



Government
of Canada

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du Canada

Risk Management Scope for Manganese and its Compounds

Environment and Climate Change Canada

Health Canada

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Canada 

Summary of proposed risk management

This document outlines the risk management options under consideration for manganese and its compounds, which have been proposed to be harmful to the environment and human health. For the purposes of paragraph 77(1)(a) of the *Canadian Environmental Protection Act, 1999* (CEPA), the Government of Canada proposes to recommend that manganese and its compounds be added to Part 2 of Schedule 1 to CEPA¹. As a result, the Government of Canada is considering the following new risk management actions:

Paint products: Regulatory or non-regulatory actions to help reduce dermal and/or inhalation exposures to manganese and its compounds from paint products containing these substances to levels that are protective of human health.

Children's paint products: Regulatory or non-regulatory actions to help reduce oral exposure to manganese and its compounds from certain paint products intended for use by children to levels that are protective of human health.

Releases to air: The Government of Canada is considering measures to reduce anthropogenic releases of manganese and its compounds to air from several identified industrial sectors to address human health concerns to those living in proximity to certain facilities.

The specific facilities are within these sectors:

- metal ore mining sector (including iron ore pelletizing)
- iron and steel mills and ferro-alloy manufacturing sector
- agricultural, construction and mining machinery manufacturing sector
- motor vehicle parts manufacturing sector
- steel product manufacturing from purchased steel sector

Proposed measures include regulatory measures such as regulations and pollution prevention planning notices, or non-regulatory measures such as environmental release guidelines, codes of practice, or environmental performance agreements (EPAs), to minimize the release of manganese and its compounds to air from the industrial use of these substances.

¹ After an assessment of a given substance under Part 5 of CEPA, other than section 83, the ministers shall propose one of the following measures: take no further action with respect to the substance, add the substance to the List referred to in section 75.1 of the Act (unless the substance is already on that List), recommend the addition of the substance to Part 1 of Schedule 1 to CEPA (for substances that pose the highest risk) or recommend the addition of the substance to Part 2 of Schedule 1 to CEPA (for other CEPA-toxic substances).

The Government of Canada is also considering other risk management actions, as follows:

Ecological

Metal ore mining sector: Reducing anthropogenic releases of manganese and its compounds to water by reviewing information received from regulated mines in response to environmental effects monitoring (EEM) requirements under the *Metal and Diamond Mining Effluent Regulations* (MDMER), to determine if additional regulatory or non-regulatory risk management is required. For mining facilities not covered² by the MDMER, by continuing to promote the application of the existing *Environmental Code of Practice for Metal Mines* for every stage of a mine's life cycle.

Human Health

Cosmetics: Listing manganese and its compounds as prohibited or restricted ingredients on Health Canada's Cosmetic Ingredient Hotlist³ to help reduce oral, dermal and/or inhalation exposures to manganese and its compounds from certain cosmetics.

Natural health products (NHPs): Modifying the existing entries for manganese and its compounds in the Natural Health Products Ingredients Database (NHPID)⁴ to help reduce oral exposure to manganese and its compounds from certain NHPs. Actions may aim to lower the quantity or concentration of these substances when used as medicinal or non-medicinal ingredients in certain NHPs to levels that are protective of human health.

In addition, reviewing the maximum daily dose allowed for manganese under the Natural and Non-prescription Health Products Directorate (NNHPD)'s Multi-

² Metal mines may not be covered by the MDMER if daily effluent flow rate is below 50 m³/day or if they are not in commercial operation.

³ The Cosmetic Ingredient Hotlist is an administrative tool that Health Canada uses to communicate to manufacturers and others that certain substances may contravene the general prohibition found in section 16 of the *Food and Drugs Act* or may contravene one or more provisions of the *Cosmetic Regulations*. Section 16 of the *Food and Drugs Act* states that "No person shall sell any cosmetic that has in or on it any substance that may cause injury to the health of the user." In addition, the Hotlist includes certain substances that may make it unlikely for a product to be classified as a cosmetic under the *Food and Drugs Act*. Compliance with the provisions of section 16 is monitored, in part, through the mandatory notification provisions of section 30 of the *Cosmetic Regulations* of the *Food and Drugs Act*, which requires that all manufacturers and importers provide a list of the cosmetic's ingredients to Health Canada.

⁴ The NHPID provides an electronic tool which enables members of the public to access information on the following topics:

- medicinal and non-medicinal ingredients used in Natural Health Products;
- standard terminology used by the Natural Health Products Online System, known as "Controlled Vocabulary", referring to quality test methods, dosage forms, non-medicinal ingredient purposes, and so on; and
- pre-cleared information such as single ingredient monographs and product monographs.

Vitamin/Mineral Supplements monograph to help reduce oral exposure to manganese and its compounds from multi-vitamin/mineral supplements.

Drinking water: Health Canada has already worked with the provinces and territories through the Federal-Provincial-Territorial Committee on Drinking Water to develop a maximum acceptable concentration (MAC) for manganese in drinking water of 0.12 mg/L, which is designed to protect people in Canada, including the most vulnerable members of society. The guideline technical document can be found on the [Guidelines for Canadian Drinking Water Quality: Guideline Technical Document – Manganese web page](#).

In the interest of communicating this information to the public, Health Canada has also published a Water Talk document online, which is intended to inform the general public about the guideline, potential health concerns from elevated exposure to manganese in drinking water, and what they can do if they are concerned about manganese in their drinking water. The Water Talk document can be found on the [Water Talk - Manganese in drinking water web page](#).

To inform risk management decision-making, information on the following topics should be provided (ideally on or before December 24, 2025) to the contact details identified in section 8 of this document:

- Dissolved concentrations of manganese in surface waters (receiving effluent from exposure sources outlined in section 5 and reference areas) and corresponding measurements of pH and water hardness
- Activities or industrial processes that contribute to the facility release of manganese and its compounds to water and air
- Bioavailability of manganese in diet and drinking water
- Availability of suitable exposure biomarkers in humans
- Intake estimates of manganese from consumption of traditional foods
- Manganese ambient air concentration data at or beyond the facility boundaries from facilities releasing manganese to air
- Best management practices and technologies in place, and efficiency of treatment methods for effluents and air releases at facilities in the industrial sectors with exposures of concern that use or have incidental releases of manganese and its compounds
- Potential alternative substances to manganese and its compounds for use in certain paint products, children's paint products, cosmetics, and NHPs identified as a concern

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

Under the CMP, Environment and Climate Change Canada (ECCC) and Health Canada are conducting assessments on a variety of metals that may identify similar or additional sectors as sources of risk. ECCC is considering the risk management options for manganese and its compounds as part of a more comprehensive strategy to manage the metals assessed as toxic under the CMP. Implementation of this strategy would begin when all risk assessments and risk management approaches for these metals have been completed and published. This strategy would focus on effluents rather than on single metals and will reduce the administrative burden on implicated sectors that would otherwise result from implementing multiple risk management actions (for example, repeated amendments to the MDMER) for metals assessed and found to be toxic.

Note: The above summary is an abridged list of options under consideration to manage manganese and its compounds 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 options may 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 human health as set out in section 64 of CEPA^{5,6}, and, if so, to manage the associated risks.

The draft assessment of manganese and its compounds was conducted under the Chemicals Management Plan (CMP) (ECCC, HC 2025). Eleven manganese-containing substances listed in Annex A were identified as priorities for assessment as they met categorization criteria, were prioritized through other mechanisms (ECCC, HC [modified 2017]), or were identified for further consideration following prioritization of the Revised In Commerce List (R-ICL⁷) (Health Canada [modified 2023]). The draft assessment focuses on the manganese moiety⁸ and therefore considers manganese in its elemental form, manganese compounds, and manganese released in dissolved or particulate form (ECCC, HC 2025). The manganese moiety is referred to as “manganese and its compounds” throughout this document.

There are both natural and anthropogenic sources of manganese to the environment. In Canada, anthropogenic sources of manganese include the incidental production and subsequent release of manganese (that is, as a by-product), and the manufacture, import and use of manganese and its compounds in products and manufactured items.

⁵ 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.*

⁶ 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 *Hazard Product Regulations*, 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.

⁷ The R-ICL is an administrative list of substances that were used in products that are regulated under the *Foods and Drugs Act* and that were in commerce in Canada between January 1, 1987 and September 13, 2001. The Government of Canada has prioritized these substances and is addressing them for their potential impact on human health and the environment, in order to risk-manage them, if required.

⁸ For the purpose of this document, “moiety” signifies a part of a molecule. A moiety is a discrete chemical entity, identified from a parent compound or its transformation products, that is expected to have toxicological significance.

The draft assessment addresses key pathways and sources of manganese exposure relevant to ecological receptors and human health and therefore considers manganese in environmental compartments (for example, water, sediments, soil, and air), food, or products that may result from natural or anthropogenic sources. It considers all substances that have the potential to dissolve, dissociate, or degrade to release manganese through various transformation pathways and that can potentially contribute to the combined exposure of living organisms to manganese. As such, the draft assessment considers all manganese-containing substances beyond those identified as priorities for assessment (ECCC, HC 2025).

2. Issue

Health Canada and Environment and Climate Change Canada (ECCC) conducted a joint scientific assessment of manganese and its compounds in Canada. A notice summarizing the scientific considerations of the draft assessment for these substances was published in the *Canada Gazette*, Part I, on October 25, 2025 (Canada 2025). For further information, refer to the draft assessment for manganese and its compounds.

