Risk Management Approach for Coal Tars and their Distillates

Environment and Climate Change Canada
Health Canada

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Summary of Proposed Risk Management

This document outlines the proposed risk management actions for coal tars and their distillates, which have been found to be harmful to the environment and human health. In particular, the Government of Canada is proposing:

- The development of regulations that would prohibit the manufacture, import and sale of coal tar-based sealant products in Canada;
- The development of a Pollution Prevention Planning Notice to prevent and control emissions of coal tars and their distillates from coal tar refining facilities; and
- To work with the Government of Ontario, notably the Ministry of the Environment, Conservation and Parks, and industry to evaluate the effectiveness of provincial and federal risk management measures to reduce emissions of benzene and benzo(a)pyrene, a polycyclic aromatic hydrocarbon (PAH), major components of coal tars, at integrated steel mills.

Moreover, because certain data gaps remain, the following information is requested (ideally on or before August 25, 2021), to the contact details identified in section 8 of this document, to further inform risk management decision-making:

- Detailed air emission dispersion modelling reports for coal tar refining facilities which include concentrations of individual PAHs associated with the releases (e.g., benzo(a)pyrene, naphthalene, acenaphthalene); and
- The level of implementation and the effectiveness of risk management measures to reduce releases of PAHs and benzene from integrated steel mills.

A section 71 survey under the *Canadian Environmental Protection Act, 1999* was published on December 1st, 2018 to collect information on coal tars and their distillates, including the quantity of products containing coal tar imported and manufactured in Canada (Canada 2018). Any new or updated information since the survey that can be provided by stakeholders is welcomed.

The risk management actions outlined in this Risk Management Approach document may evolve through consideration of assessments and risk management options or actions published for other Chemicals Management Plan (CMP) substances to ensure effective, coordinated and consistent risk management decision-making.

Note: The above summary is an abridged list of actions proposed to manage these substances and to seek information on identified gaps. Refer to section 3 of this document for more complete details in this regard. It should be noted that the

proposed risk management actions may also evolve through consideration of additional information obtained from the public comment period, literature and other sources.

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1. Context

The *Canadian Environmental Protection Act, 1999* (CEPA) (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 the environment and/or harmful to human health as set out in section 64 of CEPA[1,2], and if so to manage the associated risks.

Pursuant to the Act, the Ministers have conducted a screening assessment of coal tars and their distillates, under the Government of Canada's Chemicals Management Plan. Data obtained on the six coal tars and their distillates listed below, were used to assess the risk from all coal tars and their distillates as defined in the screening assessment. As such, the conclusions of this assessment are considered to cover all coal tars and their distillates, including the six priority CAS RNs[3] listed below.

CAS RN	Domestic Substances List Name
8007-45-2	Tar, coal
65996-82-9[a]	Tar oils, coal
65996-91-0[a]	Distillates (coal tar), upper
65996-90-9	Tar, coal, low-temp.
65996-89-6[a]	Tar, coal, high-temp.
65996-93-2	Pitch, coal tar, high-temp.

[a] This substance was not identified under subsection 73(1) of CEPA but was included in the assessment as it was considered a priority on the basis of other human health concerns.

[1] Section 64 of CEPA: *For the purposes of* [Parts 5 and 6 of CEPA]*, 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.

[2] A determination of whether one or more of the criteria of section 64 are met 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, but is not limited to, exposures from ambient and indoor air, drinking water, foodstuffs, and products used by consumers. A conclusion under CEPA is not relevant to, nor does it preclude, an assessment against the hazard criteria specified in the *Hazardous Product Regulations* (Canada 2015a), which are a part of the regulatory framework for the Workplace Hazardous Materials Information System for products intended for workplace use. Similarly, a conclusion on the basis of the criteria contained in section 64 of CEPA does not preclude actions being taken under other sections of CEPA or other Acts.

[3] The Chemical Abstracts Service Registry Number (CAS RN) 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 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.

2. Issue

Health Canada and Environment and Climate Change Canada conducted a joint scientific assessment evaluating coal tars and their distillates in Canada. A notice summarizing the scientific considerations of the screening assessment for these substances was published in the *Canada Gazette*, Part I, on June 26, 2021. For further information, refer to the screening assessment for coal tars and their distillates.

2.1 Screening Assessment Conclusion

On the basis of the information available, the screening assessment concludes that coal tars and their distillates are toxic under section 64 of CEPA as they are 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, and constitute or may constitute a danger in Canada to human life or health (ECCC, HC 2021).

Coal tars and their distillates may be released to air from activities associated with their production, transportation and storage, and to water and soil from product use and disposal. The exposure sources of concern, identified in the screening assessment, are based on the release of coal tars and their distillates from:

- Handling and storage at integrated steel mill facilities;
- Processing, storage and handling at the only coal tar refining facility in Canada; and
- Wear of coal tar-based sealant products.

As such, this document will focus on these activities and exposure sources of concern (refer to section 5).

2.2 Recommendation under CEPA

On the basis of the findings of the screening assessment conducted as per CEPA, the Ministers recommend that coal tars and their distillates be added to the List of Toxic Substances in Schedule 1 of the Act[4].

[4] When a substance is found to meet one or more of the criteria under section 64 of CEPA, the Ministers can propose to: take no further action with respect to the substances, add the substance to the Priority Substances List for further assessment, or recommend the addition of the substance to the List of Toxic Substances in Schedule 1 of the Act.

