Draft Screening Assessment

Sector-specific Inorganic UVCBs Group

Environment and Climate Change Canada
Health Canada

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Synopsis

Pursuant to sections 68 and 74 of the *Canadian Environmental Protection Act, 1999* (CEPA), the Minister of the Environment and the Minister of Health have conducted a screening assessment of 57 substances of Unknown or Variable Composition, Complex Reaction Products and Biological Materials (UVCB), referred to collectively as the Sector-specific Inorganic UVCBs Group. Substances in this group were identified as priorities for assessment as they met categorization criteria under subsection 73(1) of CEPA or were considered a priority on the basis of other human health concerns. The Chemical Abstracts Service Registry Numbers (CAS RN[1]), *Domestic Substances List* (DSL) names and some common names are listed in the table below.

Fifty-seven substances included in the Sector-specific Inorganic UVCBs Group

CAS RN	DSL name	Common name
65996-69-2	Slags, ferrous metal, blast furnace	Blast furnace slag
65996-71-6	Slags, steelmaking	Steelmaking slag
66071-92-9	Sulfite liquors and Cooking liquors, spent	Black liquor or red liquor[a]
67711-90-4	Flue dust, copper-refining	Copper smelting dusts
67711-91-5	Matte, copper	Copper matte
67711-95-9	Slimes and Sludges, copper electrolytic	Electrowinning cell sludge
67712-00-9	Slimes and Sludges, copper refining	Precipitates and slurries, copper refining
68131-30-6[b]	Sulfite liquors and Cooking liquors, green	Green pulping liquor
68131-31-7[b]	Sulfite liquors and Cooking liquors, spent, alkali-treated	Alkaline treated spent sulfite liquor
68475-76-3	Flue dust, portland cement	Kiln dust
69011-50-3	Zinc, dross	Zinc dross
69029-52-3	Lead, dross	Lead dross
69011-54-7	Silver, bullion	Dore
69011-59-2	Lead alloy, base, dross	Arsenic-nickel dross
69011-69-4	Cadmium, dross	Cadmium dross
69011-70-7	Cadmium, sponge	Cadmium sponge
69011-71-8	Aluminum dross	Aluminum dross
69011-72-9[a]	Aluminum, manufg. cathodes, carbon	Carbon cathode
69011-86-5	Zinc ores, concs., preleached	Zinc, preleached concentrates

[1] The Chemical Abstracts Service Registry Number (CAS RN) is the property of the American Chemical Society and any use or redistribution, except as required in supporting regulatory requirements and/or for reports to the Government 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.

CAS RN	DSL name	Common name
69012-17-5	Waste solids, copper-casting	Copper casting scales and solids
69012-24-4	Wastewater, zinc sulfate electrolytic, acid	NA
69012-43-7	Slimes and Sludges, zinc sulfate electrolytic	Electrolytic zinc residue
69012-48-2	Residues, zinc-refining wastewater, zinc hydroxide	Zinc hydroxide precipitate
69012-50-6	Matte, nickel	Nickel matte
69012-65-3	Fumes, zinc	Zinc fumes
69012-67-5	Leach residues, copper cake	Copper residue
69012-69-7	Leach residues, zinc-fume	Zinc fume leach residue
69012-70-0	Leach residues, zinc ore-calcine	Zinc calcine leach residue
69012-73-3	Leach residues, zinc ore-calcine, zinc sulfur	Zinc sulfur residue
69012-79-9	Calcines, zinc ore-conc.	Calcined zinc ore concentrates
69029-50-1	Lead, antimonial	Antimonial lead
69029-67-0	Flue dust, lead-refining	Lead smelter flue dust
69029-80-7	Residues, precious metal recovery lead refining	NA
69029-82-9	Residues, zinc dross	NA
69029-84-1	Slags, lead smelting	Lead smelter slag
69029-85-2	Slags, precious metal recovery lead refining	NA
69029-93-2	Slimes and Sludges, lead refining	NA
69227-11-8	Lead, dross, copper-rich	Copper dross
84583-61-9	Slimes and Sludges, zinc electrolytic	NA
84776-00-1	Slimes and Sludges, tin electrolytic	NA
85116-70-7	Ashes (residues), galvanization	Zinc ash
94552-05-3	Waste solids, lead silver anode	NA
96690-57-2	Waste solids, aluminum oxide electrolysis, cathodic	Hydrated recovered carbon
98072-44-7	Flue dust, precious metal refining	Precious metal melting dusts
98072-60-7	Slags, precious metal refining	Precious metals smelting slag
98072-61-8	Slimes and Sludges, precious metal refining	Precious metals refining slimes, sludges and residues
121053-32-5	Flue dust, nickel-refining	Nickel smelting dusts
121053-33-6	Slags, nickel-refining	Nickel melting furnace slag
124222-16-8	Residues, copper-refining	Residue, copper electrolytic
124222-19-1	Slimes and Sludges, nickel electrolytic	Precipitates and slurries, nickel electrolytic

CAS RN	DSL name	Common name
124222-20-4	Slimes and Sludges, precious metal electrolytic	Precipitates and slurries, precious metal electrolytic
124316-01-4	Slags, copper-refining	Copper smelter or refinery slag
125408-74-4	Slags, ferrous metal, blast furnace, desulfurizing	NA
128704-79-0	Leach solutions, zinc refining	NA
129618-34-4	Electrolytes, nickel-manufg.	NA
129618-37-7	Solutions, precious metal hydrometallurgical	Precious metals refining solutions
175448-53-0	Slags, lead smelting, zinc-reduced.	NA

Abbreviations: NA, not available

[a] Not a common name taken from NCI (2012)

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

These 57 UVCBs were grouped for assessment as their commercial activity is restricted to a small number of industrial sectors and exposure is either not expected or is considered to be negligible. The approach used in this assessment focuses on the exposure characterization of the substances and includes consideration of information on commercial activity (i.e., manufacturing or import into Canada) and uses, as well as existing measures to prevent or limit exposure to the environment and consequently to the general population of Canada.

The main sectors of activity for the substances are the base metals processing, iron and steel manufacturing, aluminium smelting and automotive parts manufacturing, pulp and paper manufacturing, and cement manufacturing sectors. The potential for exposure to the environment was assessed by grouping the substances among five “types” to clarify the release potential of the substances: “no longer manufactured or imported,” “intermediate,” “waste,” “by-product” or “substances with other commercial uses in other sectors.” For substances that either were no longer manufactured or imported or were intermediates, exposure was not expected as the substances were either no longer in commerce or were found to be consumed on-site (or at other facilities) as feedstock or on-site for energy recovery. For substances determined to be wastes or by-products, exposure to the environment was considered negligible because they were either disposed of on-site at the facility (e.g., some wastes from the base metals processing sector), sent to a specialized hazardous waste facility or met regulation standards to confirm lack of hazardous characteristics.

This approach used information submitted by companies in response to either a voluntary survey or to Phase 2 of the DSL Inventory Update, as well as other technical information including technical reports generated for Environment and Climate Change Canada. On the basis of the information received, 38 substances were determined to be no longer manufactured or imported or intermediates, 10 were determined to be intermediates or wastes, 3 were determined to be by-products or wastes, and 5 were determined to be wastes. On the basis of the information available, the potential for

exposure of these substances to the environment is considered to be either negligible or not expected. One additional substance, a sulfite liquor (CAS RN 68131-31-7), was determined to be an intermediate within the pulp and paper manufacturing sector for which exposure to the environment is not expected, and according to the exposure characterization of the substance for a number of applications within other sectors, its potential for exposure to the environment is negligible.

Considering all available lines of evidence presented in this draft screening assessment, there is low risk of harm to organisms and the broader integrity of the environment from all 57 substances in the Sector-specific Inorganic UVCBs Group. It is proposed to conclude that these 57 substances do not meet the criteria under paragraphs 64(*a*) or (*b*) of CEPA as they are not entering the environment in a quantity or concentration or under conditions that have or may have an immediate or long-term harmful effect on the environment or its biological diversity or that constitute or may constitute a danger to the environment on which life depends.

Given that ecological exposure was considered either negligible or not expected, general population exposure to substances through environmental media was consequently considered to be either negligible or not expected. Additionally, uses identified (beyond the pulp and paper manufacturing sector) were not considered to result in exposure to the general population. Accordingly risk to human health is considered to be low for all 57 substances.

On the basis of the information presented in this draft screening assessment, it is proposed to conclude that the 57 substances in the Sector-specific Inorganic UVCBs Group do not meet the criteria under paragraph 64(*c*) of CEPA as they are not entering the environment in a quantity or concentration or under conditions that constitute or may constitute a danger in Canada to human life or health.

Therefore, it is proposed to conclude that the 57 substances in the Sector-specific Inorganic UVCBs Group do not meet any of the criteria set out in section 64 of CEPA.