2.1 Draft assessment conclusion

On the basis of the information available, the draft assessment proposes that manganese and its compounds are toxic under paragraphs 64(a) and (c) of CEPA because they are entering or may enter 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 2025).

The draft assessment also proposes that manganese and its compounds do not meet the criteria under paragraph 64(b) of CEPA as they are 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 (ECCC, HC 2025).

The draft assessment also proposes that manganese and its compounds meet the persistence criteria but not the bioaccumulation criteria as set out in the *Persistence and Bioaccumulation Regulations* of CEPA (Canada 2000).

The ecological risk characterization in the draft assessment identified the potential for harm to the aquatic environment as a result of the release of manganese to water from a small number of facilities in the metal ore mining sector.

The human health exposures of concern identified in the draft assessment are based on the release of manganese and its compounds to air from certain facilities in the following identified industrial sectors: metal ore mining (including iron ore pelletizing); iron and steel mills and ferro-alloy manufacturing; agricultural, construction and

mining machinery manufacturing; motor vehicle parts manufacturing; and steel product manufacturing from purchased steel.

Furthermore, human health exposures of concern were also identified in the draft assessment associated with oral, dermal and/or inhalation exposures of manganese and its compounds from the use of paint products, children's paint products, cosmetics, natural health products (NHPs), and drinking water.

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

2.2 Proposed recommendation under CEPA

On the basis of the findings of the draft assessment conducted pursuant to CEPA, the ministers propose to recommend that manganese and its compounds be added to Part 2 of Schedule 1 to CEPA⁹. Addition of a substance to Schedule 1 to CEPA enables the Government to propose certain risk management measures under CEPA to manage potential ecological and human health risks associated with the substance.

CEPA sets out a 2-track approach for managing risks.

Under subsection 77(3), the ministers are required to propose recommending the addition of a substance that poses the highest risk, as defined in paragraph (a), (b) or (c), to Part 1¹⁰ of Schedule 1 of the Act and, in developing a proposed regulation or instrument respecting preventive or control actions, to give priority to the total, partial or conditional prohibition of activities in relation to the substance or to the release of the substance into the environment.

For other substances recommended for addition to Part 2 of Schedule 1 of the Act, the ministers shall give priority to pollution prevention, and this could include regulatory measures such as regulations and pollution prevention planning notices,

⁹ After an assessment of a given substance under Part 5 of CEPA, other than section 83, the ministers shall propose one of the following measures: take no further action with respect to the substance, add the substance to the List referred to in section 75.1 of the Act (unless the substance is already on that List), recommend the addition of the substance to Part 1 of Schedule 1 to CEPA (for substances that pose the highest risk) or recommend the addition of the substance to Part 2 of Schedule 1 to CEPA (for other CEPA-toxic substances).

¹⁰ Under subsection 77(3), a substance must be recommended for addition to Part 1 of Schedule 1 of the Act when the substance is determined to be toxic and the ministers are satisfied that:

- a) the substance may have a long-term harmful effect on the environment and
 - i. is inherently toxic to human beings or non-human organisms, as determined by laboratory or other studies,
 - ii. is persistent and bioaccumulative in accordance with the regulations,
 - iii. is present in the environment primarily as a result of human activity, and
 - iv. is not a naturally occurring radionuclide or a naturally occurring inorganic substance;
- b) the substance may constitute a danger to human life or health and is, in accordance with the regulations, carcinogenic, mutagenic or toxic for reproduction; or
- c) the substance is, in accordance with the regulations, a substance that poses the highest risk.

or non-regulatory measures such as environmental release guidelines, codes of practice, or environmental performance agreements (EPAs), if warranted.

The ministers will take into consideration comments made and information provided by stakeholders during the 60-day public comment period on the draft assessment for manganese and its compounds and this risk management scope.

If the ministers finalize the recommendation to add manganese and its compounds to Part 2 of Schedule 1, a risk management instrument must, unless an exception in section 91 of CEPA applies, be proposed within 24 months from the date on which the ministers recommended that manganese and its compounds be added to Schedule 1 to CEPA, and finalized within 18 months from the date on which the risk management instrument is proposed, as outlined in sections 91 and 92 of CEPA (refer to section 8 for publication timelines applicable to this group of substances). Adding a substance to Schedule 1 does not, in itself, restrict its use, manufacture, or import. Rather, it enables the Government of Canada to take enforceable risk management actions under CEPA.

3. Proposed risk management

3.1 Proposed environmental and human health objectives

Proposed environmental and human health objectives are quantitative or qualitative goals to address environmental and human health concerns.

For these substances, the proposed environmental and human health objectives are focused on addressing the exposure sources of concern outlined in section 5 of this document.

The proposed environmental objective for manganese and its compounds is to reduce anthropogenic releases of manganese and its compounds in surface waters to levels that are protective of aquatic organisms. Long-term Canadian Water Quality Guidelines (CWQGs) for dissolved manganese developed by the Canadian Council of Ministers of the Environment (CCME 2019), or background levels if they naturally exceed the CWQG, may be used as a quantitative target for this objective.

The proposed human health objective for manganese and its compounds is to reduce exposure of the general population to these substances 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 measures such as regulations and other instruments and/or tools for a given substance or substances.

The proposed environmental risk management objective for manganese and its compounds is to achieve the lowest level of anthropogenic releases of manganese and its compounds to water that is technically and economically feasible, taking into consideration socio-economic factors and natural background concentrations.

The proposed human health risk management objectives for manganese and its compounds are to:

- Reduce dermal and/or inhalation exposures of the general public to manganese and its compounds from paint products containing these substances
- Reduce oral exposure of children to manganese and its compounds from certain paint products intended for use by children
- Reduce oral, dermal and/or inhalation exposures of the general public to manganese and its compounds from certain cosmetics
- Reduce oral exposure of the general population, particularly in those most susceptible, to manganese and its compounds from certain NHPs including when used as medicinal ingredients in multi-vitamin/mineral supplements

Safe drinking water is a shared responsibility across all levels of government. Health Canada has worked with the provinces and territories through the Federal-Provincial-Territorial Committee on Drinking Water to develop a maximum acceptable concentration (MAC) for manganese in drinking water of 0.12 mg/L, which is designed to protect people in Canada, including the most vulnerable members of society. The guideline technical document can be found on the [Guidelines for Canadian Drinking Water Quality: Guideline Technical Document – Manganese web page](#).

Health Canada has also published a Water Talk document online, which is intended to inform the general public about the guideline, potential health concerns from elevated exposure to manganese in drinking water, and what they can do if they are concerned about manganese in their drinking water. The Water Talk document can be found on the [Water Talk - Manganese in drinking water web page](#).

Furthermore, the proposed human health risk management objectives for manganese and its compounds are to reduce anthropogenic releases of manganese and its compounds to air to levels that are protective of human health, in the identified sectors of concern, taking into consideration socio-economic factors and natural background concentrations. Those sectors are:

- metal ore mining (including iron ore pelletizing)
- iron and steel mills and ferro-alloy manufacturing
- agricultural, construction and mining machinery manufacturing
- motor vehicle parts manufacturing
- steel product manufacturing from purchased steel

These objectives will be refined on the basis of stakeholder consultation and new information, the proposed risk management, the outcome of the assessment, and socio-economic and technical considerations (refer to section 6). Revised environmental and human health and risk management objectives will be presented in the risk management approach for manganese and its compounds that will be published concurrently with the assessment.

3.3 Proposed risk management options under consideration

To achieve the proposed risk management objectives and to work towards achieving the proposed environmental and human health objectives, the risk management options under consideration for manganese and its compounds are outlined below.

Note that the proposed risk management options described in this document are preliminary and subject to change. Following the publication of this document and publication of other metal assessments, additional information obtained from the public comment period and from other sources will be considered, along with the information presented in this document, in further instrument selection and development¹¹, if required.

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

The design of proposed risk management instruments will strive to keep administrative burden on industry low while continuing to ensure that protections for human health and the environment are in place. This includes ensuring that requirements are aligned with other key jurisdictions wherever possible, keeping reporting requirements to those that are essential for effective administration, ensuring decision-making and processes are clear and streamlined, enabling innovation and alternative methods where feasible, and leveraging modern tools and innovative process solutions.

3.3.1 Environment

Metal ore mining

The Government of Canada is considering the following ecological risk management actions, as described below.

¹¹ 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 Regulation (TBS 2018a), the Policy on Regulatory Development (TBS 2018b), the Red Tape Reduction Action Plan (TBS 2012), and, in the case of a regulation, the *Red Tape Reduction Act* (Canada 2015), as well as the objectives of the most recent federal Red Tape Review (TBS 2025).

Manganese in effluent discharged from the metal ore mining sector is subject to the *Metal and Diamond Mining Effluent Regulations* (MDMER) under the *Fisheries Act* (Canada 2018). Metal mines that discharge effluent at any time into any water at a flow rate exceeding 50 m³/day are subject to the MDMER. The Government of Canada is proposing to reduce anthropogenic releases of manganese and its compounds to water from the metal ore mining sector. For metal mines covered by the MDMER, this would be done by reviewing information received from regulated mines in response to environmental effects monitoring (EEM) requirements under the MDMER, to determine if additional regulatory or non-regulatory risk management is required. For mining facilities not covered by the MDMER, the Government of Canada is proposing to continue to promote the application of the existing *Environmental Code of Practice for Metal Mines* for every stage of a mine's life cycle.