The Ministers have taken into consideration comments made by stakeholders during the 60-day public comment period on the draft screening assessment (ECCC, HC 2016a) and Risk Management Scope document (ECCC, HC 2016b).

As the Ministers finalize the recommendation to add coal tars and their distillates to Schedule 1, risk management instruments will be proposed within 24 months from the date on which the Ministers recommended that coal tars and their distillates be added to Schedule 1 of CEPA, and finalized within 18 months from the date on which the risk management instruments are proposed, as outlined in sections 91 and 92 of CEPA (refer to section 8 for publication timelines applicable to this group of substances).

2.3 Public Comment Period on the draft Screening Assessment and the Risk Management Scope

The draft screening assessment for coal tars and their distillates and its associated Risk Management Scope document summarizing the proposed risk management options under consideration at that time, were published on June 11, 2016. Industry and other interested stakeholders were invited to submit comments on both documents 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.

3. Proposed Risk Management

3.1 Proposed Environmental and Human Health Objectives

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

For these substances, the proposed objectives are focused on addressing the exposure sources of concern outlined in section 5 of this document. As such, the proposed environmental and human health objectives for coal tars and their distillates are to:

- Reduce releases of coal tars and their distillates to surface water and sediment from coal tar-based sealant products to levels that are protective of the environment;

- Reduce deposition of coal tars and their distillates to soil from air releases to levels that are protective of the environment; and
- Reduce exposure of the general population to releases of coal tars and their distillates to levels that are protective of human health.

3.2 Proposed Risk Management Objectives

Proposed risk management objectives set quantitative or qualitative targets to be achieved by the implementation of risk management regulations, instruments and/or tools for a given substance or substances. In this case, the proposed risk management objectives for coal tars and their distillates are to:

- Reduce concentrations of coal tars and their distillates in dust in indoor environments to levels that are protective of human health, and reduce their release to levels that are protective of the environment;
- Reduce air emissions of coal tars and their distillates released from their processing, storage and handling at coal tar refining facilities to levels protective of human health and the environment taking into account technical and economic feasibility and consideration of socio-economic factors; and
- Reduce air emissions of coal tars and their distillates released from their handling and storage at integrated steel mill facilities to levels that are protective of human health taking into account technical and economic feasibility and consideration of socio-economic factors.

3.3 Proposed Risk Management Actions

To achieve the proposed risk management objectives and to work towards achieving the proposed environmental and human health objectives, three risk management actions are being considered for coal tars and their distillates.

Note that the proposed risk management actions, described in this document, are preliminary and subject to change. Following the publication of this document, additional information obtained from the public comment period and from other sources will be considered in the instrument development process[5]. The risk management options outlined in this document may also evolve through consideration of assessments and risk management options published for other CMP substances to ensure effective, coordinated and consistent risk management decision-making.

[5] The proposed risk management instruments 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 Regulation (TBS 2018), the Red Tape Reduction Action Plan (TBS 2012), and in the case of a regulation the *Red Tape Reduction Act* (Canada 2015b).

- **Develop regulations under section 93 of CEPA that would prohibit the import, manufacture and sale of coal tar-based sealant products in Canada.**

This approach will eliminate the availability and will prevent the further use of coal tar-based sealant products. This will result in the elimination of exposure over time to the general public (human health) and to the environment from releases from these products. Currently there are no federal risk management actions existing in Canada for coal tar-based sealant products.

Coal tar-based sealant products are comprised mostly of pavement sealants, and, to a lesser extent, built-up roofing systems for flat and low-slope roofs. Both product types are used in Canada. In order to address all sources of emissions, both pavement and roofing sealants are being targeted. To support development of the regulations, a mandatory survey under section 71 of CEPA was undertaken on December 1st, 2018 in order to estimate the quantity of sealant products containing coal tar imported to and manufactured in Canada (Canada 2018). The 2018 section 71 results confirmed that products containing coal tars are still being used in pavement and roofing sealants in Canada.

The Government would report on the progress, performance and overall effectiveness of the regulations through a variety of means, including the CEPA annual report and departmental performance reports. These reports would contain updated information from reporting, surveys and targeted studies, as appropriate. This data would provide the Government with the information required to measure and evaluate progress towards achieving the objectives of the regulations.

- **Develop a Pollution Prevention Planning Notice for emissions from coal tar refining.**

This approach to minimize releases of coal tars and their distillates from their processing, handling and storage at coal tar refining facilities, was selected as it will provide a measure of flexibility to the industry to meet the risk management objective. The Pollution Prevention Planning Notice could: incorporate the existing provincial risk management measures (see section 7.1.2) as factors to consider; collect additional information about the impact of any ongoing pollution prevention activities; and set benchmarks for specific PAHs, to be protective of human health and the environment.

- **Collaborate with the Government of Ontario and with industry to verify the effectiveness of federal and provincial requirements at integrated steel mills.**

Environment and Climate Change Canada and Health Canada will work with the Government of Ontario and with industry to gather additional information on the effectiveness of federal and provincial risk management measures to minimize releases of coal tars and their distillates from integrated steel mills.

Benzo(a)pyrene and benzene, the primary components of concern with coal tars, are subject to site-specific standards (SSS) set by the Ontario Ministry of the Environment, Conservation and Parks (MECP) for integrated steel mills (see section 7.1.2). Facilities are required to meet these standards by 2021. The MECP is currently developing a new industry standard for the integrated steel mills, which would include PAHs (specifically benzo(a)pyrene) and benzene, that would be in effect in 2021 or 2022.

