

Environment Canada

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Canada

Table of Contents

Summary

This consultation document outlines the proposed risk management actions for 2,4,6-tri-*tert*-butylphenol (referred to as 2,4,6-TTBP). Stakeholders are invited to submit comments on the content of this consultation document or provide other information that would help to inform decision making.

The Government of Canada will also consult with stakeholders during the development of the specific risk management instruments.

SUMMARY OF PROPOSED RISK MANAGEMENT

- The Government of Canada is proposing to amend the *Environmental Emergency Regulations* to add diesel fuel, in which 2,4,6-TTBP can be used as an additive, to the list of substances covered by these Regulations; and
- The Government of Canada is proposing to apply the Significant New Activity (SNAc) provisions of the *Canadian Environmental Protection Act, 1999* to 2,4,6-TTBP to enable the government to assess any new use that could result in releases to the environment.

Note: This summary is an abridged list of the instruments and tools proposed to risk manage this substance. Please see section 5 of this document for a complete explanation of proposed risk management actions.

1. Introduction

The Chemicals Management Plan, launched by the Government of Canada on December 8, 2006, is part of the government's comprehensive environmental agenda. The plan aims to take immediate action to regulate chemicals that are harmful to human health or the environment, and to carry out further work on the substances identified.

A key element in the Chemicals Management Plan is the initiative known as the "Challenge". Under the Challenge, approximately 200 substances identified as high priorities for action have been divided up into twelve smaller groups of substances, or batches, which are being addressed sequentially.

The substance 2,4,6-TTBP[1], which is only used in Canada as a fuel additive, was included in Batch 2 of the Challenge.

A next step under the Chemicals Management Plan will be the assessment and potential risk management of the medium priorities, for which priority setting exercises are currently being developed. Further information on the Chemicals Management Plan can be found at: http://www.chemicalsubstances.gc.ca.

2. Background

2.1 Final Screening Assessment Report

A notice[2] summarizing the scientific considerations of the final screening assessment report for 2,4,6-TTBP was published by the Government of Canada in the *Canada Gazette*, Part I, on January 31st, 2009. The approach taken in this screening assessment report was to examine available scientific information and develop conclusions based on a weight-of-evidence approach and using a precautionary approach, as required under section 76.1 of the *Canadian Environmental Protection Act, 1999* (CEPA 1999).

The final screening assessment report concluded that 2,4,6-TTBP is entering or may be 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. Therefore, it was concluded that 2,4,6-TTBP meets the toxicity criteria in paragraph 64(*a*) of CEPA, 1999. Additionally,

[1] 2,4,6-tri-*tert*-butylphenol, Chemical Abstracts Service Registry Number (CAS RN) 732-26-3, also known as Phenol, 2,4,6-tris(1,1-dimethylethyl)-

[2] Publication of Final Decision on the Screening Assessment of Substances - Batch 2, Canada Gazette Part I: http://www.gazette.gc.ca/rp-pr/p1/2009/2009-01-31/html/sup1-eng.html#m101

2,4,6-TTBP meets the criteria for persistence and bioaccumulation potential as set out in the *Persistence and Bioaccumulation Regulations*. A Proposed Order to add 2,4,6-TTBP to Schedule 1 of CEPA 1999 was published on May 16th, 2009.

For further information on the final screening assessment report conclusion for 2,4,6-TTBP, refer to the final screening assessment report, available at http://www.ec.gc.ca/ese-ees/default.asp?lang=En&n=92E21475-1

3. Uses and Releases of 2,4,6-TTBP

3.1 Current Uses

The only known use of 2,4,6-TTBP in Canada is as an antioxidant in hydrocarbon fluids such as gasoline, diesel fuel and jet fuel. Antioxidants are added to stabilize fuels and prevent the formation of engine-fouling residues. 2,4,6-TTBP is not manufactured in pure form, but is a co-product formed during the process used to make other antioxidants. It is typically present at concentrations between 11 and 15 percent in these antioxidants. In general, petroleum fuel additives are used at maximum concentrations well below 1% volume in the fuel. The resulting maximum concentration of 2,4,6-TTBP found in fuels would therefore be about 0.1%.