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1. Introduction

Pursuant to sections 68 and 74 of the *Canadian Environmental Protection Act, 1999* (CEPA) (Canada 1999), the Minister of the Environment and the Minister of Health have conducted a screening assessment of 57 substances of Unknown or Variable Composition, Complex Reaction Products and Biological Materials (UVCBs), referred to collectively as the Sector-specific Inorganic UVCBs Group, to determine whether these substances present or may present a risk to the environment or to human health. The substances in this group were identified as priorities for assessment as they met categorization criteria under subsection 73(1) of CEPA or were considered a priority on the basis of other human health concerns (ECCC, HC [modified 2007]).

These 57 UVCBs were grouped for assessment as their commercial activity is restricted to a small number of industrial sectors, and they were anticipated to have a limited potential for exposure to humans and the environment. The approach used in this assessment focuses on the exposure characterization of the 57 substances and includes consideration of information on commercial activity (i.e., manufacturing or import into Canada) and uses, as well as existing measures to prevent or limit exposure to the environment and consequently to the general population of Canada. The substances had reported manufacturing or import quantities received through submissions of information provided in response to notices under section 71 of CEPA regarding commercial activity in Canada for the year 2011 (Canada 2012; Environment Canada 2013).

This draft screening assessment includes consideration of information on uses and exposure, including information submitted by stakeholders. Relevant data were identified up to July 2016. Additional data were submitted by stakeholders up to November 2016. Targeted literature searches were conducted up to June 2016. Empirical data from key studies as well as some results from models were used to reach proposed conclusions. When available and relevant, information presented in assessments from other jurisdictions was considered.

This draft screening assessment was prepared by staff in the CEPA Risk Assessment Program at Health Canada and Environment and Climate Change Canada and incorporates input from other programs within these departments. The ecological assessment, on which the human health assessment is based, underwent external review and/or consultation. Comments on the technical portions relevant to the environment were received from the European Chemicals Agency (ECHA). While external comments were taken into consideration, the final content and outcome of the screening assessment remain the responsibility of Health Canada and Environment and Climate Change Canada.

This draft screening assessment focuses on information critical to determining whether substances meet the criteria as set out in section 64 of CEPA, by examining scientific

information and incorporating a weight–of-evidence approach and precaution.[2] The draft screening assessment presents the critical information and considerations on which the proposed conclusion is based.

2. Identity of substances

The substances in this risk assessment are considered predominantly "inorganic UVCBs." UVCB substances are derived from natural sources or complex reactions and cannot be characterized in terms of constituent chemical compounds because their composition is too complex or variable (EC, HC 2006).

Inorganic UVCB substances in the Sector-specific Inorganic UVCBs Group contain many inorganic elements and are comparable to complex mixtures of multiple metals and metalloids. For example, according to its *Domestic Substances List* (DSL) definition, the substance "Solutions, precious metal hydrometallurgical" (CAS RN[3] 129618-37-7) may contain metal ions of palladium, platinum, gold, silver and small amounts of rhodium, ruthenium, iridium and other non-ferrous elements, such as copper, nickel, cobalt, lead, bismuth, antimony, arsenic, selenium and tellurium (NCI 2012). Because the composition of a UVCB substance is process-specific and varies between facilities within a sector of activity, representative composition information is often not available or is approximate.

The CAS RNs, DSL names, and DSL definitions for the substances in this group are presented in Appendix A (Table A-1). A list of additional chemical names (e.g., other common names) is available from the National Chemical Inventories (NCI 2012).

A total of 57 inorganic UVCB substances, distributed primarily in the base metals processing, iron and steel manufacturing, aluminium smelting and automotive parts manufacturing, pulp and paper manufacturing, and cement manufacturing sectors, were identified as remaining priorities for assessment and proposed for inclusion in the Sector-specific Inorganic UVCBs Group on the basis of their limited use and negligible expected release potential.

[2]A determination of whether one or more of the criteria of section 64 of CEPA are met is based on an assessment of potential risks to the environment and/or 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 available by consumers. A conclusion under CEPA is not relevant to, nor does it preclude, an assessment against the hazard criteria specified in the *Hazardous Products Regulations*, which are part of the regulatory framework for the Workplace Hazardous Materials Information System for products intended for workplace use. Similarly, a conclusion based on the criteria contained in section 64 of CEPA does not preclude actions being taken under other sections of CEPA or other acts.

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3. Approach for sector-specific inorganic UVCBs

3.1 Basis of the ecological and human health assessment approach

The assessment of Sector-specific Inorganic UVCBs focuses on the exposure characterization of each substance to determine whether risks to the environment and/or to human health are anticipated. This approach was taken because:

i. the hazardous characteristics of the UVCBs are not defined given their variable and complex compositions;
ii. many substances in this group are limited to a few sectors and are expected to be site-restricted or sector-restricted substances with a low potential for exposure to humans and the environment; and
iii. measures exist to prevent or to limit releases of certain substances or their constituents for most sectors considered in the assessment.

Substances in this group are site-restricted[4] or sector-restricted, and exposure to humans and the environment is either not expected or considered negligible. Site-restricted substances are expected to remain on the facility's site, where they may be further processed or disposed of. Sector-restricted substances are those that are only used within a particular industry, but may leave a facility and be transported to other industrial facilities in the same industry, for example as feedstock in metal recovery operations, including metal recycling.

Many of these UVCBs are known hazardous substances with potential specific inorganic components, such as lead, already on Schedule 1 of CEPA, and measures (e.g., federal regulations, voluntary measures) are in place to minimize releases from facilities and to limit exposure to the environment and to humans.

The assessment approach is presented in Figure 3-1, and additional information on the proposed exposure characterization approach is provided in Section 3.2.

[4] For the purpose of this screening assessment, a site is defined as the boundaries of the property where a facility is located.

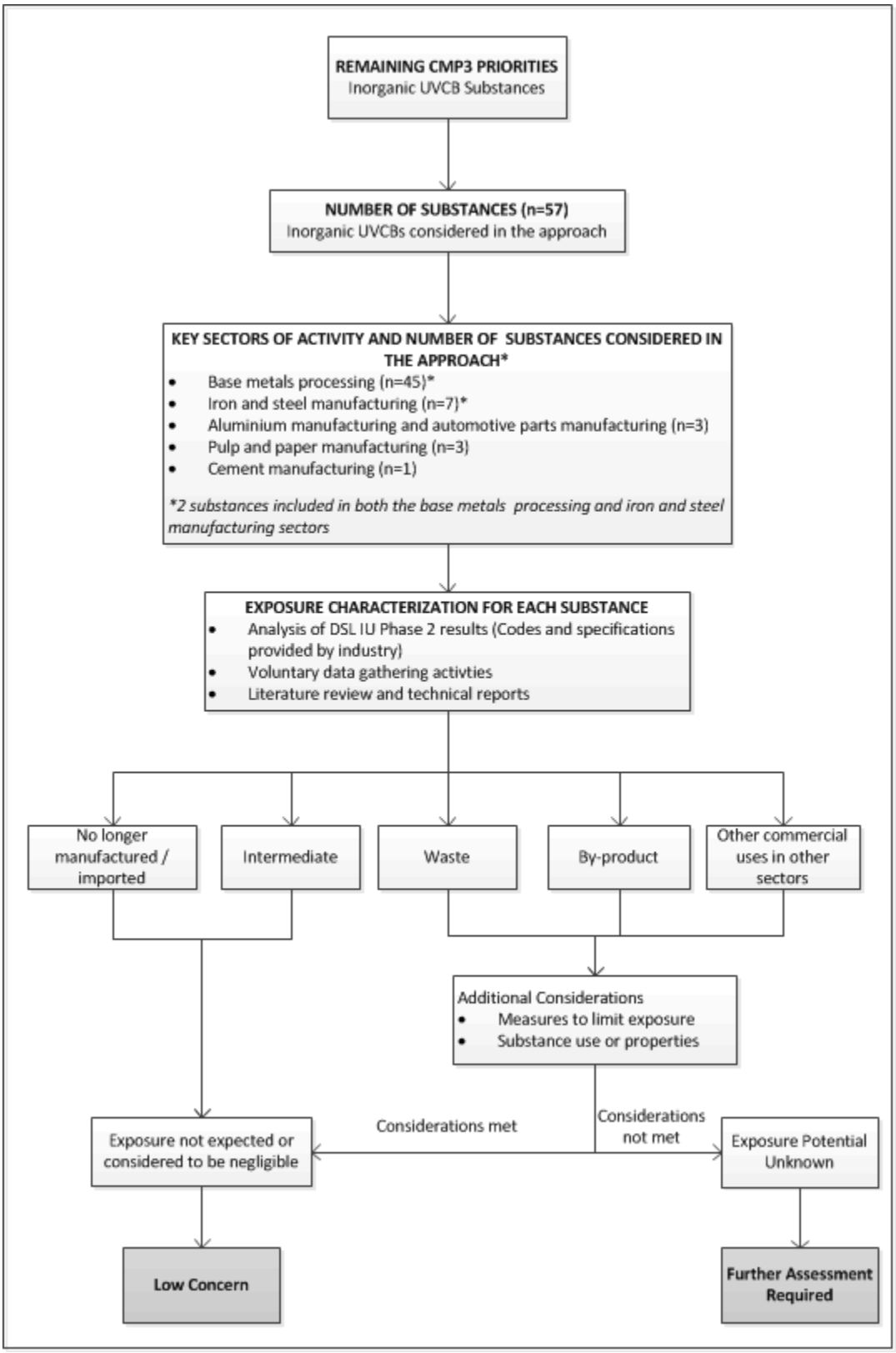

Figure 3-1. Approach for the assessment of sector-specific inorganic UVCBs

3.2 Exposure approach

The exposure potential for the 57 Sector-specific Inorganic UVCB substances is determined on the basis of two main considerations:

i. the potential to be released to environmental media (i.e., the type of substance); and
ii. in certain cases, the existence of measures to limit exposure to the environment and consequently to humans.