In addition, a Federal Pollution Prevention Planning Notice published in 2017 (ECCC 2017) requires facilities to report yearly to Environment and Climate Change Canada on the level of implementation of best management practices to reduce fugitive volatile organic compounds (including benzene). These practices are outlined in the Code of Practice to reduce fugitive particulate matter (PM) and volatile organic compounds (VOCs) (ECCC 2016) (see section 7.1.1).

3.4 Substance-Based Performance Measurement

PAHs and benzene have additional sources of exposure to the environment in Canada beyond the releases examined in the assessment of coal tars and their distillates. However, many of the sectors identified as sources of benzene and PAHs in the respective Priority Substances List Assessments are subject to federal and provincial controls (EC, HC 1993; EC, HC 1994).

The Government of Canada is considering conducting substance-based performance measurement of coal tars and their distillates to evaluate the ongoing relevance, success and effectiveness of the actions taken to manage risks from these CEPA-toxic substances (i.e., have human health and environmental objectives been met).

Substance-based performance measurement considers performance of all risk management actions applied to a chemical substance and relevant data or indicators of exposure to the environment or human health.

3.5 Risk Management Information Gaps

Additional information is requested to inform risk management decision-making and to help in the early drafting of the proposed risk management actions. Where available, information on the following aspects may be submitted during the public comment period for this Risk Management Approach document or during stakeholder outreach activities that are anticipated to occur in the future.

Interested stakeholders are invited to provide information, such as outlined below, to further inform risk management decision-making regarding coal tars and their distillates:

- The information gathered from stakeholders from a study commissioned by Environment and Climate Change Canada on coal tar-based sealant products in Canada was limited (Quorus 2017). Consequently, a survey under section 71 of CEPA was undertaken on December 1st, 2018 to collect additional information on coal tars and their distillates, such as the quantity of products containing coal tar imported and manufactured in Canada, to inform risk management decision-making (Canada 2018). Nevertheless, any new or updated information since the survey, notably information on past and future market trends that can be provided by stakeholders is welcomed.
- From the single Canadian coal tar refiner, little information is available regarding the factors used to perform the assessment of air releases in the determination of the site-specific standard or future impacts following the implementation of provincially mandated risk management. In the absence of this information, conservative assumptions will be necessary to determine the benchmarks of the risk management approach. The key information gap is the baseline (existing) and Emission Summary and Dispersion Modelling Report (ESDMR) updates for the facility and associated files; and
- For integrated steel mills, the information that is reported to Ontario MECP under Ontario Regulation 419/05: Air Pollution-Local Air Quality, related to Site-Specific Contaminants Concentration Standards.

Should stakeholders have further information to help address the above noted gaps, they should provide it ideally on or before August 25, 2021 to inform the risk management decision-making process, within the timelines (and to the contact) identified in section 8 of this document.

4. Background

4.1 General Information on Coal Tars and their Distillates

Coal tars are the condensation products obtained by cooling, to approximately ambient temperature, the gases evolved in the destructive distillation (pyrolysis) of coal. This process occurs at integrated steel mills, with the resulting coal tars often delineated by the pyrolysis temperature (low or high).

Coal tar distillates are various boiling point fractions derived from the distillation of coal tars at a coal tar refiner, and include both the fractions obtained from the distillation tower as well as the residue (pitch) remaining following distillation (Figure 1).

All coal tars and their distillates are complex mixtures of hydrocarbons (mainly aromatic), phenolics, and heterocyclic oxygen, sulphur and nitrogen compounds. As the nature and proportions of the various components are mixed and variable, coal tars and their distillates are considered to be of Unknown or Variable composition, Complex reaction products or Biological materials (UVCB) rather than discrete chemicals and, as such, have no specific chemical formula or structure. Of note, four substances present as components of coal tars and their distillates are already listed in Schedule 1 of CEPA: polycyclic aromatic hydrocarbons (PAHs), which are the major components of coal tar, benzene, naphthalene, and quinoline.

PAHs and benzene are regarded as high-hazard components present in coal tar substances.