The MDMER prescribe EEM, including effluent characterization for a list of substances. Manganese was added to the list of substances included in required effluent characterization on Schedule 5, Environmental Effects Monitoring Studies of the MDMER, in an amendment that came into effect on June 1, 2018 (Canada 2018). This requires mines subject to the MDMER to analyze and report manganese concentrations in samples collected as part of effluent and water quality monitoring.

Under the CMP, ECCC and Health Canada are conducting assessments of a variety of metals that may also identify metal mines as sources of risk. Following the publication of these metal assessments, ECCC will review the information received from regulated mines in response to EEM requirements under the MDMER, to determine if additional regulatory or non-regulatory risk management of effluents from metal mines is needed for one or more assessed metals.

ECCC is considering the risk management actions for manganese and its compounds as part of a more comprehensive strategy to manage the metals assessed as toxic under the CMP. Implementation of this strategy would begin when all risk assessments and risk management approaches for these metals are expected to be completed and published. This strategy would focus on managing all CEPA toxic metals in effluents, rather than managing single metals. This strategy will reduce the administrative burden on metal mines that would otherwise result from implementing multiple risk management actions (for example, repeated amendments to the MDMER) for metals assessed and found to be toxic.

3.3.2 Human health

For the purposes of paragraph 77(1)(a) of CEPA, the Government of Canada proposes to recommend that manganese and its compounds be added to Part 2 of Schedule 1 to CEPA. As a result, the Government of Canada is considering the following new risk management actions:

Paint products: Regulatory or non-regulatory actions to help reduce dermal and/or inhalation exposures to manganese and its compounds from paint products containing these substances to levels that are protective of human health.

Children's paint products: Regulatory or non-regulatory actions to help reduce oral exposure to manganese and its compounds from certain paint products intended for use by children to levels that are protective of human health.

The Government of Canada is considering measures to reduce anthropogenic releases of manganese and its compounds to air from several identified industrial sectors to address human health concerns to those living in proximity to certain facilities.

The specific facilities are within these sectors:

- metal ore mining sector (including iron ore pelletizing)
- iron and steel mills and ferro-alloy manufacturing sector
- agricultural, construction and mining machinery manufacturing sector
- motor vehicle parts manufacturing sector
- steel product manufacturing from purchased steel sector

Metal ore mining (including iron ore pelletizing): Regulatory and non-regulatory measures to reduce inhalation exposure of people living in the vicinity of metal ore mining facilities (including iron ore pelletizing facilities) releasing manganese and its compounds to air to levels that are protective of human health. These could include voluntary actions by industry via mechanisms such as EPAs or codes of practice, regulatory actions, or enhancement of other federal management initiatives already in place for this sector.

Iron and steel mills and ferro-alloy manufacturing: Regulatory and non-regulatory measures to reduce inhalation exposure of people living in the vicinity of iron and steel mills and ferro-alloy manufacturing facilities releasing manganese and its compounds to air to levels that are protective of human health. These could include voluntary actions by industry via mechanisms such as EPAs or codes of practice, regulatory actions, or enhancement of other federal management initiatives already in place for this sector. In the case of steel mills, this sector is currently subject to 3 codes of practice under CEPA depending on the type of facility. In addition, a pollution prevention planning notice was published in May 2017, in respect of specified toxic substances released from the iron, steel and ilmenite sector.

Agricultural, construction and mining machinery manufacturing: Regulatory and non-regulatory measures to reduce inhalation exposure of people living in the vicinity of these facilities releasing manganese and its compounds to air to levels that are protective of human health. These could include voluntary actions by industry via mechanisms such as EPAs or codes of practice, or regulatory actions.

Motor vehicle parts manufacturing: Regulatory and non-regulatory measures to reduce inhalation exposure of people living in the vicinity of motor vehicle parts manufacturing facilities releasing manganese and its compounds to air to levels that are protective of human health. These could include voluntary actions by industry via mechanisms such as EPAs or codes of practice, or regulatory actions.

Steel product manufacturing from purchased steel: Regulatory and non-regulatory measures to reduce inhalation exposure of people living in the vicinity of steel product manufacturing facilities releasing manganese and its compounds to air to levels that are protective of human health. These could include voluntary actions by industry via mechanisms such as EPAs or codes of practice, or regulatory actions.

The Government of Canada is also considering other risk management actions, as follows:

Cosmetics: Listing manganese and its compounds as prohibited or restricted ingredients on Health Canada's Cosmetic Ingredient Hotlist¹² to help reduce oral, dermal and/or inhalation exposures to manganese and its compounds from certain cosmetics.

NHPs: Modifying the existing entries for manganese and its compounds in the Natural Health Products Ingredients Database (NHPID)¹³ to help reduce oral exposure to manganese and its compounds from certain NHPs. Actions may aim to lower the quantity or concentration of these substances when used as medicinal or non-medicinal ingredients in certain NHPs to levels that are protective of human health.

In addition, reviewing the maximum daily dose allowed for manganese under the Natural and Non-prescription Health Products Directorate (NNHPD)'s Multi-

¹² The Cosmetic Ingredient Hotlist is an administrative tool that Health Canada uses to communicate to manufacturers and others that certain substances may contravene the general prohibition found in section 16 of the *Food and Drugs Act* or may contravene one or more provisions of the *Cosmetic Regulations*. Section 16 of the *Food and Drugs Act* states that "No person shall sell any cosmetic that has in or on it any substance that may cause injury to the health of the user." In addition, the Hotlist includes certain substances that may make it unlikely for a product to be classified as a cosmetic under the *Food and Drugs Act*. Compliance with the provisions of section 16 is monitored, in part, through the mandatory notification provisions of section 30 of the *Cosmetic Regulations* of the *Food and Drugs Act*, which requires that all manufacturers and importers provide a list of the cosmetic's ingredients to Health Canada.

¹³ The NHPID provides an electronic tool which enables members of the public to access information on the following topics:

- medicinal and non-medicinal ingredients used in NHPs;
- standard terminology used by the Natural Health Products Online System, known as "Controlled Vocabulary", referring to quality test methods, dosage forms, non-medicinal ingredient purposes, and so on; and
- pre-cleared information such as single ingredient monographs and product monographs.

Vitamin/Mineral Supplements monograph to help reduce oral exposure to manganese and its compounds from multi-vitamin/mineral supplements.

Drinking water: As indicated in section 3.2 above, Health Canada has already worked with the provinces and territories through the Federal-Provincial-Territorial Committee on Drinking Water to develop a MAC for manganese in drinking water of 0.12 mg/L, which is designed to protect people in Canada, including the most vulnerable members of society. The guideline technical document can be found on the [Guidelines for Canadian Drinking Water Quality: Guideline Technical Document – Manganese web page](#).

In the interest of communicating this information to the public, Health Canada has also published a Water Talk document online, which is intended to inform the general public about the guideline, potential health concerns from elevated exposure to manganese in drinking water, and what they can do if they are concerned about manganese in their drinking water. The Water Talk document can be found on the [Water Talk - Manganese in drinking water web page](#).

3.3.3 Other activities

Although a risk to human health from foods and infant formula was not identified in the draft assessment, the Food and Nutrition Directorate of Health Canada will collaborate with other government departments and industry on appropriate science initiatives as needed. For example, as part of its planned modernization of the infant formula regulations in Division 25 of the *Food and Drugs Regulations*, the Food and Nutrition Directorate will evaluate adding a maximum level of manganese in infant formulas that aligns with other international jurisdictions.

The Directorate will also evaluate updating its guidance on the preparation and handling of infant formula to advise families living in areas with high drinking water manganese to use an alternate water source for preparing formula.

3.4 Performance measurement evaluation

Performance measurement evaluates the ongoing effectiveness and relevance of the actions taken to manage risks from toxic substances¹⁴. ECCC and Health Canada

¹⁴ Performance measurement can be performed at 2 levels:

- Instrument-based performance measurement evaluates the effectiveness of an individual instrument in meeting the specific risk management objectives that were set out when the risk management tool was designed. The results of performance measurement will help determine if additional risk management or assessment is needed (that is, evaluate whether risk management objectives have been met); and
- Substance-based performance measurement considers performance of all final risk management instruments applied to a chemical substance and relevant data or indicators of exposure to the environment or human health (that is, evaluate whether human health and/or environmental objectives have been met).

have developed a [Performance Measurement Evaluation Strategy](#) that sets out the approach to evaluate the effectiveness of actions taken on substances found toxic under CEPA. The aim is to determine whether human health and/or environmental objectives have been met and whether there is a need to revisit the risk management approach for those substances. Selection of a substance for performance measurement evaluation is conducted through readiness, prioritization and work planning as outlined in the Performance Measurement Evaluation Strategy. In evaluating progress and revisiting risk management, as warranted, these activities together will aim to manage risks effectively over time.

The Government of Canada may measure the effectiveness of the risk management actions and the progress towards meeting the risk management, environmental, and human health objectives for manganese and its compounds by:

- collecting and analyzing data submitted by metal mines under the MDMER
- considering monitoring and other data on air emissions of manganese from the metal ore mining (including iron ore pelletizing), iron and steel mills and ferro-alloy manufacturing, agricultural, construction and mining machinery manufacturing, motor vehicle parts manufacturing, and steel product manufacturing from purchased steel sectors
- collecting and analyzing monitoring data, such as data collected by ECCC on manganese concentrations and corresponding pH and water hardness in surface waters, and manganese concentrations in air

When undertaken, the results of performance measurement and evaluation are used to inform whether further risk management action is warranted and are made available to people in Canada along with recommendations for further action, if applicable.