The substances are grouped by "type" to characterize their potential for exposure using several lines of evidence. This includes function codes and consumer and commercial codes information as well as North American Industry Classification System Codes (NAICS) submitted under Phase 2 of the Domestic Substances List Inventory Update (DSL IU Phase 2) (Environment Canada 2013; ECCC 2016a), literature reviews, and results from voluntary stakeholder engagement (ECCC 2016b). These codes provide information on the uses or functions of substances in an industrial or a commercial/consumer use setting and are used as a first line of evidence to classify the substance. The definitions of the codes are provided in Appendix C (Table C-1).

For the purpose of this assessment, five substance "types" were therefore defined: "no longer manufactured or imported," "intermediate," "waste," "by-product" and "substance with other commercial uses in other sectors" (Table 3-1). The commercial activity of substances determined to be "no longer manufactured or imported" was updated as a result of voluntary stakeholder engagement activities (ECCC 2016b) and their exposure potential is non-existent. Substances determined to be "intermediate" are transient (i.e., transformed into another substance) and their potential for exposure is negligible. "Intermediates" may be site-restricted process intermediates or sector-restricted substances that are sent to another site for further processing and transformed into another substance (e.g., residue sent for metal recovery). Substances determined to be "wastes" can be site-restricted (i.e., disposed of on the site of the facility) or sent to specialized facilities to be disposed of, and exposure may be negligible when considering measures that exist to limit exposure, especially when sent off-site. "By-products" is a term widely used in industry and refers to substances generated by a specific sector that may have commercial applications. Permitted uses may depend on meeting certain criteria from provincial regulations, and exposure to the substances may therefore be considered acceptable. The last type, "substances with other commercial uses in other sectors," refers to substances used in sectors other than the ones discussed in this assessment and that may require further assessment if the exposure potential is unknown.

Table 3-1. Definitions of substances types and associated codes

Substance Type	Definition	Function or consumer and commercial codes	Other sources of information for classification
No longer manufactured or imported	A substance that was no longer manufactured in 2014 or no longer imported into Canada in 2015	-	Voluntary stakeholder engagement
Intermediate[a,b]	A substance consumed in a reaction to produce other substance(s) for commercial advantage	U015, U023, U999 and C999, C206	Literature review; voluntary stakeholder engagement
Waste[a]	A substance that is removed from the final product or an intermediate, during the manufacturing process and that has no commercial value	U999 and C999	Literature review; voluntary stakeholder engagement
By-product[a]	A secondary product resulting from the manufacturing process that: (i) can be partially or completely removed from the intended product; and (ii) has commercial value on its own or by adding to another product	U999 and C999, C204	Literature review; voluntary stakeholder engagement
Substance with other commercial uses in other sectors	A substance of commercial interest that may be used directly for other consumer or commercial activities in other sectors of activity	Other codes	Literature review

[a] Definition from Environment Canada (2012).
[b] This definition also covers a substance manufactured at one site and transported to a second site where it is consumed, or a substance imported at one site and transported to a second site where it is consumed, as expressed in the definition of "site-limited intermediate" in the *New Substances Notification Regulations (Chemicals and Polymers)* (Canada 2015).

Measures that exist to limit exposure to the substances would be considered when determining the exposure potential of the substances, particularly for non-site-restricted "wastes" or "by-products." Measures in place to limit exposure to the substance during its manufacturing, processing, transportation or disposal include federal or provincial regulations and voluntary measures (e.g., codes of practice), provincial/territorial operating permit requirements, and best practices and guidelines put in place by industry.

4. Sources and uses

Information regarding the manufacture or import of a number of the inorganic UVCBs for the year 2011 was obtained through a notice issued pursuant to section 71 of CEPA, commonly referred to as Phase 2 of the DSL Inventory Update (Canada 2012). Results for these substances with regard to their quantities in commerce and uses (Environment Canada 2013) are presented in section 4.1 and 4.2, respectively.

4.1 Sources

Survey results indicate the 57 inorganic UVCBs included in the approach were generally manufactured[5] or imported into Canada in 2011 in large quantities (Environment Canada 2013). Quantities varied between ranges of 10–100 t and 1 000 000–10 000 000 t for manufacturing and between ranges of 0.01–0.1 t and 1 000–10 000 t for import into Canada (Table B-1, Appendix B). Only 9 substances were manufactured in quantities lower than 100 t.

Substances were distributed almost exclusively in the base metals processing, iron and steel manufacturing, aluminium smelting and automotive parts manufacturing, pulp and paper manufacturing, and cement manufacturing sectors, with next to no overlap between these sectors. Two substances, “zinc, dross” (CAS RN 69011-50-3) and “lead, dross” (CAS RN 69029-52-3), were manufactured by companies from both the base metals processing and iron and steel manufacturing sectors. Another substance, “aluminum dross” (CAS RN 69011-71-8), was manufactured by companies associated with both the aluminium smelting and automotive parts manufacturing sectors.

Relatively small quantities (i.e., 0.1–1 t up to 10–100 t) of “slags, ferrous metal, blast furnace” (CAS RN 65996-69-2), “sulfite liquors and cooking liquors, green” (CAS RN 68131-30-6) and “sulfite liquors and cooking liquors, spent alkali-treated” (CAS RN 68131-31-7) were imported by five companies involved in other sectors of activity.

Results from voluntary information gathering conducted with stakeholders for the years 2014 to 2016 determined that one company was no longer manufacturing the substance “matte, copper” (CAS RN 67711-91-5) in 2014 and that the substance “sulfite liquors and cooking liquors, green” (CAS RN 68131-30-6) was no longer imported into Canada in 2015 (ECCC 2016b).

5 The definition of “manufacturing” as provided in the DSL IU Phase 2 Guidance document means to produce or to prepare a substance, and also includes the incidental production of a substance (Environment Canada 2012).

4.2 Uses

"Function codes" (UXXX) and "consumer and commercial codes" (CXXX) provide information on the uses or functions of substances in an industrial or a commercial/consumer use setting. Results for the 57 substances show that multiple codes were often provided for the same substance, but companies predominantly provided the codes U015 "Intermediates" and U999 "Other" or C206 "Metal materials not otherwise covered in this table" or C999 "Other" for substances within the five main sectors (Environment Canada 2013, ECCC 2016a, ECCC 2016b). The list of codes and their definitions are provided in Appendix C (Table C-1), and detailed results for each substance within each sector are provided in Appendix D (Tables D-1 to D-5). Codes identified as confidential business information (CBI) are masked to protect confidentiality.

5. Potential to cause ecological harm

5.1 Ecological exposure assessment

The exposure assessment of the 57 Inorganic UVCB substances is discussed by sector in sections 5.1.1 to 5.1.6. The aluminium smelting and automotive parts manufacturing sectors are discussed together (5.1.3) and the exposure assessment of substances with other commercial uses in other sectors is discussed in section 5.1.6. A summary of the exposure characterization is presented in section 5.1.7.

5.1.1 Base metals processing

The base metals processing sector includes smelting and refining facilities that produce precious and base metals from ores or scrap and process wastes through pyrometallurgical, hydrometallurgical and vapo-metallurgical processes (Environment Canada 2006). Base metals include copper, lead, nickel and zinc, and depending on the origin of the ore or scrap metal and its residual metals content, various metals such as gold, silver, indium, germanium, cadmium, bismuth and selenium may be recovered as co-products (Environment Canada 2006).

The sector uses or produces substantial quantities of a number of complex inorganic substances as a result of its manufacturing processes and pollution control devices. A total of 45 substances were confirmed to be manufactured or imported into Canada by this sector in 2011, including two substances that are also manufactured by the iron and steel sector. Whether substances may be recovered or disposed of varies from facility to facility depending on a number of technical, environmental and economic factors (Environment Canada 2006). On the basis of the analysis of function codes and relevant consumer and commercial codes submitted by industry, these 45 substances were determined to be intermediates or wastes (Table D-1).

A total of 34 substances were determined to be “intermediates” on the basis of the function code for “Intermediate” (U015), “Other” (U999), “Plating agents and surface treating agents” (U023) and, when relevant, the consumer and commercial code “Other” (C999) submitted by industry. These substances were either further processed on-site or sent to recycling for metal recovery (Environment Canada 2013, ECCC 2016b). The substance “matte, copper” (CAS RN 67711-91-5) was determined to be no longer manufactured in 2014 by one company that submitted the function code U999 in 2011 (Environment Canada 2013, ECCC 2016b).