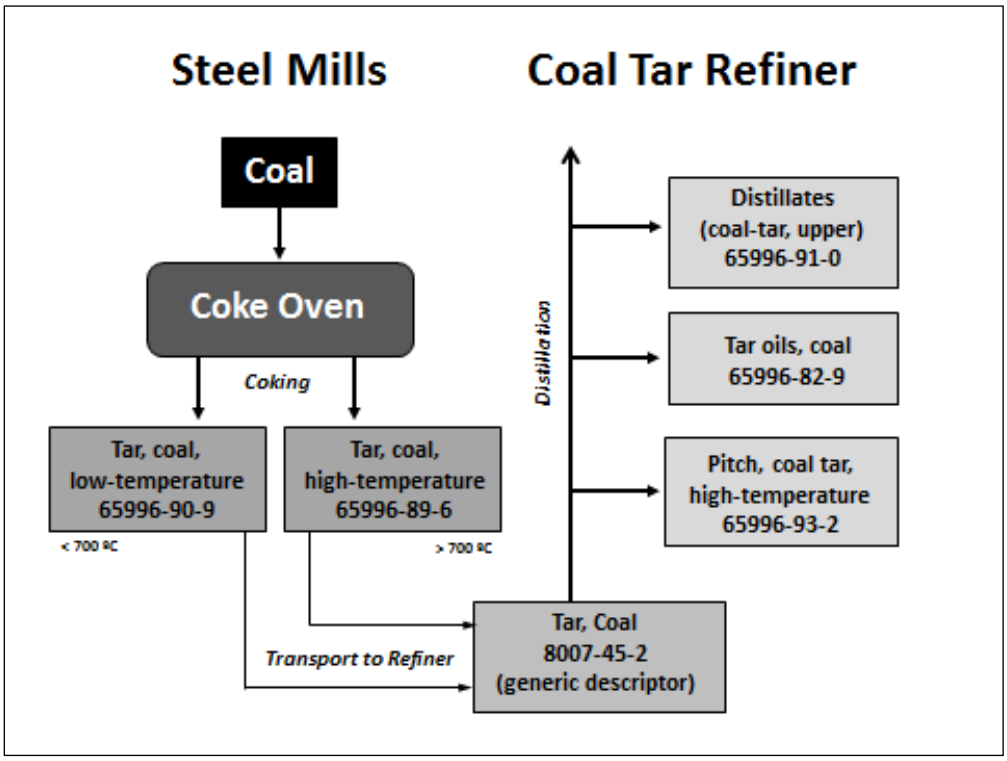

Figure 1. Occurrence of coal tars and their distillates from industrial processes. The CAS RNs presented in this flow diagram are a subset of CAS RNs produced in the process. Other CAS RNs are also produced by the distillation process at coal tar refiner.

Long description for the visual impaired **(HTML requirement)**

This figure shows the occurrence of coal tars and their distillates with their respective CAS RNs from two industrial processes. The first industrial process is at steel mills with the occurrence of low-temperature and high-temperature coal tar following the coking process. The second industrial process is at a coal tar refiner where coal tars are coal tar pitch, oils and upper distillates are obtained through distillation.

4.2 Current Uses and Identified Sectors

Information on manufacturing and import of low-temperature coal tar (CAS RN 65996-90-9), coal tar oils (CAS RN 65996-82-9) and coal tar upper distillates (CAS RN 65996-91-0) during the 2011 calendar year was collected by means of a survey conducted under section 71 of CEPA (Canada 2012).

In the four Canadian integrated steel mills, only high-temperature coal tar (CAS RN 65996-89-6) is produced during the coke making operations (above 700°C). An estimated 165 to 220 kilotonnes (kT) of high-temperature coal tars are produced and refined annually in Canada, with their production varying from year to year, driven primarily by the demand for steel (Sutton 2008).

Low-temperature coal tar (CAS RN 65996-90-9) was not reported to be manufactured in or imported into Canada in 2011, and no information was found on its use in Canada.

The single Canadian coal tar refiner distills high-temperature coal tar into several oil fractions and pitch. Distillation of coal tar produces about 50% by weight of coal tar pitch (European Commission 2008a). Therefore, about 82 to 110 kT of coal tar pitch are estimated to be produced annually in Canada.

Coal tar pitch is primarily used by aluminum smelters as a binder for aluminum smelting anodes. In Canada, approximately 307 kT per year of coal tar pitch are used as binder in anodes by the aluminum industry (Sutton 2008). Therefore, additional coal tar pitch is imported to meet the demand.

Coal tar pitch can also be used as a binder in graphite electrodes, as an adhesive/binder in clay pigeons and briquettes, as fuel in blast furnaces of the steel industry, in surface coatings for industrial applications such as pipe linings and harsh climate protection, to strengthen and impregnate refractories (for lining industrial furnaces), and in pavement sealants and built-up roofing systems for flat and low-slope roofs (NTP 2016; European Commission 2008a; EHS 2010).

Coal tar-based pavement sealants constitute one of several types of pavement sealants and contain coal tars and/or their distillates (Ruetgers 2013; EHS 2010). They contain approximately 15 to 30% coal tar pitch emulsified in water (EHS 2010), and are available in the Canadian retail market with limited availability in stores across Canada in do-it-yourself products used by consumers. Pavement sealing contractors are known to use coal tar-based pavement sealants but detailed information is limited. Pavement sealants are mainly applied to residential driveways and small commercial or residential parking lots; they are not applied to roadways or airport tarmacs in Canada. It was estimated that 10 500 ± 50%

tonnes/year of coal tar-based pavement sealants were sold in Canada by a small number of companies, mostly in the retail sector (EHS 2010).

Coal tar pitch may be used in roofing systems for buildings with flat roofs in Canada (Conestoga 2014). However, there appears to be very low usage of coal tar pitch in built-up roofing systems (BUR) used for low-slope roofs in Canada.

Coal tar oils and coal tar upper distillates are industry-restricted substances. While coal tar upper distillates are used to produce creosote and carbon black feedstock, coal tar oils are used as industrial fuel, in organics recovery, and also in naphthalene refining and the production of naphthalene sulphonates (superplasticizers) (Ruetgers 2013).

Coal tar is listed in Health Canada`s Drug Product Database (DPD [modified 2019]) as an active ingredient present in human and veterinary drugs (therapeutic products), primarily in the form of shampoos, and is used to treat skin conditions, such as psoriasis, eczema and seborrheic dermatitis.

None of the six priority coal tars and distillates is listed as approved food additives in the Lists of Permitted Food Additives (Health Canada [modified 2017]) as regulated under the *Food and Drugs Act* (Canada 1985). Based on the nature of these substances, it is unlikely that any of these substances would be used in food flavours or components of fruit and vegetable coatings. None of the substances are identified as being used in food packaging applications or incidental additives.