3.5 Risk management information gaps

Interested stakeholders are invited to provide further information to inform risk management decision-making regarding manganese and its compounds, including the following:

- Dissolved concentrations of manganese in surface waters (receiving effluent from exposure sources outlined in section 5 and reference areas) and corresponding measurements of pH and water hardness
- Activities or industrial processes that contribute to the facility release of manganese and its compounds to water and air
- Bioavailability of manganese in diet and drinking water
- Availability of suitable exposure biomarkers in humans

For more information on performance measurement evaluation (including Health Canada and ECCC's [Performance Measurement Evaluation Strategy](#)), please visit [Performance measurement for toxic substances - Canada.ca](#).

- Intake estimates on manganese from consumption of traditional foods
- Manganese ambient air concentration data at or beyond the facility boundaries from facilities releasing manganese to air
- Best management practices and technologies in place, and efficiency of treatment methods for effluents and air releases at facilities in the industrial sectors with exposures of concern that use or have incidental releases of manganese and its compounds
- Potential alternative substances to manganese and its compounds for use in certain paint products, children's paint products, cosmetics, and NHPs identified as a concern

Stakeholders that have information to help address these gaps should provide it on or before December 24, 2025 to the contact details identified in section 8.

4. Background

4.1 General information on manganese and its compounds

Manganese is a naturally occurring element and is abundant in the environment. It is found in more than 100 minerals including oxides, sulfides, carbonates, silicates, phosphates and borates (NAS 1973 as cited in IPCS 1981), as well as in ores, coal, and crude oil (Bryan 1970; Ruch et al. 1973; Nagpal 2001). Natural sources of manganese to the environment include weathering of rock, ocean spray, forest fires, vegetation, and volcanic activity (Stokes et al. 1988).

Anthropogenic sources of manganese include the incidental production of manganese (that is, as a by-product), and the manufacture, import and use of manganese and its compounds in products and manufactured items. Naturally occurring background levels of manganese were identified in the draft assessment and were taken into consideration when estimating the exposure of ecological receptors to manganese and its compounds.

Manganese is an essential element for biological functioning, optimal growth and development of micro-organisms, plants, animals, and humans. Manganese deficiency has been observed in plants and fish (McHargue and Calfee 1932; Tan et al. 2012). The ecological effects assessment evaluates the potential for harm from elevated manganese exposure rather than deficiency or essentiality.

Manganese is an essential nutrient for human health and the nutritional benefits of foods contributing most significantly to dietary exposure to manganese (for example, infant formula, whole grain cereals, fruits and vegetables) were appropriately considered. In general, manganese nutritional requirements are met via food. Because manganese is deemed an essential mineral in humans (IOM 2001), ordinary risk assessment methods using rodent data and uncertainty factors are not generally considered practicable for risk assessment of manganese in food. Consistent with other food regulatory agencies worldwide,

dietary intake of manganese was generally regarded as safe and the risk and nutritional benefits of foods contributing most to dietary manganese exposure were considered appropriately.

The bioavailability and toxicity of manganese is largely dependent on environmental physical-chemical properties such as pH and water hardness. Manganous Mn(II) and manganic Mn(IV) are the 2 primary forms of manganese in the environment. The former is the more soluble and, therefore, more bioavailable form. All substances that have the potential to dissolve, dissociate, or degrade to release manganese through various transformation pathways can potentially contribute to the exposure of living organisms and the environment to bioavailable forms of manganese (ECCC, HC 2025).

4.2 Current uses and identified sectors

In Canada, manganese is primarily used as both an additive and alloy for steel production (Health Canada 1987 as cited in CCME 2019). The second-largest market for manganese is the production of dry-cell alkaline batteries, where manganese dioxide is used as a depolarizer. Manganese is also present in thousands of everyday metallic items and non-metallic products such as matches, glass, perfume, brick, paint, varnish, oil, disinfectant, fertilizer, and animal food (Nagpal 2001; Webb 2008).

There are many other uses of manganese as explained below.

4.2.1 Information gathering under section 71 of CEPA

Manufacturing, import, use and volume information for manganese and its compounds was obtained through a CEPA section 71 survey (Environment Canada 2013), from the Canadian International Merchandise Trade Web Application (CIMTWA [modified 2022]), and from voluntary data submissions received from stakeholders (ECCC, HC 2017).

Six substances identified as priorities for assessment were included in a survey issued pursuant to section 71 of CEPA (Environment Canada 2013). According to information received in response to the survey, 3 manganese substances were reported to be manufactured in Canada in 2011 in quantities ranging from 1 tonne to greater than 10,000 tonnes and 4 substances were imported into Canada in 2011 in quantities ranging from 1 tonne to 10,000 tonnes. In addition, information from the CIMTWA ([modified 2022]) indicated that Canada imported approximately 14,000 tonnes of manganese-containing commodities per year on average from 2017 to 2021.

In Canada, manganese and its compounds have a wide array of industrial, commercial and consumer uses. Based on information gathered through the section 71 survey, results from voluntary stakeholder engagement, publicly available websites and safety data sheets, these uses include: non-pesticidal

agricultural products, cleaning and furnishing care (for example, cleaning products and odour control products), water treatment, paints and coatings, building or construction materials, metal materials, medical devices, children's toys, playground and sporting equipment, alloying materials used in steel making, batteries, electronics, self-care products¹⁵, textiles, deoxidizers, fuels and related products, lubricants and greases, automotive care, adhesives and sealants, and aircraft and transportation uses (for example, fuel additives). Other uses identified in surveys issued pursuant to section 71 of CEPA beyond those identified here are confidential (Environment Canada 2013; ECCC, HC 2017; CPCat 2021; CPID [modified 2021]).

Additional uses of manganese and its compounds in Canada include as food additives and food packaging materials; as a mineral nutrient added to foods, including infant formula and human milk fortifiers; as an ingredient in registered plant fertilizer or supplements; as medicinal or non-medicinal ingredients in disinfectant; as medicinal or non-medicinal ingredients in human or veterinary drug products; as medicinal or non-medicinal ingredients in NHPs; in cosmetic products; and as an active ingredient and formulant in registered pest control products.

The sections below provide a more detailed summary of the uses and sectors where a potential risk to human health was identified in the draft assessment.

4.2.2 Information gathering from the National Pollutant Release Inventory

Reporting to the National Pollutant Release Inventory (NPRI) is mandatory for manganese and its compounds¹⁶ (ECCC 2022). According to NPRI data from various industrial sectors from 2015 to 2019, the average annual total quantity of manganese released to the environment was 1,306 tonnes (ranging from 1,203 to 1,451 tonnes) per year (NPRI 2022). Manganese is released primarily to water, representing 82% of total manganese released to the environment. Releases of manganese to land, air, and unspecified media (where releases are less than 1 tonne per facility) represent 10.4%, 6.7%, and 0.9% of total quantities, respectively (NPRI 2022).

The sectors with the highest average annual releases of manganese to all media (mean $\pm$ standard deviation) from 2015 to 2019 were: 1) pulp, paper and paperboard mills (932 $\pm$ 44 tonnes), 2) metal ore mining (210 $\pm$ 56 tonnes), 3) water, sewage and other systems (64 $\pm$ 3 tonnes), and 4) iron and steel mills and ferro-alloy manufacturing (39 $\pm$ 5 tonnes). The former 3 sectors also represent the sectors with the highest annual releases of manganese to water.

¹⁵ Self-care products are products available for purchase without a prescription from a doctor, and fall into one of 3 broad categories: cosmetics, NHPs, and non-prescription drugs.

¹⁶ Total of the pure element and the equivalent weight of the element contained in any compound, alloy or mixture.

The sectors with the highest average annual releases to air were: 1) iron and steel mills and ferro-alloy manufacturing (35 ± 6 tonnes), 2) metal ore mining (including iron ore pelletizing) (22 ± 6 tonnes), 3) pulp, paper, and paperboard mills (10 ± 0.7 tonnes), 4) coating, engraving, cold and heat treating and allied activities (one single reported quantity of 10 tonnes in 2019), 5) electric power generation, transmission and distribution (6 ± 0.2 tonnes), and 6) motor vehicle parts manufacturing (3 ± 0.5 tonnes) (NPRI 2022).

4.2.3 Pulp and paper

According to the NPRI, the Canadian pulp and paper sector reported average annual releases of 895 ± 42 tonnes of manganese to water from 2015 to 2019 (NPRI 2022). Sources of manganese from this sector include furnish, intake water, processing additives, and raw materials (NCASI 2018). Furnish, consisting of materials such as virgin fibre (for example, wood chips and sawdust), old corrugated containers, and recycled paper (for example, newsprint, magazines and copy paper), is the primary source of manganese from the pulp and paper sector (NCASI 2018). Fuels used for energy generation within the industry also contain manganese.

4.2.4 Metal ore mining

Canada has manganese deposits in the Maritime Provinces and British Columbia with only a few small bog deposits located in other parts of the country (Hanson 1932; Johnston and McCartney 1965). Small mines have been functional in the past for low- to medium-grade manganese ore.

Canada currently imports the vast majority of its manganese requirements due to the economic viability of the extraction and processing of ore (Webb 2008). However, the Canadian Manganese Company commenced a drill program in New Brunswick in 2021 and the company aims to become a supplier of high-purity manganese-metal products (CMC 2022).

Mining activities in Canada can include both ore extraction via open-pit or underground mining, and ore processing at a milling facility (commonly referred to as a mill). Small quantities of valuable minerals are separated from larger quantities of waste minerals at milling facilities through grinding and crushing, chemical and physical separation, and dewatering (Environment Canada 2009).