Seven substances with the function codes U015 and U999/C999 or just U999/C999 were determined to be either “intermediate” or “waste.” Facilities situated upstream in base metals processing are usually equipped with large smelting furnaces where residues produced at various steps of the manufacturing process may be re-introduced to recover valuable metals and may effectively be considered “intermediates.” For example, substances that are often considered wastes such as “slags, precious metal recovery lead refining” (CAS RN 69029-85-2) and “slags, lead smelting, zinc reduced” (CAS RN 175448-53-0) are re-introduced in the furnace of one smelting facility for metal recovery (Environment Canada 2002) and are therefore “intermediates” at that particular facility. Downstream facilities such as metal refineries that produced higher purity metals may not “recycle” the substances on-site and may have declared sending the substances to metal recyclers for metal recovery or to other facilities for disposal, depending on market value (Environment Canada 2013).

Four substances with the code U999 and consisting of slags and other residues were determined to be “wastes,” with the exception of the substance “slags, lead smelting” (CAS RN 69029-84-1), which had the code U015 submitted by a company that responded to the DSL IU Phase 2 survey (Environment Canada 2013). These substances are disposed of if their valuable metal content is too low to warrant further recovery or too high to pass a leachate test allowing other uses (e.g., construction materials) (Hatch 2004). The substances are generally stored on-site (Environment Canada 2002; Environment Canada 2013), and leachate from the disposal areas is collected and treated (Hatch 2004) as required by federal and provincial regulations.

5.1.2 Iron and steel manufacturing

The iron and steel manufacturing sector is comprised of integrated mills and mini-mills. Integrated mills process iron ore to produce iron in blast furnaces (BFs) using metallurgical coke and then transform iron to steel in basic oxygen furnaces (BOFs). Non-integrated mills (or “mini-mills”) melt scrap steel or direct-reduced iron (DRI) in electric arc furnaces (EAFs) to form new steel products. EAFs are also used to produce carbon and alloy steels (US EPA 1995a).

This sector uses or produces substantial quantities of a number of complex inorganic substances as a result of its manufacturing processes and pollution control devices. A total of seven substances were reported to be manufactured in Canada in 2011 by this sector. On the basis of the analysis of function codes and consumer and commercial

codes submitted by companies, the seven substances were determined to be intermediates, by-products or wastes in the iron and steel sector (Table D-2). Two of the substances, “zinc, dross” (CAS RN 69011-50-3) and “lead, dross” (CAS RN 69029-52-3), are also manufactured by the base metals processing sector, where they were also determined to be intermediates (section 5.1.1). Small quantities from 1000 to 10 000 kg of “slags, ferrous metal, blast furnace” (CAS RN 65996-69-2) imported into Canada in 2011 by companies from other sectors of activity, are discussed in section 5.1.6.

Four substances were produced at a limited number of facilities in the iron and steel manufacturing sector were determined to be intermediates (Environment Canada 2013). Indeed, these four substances are further processed at specialized recycling facilities to recover valuable metals such as zinc, lead or tin.

The substances “slags, ferrous metal, blast furnace” (CAS RN 65996-69-2), “slags, ferrous metal, blast furnace, desulfurizing” (CAS RN 125408-74-4) and “slags, steelmaking” (CAS RN 65996-71-6) are by-products, produced at various steps of the processing of iron ore to manufacture iron and steel (Environment Canada 2001; US EPA 1995a). Steel slags are incidentally produced by all 15 primary steelmaking facilities in Canada. Iron and steel slags are considered a commodity (USGS 2016) and are used mainly for construction and environmental applications because they are generally alkaline and contain lower concentrations of many trace elements as compared to non-ferrous slags (Piatak et al 2015). According to a review of the Canadian iron and steel sector by Environmental Health Strategies (EHS) (2013), slags are generally processed on-site or by specialized industries and sold for other uses in accordance with provincial regulations (e.g., need to pass a leachate test). Blast furnace slags are processed on-site or by a contractor. They can be water-cooled or pelletized and are sold for use as construction material mainly in the cement industry (Environment Canada 2001; EHS 2013). Basic oxygen furnace slags are broken into pieces and residual steel is recovered magnetically before the slag is finally crushed and screened (Environment Canada 2001). Approximately two-thirds of basic oxygen furnace slags were recycled off-site for use as aggregate in parking lots or road shoulders or for use in hot mix asphalt and in the cement industry, while the remaining portion is stockpiled on-site of the facilities (EHS 2013). Electric arc furnace slags generated by mini-mills were processed by a contractor and sold for use in the cement or road construction industries (EHS 2013).

5.1.3 Aluminium smelting and automotive parts manufacturing

The aluminium smelting sector in Canada comprises facilities that produce aluminium and alumina from mined ore. The ore is refined into alumina by the Bayer process, while the reduction of alumina to primary aluminium is done via electrolysis using the Hall-Heroult process (US EPA 1998).

The sector uses or produces substantial quantities of a number of complex inorganic substances as a result of its manufacturing processes. A total of three substances were reported to be manufactured or imported into Canada by this sector in 2011

(Environment Canada 2013). The substance “aluminum dross” (CAS RN 69011-71-8) was also reported to be manufactured by one automotive parts manufacturing company, which identified it as being an intermediate (i.e., function code U015). Voluntary stakeholder engagement on the substance determined that it is a waste recycled off-site to recover valuable aluminium (ECCC 2016b). On the basis of the analysis of function codes and consumer and commercial codes submitted by companies, the three substances were determined to be intermediates or wastes in the aluminium smelting sector (Table D-3).

“Aluminum, dross” (CAS RN 69011-71-8) contains predominantly aluminium oxide and may be sent to external recycling for the recovery of aluminium or disposed of in landfills (Alcoa 2016; Environment Canada 2013; Sanexen Environmental Services 2013).

The substances “aluminum, manufg. cathodes, carbon” (CAS RN 69011-72-9) and “waste solids, aluminum oxide electrolysis cathodic” (CAS RN 96690-57-2) are closely linked. The first is an integral part of the electrolytic process to produce aluminium metal and is imported in Canada for use in aluminium metal manufacturing. In the Hall-Heroult process, electrolytic reduction of alumina occurs in shallow rectangular cells, or “pots,” consisting of insulated steel shells lined with carbon which serves as the cathode (US EPA 1998). The pots, including the steel shell lined with refractory materials insulation and the layer of carbon, need to be refurbished every 5 to 8 years (Sanexen Environmental Services 2013) because cathodes become saturated with contaminants (Alcoa 2016). The substance “waste solids, aluminum oxide electrolysis cathodic” (CAS RN 96690-57-2) corresponds to the used pots (including the cathode), which are commonly named “spent pot liners” (SPLs). This waste is considered hazardous as it may contain sodium cyanide (NaCN) among other components and may be explosive if exposed to water (Øye 1994). It must therefore be managed appropriately. In Canada, SPLs can be sent to specific treatment facilities (e.g., one exists in Quebec) for processing or disposed of in designated landfill and disposal areas (Sanexen Environmental Services 2013). The substance “aluminum, manufg. cathodes, carbon” (CAS RN 69011-72-9) may be classified as an intermediate that becomes an integral part of “waste solids, aluminum oxide electrolysis cathodic” (CAS RN 96690-57-2) once it needs to be replaced.

Aluminium dross and spent pot liners are two of several types of waste from the aluminium smelting industry identified by the NPRI as transferred off-site for disposal or recycling (Environment Canada 2015a).

5.1.4 Pulp and paper manufacturing

The pulp and paper manufacturing sector includes facilities that manufacture pulp or paper products, which is generally accomplished via three major processing steps: pulping, bleaching and paper product production.

The sector uses or produces substantial quantities of a number of complex inorganic substances as a result of its manufacturing processes. A total of three substances were reported to be manufactured in Canada by this sector (Environment Canada 2013). On the basis of the analysis of function codes and consumer and commercial codes, the three substances were determined to be intermediates in the pulp and paper sector (Table D-4).

The three substances are spent liquors from chemical pulping processes. The main objective of the pulping process is to separate cellulose fibre from lignin to free fibres for papermaking (EC, HC 1991). The two main types of pulping process are mechanical and chemical. As summarized in the assessment report of effluents from pulp mills using bleaching (EC, HC 1991), chemical pulping uses a mixture of chemicals to separate the cellulose fibres from the lignin, and two major chemical processes exist: Kraft and sulfite pulping.

Kraft pulping is carried out in an alkaline medium and releases fibres by dissolving lignin in a caustic (or alkaline) solution of sodium hydroxide and sodium sulfide. This solution is commonly referred to as “white liquor” and dissolves the lignin that binds the cellulose fibres together (US EPA 1995b). Spent cooking liquor and pulp wash water are combined and concentrated to form “black liquor” (US EPA 1995b) and may correspond to the UVCB substance “sulfite liquors and cooking liquors, spent” (CAS RN 66071-92-9), which can be fired in a recovery furnace. The combustion of organics (e.g., lignin) dissolved in the black liquor provide heat for generating steam or electricity and for converting sodium sulfate to sodium sulfide (US EPA 1995b). The inorganic chemicals present in the black liquor collect as a molten smelt at the bottom of the furnace. This smelt is then dissolved in water to form “green liquor,” corresponding to “sulfite liquors and cooking liquors, green” (CAS RN 68131-30-6), which may then be transferred to a causticizing tank where quicklime (calcium oxide) is added to convert the solution back to white liquor, which may correspond to “sulfite liquors and cooking liquors, spent, alkali-treated” (CAS RN 68131-31-7), for return to the digester system (US EPA 1995b).