Coal tars, crude and refined, are described on the Cosmetic Ingredient Hotlist (Health Canada [modified 2018]) as prohibited as ingredients in cosmetic products in Canada. The Hotlist is an administrative tool that Health Canada uses to communicate to manufacturers and others that certain substances, when present in a cosmetic, may contravene (a) the general prohibition under the *Food and Drugs Act*, or (b) a provision of the *Cosmetic Regulations* (Canada 2008).

Coal tar is listed in the Natural Health Products Ingredients Database (NHPID [modified 2019]) as a non-natural health product substance not falling under Schedule 1 of the *Natural Health Products Regulations* (Canada 2003) and thus not listed in the Licensed Natural Health Products Database (LNHPD [modified 2018]) as being present in any currently licensed natural health products. None of the priority coal tars and their distillates are listed in these databases as medicinal or non-medicinal ingredients present in licensed natural health products in Canada (NHPID [modified 2019]; LNHPD [modified 2018]).

5. Exposure Sources and Identified Risks

Coal tars and their distillates are not naturally produced. They may be released from activities associated with their production, processing, handling, transportation and storage, as well as during the use and disposal of consumer and industrial products that contain them.

Releases to the Environment/Ecological Risks

As coal tars and their distillates are complex mixtures that cannot be easily measured, the emissions of PAHs, which are major components of coal tars and their distillates, from coal-tar-related sources, were used to estimate the potential for ecological exposure from coal tars and their distillates.

- **Coal Tar-Based Sealants**

The use of coal tar pitch in coal tar-based sealants is of concern for releases of PAHs in runoff which have the potential to cause adverse effects in surface water organisms in Canada. The persistence of some PAHs in sediment suggests there is potential for long-term accumulation of PAHs in the sediment bed that could lead to direct adverse effects in sediment organisms, as well as exposure to pelagic species should sediment re-suspension occur.

- **Coal Tar Refiner**

The deposition of PAHs from coal tars and their distillates to soil in the Hamilton, Ontario area resulting from air emissions from the only coal tar refiner in Canada was examined as a potential route of exposure to the environment. The distillation and processing of coal tars to produce coal tar oils, upper distillates and pitch take place at the coal tar refinery. These processing activities take place within an industrial setting with control systems that reduce releases of coal tars and their distillates to the environment. However, there is still potential for fugitive air release of the coal tars and their distillates, both at the plant and during transport of these substances to other processing facilities.

Exposure to the General Population/ Human Health Risks

Due to the complex and variable nature of the substances being assessed, it is difficult to estimate exposure to coal tar, coal tar oil, coal tar upper distillate and coal tar pitch substances. Exposure was characterized by choosing benzene, benzo(a)pyrene (B(a)P) and, more generally, the United States Environmental Protection Agency (US EPA) priority PAHs as a marker for coal tars. PAHs and benzene are regarded as high-hazard components present in coal tar substances and have been included on the List of Toxic Substances under Schedule 1 of CEPA.

- **Coal Tar-based Pavement Sealants**

As noted in the *Uses* section, coal tars and their distillates are used in pavement sealants (typically 15–30% weight/weight basis) in Canada, which are generally applied to residential driveways and small commercial or residential parking lots (EHS 2010). Due to aging and weathering of these surfaces, coal tars and their distillates can accumulate in house dust in nearby houses or apartments. It should be noted that the exposure to coal tar pitch from roofing materials is unknown and was not included in the exposure scenario.

Young children are considered to represent a susceptible subpopulation in this particular scenario, based on greater exposure potential associated with their extensive hand-to-mouth action; crawling on floors and surfaces that accumulate dust (Van Metre et al. 2013). The screening assessment identified a risk with ingestion of house dust contaminated with coal tars and their distillates by children, a susceptible subpopulation.

- **Coal Tar Refiner**

PAHs and benzene are regarded as high-hazard components present in coal tar substances. Releases of benzene and PAHs constituents are associated with the production/processing, storage and handling of coal tars and their related products. There may be some general population exposure to these high-hazard volatile constituents of coal tars and their distillates in the vicinity of coal tar refiners. The margins of exposure for inhalation of benzene emissions from a coal tar refinery are considered potentially inadequate to address uncertainties related to health effects and exposure estimates. The margin of exposure to PAHs from a coal tar refinery is considered adequate to address the uncertainties in the exposure and health effects databases.

- **Integrated Steel Mills**

In Canada, coal tars are produced as by-products of coke production at integrated steel mills, and there is potential for release of coal tar or its components during production, their storage at the steel mill and during loading and transportation activities. There is potential for release of coal tars or their components to the environment in the vicinity of the integrated steel mills, from relief valves and venting valves or drain valves on the piping or equipment (e.g., vessels). Releases of benzene and PAH constituents are associated with the storage and handling of coal tars and their related products, and represent high-hazard constituents of concern of high temperature coal tar. The margins of exposure for inhalation of benzene emissions from steel mills are considered potentially inadequate to address uncertainties related to health effects and exposure databases. While no emissions of PAHs were attributed to coal tar storage and handling, an estimation of potential exposures from releases of PAHs was determined. The margin of exposure for PAHs is considered adequate to address uncertainties related to the health effects and exposure databases.