Manganese is not currently extracted and processed in Canada but is incidentally produced and released as a by-product of metal ore mining activities (ECCC, HC 2025). Based on NPRI data from 2015 to 2019 presented in the draft assessment, a yearly average of 91 ± 30 (48 to 136) tonnes of manganese was released to water (NPRI 2022).

4.2.5 Wastewater systems

Wastewater systems (WWS) may discharge effluent containing manganese from consumer, commercial, and industrial uses to surface waters. Canadian WWS reported average annual releases of 64 ± 3 tonnes of manganese to water from 2015 to 2019 (NPRI 2022).

4.2.6 Iron and steel mills and ferro-alloy manufacturing

Globally, 90% of all manganese consumed is used for steel production (IMnI 2022). The iron and steel mills and ferro-alloy manufacturing sector reported average annual releases of manganese to water of 3 ± 0.6 tonnes (NPRI 2022).

4.2.7 Industries with human health implications

In addition, several sectors have been identified that pose risks to human health based on releases of manganese to air:

- **Metal ore mining:** 49 metal ore mining and refining facilities reported releases of manganese to air to NPRI between 2015 and 2019. Five-year average releases from these facilities ranged from 0.000002 to 16.5 tonnes per year (NPRI 2016, 2020)
- **Iron and steel mills and ferro-alloy manufacturing:** 12 iron and steel mills and ferro-alloy manufacturing facilities across Canada reported releases of manganese to air to NPRI between 2015 and 2019. Five-year average releases from these facilities ranged from 0.02 to 7.1 tonnes per year (NPRI 2020)
- **Agricultural, construction and mining machinery manufacturing:** 2 agricultural, construction and mining machinery manufacturing facilities reported releases of manganese to air to NPRI between 2015 and 2019. Five-year average releases from these facilities ranged from 0.0001 to 3.9 tonnes per year (NPRI 2016, 2020)
- **Motor vehicle parts manufacturing:** 16 motor vehicle parts manufacturing facilities reported releases of manganese to air to NPRI between 2015 and 2019. Five-year average releases ranged from 0.00017 to 3.0 tonnes per year (NPRI 2020)
- **Steel product manufacturing from purchased steel:** 7 steel product manufacturing from purchased steel facilities reported releases of manganese to air to NPRI between 2015 and 2019. Five-year average releases ranged from 0.0004 to 1.2 tonnes per year (NPRI 2020)

Releases of effluent from steel-related sectors (including iron and steel mills and ferro-alloy manufacturing, motor vehicle parts manufacturing, the agricultural,

construction and mining machinery manufacturing, and the steel product manufacturing from purchased steel) have a low potential for ecological harm to the aquatic environment at current levels of exposure. However, the potential contribution of air releases to aquatic manganese concentrations could not be addressed due to a lack of measured concentrations in surface waters for these sectors. There is also uncertainty regarding the soil compartment where data are limited.

4.2.8 Other uses and sectors

Manganese and its compounds are used or produced incidentally, due to their natural occurrence, in a variety of other sectors. Apart from the above-mentioned sectors, the draft assessment identified various additional sectors as sources of manganese to the environment including, among others, electric power generation, basic chemical manufacturing, coal mining, and oil and gas extraction.

4.2.9 Products available to consumers

Manganese and its compounds are present in thousands of products available to consumers including approximately 11,600 self-care products, a subset of which are cosmetics. The most common cosmetics containing manganese include moisturizer, cleanser, bath products, hairstyling products, shampoo, conditioner, face makeup, lipstick, lip balm, and nail polish. Reported manganese concentrations in cosmetics range from less than 0.1% to 22% (ECCC, HC 2025).

Manganese is also present as a medicinal ingredient in multi-vitamin/mineral supplements, workout supplements and joint health products. A maximum daily dose of 9 mg/day for adults only is associated with manganese in the NNHPD's Multi-Vitamin/Mineral Supplements, Workout Supplements and Multiple Ingredient Joint Health Products monographs (Health Canada 2023a, 2022a, 2022b).

Other products available to consumers containing manganese and its compounds include arts and crafts materials, children's jewellery and toys, automotive products, household cleaning products, home maintenance products, paints, and textiles (ECCC, HC 2025).

5. Exposure sources of concern and identified risks

The following subsections address exposure sources of concern.

5.1 Exposure sources of concern to the environment

5.1.1 Metal ore mining sector

Anthropogenic releases of manganese and its compounds to the environment from a small number of facilities in the metal ore mining sector have been identified as having potential to cause harm to the aquatic environment.

Although manganese is not currently extracted and processed in Canada, it is incidentally produced and released as a by-product of metal ore mining activities (ECCC, HC 2025). Ore extraction and concentration operations generate dust, which may escape and deposit nearby, and effluents, which may be stored in tailings ponds or treated and released to surface waters. The generated dusts, potential leachates from tailings ponds, and effluent releases to surface waters are some of the pathways from which manganese and its compounds may be released into the surrounding environment from mining activities (Environment Canada 2009).

According to the NPRI, from 2015 to 2019, a yearly average of 91 ± 30 (48 to 136) tonnes of manganese was released to water from facilities in the metal ore mining sector. Of potential concern is the exposure of freshwater biota to bioavailable forms of manganese in surface waters receiving mining effluents (ECCC, HC 2025).

From 2015 to 2019, on average 57 metal ore mining facilities (including iron ore pelletizing facilities) in Canada reported releases, disposal and/or off-site recycling of manganese and its compounds to the NPRI. A total average of 22 tonnes/year were released on-site to air, 91 tonnes/year were released to water and 95 tonnes/year were released to land. It should be noted that the main contributors of air emissions are 2 facilities, one of which includes an iron ore pelletizing facility. Together, these 2 sites represent 82% of air emissions from mines. Both sites are located close to each other, and the high manganese releases may be due to high manganese content in the ore. Additional analysis is required with respect to the manganese releases from these 2 sites. Other metal ore mines in Canada emit low quantities of manganese to air compared to these 2 sites. A total average of 356,708 tonnes/year were disposed on-site, 330 tonnes/year were disposed off-site, and 277 tonnes/year were recycled off-site (NPRI 2021a). It should be noted that “disposal” includes the disposal of tailings and waste rock, which tend to be disposed on-site.

When the MDMER was amended in June 2018, manganese was added to the list of substances to be monitored in effluent and water (in reference and exposure areas) under the EEM provisions. Exposure areas refer to surface waters frequented by fish that are exposed to metal ore mining effluent, whereas reference areas refer to surface water frequented by fish that are not exposed to metal ore mining effluent but which have, to the extent practicable, similar fish habitat to that of a corresponding exposure area (Canada 2002).

Before the amendments, some mines voluntarily reported to ECCC the manganese concentrations in effluent and water along with their other EEM data. Total manganese concentrations at exposure areas from 120 metal ore mining facilities releasing effluent to fresh water (submitted under EEM provisions of the MDMER between 2013 and 2020) were reviewed in the assessment, including voluntary information. The data indicate that manganese releases from the metal ore mining sector are likely the cause of the elevated manganese levels found near some of the exposure sites compared to reference sites (ECCC, HC 2025).

According to the draft assessment, 3.5% of samples (126 exposure area and 34 reference area samples) had risk quotients (RQs) greater than one. Of the 12 metal ore mining facilities examined in detail in the assessment, 3 facilities had median RQs of 1.3, 0.8, and 2.7 at their exposure areas compared to respective reference areas (that is, all below 0.3). This indicates that there is potential for manganese to cause ecological harm in the aquatic environment as a result of its release in effluents from a small number of facilities in the metal ore mining sector across Canada. Manganese causes mortality as well as effects on growth and reproduction in freshwater aquatic and soil-dwelling organisms at moderate to high concentrations (ECCC, HC 2025).

5.2 Exposure sources of concern to human health

The draft human health assessment for manganese and its compounds under CEPA indicates that elevated intake of manganese may result in adverse neurotoxicological effects. Subclinical neurological effects, including disturbances to fine motor control, memory, cognitive function, hyperactivity and tremor were noted in humans and experimental animals as some of the earliest effects following excess oral or inhalation exposures to manganese. As excessive manganese exposure can adversely affect brain development, the developing fetus, infants and children under 3 years of age are considered to be the most susceptible subpopulations for manganese toxicity. The critical endpoint identified for risk characterization of oral manganese exposures is the lowest-observed-adverse-effect level (LOAEL) of 25 mg Mn/kg bw/day for neurotoxic effects in the young. This was used to establish a tolerable daily intake of 0.025 mg/kg bw/day. As neurotoxicity has not been evaluated via the dermal route, it is considered appropriate to compare dermal exposure to the oral endpoint (systemic dose), taking into account dermal absorption in risk characterization (ECCC, HC 2025).

Previous assessments by Health Canada and other international organizations were used to inform the section for health effects associated with inhalation exposure. The Health Canada (2010) reference concentration (RfC) for inhaled manganese of 0.05 µg/m³ was determined to be the most suitable guideline to bring forward for risk characterization of exposure to manganese via the inhalation route in the general population. The RfC was established using a neurofunctional endpoint, which is considered the most sensitive marker

associated with exposure to low concentrations of manganese via inhalation, in order to protect against impaired motor and cognitive functions (ECCC, HC 2025).