2,4,6-TTBP is not manufactured in Canada. It is imported through Canadian distributors from a small number of U.S. manufacturers/blenders as a component of antioxidants containing 2,4,6-TTBP. The only known end-users are petroleum refineries. It is estimated that the total quantity of 2,4,6-TTBP imported into Canada in 2006 was below 20 tonnes. Based on information collected by Environment Canada between 1986 and 2007, there appears to be a decreasing trend in the quantity of this substance in commerce during this time.

U.S. production/importation volumes of 2,4,6-TTBP were estimated at between 4,500 and 22,700 tonnes in 2002. Denmark, Norway and Sweden also reported the use of this substance in annual quantities between 1 and 33 tonnes.

3.2 Possible Alternatives

A few potential substitutes for 2,4,6-TTBP have been identified. However, most of them appear on the medium priority list under the Chemicals Management Plan. As such, they will be assessed to determine whether they meet the section 64 criteria under CEPA 1999.

3.3 Releases and Exposure Sources to the Environment

Antioxidants containing 2,4,6-TTBP are shipped directly to refineries by distributors in 55 gallon drums or 250-300 gallon totes. Some containers are dedicated and returned to the vendor. Tanker truck transport is not expected since the additives market is relatively small in Canada. In order to prevent exposure of fuels to oxygen, antioxidants need to be added to the fuels as soon as possible after they are produced. For this reason, antioxidants are added to the fuels at petroleum refineries and not at bulk terminals or other locations.

Once at the refinery, the antioxidant container is attached to a positive displacement pump which can inject the antioxidant into the pipeline carrying the fuel from the production unit to the storage tank. As this addition is typically conducted under pressure, it is not expected that there will be any releases.

Emissions of the substance to air could occur during transport and storage of the additives. In addition, emissions could happen at refineries, bulk terminals and service stations once the additives are added to fuels due to volatilization of the liquids. It is assumed that over 99% of the substance in the fuel is destroyed during combustion, leaving a small portion of the substance which could be released to air as uncombusted tailpipe emissions. However, releases to air will be rapidly oxidized as the substance is not persistent in air.

The transport, storage and handling of gasoline and other fuels containing 2,4,6-TTBP may also result in accidental release of this substance into the Canadian environment. This is believed to be the most likely potential source of release of this substance.

4. Existing Risk Management Actions

4.1 Canada (federal, provinces and territories)

2,4,6-TTBP is an alkylphenol and such substances are required to be labelled as “Class 9 – Environmentally Hazardous Substances, Liquid, NOS (Not Otherwise Specified)” pursuant to the *Transportation of Dangerous Goods Regulations*.

Fuels that may contain 2,4,6-TTBP as an additive are managed through various existing regulations, codes of practice, guidelines, and best industry practices in place in Canada, such as:

- the *Environmental Emergency Regulations* (CEPA 1999), under which gasoline is listed;
- *Onshore Pipeline Regulations, 1999* (National Energy Board);

- Storage tank requirements for fuel products (e.g. CCME Environmental Code of Practice for Underground and Above Ground Storage Tank Systems, Ontario Fire Code, *Ontario Liquid Fuels Regulation* (O.Reg. 217/01), New Brunswick *"Petroleum Product Handling and Storage Regulation*", Alberta Fire Code)
- Transportation requirements for fuel products (e.g. *Transportation of Dangerous Goods Act*).

For a more comprehensive list of federal, provincial and territorial measures, please see Appendix A.

4.2 International

Japan is the only country to have banned the import, manufacture, sale and use of 2,4,6-TTBP. Other countries have included the substance on lists for assessment/evaluation purposes. For instance, 2,4,6-TTBP is included on the OECD's list of HPV chemicals[3] and on the U.S. EPA's HPV Challenge Program[4]. The U.S. EPA published a screening-level hazard characterization document on the Alkylphenols category (of which 2,4,6-TTBP is part of) in September 2009, but has not yet completed a risk-based decision document, which would assign a priority level for further work[5].