6. Risk Management Considerations

6.1 Alternatives and Alternate Technologies

Coal Tar-based Sealant Products

Coal tar-based pavement sealants constitute one of several types of pavement sealants in the Canadian do-it-yourself retail market and appear to have limited availability in stores across Canada (EHS 2010; Quorus 2017). Alternative pavement sealers are widely available and include asphalt-based pavement sealants, acrylic co-polymers and organic concrete sealants including acrylic sealers, epoxy coatings, urethane sealants, polyureas, and polyaspartics (US EPA 2011). However, the advantages and disadvantages of the alternatives in relation to functionality, safety and resource efficiency, *etc*. should be considered prior to substituting coal tar-based sealant products. For instance, volatile organic compound emissions can occur from the use of asphalt-based pavement sealants as indicated in the *Code of Practice for the Reduction of Volatile Organic Compound (VOC) Emissions from Cutback and Emulsified Asphalt* (ECCC 2017). Products using emulsified agents instead of cutback solvents are an alternative. Soybean-based sealers, which comprise of a soybean-based emulsion in water are also available on the market.

In the specific context of roofing applications, coal tar pitch can be used as a waterproofing agent in dead-level or low slope built-up roofs. Coal tar-based sealant products represent only one type of roofing amongst several others, such as polyvinyl chloride (PVC) membrane; ethylene propylene diene terpolymer (EPDM) rubber, a durable synthetic rubber roofing membrane widely used in low-slope buildings; thermoplastic polyolefin (TPO), a single-ply reflective roofing membrane made from polyprophylene and ethylene-propylene rubber polymerized together; and other products (Quorus 2017).

Coal Tar Refiner

No alternative substances or technologies were identified that would minimize or eliminate the production of coal tar distillates during the coal tar refining process. However, technologies and practices for reducing releases of these substances during their production, storage, and transportation exist. Examples include equipment selection such as leak-proof valves and fittings, use of vapour recovery systems during loading/unloading operations, use of floating roof storage tanks with appropriate seal systems, as well as work practices such as leak detection and repair (LDAR) programs for equipment leaks. Other equipment that can be used to reduce emissions includes pollution control measures like fume scrubbing systems and fume gathering and incineration systems.

Integrated Steel Mills

No alternative substances or technologies were identified that would minimize or eliminate the production of coal tars from the coking process when taking into account socio-economic factors. However, similar to coal tar refiners, technologies and practices for reducing releases of these substances during their production, transportation and storage exist. Examples include equipment selection such as leak-proof valves and fittings, use of vapour recovery systems during loading/unloading operations, as well as work practices such as LDAR programs for equipment leaks.

6.2 Socio-economic and Technical Considerations

Socio-economic factors are being considered in the selection process for a potential regulatory or non-regulatory approach respecting preventive or control actions, and in the development of the risk management objectives. Socio-economic factors are also being considered in the development of potential regulations or non-regulatory instruments or tools as identified in the *Cabinet Directive on Regulation* (TBS 2018) and the guidance document *Assessing, Selecting, and Implementing Instruments for Government Action* (TBS 2007) by the Treasury Board of Canada Secretariat.

Coal Tar-based Sealant Products

A study was commissioned by Environment and Climate Change Canada, assessing the technical and economic impact of coal tar-based products in Canada (Quorus 2017); however the lack of industry participation in sharing volume, pricing and product information did not allow clear conclusions to be drawn.

A mandatory survey under section 71 of CEPA was undertaken in 2018, in order to estimate the quantity of sealant products-containing coal tar imported into and manufactured in Canada. The survey results will be used to inform the risk management instrument design.

Coal Tar Refiner

Environment and Climate Change Canada considered socio-economic and technical factors in the selection of Pollution Prevention Planning Notice for emissions from coal tar refining. In designing the Notice, consideration will be given to minimizing duplication with Ontario legislation. This could include incorporating by reference the Ontario Action Plan requirements as factors to consider which take into account economic feasibility and technology benchmarking to meet the Ontario SSS for the coal tar refiner. Additional factors to consider will also be taken under consideration in order to target PAHs of concern besides those targeted by the Ontario SSS (benzo(a)pyrene and benzene).

Integrated Steel Mills

Under Ontario Regulation 419/05 (see section 7.1.2), all four integrated steel mills obtained approvals for SSS for benzo(a)pyrene and benzene for each facility. The SSS requires facilities to develop an action plan to reduce their emissions and to also provide an emission summary and dispersion modeling report, a technology benchmarking report, and a Public Consultation Report.

7. Overview of Existing Risk Management

In Canada, there are currently no risk management measures in place to manage industrial releases from coal tars and their distillates or to manage releases of coal tars and their distillates from sealant products. However, the Government of Canada and the Government of Ontario have risk management measures in place pertaining to industrial sectors of concern, specifically for releases of PAHs and benzene.

7.1 Related Canadian Risk Management Context

7.1.1 Federal

Coal Tar-Based Sealant Products

There are no federal risk management actions in place for the import, manufacture, use or release of coal tar-based sealant products.

Coal Tar Refiner

There are no federal risk management actions in place for coal tar refining specifically, or pertaining to the release of coal tars and their distillates from coal tar refiner.

Integrated Steel Mills

- **Pollution Prevention Planning Notice**

A Pollution Prevention Planning Notice was published in May 2017 *(Notice requiring the preparation and implementation of pollution prevention plans in respect of specified toxic substances released from the iron, steel and ilmenite sector*; Canada 2017). This Notice complements the *Code of Practice to Reduce Fugitive Emissions of Total Particulate Matter and Volatile Organic Compounds from the Iron, Steel and Ilmenite Sector* (ECCC 2016). Facilities are required to report annually on the implementation of the recommendations of the 2016 Code

to reduce fugitive VOCs (including benzene). This Notice applies to all facilities in the sector and allows ECCC to obtain information on the level of implementation for each facility.