The sulfite process is similar to the kraft process but is carried out under acidic conditions and solubilizes lignin through sulfonation using a solution of sulfur dioxide and alkaline oxides, such as sodium, magnesium, ammonium, or calcium (EC, HC 1991). Chemical recovery in calcium base systems found mostly in older mills is not practical and the spent liquor is usually discharged or incinerated (US EPA 1995b). In ammonium base operations, heat can be recovered by combusting the spent liquor, but the ammonium base is thereby consumed (US EPA 1995b). In sodium or magnesium base operations, the heat, sulfur and base may all be feasibly recovered (US EPA 1995b). In the acid sulfite process, the spent liquor is referred to as “red liquor” and corresponds to the UVCB substance “sulfite liquors and cooking liquors, spent” (CAS RN 66071-92-9) as described by CAS. If recovered, the spent liquor is sprayed into a furnace and burned to produce steam, which is then used to operate the digesters, or evaporators or to generate electricity (US EPA 1995b). When sodium-based liquor is burnt, the inorganic compounds are recovered as a molten smelt containing sodium sulfide and sodium carbonate. This smelt can be further processed to absorb sulfur

dioxide from the flue gas and sulfur burner or may be sold to a kraft mill as raw material for producing “green liquor” (US EPA 1995b) corresponding to “sulfite liquors and cooking liquors, green” (CAS RN 68131-30-6).

In a limited number of Canadian facilities, sulfite liquors are intermediates for the manufacturing of a variety of other substances, such as lignosulfonates, high purity cellulose, rosins or fatty acids, or vanillin (Adams 1988; Environment Canada 2015b; Magdzinski 2006; Mikkola et al 2016). These manufactured substances may be used as feedstock in a wide variety of industrial or commercial applications such as food products, pharmaceuticals and explosives, coatings (i.e., cellulose), inks and adhesives (i.e., rosin), paints and corrosion inhibitors (i.e., fatty acids), as surfactants and dispersants in textile dyes, cement concrete, wax and asphalt emulsions or transformed into carbon black (i.e., lignin and lignosulfonates) (Magdzinski 2006).

In the pulp and paper manufacturing sector, all three substances are considered intermediates manufactured by chemical pulping sulfite mills (Environment Canada 2013) that may be transformed to recover energy or to produce other substances.

5.1.5 Cement manufacturing

Portland cement consists of a mixture of hydraulic cement minerals, calcium silicates, aluminates and aluminoferrites, and calcium sulfates (US EPA 1995c). The manufacturing of Portland cement may be summarily described by the following steps: raw materials acquisition and handling, kiln feed preparation, pyroprocessing, and finished cement grinding (US EPA 1995c). The main part of Portland cement manufacturing is the pyroprocessing system where the raw mix is transformed into clinkers in rotary kilns through a variety of chemical reactions and physical processes at temperatures of up to 1510 °C (US EPA 1995c).

The substance “flue dust, portland cement” (CAS RN 68475-76-3) is defined as “a complex combination of finely divided inorganic particles separated from the exit gases formed during the manufacture of Portland cement, and consists of uncalcined raw materials along with partially calcined materials” (NCI 2012). The substance corresponds to the particulate materials (PM) that are captured from the smokestack. The largest source of PM at cement plants is the pyro-processing system, which includes the kiln and clinker cooler exhaust stacks (US EPA 1995c). Flue dust is incidentally manufactured at all 16 cement manufacturing facilities in Canada. The dust from the smokestack may be recycled into the kiln or landfilled at an approved facility (US EPA 1995c).

The substance was reported to be manufactured in Canada in 2011 by fewer than four cement manufacturing companies (ECCC 2016a). The substance was attributed the function code U999 and is identified as a waste produced during cement production that is recycled back into the process (ECCC 2016a). On the basis of this information, the substance “flue dust, portland cement” (CAS RN 68475-76-3) is determined to be either an intermediate if recycled within the process or a waste (Table D-5).

5.1.6 Other sectors of activity

Three substances, primarily linked to iron and steel manufacturing or pulp and paper manufacturing, were also imported into Canada in 2011 by four or fewer companies involved in other sectors of activities: “slags, ferrous metal, blast furnace” (CAS RN 65996-69-2), “sulfite liquors and cooking liquors, green” (CAS RN 68131-30-6) and “sulfite liquors and cooking liquors, spent alkali-treated” (CAS RN 68131-31-7) (Table D-6) (Environment Canada 2013). When considering upper range limits, these import quantities are 10 000- to more than 1 000 000-fold smaller than the quantities manufactured by the iron and steel or pulp and paper manufacturing sectors (Table B-1).

Slags from blast furnace may be used as supplementary cementitious materials in concrete, mortars (NRMCA 2012) or cement-based waterproofing sealants (SDS 2012). To be used as cementitious materials, the composition of the blast furnace slags must meet certain sulfate chemical composition standards from ASTM C989 (ASTM International 2016). Additionally, cement is used to stabilize and solidify hazardous waste, as contaminants are immobilized within the solid concrete matrix (Ucaroglu and Talinli 2012) and possibly transformed. Therefore, considering the relatively small quantity in commerce and the facts that the product must meet certain chemical quality standards for it to be used and that it may be immobilized or transformed, the exposure potential from this use is anticipated to be negligible.

The substance “sulfite liquors and cooking liquors, green” (CAS RN 68131-30-6) may be used in paints and coatings (Environment Canada 2013). However, additional information received from stakeholders determined that the substance was no longer imported in 2015 (ECCC 2016b), indicating that the exposure potential for this substance is non-existent.

The largest use of “sulfite liquors and cooking liquors, spent alkali-treated” (CAS RN 68131-31-7) reported by importers (on the basis of quantities) is as a dust control binding agent to control fugitive emissions from storage piles and haul roads (Environment Canada 2013; ECCC 2016b). Additional information received from stakeholders for the year 2015 indicate that the substance was used exclusively by industries within the metal mining, base metals smelting or petroleum refining sectors (ECCC 2016b), and may be considered site-restricted. Sulfite liquors have been used directly for dust control in rural towns located near paper mills (WTIC 1997), but paper mills prefer other methods to reuse or to recycle liquors because they may be highly acidic, very sticky and foul-smelling (WTIC 1997). Therefore, sulfite liquors might be further processed to isolate value-added products before being used as dust control binding agents. Lignosulphonate salts, which may be derived from sulfite liquors (Section 5.1.4), are identified as the main active ingredient of many dust control binding agents (Adams 1998; SDS 2007; Tembec 2016; US ACE 2013). They are isolated from spent sulfite liquors by a variety of physical and chemical processes (e.g., precipitation or membrane processes) (Fatehi and Chen 2016; Sjostrom 2013). The additional processing steps could indicate that the substances used in dust control binding agents

actually correspond to lignosulphonate salts registered under a different CAS RN. A total of six lignin derivatives, including lignosulfonic acid (CAS RN 8062-15-5), lignosulfonic acid, sodium salt (CAS RN 8061-51-6), lignosulfonic acid, calcium salt (CAS RN 8061-52-7) and lignosulfonic acid, ammonium salt (CAS RN 8061-53-8), all of which are known ingredients of dust control binding agents, were recently found to not meet the criteria set out in section 64 of CEPA as a result of the second phase of Polymer Rapid Screening (ECCC, HC 2017). Therefore, considering the site-restricted nature of the use of the substance as dust control binding agents, the fact that lignosulphonates are of low environmental concern and the uncertainty of whether the substance “sulfite liquors and cooking liquors, spent alkali-treated” (CAS RN 68131-31-7) is actually used in for this use, exposure to the substance is considered low and of low concern to the environment.

The substance was also reported to be used as a plasticizer in 2011, but additional information received from stakeholders in 2016 determined that this use was now discontinued (ECCC 2016b). Other minor uses of the substance include its use as a concrete admixture, corrosion inhibitor, and anti-scaling agent (Environment Canada 2013) and potential for exposure is anticipated to be negligible. The substance would be immobilized within the concrete matrix and possibly transformed as a result of its use as a concrete admixture, while exposure from its use as a corrosion inhibitor and anti-scaling agent would be negligible because of the small quantities in commerce for this use (i.e., < 1000 kg).

5.1.7 Summary of the ecological exposure assessment

The exposure characterization of 57 inorganic UVCB substances primarily imported and manufactured by the base metals processing, iron and steel manufacturing, aluminium smelting and automotive parts manufacturing, pulp and paper manufacturing, and cement manufacturing sectors as well as a small number of other sectors was conducted (section 5.1.1 to 5.1.6).