Manganese is ubiquitous in air, drinking water, food, soil, and house dust, and it is present in thousands of products available to consumers. Food is the primary source of exposure for the general public followed by drinking water. Formula-fed infants have the highest background exposure from environmental media, food (formula) and drinking water, when normalized by body weight.

5.2.1 Drinking water

Total manganese concentrations in the drinking water from provinces and territories, as well as First Nations communities were compared with the MAC of 120 µg/L in order to characterize risk to people in Canada from drinking water. The upper bounding manganese concentration in drinking water exceeded the MAC in all provinces and territories other than Alberta, Ontario, Prince Edward Island and Yukon. The proportion of provincial and territorial drinking water samples that exceeded the MAC ranged from 0% to 21%. In First Nations communities, the upper bounding manganese concentration in drinking water exceeded the MAC in Manitoba and the Atlantic region, and exceedances of the MAC ranged from 0% to 14.8% (ECCC, HC 2025).

5.2.2 Products available to consumers

Sentinel oral and dermal exposure estimates were derived for a variety of products available to consumers containing manganese. Dermal and oral exposure estimates were combined and are based upon an exposure frequency of once per day or more. A LOAEL of 25 mg Mn/kg bw/day, as outlined above, was selected to characterize risk from oral exposure to manganese. In the absence of studies assessing neurotoxicity via the dermal route, dermal exposure was compared to the oral endpoint. As such, the LOAEL of 25 mg Mn/kg bw/day was used to characterize dermal exposure, taking into account a dermal absorption value of 8.3% (ECCC, HC 2025).

The margins of exposure (MOEs) derived from the use of some children's modelling clay, automotive products, household products, paint applicator sticks, some self-care products, and textiles were found to be adequate for the protection of human health. The MOEs derived from the use of some children's paint products, paint products, and self-care products (that is, cosmetics and NHPs) are considered potentially inadequate for the protection of human health (ECCC, HC 2025).

As previously discussed, the Health Canada (2010) RfC of 0.05 µg/m³ for the respirable fraction of manganese (as measured in particulate matter with a diameter of 3.5 microns or less (PM_{3.5})) was selected to characterize the risk from inhalation exposure to manganese. This was established using a

neurofunctional endpoint, which is considered the most sensitive marker associated with exposure to low concentrations of manganese via inhalation. For risk characterization, hazard quotients (HQs) were derived for manganese by calculating the ratio of the continuous air concentrations to the RfC for the respirable fraction of inhaled manganese, a concentration at which health effects are not expected to occur. A HQ exceeding one was considered potentially inadequate for the protection of human health (ECCC, HC 2025).

Accordingly, the HQs calculated for air concentrations generated from the use of some household products (that is, odour eliminator spray), aerosol hair spray, loose face powder (with 1.1% manganese concentration) and loose powder body makeup were equal to or below one and were considered adequate for the protection of human health. The HQs calculated for air concentrations generated from the use of aerosol spray paint (can), paint applied using an airless sprayer and loose face powder (with 8.7% manganese concentration) are considered potentially inadequate for the protection of human health. Note that dermal exposure alone, for some paints (applied using airless sprayer), discussed previously, fall under the category of not sufficiently protective of human health (ECCC, HC 2025).

5.2.3 Ambient air and point sources

As outlined above, the Health Canada (2010) RfC of $0.05 \mu\text{g}/\text{m}^3$ for the respirable fraction of manganese (as measured in $\text{PM}_{3.5}$) was selected to characterize the risk from inhalation exposure to manganese. HQs were calculated for continuous air concentration data in outdoor air, air concentrations with transit influence, and air concentrations in the vicinity of industrial facilities that release manganese to air. The HQs for manganese concentrations measured in outdoor air and adjacent to public transit to account for a potential increase in exposure during commuting were below one and are considered adequate for the protection of human health (ECCC, HC 2025).

5.2.4 Industrial releases to air

In addition, HQs were calculated for airborne manganese concentrations in the vicinity of various industrial facilities to determine potential inhalation risk for people living in the vicinity of industrial facilities that release manganese to air (ECCC, HC 2025).

The HQs calculated for mean airborne manganese concentrations in the vicinity of facilities from the electric power generation, transmission and distribution sector and the pulp, paper and paperboard mills sector were below one and are considered adequate for the protection of human health.

The HQs calculated for mean airborne manganese concentrations in the vicinity of facilities from the metal ore mining sector (including iron ore pelletizing) (1.42), the iron and steel mills and ferro-alloy manufacturing sector (2.72), the

agricultural, construction and mining machinery manufacturing sector (4.16), the motor vehicle parts manufacturing sector (16.14), and the steel product manufacturing from purchased steel sector (3.6) indicate a concern for human health (ECCC, HC 2025).

To characterize exposure from these industrial facilities, air concentrations in the vicinity of the facilities from each respective sector with the highest reported manganese emissions to air across Canada were considered. To calculate the HQ for the highest emitting facility, the mean air concentration ($\mu\text{g}/\text{m}^3$) at a residential receptor was estimated using the 5-year NPRI average annual emission (2015 to 2019) data (tonnes) and the SCREEN3 model.

6. Risk management considerations

6.1 Alternatives and alternate technologies

For the sectors of concern identified in the draft assessment, it is not expected that alternative substances or alternate process technologies would be a practical approach to minimizing releases of manganese and its compounds. As the exposures of concern are associated with incidental manganese releases from these industrial sectors, consideration of the use of alternatives is not relevant in these cases.

Additional effluent control technologies (that is, additional on-site or off-site effluent treatment), process optimization, and recovery of waste metals at the end of the process may be effective approaches for most sectors, as appropriate and economically feasible.

Furthermore, for metal ore mining and the other industrial sectors with health implications regarding inhalation exposure in the vicinity of facilities, best available practices regarding releases to air may assist in reducing air concentration of manganese in the vicinity of these facilities.

Regarding exposure of humans through the use of products available to consumers, there is no information available at present as to safe alternatives for manganese in these products.

6.2 Socio-economic and technical considerations

Socio-economic factors will be considered in the selection process for a regulation or instrument respecting preventive or control actions, and in the development of the risk management objectives, as per the guidance provided in the Treasury Board document [Policy on Regulatory Development](#) (TBS 2018b).

In addition, socio-economic factors will be considered in the development of regulations, instrument(s) or tool(s) to address risk management objectives, as

identified in the [Cabinet Directive on Regulation](#) (TBS 2018a), the [Red Tape Reduction Action Plan](#) (TBS 2012), and the [Red Tape Reduction Act](#) (Canada 2015), as well as in the objectives of the most recent federal [Red Tape Review](#) (TBS 2025).

7. Overview of existing risk management

7.1 Related Canadian risk management context

7.1.1 Metal ore mines

Manganese in effluent discharged from the metal ore mining sector is subject to the MDMER under the *Fisheries Act* (Canada 2002).

The MDMER authorize the deposit of certain deleterious substances from metal mines into waters frequented by fish within regulated limits. Manganese is not listed in Schedule 4 (which prescribes effluent limits for certain deleterious substances). However, as part of amendments to the MDMER that came into force on June 1, 2018, manganese is listed in Schedule 5 (which prescribes EEM studies) and is measured as part of the effluent characterization and water quality monitoring in reference and exposure areas for the MDMER EEM provisions. The MDMER also require EEM to identify potential effects caused by effluents on fish, fish habitat, and use by humans of fish. EEM is a science-based performance measurement tool used to evaluate the adequacy of effluent regulation. EEM studies include water quality monitoring, effluent chemical characterization, effluent sublethal toxicity testing, and biological monitoring in the receiving environment. For complete details, please refer to the MDMER (Canada 2002).

In 2009, Environment Canada published the *Environmental Code of Practice for Metal Mines* under subsection 54(4) of CEPA, to support the MDMER and to include other subjects that are not dealt with in the MDMER. The objective of the Code is to identify and promote recommended best practices to facilitate and encourage continual improvement in the environmental performance of mining facilities throughout the mine's life cycle (Environment Canada 2009).

Provinces and territories may have established effluent limits for metal ore mines, either by regulations, permits, licenses, or certificates of approval.

7.1.2 Iron and steel manufacturing facilities

Under CEPA, a pollution prevention planning notice has been developed for the iron, steel and ilmenite sector. Additionally, codes of practice have been put in place specifying technical requirements for the operation of both integrated and non-integrated steel mills in Canada.

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 total particulate matter. 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 best practices to control and limit fugitive air emissions of total particulate matter and volatile organic compounds from facilities in this sector.

An *Environmental code of practice for integrated steel mills* was put in place in March 2001 (Environment Canada 2001a). 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.

Non-integrated steel mills

An *Environmental code of practice for non-integrated steel mills* was put in place in December 2001 (Environment Canada 2001b). It outlines environmental concerns associated with the non-integrated steel mills and recommends best practices aimed at preserving and enhancing the quality of the environment that is affected by these mills.

7.1.3 Other (acts, regulations, and communications products)

Existing risk management for manganese and its compounds in Canada relating to other acts and regulations is summarized below.

Science Education Sets Regulations (Canada Consumer Product Safety Act) – These regulations restrict the inclusion of manganese dioxide, and potassium permanganate other than as an aqueous solution that contains a maximum of 10% potassium permanganate in any science education set as defined in the *Science Education Sets Regulations*.