- **Codes of Practice**

The *Code of Practice to Reduce Fugitive Emissions of Total Particulate Matter and Volatile Organic Compounds from the Iron, Steel and Ilmenite Sector* was published in May 2016 (ECCC 2016). It includes recommendations for material handling and storage along with recommendations for coke making operations, vapour collection during transfer operations, containment and equipment leaks.

An *Environmental Code of Practice for Integrated Steel Mills* was put in place in March 2001 (Environment Canada 2001). It outlines environmental concerns associated with the integrated steel mills and advances recommendations aimed at preserving and enhancing the quality of the environment that is affected by these mills. There are recommendations for the control of emissions from coke ovens, coke by-products plants and liquid storage containment. Environmental performance standards are included for atmospheric emissions of PAHs, benzene and total particulate matter. A conformance report in 2003 concluded that integrated mills had achieved substantial reductions in PAHs and benzene releases to air (Stratos 2003). Almost all recommendations of the Code related to coke ovens and coke by-product plants had been implemented.

Storage and handling of coal tars are also subject to the recommendations in the Canadian Council of Ministers of the Environment's *Environmental Guidelines for Controlling Emissions of Volatile Organic Compounds from Aboveground Storage Tanks* (CCME 1995) and in the Canadian Council of Ministers of the Environment's *Environmental Code of Practice for the Measurement and Control of Fugitive VOC Emissions from Equipment Leaks* (CCME 1993) including leak-detection and repair (LDAR) program.

- **Canada-Wide Standard (CWS)**

The Canada-Wide Standard for benzene set in 2001*Canada-Wide Standard for Benzene – Phase 2* (CCME 2001) included a national target of 30% reduction in total benzene emissions (from 1995 levels) which had to be achieved by the end of 2000. Steel Mills reduced their benzene emissions by 88% from 1995 to 2008 (CCME 2012). These reductions were achieved in large part with the implementation of the Canadian Steel Producers Association's *Benzene Environmental Best Practice Manual for Coke Producers in Canada - Controlling and Reducing Fugitive Benzene Emissions from the Coke Production Byproduct Process* (CSPA 1999) which is a voluntary initiative from Industry and the Association. These best practices were implemented in 2000 by all coke producers in Ontario.

7.1.2 Provincial

- ***Ontario – Industrial Releases***

In 2005, the Ontario Ministry of the Environment introduced *Regulation 419/05: Air Pollution – Local Air Quality* (Ontario 2005). This Regulation aims to limit exposure to substances released from local industrial and commercial facilities into air that can affect human health and/or the environment.

Under this Regulation, industry can implement one of three compliance approaches, each designed to manage the risks associated with a facility's air emissions:

- Meet the general air standard by the phase-in period;
- Request and meet a site-specific standard (SSS); or
- Register and meet the requirements under a technical standard, if available.

In 2011, the Ontario Regulation was amended to include new annual average air standards of 0.45 µg/m^3 for benzene (CAS RN 71-43-2) and 0.00001 µg/m^3 for benzo(a)pyrene (CAS RN 50-32-8) as a surrogate for total PAHs. These standards took effect on July 1, 2016.

Individual facilities may also have an *Environmental Compliance Approval* for discharge into air, subject to conditions, in accordance with section 9 of the *Ontario Environmental Protection Act* (Ontario 1990).

- ***Coal Tar-Based Sealant Products***

There are no provincial risk management actions on coal tar-based sealant products in place pertaining to the prevention or control of releases of coal tars from these products.

- ***Coal Tar Refiner***

In 2017, the coal tar refiner received provincial approval of their SSS for five years. The approval of a site-specific air emissions standard for the facility includes an action plan that consists of, among other things, implementation of a leak detection and repair (LDAR) program and improvements in emissions control efficiency. The implementation of the SSS was expected to result in a significant reduction of air emissions of targeted substances (e.g, benzo(a)pyrene and benzene) and potentially other substances as a result of measures taken. However, based on data reported under the National Pollutant Release Inventory (NPRI) since the implementation of the SSS, a reduction in the amount of targeted substances released from the facility, as well as other PAHs of concern, has not been seen.

The standards for benzo(a)pyrene and benzene are set in phases, with targets to be met by January 2018 and more stringent targets by June 2018. In addition, the SSS includes a requirement for a fence line measurement program that is intended to confirm that all necessary actions to reduce air emissions with respect to the substances targeted have been taken at the subject facility. The SSS for benzo(a)pyrene and benzene are valid until November 2022.

- ***Integrated Steel Mills***

Between 2016 and 2017, all four integrated mills located in Ontario requested the development of SSS, in place of the general air standard. The Ontario MECP agreed, and set SSS for benzo(a)pyrene and benzene. The approval of a site-specific air emissions standard requires each facility to develop an action plan that consists of, among other things, restoration projects, improvements in emissions control efficiency, refurbishment of specific equipment, improvement in the quality of feedstock, and implementation of US EPA rules for coke plants. The implementation of SSS is expected to result in a 30-40% reduction in coke oven battery air emissions (e.g, benzo(a)pyrene, benzene, and total particulate matter). The SSS for benzo(a)pyrene and benzene have an initial 2019 target and a more stringent target for 2021. In addition, there are requirements for a benzene measurement program that is intended to confirm that all necessary actions to reduce benzene air emissions have been taken at each subject facility [Ontario 419/05, s33(7)(ii), s35(7)(a), s35(7)(b)].