Results for the main industrial sectors indicate that 38 substances were determined to be no longer manufactured or imported or intermediates, 10 were determined to be intermediates or wastes depending on the company, 3 substances were determined to be by-products or waste, 5 substances were determined to be wastes only, and 1 substance was determined to be an intermediate within the pulp and paper manufacturing sector. An exposure characterization of this last substance for a number of applications within other sectors determined that its potential for exposure to the environment is negligible. On the basis of the information available, the potential for exposure of these substances to the environment is considered either negligible or not expected.

Therefore, on the basis of the information available, the potential for exposure of the 57 inorganic UVCB substances to the environment is either negligible or not expected.

5.2 Characterization of ecological risk

On the basis of information obtained from multiple sources (regulatory survey, voluntary industry submissions, an in-depth literature review, and a search of material safety data sheets) the likelihood of exposure to the inorganics UVCBs included in this assessment and the potential for ecological harm are considered to be low.

Substances that are no longer manufactured or imported have a non-existent exposure potential. Substances that are intermediates (either site-restricted or sector restricted) are consumed on-site or further processed at other facilities where they are transient, indicating that they transformed into different substances. Additionally, measures (including provincial/territorial operating permit requirements and best practices and guidelines put in place by industry) exist to minimize releases from facilities during processing or transport. Disposal of wastes is also governed by such measures, and the substances are either disposed of on-site or sent to specialized facilities for disposal. The use of substances that have commercial applications as by-products must meet certain standards specified by operating permits or existing regulations or the uses identified have negligible exposure potential (e.g., immobilization of the substance in solid matrices or site-restricted uses).

Therefore, environmental exposure to the 57 substances is expected to be negligible, and harm to the environment is not expected. It is therefore proposed to conclude that the 57 inorganic UVCBs are not entering the environment in a quantity or concentration or under conditions that have or may have an immediate or long-term harmful effect on the environment or its biological diversity, or that constitute or may constitute a danger to the environment on which life depends.

6. Potential to cause harm to human health

Information obtained from the DSL IU Phase 2 survey, voluntary industry submissions, material safety data sheets and consumer product databases were searched to investigate the potential for exposure to consumers from products. On the basis of this search, exposure from products available to consumers is not expected.

Given that ecological exposure was considered either negligible or not expected, general population exposure to substances through environmental media was consequently considered to be either negligible or not expected. Additionally, uses identified (beyond the pulp and paper manufacturing sector in Table D-6) were not considered to result in exposure to the general population.

Accordingly, risk to human health is considered to be low for all 57 substances.

7. Assessment of uncertainties

Substances determined to be by-products may only be used if specific environmental criteria are met, and substances determined in this report to be intermediates or wastes are not expected to be released into the environment. Monitoring data for specific substances in the Canadian environment were not identified in order to systematically verify these assumptions. However, it is unclear whether analytical protocols exist to monitor these kinds of complex substances, and if releases were to occur, these are not anticipated to be in the original chemical form to which a CAS RN is attributed.

Because many potential individual components of these inorganic UVCBs are listed on Schedule 1, List of Toxic Substances, under CEPA, releases of these substances are already regulated at the federal or provincial levels. Additionally, releases of many individual components of the UVCB substances are reportable to the National Pollutant Release Inventory (NPRI) or to federal, provincial, and/or territorial monitoring and surveillance programs, and environmental monitoring data may be consulted when available in the context of other moiety assessments.

8. Conclusion

Considering all available lines of evidence presented in this draft screening assessment, there is low risk of harm to organisms and the broader integrity of the environment from the Sector-specific Inorganic UVCBs Group. It is proposed to conclude that the 57 substances in the Sector-specific Inorganic UVCBs Group do not meet the criteria under paragraphs 64(*a*) or (*b*) of CEPA as they are not entering the environment in a quantity or concentration or under conditions that have or may have an immediate or long-term harmful effect on the environment or its biological diversity or that constitute or may constitute a danger to the environment on which life depends.

On the basis of the information presented in this draft screening assessment, it is proposed to conclude that the 57 substances in the Sector-specific Inorganic UVCBs Group do not meet the criteria under paragraph 64(*c*) of CEPA as they are not entering the environment in a quantity or concentration or under conditions that constitute or may constitute a danger in Canada to human life or health.

Therefore, it is proposed to conclude that the 57 substances in the Sector-specific Inorganic UVCBs Group do not meet any of the criteria set out in section 64 of CEPA.

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Appendices

Appendix A. Substance identity information

Table A-1. Substance identity information for the Sector-specific Inorganics UVCBs group with a low potential for exposure

CAS RN	Chemical Name	DSL Definition
65996-69-2	Slags, ferrous metal, blast furnace	The fused substance formed by the action of a flux upon the gangue of the iron-bearing materials charged to a blast furnace and upon the oxidized impurities in the iron produced. Depending upon the particular blast furnace operation, the slag is composed primarily of sulfur and oxides of aluminum, calcium, magnesium, and silicon.
65996-71-6	Slags, steelmaking	The fused substance formed by the action of a flux upon the gangue of iron-bearing materials charged to a steelmaking furnace and upon the oxidized impurities in the steel produced. Depending upon the particular steelmaking operation, the slag is composed primarily of sulfur and oxides of aluminum, calcium, iron, magnesium, manganese, phosphorus, and silicon.
66071-92-9	Sulfite liquors and Cooking liquors, spent	The aqueous solution resulting from the reaction of lignocellulosic substances (wood or other agricultural fibre sources) with one or more pulping chemicals including those used in the kraft, sulfite, semichemical or other pulping processes. Composition is highly variable and includes excess pulping chemicals, dissolved and degraded cellulose, hemicellulose and lignin.
67711-90-4	Flue dust, copper-refining	Finely divided solid particles found in furnaces, flues and settling chambers as a result of copper refining operations such as roasting, smelting, melting and converting. Constituents found as end products are dependent on the materials used during various operations.
67711-91-5	Matte, copper	Product of smelting and/or converting of roaster calcines, concentrates, or cement copper with flux in equipment such as reverberatory, flash, or electric furnaces. Composed primarily of copper and copper, iron, and nickel sulfides with minor compounds of other metals.
67711-95-9	Slimes and Sludges, copper electrolytic	A complex combination of insoluble compounds either resulting from or formed during copper electrolytic refining.

CAS RN	Chemical Name	DSL Definition
67712-00-9	Slimes and Sludges, copper refining	A complex combination of insoluble compounds resulting from copper processing-other than electrolytic.
68131-30-6	Sulfite liquors and Cooking liquors, green	A solution obtained by dissolving the chemicals recovered in the alkaline pulping process in water.
68131-31-7	Sulfite liquors and Cooking liquors, spent, alkali-treated	No definition provided
68475-76-3	Flue dust, portland cement	A complex combination of finely divided inorganic particles separated from the exit gases formed during the manufacture of Portland cement. The flue dust consists of uncalcined raw materials along with partially calcined materials. Some Portland cement clinker is usually included. The major constituents of kiln dust are calcium carbonate, clays, shales, quartz and sulfate salts. The following materials may also be present:
69011-50-3	Zinc, dross	A scum formed on the surface of molten zinc and zinc alloys.
69029-52-3	Lead, dross	A scum formed on the surface of molten lead.
69011-54-7	Silver, bullion	A complex combination of substances resulting from the addition of zinc to kettles of lead bullion in the refining of lead. Consists predominantly of silver. May also contain various amounts of Pb, Sn, Fe, S, Ni, Ag.
69011-59-2	Lead alloy, base, dross	A scum formed on the surface of molten lead-base alloys. Includes those cases in which aluminum is used to remove arsenic, nickel and antimony.
69011-69-4	Cadmium, dross	A scum formed on the surface of molten cadmium.
69011-70-7	Cadmium, sponge	A precipitate obtained by treatment of slurried dusts from lead manufacturing with zinc.
69011-71-8	Aluminum dross	A scum formed on the surface of molten aluminum and molten aluminum alloys.
69011-72-9	Aluminum, manufg. cathodes, carbon	Spent carbon liner from the cathode of the aluminum reduction cell. Consists primarily of sodium, sodium fluoride, aluminum fluoride and carbon.
69011-86-5	Zinc ores, concs., preleached	Product of treatment of zinc concentrates with sulfuric acid to remove magnesium. Consists predominantly of lead and zinc sulfides.
69012-17-5	Waste solids, copper-casting	Cleanings from tanks used to cool copper castings.