Consumer Chemicals and Containers Regulations, 2001 (Canada Consumer Product Safety Act) – Paint products available to consumers may be subject to classification and labelling requirements set out in the *Consumer Chemicals and Containers Regulations, 2001* (CCCR 2001). A consumer product that meets any

of the acute hazard classification criteria set out in the CCCR, 2001 must display labelling in the form of hazard symbols, hazard statements, instructions for safe use and first-aid treatments in both official languages. The label must also correctly disclose all hazardous ingredients, as defined in the regulations. The CCCR, 2001 also sets out prohibitions on dangerous chemical products and container requirements such as child-resistant containers for certain hazard sub-categories. While manganese is not listed as a substance of special concern in the CCCR, 2001, all hazardous ingredients are considered when classifying a product.

Fertilizers Regulations (Fertilizers Act) – These regulations describe labelling requirements with respect to manganese.

Pest Control Products Act – Manganese is listed as an active ingredient and formulant in registered pest control products (Canada 2021).

Cosmetics – The human health risks of substances in cosmetics are primarily managed under the [Food and Drugs Act](#) and the *Cosmetic Regulations*. The addition or modification of the entries in the [Cosmetic Ingredient Hotlist](#) inform stakeholders and the public about substances that, according to Health Canada, may contravene section 16 of the *Food and Drugs Act* or may contravene one or more provisions of the *Cosmetic Regulations* when they are present in a cosmetic. Section 16 of the *Food and Drugs Act* states, among other things, that “No person shall sell any cosmetic that has in or on it any substance that may cause injury to the health of the user.” Manganese is present in cosmetics that are regulated under the *Cosmetic Regulations*.

NHPs – *NHPs* are regulated under the *Food and Drugs Act* and the [Natural Health Products Regulations \(NHPR\)](#) and undergo pre-market review in accordance with the NHPR. The risks to human health from substances in *NHPs* are primarily managed under section 7 of the NHPR, which provides for issuance or amendments to a product licence if the licence is not likely to result in injury to the health of a purchaser or consumer. The NHPID provides information on substances used as medicinal and/or non-medicinal ingredients in *NHPs*. The NHPID and applicable monograph entries for substances can be revised to describe limits on the quantity and recommended uses of substances in *NHPs* to inform the public and stakeholders about potential health concerns. *NHP* applicants may access the information when completing a product licence application. Health Canada may access the information in the NHPID when reviewing a product licence application which may inform how a product is managed under the provisions of the NHPR, such as section 7.

Manganese and its compounds are present in a large number of self-care products, as both a medicinal or non-medicinal ingredient. These products are regulated under the *Natural Health Products Regulations* made under the *Food and Drugs Act*. A maximum daily dose of 9 mg/day for adults only is associated with manganese in the NNHPD’s Multi-Vitamin/Mineral Supplements, Workout

Supplements and Multiple Ingredient Joint Health Products monographs (Health Canada 2023a, 2022a, 2022b).

Food packaging materials and food additives – The safety of chemicals used in food packaging materials are subject to section 4(1)(a) of the *Food and Drugs Act* and Division B.23 of the *Food and Drug Regulations*. Food additives are regulated in Canada under the *Food and Drug Regulations* and associated Marketing Authorizations. All permitted food additives and their conditions of use are listed in the [Lists of Permitted Food Additives](#).

7.1.4 Federal, provincial and territorial water quality guidelines

The Guidelines for Canadian Drinking Water Quality for manganese were published in May 2019, and established a MAC for total manganese in drinking water of 120 µg/L and an aesthetic objective for total manganese in drinking water of 20 µg/L (Health Canada 2019).

The CCME CWQGs for the protection of freshwater aquatic life for manganese were published in 2019. Short-term benchmark concentrations are water hardness-based, with a short-term benchmark of 3,600 µg/L dissolved manganese at water hardness of 50 mg/L as CaCO₃, and ranging from 2,000 to 15,000 µg/L dissolved manganese across the range of water hardness (25 to 250 mg/L as CaCO₃) (CCME 2019). Long-term CWQGs for dissolved manganese incorporate pH and water hardness values (CCME 2019), with a long-term benchmark of 430 µg/L dissolved manganese at water hardness of 50 mg/L as CaCO₃ and pH of 7.5, and ranging from 200 to 1,500 µg/L dissolved manganese across the range of water hardness (25 to 670 mg/L as CaCO₃) and pH (5.8 to 8.4). Site-specific long-term CWQGs were selected as freshwater predicted no-effect concentrations in the draft assessment of manganese and its compounds. These non-regulatory guidelines often set the basis on which many Canadian provincial, territorial, and municipal regulations, guidelines and standards are formed, though further research and data are required if limits are to be implemented instead.

Canada's provinces and territories typically develop province- and territory-specific water quality guidelines (WQG) or adopt the WQG from another jurisdiction (for example, CCME). British Columbia and Quebec both have hardness-based water quality guidelines in place for the protection of aquatic life. British Columbia has set a recommended acute guideline of 1,100 µg/L total manganese and a recommended chronic guideline of 800 µg/L total manganese at water hardness of 50 mg/L as CaCO₃ (Nagpal 2001). In Quebec, the WQG for the protection of aquatic organisms are 2,300 µg/L total manganese and 1,000 µg/L total manganese at water hardness of 50 mg/L as CaCO₃ for acute and chronic values, respectively (MELCC 2022a).

7.1.5 Federal, provincial and territorial air quality guidelines

In 2010, Health Canada established a RfC for inhaled manganese of 0.05 µg/m³ for the respirable fraction of manganese, as measured in PM_{3.5} (Health Canada 2010).

Canada's provinces and territories may also develop province- and territory-specific air quality guidelines (AQG) or adopt the AQG from another jurisdiction. In Alberta, an ambient air quality objective was set for manganese at 2 µg/m³ (0.89 ppb) for a 1-hour average concentration, and 0.2 µg/m³ (0.089 ppb) as an annual average concentration (Alberta Environment 2005). Similar air quality objectives were set for Quebec with a 1-year value limit of 0.025 µg/m³ for manganese and its compounds, neodecanoate manganese, and manganese dioxide (CAS RN¹⁷ 1313-13-9) and a 1-year initial concentration of 0.02 µg/m³ for the same substances (MELCC 2022b). In Ontario, the ambient air quality guidelines for manganese and manganese compounds are 0.1 µg/m³ in particulate matter with a diameter of 2.5 microns or less (PM_{2.5}), 0.2 µg/m³ in particulate matter with a diameter of 10 microns or less (PM₁₀), and 0.4 µg/m³ in suspended particulate matter (MECP 2020). In Newfoundland and Labrador, air quality is maintained using the *Air Pollution Control Regulations, 2022* under the *Environmental Protection Act* (Newfoundland and Labrador 2022). While these regulations do not contain air quality standards for manganese, they do have restrictions in place for particulate matter, which may indirectly limit releases of manganese emissions to air. Other provincial jurisdictions may have similar restrictions in place that indirectly affect manganese emissions.

7.1.6 Other domestic actions

The NPRI is Canada's legislated, publicly accessible inventory of pollutant releases (to air, water, and land), disposals and recycling. Over 7,000 industrial, commercial and institutional facilities across Canada report to the NPRI on more than 320 substances (NPRI 2021b). Manganese (and its compounds) has been on the NPRI substance list since 1993, with a 10-tonne manufacture, process, or otherwise use reporting threshold, and a 1% or greater concentration reporting threshold except for by-products (NPRI 2021a, 2021c, 2022).

Under the *Vessel Pollution and Dangerous Chemicals Regulations* (Canada 2012), manganese can be discharged from vessels in certain areas into the St. Lawrence River. Additionally, several manganese-containing compounds are considered to be dangerous goods in Canada under Part 2 of the *Vessel Pollution and Dangerous Chemicals Regulations*, a designation that has implications for the transportation of these substances (Canada 1992).

¹⁷ CAS RN: Chemical Abstracts Service Registry Number. The 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 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.

In Quebec, the *Regulation Respecting the Environmental Impact Assessment and Review* under the *Environment Quality Act*, regulates the use of certain substances during a broad range of activities, which include the opening and operation of certain mines. Under chapter Q-2 of the regulation, the establishment or enlargement of sites used to deposit soils exceeding 2,200 mg/kg manganese, or the storing of such soils in previously established sites, are subject to the provincial environmental impact and review procedure. The regulation also specified that these activities must be carried out after a certificate of authorization is granted, unless the actions are carried out during the course of rehabilitation work that is authorized under the Act (MTESS 2018).

7.2 Pertinent international risk management context

Manganese scrap is listed in Annex IX of the [Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal \[PDF\]](#). The Basel Convention's key objectives are to minimize the generation of hazardous wastes, ensure they are disposed of in an environmentally sound manner and as close to the source of generation as possible, and minimize the international movement of hazardous wastes. Wastes contained in Annex IX are not wastes covered by Article 1, paragraph 1 (a) of this Convention unless they contain Annex I material to an extent causing them to exhibit an Annex III characteristic. As such, manganese scrap is not subject to Basel Convention controls unless these criteria are met (UNEP [revised 2023]).

7.2.1 The United States

Many manganese compounds are regulated in the United States (US) under different statutes, with legal requirements ranging from reporting and notifications to restrictions. Of relevance to water releases is the *Clean Water Act* (CWA).

Manganese (CAS RN 7439-96-5) is regulated under section 304 of the CWA, which requires the US Environmental Protection Agency (EPA) to develop guidelines for releases and standards for classes and categories of point sources to support the National Pollution and Discharge Elimination System permits program (US EPA 2022a, 2022b, 2022c, 2023a).