5. Proposed Risk Management Actions for 2,4,6-TTBP

5.1 Proposed Risk Management Approach

A proposed Risk Management Approach[6] for 2,4,6-TTBP was published on January 31st, 2009. It identified potential risk management actions to address environmental risk associated with 2,4,6-TTBP.

Since the final screening assessment report concluded that 2,4,6-TTBP meets the virtual elimination criteria set out in subsection 77(4) of CEPA 1999, the ultimate environmental objective for 2,4,6-TTBP is virtual elimination of releases to the environment.

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[3] 2004 Organisation for Economic Co-operation and Development (OECD) list of High Production Volume (HPV) Chemicals. Available at: http://www.oecd.org/dataoecd/55/38/33883530.pdf

[4] United States Environmental Protection Agency's High Production Volume (HPV) Challenge Program. Available at: http://www.epa.gov/hpv/

[5] Further information on the Alkylphenols category documents can be found at: http://iaspub.epa.gov/oppthpv/public_search.publicdetails?submission_id=24959738&ShowComments=Yes&sqlstr=null&recordcount=0&User_title=DetailQuery%20Results&EndPointRpt=Y

[6] Proposed Risk Management Approach for 2,4,6-tri-tert-butylphenol, January 2009: http://www.ec.gc.ca/ese-ees/default.asp?lang=En&n=830056FB-1

As the most significant potential source of release to the environment identified for 2,4,6-TTBP is associated with the transport, storage and handling of gasoline and other fuels containing the substance, the proposed risk management objective is to prevent accidental releases of the substance to the environment.

In the Risk Management Approach, the Government of Canada indicated it would undertake a review of the current regulatory regime that contributes to preventing spills of 2,4,6-TTBP as it is contained in fuels to identify gaps and that it would amend federal regulatory controls accordingly. This review has identified the absence of diesel fuel on the *Environmental Emergency Regulations* as a gap.

In order to achieve the risk management objective and to work towards achieving the environmental objective, the Government of Canada is proposing:

- to amend the *Environmental Emergency Regulations* to add diesel fuel to the list of substances covered by these Regulations; and
- to apply the Significant New Activity (SNAc) provisions of CEPA 1999 to 2,4,6-TTBP to enable the Government of Canada to assess any new use that could result in releases to the environment.

The proposed requirements of both measures are discussed further below.

5.2 Amendment to add Diesel Fuel to the *Environmental Emergency Regulations*

The *Environmental Emergency Regulations* require anyone storing or using a listed substance at or above specified thresholds for concentration and quantity, or having a container with a capacity for that substance equal to or in excess of the specified threshold quantity, to notify Environment Canada of the place of storage or use, the maximum expected quantity and the size of the largest container for that substance as well as other information. If both of the above criteria are met, a regulatee is also required to prepare, implement and annually test an environmental emergency plan (E2 plan) and notify Environment Canada accordingly.

The E2 plan must document how the person will prevent, prepare for, respond to and recover from environmental emergencies caused by the regulated substance.

Gasoline is currently listed in Schedule 1 of the Regulations, but diesel fuel is not. Therefore, the Government of Canada proposes to amend the *Environmental Emergency Regulations* to add diesel fuel to the Schedule of substances covered by the Regulations. The proposed quantity threshold for

diesel fuel would be 150 tonnes, which is the threshold already listed for gasoline under the Regulations. This would fill the gap that was identified from the review of the current regulatory regime and contribute to preventing accidental releases of 2,4,6-TTBP when contained in fuels. The draft amendment would be as follows:

> Part 3 of Schedule 1 to the *Environmental Emergency Regulations* is amended by adding the following in numerical order:

CAS Registry Number	Column 1 Name of Substance	Column 2 Concentration	Column 3 Minimum Quantity (metric tonnes)
68334-30-5	Fuels, Diesel	10%	150
68476-34-6	Fuels, Diesel, No.2	10%	150

It is expected that the majority of regulatees that would be subject to the Regulations as a result of the listing of diesel fuel are already subject to the Regulations because of gasoline.