CAS RN	Chemical Name	DSL Definition
69012-24-4	Wastewater, zinc sulfate electrolytic, acid	Electrolytic solution from electrolysis of zinc sulfate consisting primarily of zinc sulfate, manganese oxides and sulfuric acid.
69012-43-7	Slimes and Sludges, zinc sulfate electrolytic	Product resulting from cleaning anodes and electrolyzing cells in an electrolytic zinc plant with zinc sulfate. Consists primarily of oxides of lead and manganese and calcium sulfate.
69012-48-2	Residues, zinc-refining wastewater, zinc hydroxide	Product of hydrolysis and neutralization of zinc refinery wastewater. Consists primarily of zinc hydroxide, calcium sulfate and calcium sulfite.
69012-50-6	Matte, nickel	Product of smelting and/or converting of roaster calcines, concentrates, or cement nickel with flux in equipment such as reverberatory, flash, or electric furnaces. Composed primarily of nickel and nickel, iron, and copper sulfides with minor compounds of other metals.
69012-65-3	Fumes, zinc	Produced by vapor metallurgy during the remelting of zinc-rich lead blast-furnace slag. Consists primarily of zinc oxide and lead sulfate.
69012-67-5	Leach residues, copper cake	Product of the reaction of cadmium copper precipitate with sulfuric acid at 40°C to 90°C (104°F to 194°F), resulting in the selective dissolution of cadmium and zinc. Consists primarily of cadmium, copper, zinc and lead sulfate.
69012-69-7	Leach residues, zinc-fume	Residue filtered from solution after leaching zinc oxide fume with sulfuric acid. Consists of insoluble sulfates and hydroxides of various heavy metals.
69012-70-0	Leach residues, zinc ore-calcine	By-product of leaching calcined zinc ore concentrates with sulfuric acid. Consists primarily of lead sulfate with other calcium and iron salts and SiO2.
69012-73-3	Leach residues, zinc ore-calcine, zinc sulfur	Residue obtained by treating the hot acid leached filtrate of calcined zinc ore concentrates with zinc ore concentrates at 90°C (194°F). Consists primarily of ferrous sulfide, silica, sulfur and zinc sulfide.
69012-79-9	Calcines, zinc ore-conc.	Product of the reaction of zinc ore concentrates with air at 954°C to 1010°C (1750°F to 1850°F). Consists primarily of ZnO, ZnFeO2, ZnSO4 and a composite of metallic oxides.
69029-50-1	Lead, antimonial	Product from treatment of antimony slag from softening furnace and baghouse product with soda ash and coal

CAS RN	Chemical Name	DSL Definition
69029-67-0	Flue dust, lead-refining	By-product of refining lead ores obtained from baghouse and electro-static precipitator and as slurry from scrubbers.
69029-80-7	Residues, precious metal recovery lead refining	Residues from treating lead refinery ores and residues containing precious metals with sodium boroplumbate followed by thermal fusion.
69029-82-9	Residues, zinc dross	Residues from volatilizing zinc dross. Consist primarily of iron and iron oxides.
69029-84-1	Slags, lead smelting	Slag formed as the feed progresses through the blast furnace in lead smelting. Consists primarily of metallic elements and oxides of calcium, magnesium and silicon.
69029-85-2	Slags, precious metal recovery lead refining	Inorganic slags produced from treatment of calcined scrap metals and oxides with borax, litharge and sodium carbonate followed by fusion.
69029-93-2	Slimes and Sludges, lead refining	Product of neutralizing lead refining wastes to precipitate heavy metals.
69227-11-8	Lead, dross, copper-rich	A scum formed on the surface of molten copper.
84583-61-9	Slimes and Sludges, zinc electrolytic	Anodic sludge formed during the electrolysis of zinc sulfate solution. Contains MnO2, lead and silver.
84776-00-1	Slimes and Sludges, tin electrolytic	Substance resulting from the electrolytic deposition of tin and its alloys obtained from primary and secondary sources and including recycled plant intermediates. Composed primarily of tin, lead and antimony and may contain other residual metals and their compounds.
85116-70-7	Ashes (residues), galvanization	Insoluble material precipitated by zinc dust addition to crude zinc sulfate leach solutions. Consists primarily of cadmium, cobalt, copper, lead, manganese, arsenic, nickel, thallium, tin and zinc.
94552-05-3	Waste solids, lead silver anode	The slag or residue obtained when lead/silver anodes used in the electrolytic production of zinc are recast. Fusion of the alloys of lead and silver (manganese may also be present) and simultaneous oxidation occur.
96690-57-2	Waste solids, aluminum oxide electrolysis, cathodic	The lining of the cathodic portion of aluminum electrolysis cells consists of a carbon mass which, for the purpose of thermal isolation, is embedded in a layer of fireproof masses (SiO2 + Al2O3) in a steel vat. Flux and aluminum penetrate these masses during the furnace operation.

CAS RN	Chemical Name	DSL Definition
98072-44-7	Flue dust, precious metal refining	Finely divided solid particles found in furnaces, flues and settling chambers as a result of precious metals refining operations such as roasting, smelting, melting, and converting. Constituents found as end products are dependent upon the materials used during various operations.
98072-60-7	Slags, precious metal refining	Slags produced during various precious metals refining processes such as smelting, melting, or converting in equipment such as reverberatory, flash, or electric furnaces. Composition of the slag is dependent on the materials used during the various operations.
98072-61-8	Slimes and Sludges, precious metal refining	A complex combination of insoluble compounds resulting from precious metals processing-other than electrolytic.
121053-32-5	Flue dust, nickel-refining	Finely divided solid particles found in furnaces, flues and settling chambers as a result of nickel refining operations such as roasting, smelting, melting, and converting. Constituents found as end products are dependent upon the materials used during various operations.
121053-33-6	Slags, nickel-refining	Slags produced during various nickel refining processes such as smelting, melting, or converting in equipment such as reverberatory, flash, or electric furnaces. Composition of the slag is dependent on the materials used during the various operations.
124222-16-8	Residues, copper-refining	Substances resulting from the processing of copper bearing ores, concentrates, alloys, and other materials as incidental products which may be further processed for recovery of the valuable metals. These substances generally contain nickel, copper, cobalt, iron, and other non-ferrous metals and oxides, and are of widely variable composition.
124222-19-1	Slimes and Sludges, nickel electrolytic	A complex combination of insoluble compounds either resulting from or formed during nickel electrolytic refining.
124222-20-4	Slimes and Sludges, precious metal electrolytic	A complex combination of insoluble compounds either resulting from or formed during precious metals electrolytic refining.

CAS RN	Chemical Name	DSL Definition
124316-01-4	Slags, copper-refining	Slags produced during various copper refining processes such as smelting, melting, or converting in equipment such as reverberatory, flash, or electric furnaces. Composition of the slag is dependent on the materials used during the various operations.
125408-74-4	Slags, ferrous metal, blast furnace, desulfurizing	No definition provided
128704-79-0	Leach solutions, zinc refining	Solutions of variable composition used in, or produced by hydrometallurgical processes for the extraction and refining of zinc bearing materials. Such solutions may result from the leaching of a zinc bearing material, the removal of impurities from a depleted zinc electrolyte, or from the washing of solids such as precipitates and residues.
129618-34-4	Electrolytes, nickel-manufg.	A solution used in the electrolytic refining of nickel. The composition varies according to the particular process involved. The electrolyte generally contains high levels of nickel ions and lower levels of impurity metal ions such as copper, cobalt, lead, arsenic, bismuth, iron, selenium, tellurium, zinc and other non-ferrous metal ions. It also contains high levels of salts such as sodium chloride, sodium sulfate, sodium borate, sulfuric or hydrochloric acids and organic reagents.
129618-37-7	Solutions, precious metal hydrometallurgical	Solutions of variable composition used in, or produced by hydrometallurgical processes for the extraction and refining of platinum group metals, silver and gold. Such solutions may result from the leaching of precious metal bearing materials or the washing of solids such as precipitates and residues. The solutions generally contain metal ions of palladium, platinum, gold, silver and small amounts of rhodium, ruthenium, iridium and other non-ferrous elements such as copper, nickel, cobalt, lead, bismuth, antimony, arsenic, selenium and tellurium.
175448-53-0	Slags, lead smelting, zinc-reduced.	No definition provided

Appendix B. Quantities in commerce in Canada in 2011

Table B-1. Summary of manufacturing and importing quantity information obtained under Phase 2 of the DSL IU for the year 2011 for CMP 3 remaining priorities (tonnes) (Environment Canada 2013)

CAS RN	Chemical Name	SHI[a]	# of Compa-nies Manu-facturing	Quantity Manu-factured (t)	# of Compa-nies Impor-ting	Quantity Imported (t)	Main Indus-trial Sector
67711-90-4	Flue dust, copper-refining	-	Less than 4	10 000 to 100 000	0	0	Base metals
67711-91-5	Matte, copper	-	Less than 4	100 000 to 1 000 000	0	0	Base metals
67711-95-9	Slimes and Sludges, copper electrolytic	-	Less than 4	10 to 100	0	0	Base metals
67712-00-9	Slimes and Sludges, copper refining	-	Less than 4	10 000 to 100 000	0	0	Base metals
69011-54-7	Silver, bullion	-	Less than 4	1 000 to 10 000	Less than 4	100 to 1 000	Base metals
69011-59-2	Lead alloy, base, dross	-	Less than 4	100 to 1 000	0	0	Base metals
69011-69-4	Cadmium, dross	-	Less than 4	10 to 100	0	0	Base metals
69011-70-7	Cadmium, sponge	-	Less than 4	1 000 to 10 000	0	0	Base metals
69011-86-5	Zinc ores, concs., preleached	-	Less than 4	1 000 000 to 10 000 000	0	0	Base metals
69012-17-5	Waste solids, copper-casting	-	Less than 4	100 000 to 1 000 000	0	0	Base metals
69012-24-4	Wastewater, zinc sulfate electrolytic, acid	-	Less than 4	1 000 000 to 10 000 000	0	0	Base metals
69012-43-7	Slimes and Sludges, zinc sulfate electrolytic	-	Less than 4	10 to 100	0	0	Base metals