Ontario Regulation 419/05 and SSS for benzo(a)pyrene and benzene for integrated steel mills are considered as relevant and enforceable risk management measures for these facilities. The Government of Canada intends to work with the Government of Ontario and industry to review progress in reducing benzene and PAHs emissions, and to evaluate the degree to which the risk management objectives for coal tars and their distillates have been met.

7.2 Pertinent International Risk Management Context

There is general agreement with other international jurisdictions that coal tars and their distillates are substances of concern for the environment and human health.

United States

The US EPA, under the *Toxic Substances Control Act* (TSCA), subjects coal tar (CAS RN 8007-45-2) and upper distillates of coal tar (CAS RN 65996-91-0) to a significant new use rule (SNUR). The SNUR would require persons to file a significant new use notification with the US EPA prior to manufacturing, importing, or processing any of these chemical substances for use in a consumer product or for any use, or combination of uses, that is reasonably likely to expose 1000 or more workers at a single corporate entity. The required notification would provide

the US EPA with the opportunity to evaluate the intended use and, if necessary, to prohibit or limit that activity before it occurs.

Awareness on the toxicity of coal tar-based pavement sealants has been rising in the United States over recent years. Since the initial scan of existing risk management in other jurisdictions as published in the proposed Risk Management Scope document for coal tars and their distillates in June 2016, an increasing number of jurisdictions in the United States have taken action to control or ban the use of coal tar-based pavement sealants. These restrictions are occurring at the state, county, and city levels across the country, and are supported by non-governmental organizations for the protection of human health protection groups such as the American Medical Association (AMA 2016).

Additionally, several regulations under the National Emission Standards for Hazardous Air Pollutants (NESHAP) program of the *Clean Air Act* could be applicable to coal tar production under standards for coke oven batteries (40 CFR, Part 63, subpart L) and from coal tar refining under the standard for synthetic organic chemical manufacturing industry - equipment leaks (40 CFR, Part 63, subparts F, G, and H).

European Union

In the European Union, high-temperature coal tar pitch (CAS RN 95996-93-2) is identified as a *Substance of Very High Concern* (SVHC). In 2017, the European Chemicals Agency (ECHA) recommended high temperature coal tar pitch for inclusion in Annex XIV (Authorisation List) of the *Registration, Evaluation, Authorisation and Restriction of Chemicals* (REACH) *Regulation* (European Commission 2017). Once finalized, this substance will not be allowed to be placed on the market or used after October 2020 (sunset date), unless an authorisation is granted for their specific use, or the use is exempted from authorisation.

A recent ruling from the Court of Justice of the European Union denied the classification of high-temperature coal tar pitch as Aquatic Acute 1 and Aquatic Chronic 1 in the *Classification, Labelling, and Packaging of Substances and Mixtures Regulation* (Regulation (EC) No. 1272/2008). The substance remains classified as Carcinogenic 1A, Mutagenic 1B, and Toxic for reproduction 1B (European Commission 2018).

The Directive for Integrated Pollution Prevention and Control (IPPC) sets out guidelines to minimize pollution from various point sources such as emissions from storage tanks and establishes the Best Available Techniques (BAT) reference documents, the so-called BREFs (IPPC Directive 2008/1/EC) (European Commission 2008b). Furthermore, Directive 2010/75/EU of the European Parliament and the Council on industrial emissions (the Industrial Emissions Directive or IED) which repealed and replaced Directive 2008/1/EC becomes the main EU instrument regulating pollutant emissions from industrial installations and

requires that these BAT are the reference in setting permit conditions (European Commission 2010).

7.2.1 Risk Management Alignment

There is mixed risk management alignment between actions undertaken in Canada, and those undertaken in the United States and the European Union. As described earlier, there are actions in all three jurisdictions regarding best practices and general air pollution control requirements for industrial sectors. However, there is no evidence that any jurisdiction has taken specific action on the release of coal tars from integrated steel mills or coal tar refiners. If the Government of Canada moves forward with the development of federal regulations under section 93 of CEPA that would prohibit the import, manufacture and sale of coal tar-based sealant products in Canada, they would be the first to take federal level action on these products.

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 or other information that would help to inform the decision-making process (as outlined in section 3.2 and 3.3). Please submit additional information and comments prior to August 25, 2021.

Comments and information submissions on the Risk Management Approach should be submitted to the address provided below:

Environment and Climate Change Canada
Gatineau, Quebec K1A 0H3
Telephone: 1-800-567-1999 (in Canada) or 819-938-3232
Fax: 819-938-5212
Email: eccc.substances.eccc@canada.ca

Companies who have a business interest in coal tars and their distillates are encouraged to identify themselves as stakeholders. The stakeholders will be informed of future decisions regarding coal tars and their distillates 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 instruments, where necessary. Comments received on the Risk Management Approach document will be taken into consideration in the selection

or development of these instruments. Consultation will also take place as instruments are developed.

8.2 Timing of Actions

Electronic consultation on the Risk Management Approach: June 26, 2021 to August 25, 2021.

Publication of responses to public comments on the Risk Management Approach document: Concurrent to the publication of the proposed instruments.

Publication of the proposed instruments: At the latest, 24 months from the date on which the Ministers recommended that coal tars and their distillates be added to Schedule 1 of CEPA.

Consultation on the proposed instruments: 60-day public comment period starting upon publication of each of the proposed instruments.

Publication of the final instruments: At the latest, 18 months from the publication of each of the proposed instruments.

Review of the effectiveness of existing federal and provincial risk management actions in meeting the risk management objective for integrated steel mills: 2024–review of provincial actions; 2029 – review of federal actions.

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