Although antioxidants containing 2,4,6-TTBP are also used in jet fuel, quantities of jet fuel used on an annual basis in Canada total less than 10% of quantities of gasoline and diesel fuel combined. In addition, spills data available indicate that the number of reported jet fuel spills is approximately one seventh of the number of reported diesel fuel spills. Therefore, the addition of jet fuel to the *Environmental Emergency Regulations* is not being considered at this time.

It should be noted that the addition of 2,4,6-TTBP to the *Environmental Emergency Regulations* is not being proposed either. As mentioned in section 3.3, releases of antioxidant additives stored at refineries are not expected. In addition, the concentration of 2,4,6-TTBP in these additives does not exceed 15% in volume, and information available indicates that quantities stored at refineries would be below the quantity threshold of 220 kg that would be specified under the Regulations for this substance if listed.

Additional consultation with stakeholders will take place during the development of proposed amendments to the *Environmental Emergency Regulations*, which would include the addition of diesel fuel to the Schedule of substances covered by the Regulations.

5.3 Application of Significant New Activity provisions of CEPA 1999 to 2,4,6-TTBP

A Significant New Activity "SNAc" is a new use or activity for a substance, that results or may result in:

- a significantly greater quantity or concentration of the substance in the environment; or
- a significantly different manner or circumstances of exposure to the substance.

The application of the SNAc provisions to a substance pursuant to subsection 87(3) of CEPA 1999 results in the substance being listed on the *Domestic Substances List* with a "SNAc flag". This "flag" means that for certain "significant new activities", the substance will have to be notified under the New Substances provisions of CEPA 1999. A SNAc notice sets out the criteria under which a notification is required.

The Government of Canada proposes to apply the Significant New Activity provisions of CEPA 1999 to 2,4,6-TTBP. This measure will allow the Government of Canada to assess any new use of 2,4,6-TTBP that could result in releases to the environment and to determine if such new uses require further risk management consideration.

A Notice of Intent[7] to apply the SNAc provisions of CEPA 1999 to five toxic substances in Batch 2 of the Challenge, including 2,4,6-TTBP, was published on January 22, 2011 in the *Canada Gazette* for a 60-day comment period.

6. Request for input

Environment Canada is seeking comments from stakeholders on the following issues:

1. Do you support the risk management actions proposed for 2,4,6-TTBP?

2. Are there any existing uses of 2,4,6-TTBP in Canada other than as an antioxidant in fuels?

[7] Notice of intent to amend the *Domestic Substances List* pursuant to subsection 87(3) of the *Canadian Environmental Protection Act, 1999* to indicate that subsection 81(3) of that Act applies to five substances, Canada Gazette Part I: http://gazette.gc.ca/rp-pr/p1/2011/2011-01-22/html/notice-avis-eng.html#d103

3. Are there many facilities storing or using diesel fuel in a quantity above 150 tonnes that do not already have an E2 plan in place for gasoline or other substances? Or do these facilities generally have an E2 already in place?

4. Where an E2 plan has already been prepared and implemented for a facility in respect of gasoline or other substances, what would be the cost of modifying the plan to address diesel fuel and implementing the revised plan?

7. Next Steps

Please submit any comments in writing no later than February 21, 2011 as follows:

By mail	By e-mail
Executive Director Oil, Gas and Alternative Energy Division Environment Canada Place Vincent Massey, 9th Floor 351 St-Joseph Blvd. Gatineau QC K1A 0H3	Email: **ogaed@ec.gc.ca** Please type "**CONSULTATION ON 2,4,6-TTBP RISK MANAGEMENT**" in the subject line of your message.
By fax	
Executive Director Oil, Gas and Alternative Energy Division Environment Canada Fax: (819) 953-8903	Please type "**CONSULTATION ON 2,4,6-TTBP RISK MANAGEMENT**" in the subject line of your fax.

Pursuant to section 313 of CEPA 1999, any person who provides information to the Minister of the Environment under CEPA 1999 may submit with the information a request that it be treated as confidential.