Effluent containing manganese is controlled by the Effluent Guidelines and Standards under the *Code of Federal Regulations*, Title 40: Protection of Environment. Based on best practicable control technology currently available, these guidelines recommend different maximum daily limits and maximum monthly averages for the release of manganese for various point source categories (US EPA 2022c, 2023b). Of those, only 3 were found to have these limits for manganese: ferroalloy manufacturing, coal mining, and battery manufacturing (US EPA 2021). In addition, within the coil coating point source category, can manufacturers subject to the provisions of the regulation must advise an appropriate authority as well as the US EPA Office of Water Regulations and Standards whenever it is decided for a plant to produce cans

using an aluminium alloy containing less than 1 percent of manganese (US EPA 2021, 2022c, 2022d).

Under the *Clean Air Act*, the US EPA regulates and controls airborne emissions of hazardous air pollutants from industrial sources. Manganese compounds are listed as a hazardous air pollutant under section 112 of the Act (US EPA 2022a, 2023c, 2023d).

Manganese oxide (CAS RN 1344-43-0), manganese dioxide (CAS RN 1313-13-9), manganese violet (CAS RN 10101-66-3), C.I. pigment red 63:2 (CAS RN 35355-77-2), and manganous (C6-C19) branched alkanoate (CAS RN 68551-42-8) can be found on the list of Inert Ingredients in Pesticide Products under the *Federal Insecticide, Fungicide, and Rodenticide Act* (US EPA 2022a, 2022e). This list aims to regulate substance usage in registered pesticide products in the US.

In 2012, the Agency for Toxic Substances and Disease Registry established minimal risk levels for chronic inhalation exposure as 0.3 µg/m³ (ATSDR 2012). The US EPA established a RfC for inhalation exposure as 0.05 µg/m³, based on a critical effect impairment of neuro-behavioural function (US EPA 2002).

The US EPA also established reference doses for oral exposure as 0.14 mg/kg bw/day, using the Institute of Medicine (IOM) Tolerable Upper Intake Level (UL) in consideration of central nervous system effects (US EPA 2002).

Manganese (CAS RN 7439-96-5) is on the Drinking Water Contaminant Candidate List (US EPA 2022a, 2022f), which provides a list of contaminants that are not currently subject to any national primary drinking water regulations but are anticipated or known to occur in public drinking water systems. A concentration limit of 0.05 mg/L was set for manganese in the Secondary Drinking Water Standards, which assist public water systems in managing their drinking water for aesthetic considerations and are not enforceable (US EPA 2022a, 2022g). In addition, manganese is included in the Unregulated Contaminant Monitoring Rule, which was established under the 1996 *Safe Drinking Water Act* amendments, requires monitoring for 30 chemical contaminants, and provides the basis for future actions to protect public health (US EPA 2022h).

Manganese (CAS RN 7439-96-5) and some manganese-containing products are found under section 313 of the *Emergency Planning and Community Right-to-Know Act*, requiring facilities that exceed a manufacturing, processing, or use threshold for the substances to report information on their releases to the environment and other waste handling practices to the US EPA annually (US EPA 2022a, 2022i). Under the Act, facilities that manufacture, process, or use more than 100 pounds per year of methylcyclopentadienyl manganese tricarbonyl (CAS RN 12108-13-3) would be required to report on the storage, use and releases of the substance to federal, state, and local governments, and to

provide information that would allow for preparation of chemical emergency response plans to protect communities from potential risks (US EPA 2022j).

7.2.2 The European Union

On December 7, 2021, the European Chemicals Agency published an assessment of regulatory needs for simple manganese compounds. Manganese dioxide (CAS RN 1313-13-9), manganese oxide (CAS RN 1344-43-0), manganese (CAS RN 7439-96-5), manganese sulfide (CAS RN 18820-29-6), and ammonium manganese pyrophosphate (CAS RN 10101-66-3) were among the manganese compounds assessed. The first 4 substances were classified into the simple inorganic salts, oxides and manganese metal sub-group (sub-group 1). Substances in sub-group 1 were found to be known or potential hazards for aquatic toxicity and known or potential hazards for reproductive toxicity and neurotoxicity. For this sub-group, based on the Classification, Labelling and Packaging and the Registration, Evaluation, Authorisation, and Restriction of Chemicals information available at the time of the assessment, the first regulatory risk management action proposed was confirmation of hazard via harmonized classification and labelling. The next proposed action (if the hazard is confirmed) is restriction of professional or consumer uses of the substance as such or in mixtures (concentration limit in mixtures). For the remaining industrial uses where potential for exposure cannot be excluded, the regulatory risk management action proposed is substance of very high concern identification and authorization (ECHA 2021).

In respect of drinking water, in 2021, the World Health Organization (WHO) updated their review of manganese to consider potential neurotoxic effects in children, establishing a provisional guideline value (pGV) of 0.08 mg/L. This value represents a health based pGV for manganese for bottle-fed infants, the subpopulation most susceptible to manganese exposure, but is applicable to the general population as a whole. Prior to this, the WHO did not have a formal guideline but a health-based value of 0.4 mg/L, based on an absence of effect in a composite of dietary studies (WHO 2011).

In 2001, the IOM set a UL for manganese of 11 mg/day for adults, based on an absence of effects noted in adults from manganese in food; however, none of the studies reviewed assessed neurotoxicity associated with dietary intakes in a healthy population. In addition, the UL values for children and adolescents, a more sensitive subpopulation, were extrapolated from those established for adults (IOM 2001).

8. Next steps

8.1 Public comment period

Interested stakeholders are invited to submit comments on the content of this document or other information that would help to inform decision-making (such as outlined in section 3). Please submit additional information and comments prior to December 24, 2025.

If the final assessment confirms that manganese and its compounds are toxic, a risk management approach document outlining and seeking input on the proposed risk management instrument(s) would be published concurrently with the assessment. At that time, there would be further opportunity for consultation.

Comments and information submissions on the risk management scope should be submitted to the following address:

Substances Management Information Line
Chemicals Management Plan
Environment and Climate Change Canada
Gatineau, Quebec K1A 0H3
Telephone: 1-800-567-1999 (in Canada) or 819-938-3232
Fax: 819-938-3231
Email: substances@ec.gc.ca

Companies who have a business interest in manganese and its compounds are encouraged to identify themselves as stakeholders. The stakeholders will be informed of future decisions regarding manganese and its compounds and may be contacted for further information.

Stakeholders and members of the public who are interested in being notified of CMP publications are invited to [subscribe for the latest news on the CMP](#). Stakeholders and members of the public who would like to receive CMP Publication Plans on a quarterly basis by email can contact: substances@ec.gc.ca.

8.2 Timing of actions

Electronic consultation on the draft assessment and risk management scope: October 25, 2025 to December 24, 2025. This should include the submission of public comments, additional studies and/or information on manganese and its compounds.

Publication of responses to public comments on the draft assessment and risk management scope: Concurrent with the publication of the final assessment and, if required, the risk management approach.

Publication of responses to public comments on the risk management approach, if applicable and if required, the proposed instrument(s): At the latest, 24 months from

the date on which the ministers recommended that manganese and its compounds be added to Schedule 1 to CEPA.

Consultation on the proposed instrument(s), if required: 60-day public comment period starting upon publication of each proposed instrument.

Publication of the final instrument(s), if required: At the latest, 18 months from the publication of each proposed instrument.

These are planned timelines and are subject to change.

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Annex A. Substance identity information

Table A-1: Substance identity information for manganese substances identified as priorities for assessment

CAS RN	DSL or R-ICL name	Common name	List
1313-13-9	Manganese oxide (MnO ₂)	Manganese dioxide	DSL
1335-36-0	1,2,3-Propanetriol, mono(dihydrogen phosphate), manganese salt (MnC ₃ H ₉ O ₆ P; MnC ₃ H ₇ O ₆ P)	Manganese glycerophosphate	R-ICL
1344-43-0	Manganese oxide (MnO)	Manganese oxide	DSL
7439-96-5	Manganese (Mn)	Elemental manganese	DSL
10101-66-3 ^a	Diphosphoric acid, ammonium manganese (3++) salt (1:1:1) [Mn(NH ₄)P ₂ O ₇]	Ammonium manganese pyrophosphate/ Manganese violet	DSL
12108-13-3	Manganese, tricarbonyl [(1,2,3,4,5-<C)-1-methyl-2,4-cyclopentadien-1-yl]- (MnC ₉ H ₇ O ₃)	Methylcyclopentadienyl manganese tricarbonyl (MMT)	DSL
18820-29-6	Manganese sulfide (MnS)	Manganese sulfide	DSL
29193-02-0	L-Proline, 5-oxo-, manganese salt (1:?) (Mn _x C ₅ H ₇ NO ₃ ; MnC ₅ H ₆ NO ₃)	Manganese pyroglutamate	R-ICL
35355-77-2 ^a	C.I. Pigment Red 63:2 (C ₂₁ H ₁₂ MnN ₂ O ₆ S)	C.I. Pigment Red 63:2	DSL
68551-42-8	Fatty acids, C6-19-branched, manganese salts (UVCB)	Manganous (C6-C19) branched alkanoate	DSL
105883-50-9	Manganese, bis[N-(acetyl-.K.O)-L-methioninato-.K.O]- (MnC ₁₄ H ₂₄ N ₂ O ₆ S ₂)	Manganese acetyl methionate	R-ICL

Abbreviations: CAS RN, Chemical Abstracts Service Registry Number; DSL, Domestic Substance List; R-ICL, Revised In Commerce List.

^a This substance did not meet categorization criteria but was prioritized through other mechanisms (ECCC, HC [modified 2017]).