8. References

1. Canadian Environmental Protection Act, 1999 (1999, c. 33), Department of Justice of Canada: http://laws.justice.gc.ca/en/C-15.31/text.html

2. Cheminfo Services Inc. for Environment Canada, *"Background Technical Study on Certain Challenge Substances of Interest Under the Chemicals Management Plan",* 2008.

3. Environment Canada*, Environmental Emergency Regulations (SOR/2003-307),* September 2003*,* Canada Gazette Part II, Vol.137, No.19: http://www.ec.gc.ca/lcpe-cepa/eng/regulations/detailReg.cfm?intReg=70

4. Environment Canada, *Persistence and Bioaccumulation Regulations (SOR/2000-107),* March 2000*,* Canada Gazette Part II, Vol.134, No.07*:* http://www.ec.gc.ca/lcpe-cepa/eng/regulations/detailReg.cfm?intReg=35

5. Factsheet – *Environmental Emergency Regulations* under Part 8 of CEPA 1999: http://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=054EBA3E

6. Health Canada and Environment Canada, *Proposed Risk Management Approach for 2,4,6-tri*-tert-*butylphenol*, January 2009: http://www.ec.gc.ca/ese-ees/default.asp?lang=En&n=830056FB-1

7. Health Canada and Environment Canada, *Screening Assessment for the Challenge for 2,4,6-tri*-tert-*butylphenol*, January 2009: http://www.ec.gc.ca/ese-ees/default.asp?lang=En&n=92E21475-1

8. The Significant New Activity (SNAc) Approach: http://www.chemicalsubstanceschimiques.gc.ca/plan/approach-approche/snac-nac-eng.php

Appendix A: Risk Management Measures Related to Fuels in place in Canada **(federal, provincial and territorial)**

- Environmental Emergency Regulations (which includes gasoline in addition to many other substances considered toxic or hazardous) (CEPA 1999)
- Onshore Pipeline Regulations (National Energy Board)
- Various storage tank requirements for fuel products; for example:
    - Flammable Liquids Bulk Storage Regulations (National rail)
    - Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations (federal)
    - Alberta Fire Code, 2006
    - British Columbia "Petroleum Storage and Distribution Facilities Storm Water Regulation"
    - Manitoba "Storage and Handling of Petroleum Products and Allied Products Regulation"
    - New Brunswick "Petroleum Product Handling and Storage Regulation"
    - Newfoundland "Storage and Handling of Gasoline and Associated Products Regulations, 2003"
    - Nova Scotia "Motive Fuel and Fuel Oil Approval Regulations"
    - Nova Scotia "Petroleum Management Regulations"
    - North West territories "Waters Regulations"
    - Ontario Fire Code
    - Ontario Liquid Fuels Regulation
    - Québec "Regulation respecting hazardous materials"
    - Prince Edward Island "Petroleum Storage Tanks Regulations"
    - Saskatchewan "Hazardous Substances and Waste Dangerous Goods Regulations"
    - Yukon Territory "Gasoline Handling Regulations"
    - Yukon Territory "Storage Tank Regulations"
    - CCME Environmental Code of Practice for Underground and Above Ground Storage Tank Systems
- Various spill prevention and reporting requirements for fuels; for example:
    - British Columbia's "Guidelines for Industry Emergency Response Plans July, 2002"
    - Nunavut and North West Territories "Spill Contingency Planning and Reporting Regulations"
    - Ontario's "Classification and Exemption of Spills and Reporting of Discharges Regulations"
    - Ontario's "Spill Prevention and Contingency Plans"
    - Saskatchewan's "Environmental Spill Control Regulations"
    - Yukon territories "Spills Regulations"
- Various spill cleanup requirements for fuel products, for example:
    - Ontario Environmental Protection Act (s.92 and s.15)
    - Alberta Environmental Protection and Enhancement Act,

- Transportation requirements for fuel products (e.g. Transportation of Dangerous Goods Act),
- Handling and disposal of liquid and solid waste (e.g. Ontario Waste Management (Hazardous Waste) Regulation (O.Reg 347).