69012-48-2	Residues, zinc-refining wastewater, zinc hydroxide	-	Less than 4	1 000 000 to 10 000 000	0	0	Base metals
69012-50-6	Matte, nickel	-	Less than 4	100 000 to 1 000 000	Less than 4	0.010 to 0.1	Base metals
69012-65-3	Fumes, zinc	-	Less than 4	10 000 to 100 000	0	0	Base metals
69012-67-5	Leach residues, copper cake	-	Less than 4	1 000 to 10 000	0	0	Base metals
69012-69-7	Leach residues, zinc-fume	-	Less than 4	100 000 to 1 000 000	0	0	Base metals
69012-70-0	Leach residues, zinc ore-calcine	-	Less than 4	100 000 to 1 000 000	0	0	Base metals
69012-73-3	Leach residues, zinc ore-calcine, zinc sulfur	-	0	0	Less than 4	1 000 to 10 000	Base metals
69012-79-9	Calcines, zinc ore-conc.	-	Less than 4	100 000 to 1 000 000	0	0	Base metals
69029-50-1	Lead, antimonial	-	Less than 4	100 to 1 000	0	0	Base metals
69029-67-0	Flue dust, lead-refining	-	Less than 4	10 000 to 100 000	0	0	Base metals
69029-80-7	Residues, precious metal recovery lead refining	-	Less than 4	100 to 1 000	0	0	Base metals
69029-82-9	Residues, zinc dross	-	Less than 4	1 000 to 10 000	0	0	Base metals
69029-84-1	Slags, lead smelting	-	Less than 4	100 000 to 1 000 000	0	0	Base metals
69029-85-2	Slags, precious metal recovery lead refining	-	Less than 4	1 000 to 10 000	0	0	Base metals
69029-93-2	Slimes and Sludges, lead refining	-	Less than 4	1 000 to 10 000	0	0	Base metals
69227-11-8	Lead, dross, copper-rich	-	Less than 4	10 000 to 100 000	0	0	Base metals

84583-61-9	Slimes and Sludges, zinc electrolytic	-	Less than 4	1 000 to 10 000	0	0	Base metals
94552-05-3	Waste solids, lead silver anode	-	Less than 4	100 to 1 000	0	0	Base metals
98072-44-7	Flue dust, precious metal refining	-	Less than 4	1 000 to 10 000	0	0	Base metals
98072-60-7	Slags, precious metal refining	-	Less than 4	1 000 to 10 000	0	0	Base metals
98072-61-8	Slimes and Sludges, precious metal refining	-	Less than 4	100 to 1 000	0	0	Base metals
121053-32-5	Flue dust, nickel-refining	-	Less than 4	1 000 to 10 000	0	0	Base metals
121053-33-6	Slags, nickel-refining	-	Less than 4	100 000 to 1 000 000	Less than 4	0.010 to 0.1	Base metals
124222-16-8	Residues, copper-refining	-	Less than 4	10 000 to 100 000	0	0	Base metals
124222-19-1	Slimes and Sludges, nickel electrolytic	-	Less than 4	10 000 to 100 000	Less than 4	1 000 to 10 000	Base metals
124222-20-4	Slimes and Sludges, precious metal electrolytic	-	Less than 4	1 to 10	0	0	Base metals
124316-01-4	Slags, copper-refining	-	Less than 4	1 000 to 10 000	0	0	Base metals
128704-79-0	Leach solutions, zinc refining	-	Less than 4	1 000 000 to 10 000 000	0	0	Base metals
129618-34-4	Electrolytes, nickel-manufg.	-	Less than 4	1 000 000 to 10 000 000	0	0	Base metals
129618-37-7	Solutions, precious metal hydrometallurgical	-	Less than 4	1 to 10	0	0	Base metals
175448-53-0	Slags, lead smelting, zinc-reduced.	-	Less than 4	100 000 to 1 000 000	0	0	Base metals

69011-50-3	Zinc, dross	-	Less than 4	1 000 to 10 000	0	0	Base metals/ iron and steel
69029-52-3	Lead, dross	-	Less than 4	1 000 to 10 000	0	0	Base metals/ iron and steel
65996-69-2	Slags, ferrous metal, blast furnace	Less than 4	Less than 4	1 000 000 to 10 000 000	Less than 4	1 to 10	Iron and steel
65996-71-6	Slags, steelmaking	-	6	1 000 000 to 10 000 000	0	0	Iron and steel
84776-00-1	Slimes and Sludges, tin electrolytic	-	Less than 4	10 to 100	0	0	Iron and steel
85116-70-7	Ashes (residues), galvanization	-	Less than 4	10 to 100	0	0	Iron and steel
125408-74-4	Slags, ferrous metal, blast furnace, desulfurizing	-	Less than 4	10 000 to 100 000	0	0	Iron and steel
69011-71-8	Aluminum dross	-	5	10 000 to 100 000	0	0	Alumi-nium and auto-motive parts manu-facturing
69011-72-9	Aluminum, manufg. cathodes, carbon	-	Less than 4	1 000 to 10 000	Less than 4	1 000 to 10 000	Alumi-nium
96690-57-2	Waste solids, aluminum oxide electrolysis, cathodic	-	Less than 4	10 000 to 100 000	0	0	Alumi-nium
68475-76-3	Flue dust, portland cement	2	Less than 4	10 000 to 100 000	0	0	Cement manu-facturing

66071-92-9	Sulfite liquors and Cooking liquors, spent	-	Less than 4	100 000 to 1 000 000	0	0	Pulp and paper manu-facturing
68131-30-6	Sulfite liquors and Cooking liquors, green	-	Less than 4	1 000 000 to 10 000 000	Less than 4	1 to 10	Pulp and paper manu-facturing
68131-31-7	Sulfite liquors and Cooking liquors, spent, alkali-treated	1	Less than 4	100 000 to 1 000 000	4	10 to 100	Pulp and paper manu-facturing

[a.] SHI: responses provide voluntarily through the Stakeholder Interest form (SHI)

Appendix C. Substances use pattern in 2011

Table C-1. List and definitions of function codes and consumer and commercial codes submitted for the inorganic UVCBs under Phase 2 of the DSL IU

Function code	**Definitions**
U015 Intermediate	Substances consumed in a reaction to produce other substances for commercial advantage
U999 Other (specify)	Substances with a substance function not otherwise described in this table. A written description of the substance function must be provided when using this code
U002 Adhesives and sealant substances	Substances used to promote bonding between other substances, promote adhesion of surfaces, or prevent seepage of moisture or air
U007 Corrosion inhibitors and anti-scaling agents	Substances used in a paint or coating formulation to enhance properties such as water repellence, increased gloss, improved fade resistance, ease of application or foam prevention
U022 Plasticizers	Substances used in plastics, cement, concrete, wallboard, clay bodies, or other materials to increase their plasticity or fluidity
U023 Plating agents and surface treating agents	Substances applied to metal, plastic, or other surfaces to alter physical or chemical properties of the surface
Consumer and Commercial Codes	**Definitions**
C999 Other (specify)	Substances that are, or are contained in products, mixtures or manufactured items that are not described within any other Consumer and Commercial Code. A written description of the substance, product, mixtures or manufactured item must be provided when using this code.
C206 Metal materials not otherwise covered in this table	Substances that are, or are contained in, metal products, mixtures or manufactured items not otherwise covered in this table.
C201 Adhesives and sealants	Substances that are, or are contained in, adhesive or sealant products or mixtures used to fasten other materials together or prevent the passage of liquid or gas
C202 Paints and Coatings	Substances that are, or are contained in, paints or coatings
C204 Building or Construction Materials not otherwise covered in this table	Substances that are, or are contained in, electrical and electronic products, mixtures or manufactured items.
Code is CBI	-

CBI: Confidential Business Information

Appendix D. Function codes and exposure potential types of the Sector-specific Inorganics UVCBs Group

Table D-1. Substances associated with the base metals processing sector

CAS RN	Function code and/or consumer and commercial code	U999 / C999 Details and Other Information	Type
67711-91-5	U015 and U999	No longer manufactured in 2014 (ECCC 2016b).	Intermediate / No longer manufactured
67711-95-9	U015	Substance is refined hydrometallurgically and the resulting product is sent off-site for additional metal recovery (ECCC 2016b).	Intermediate
69011-59-2	U015	-	Intermediate
69011-69-4	U015	-	Intermediate
69012-24-4	U015	-	Intermediate
69012-65-3	U015	-	Intermediate
69012-70-0	U015	-	Intermediate
69012-73-3	U015	-	Intermediate
69012-79-9	U015	-	Intermediate
69029-80-7	U015	-	Intermediate
69029-82-9	U015	-	Intermediate
69029-85-2	U015	-	Intermediate
69029-93-2	U015	-	Intermediate
84583-61-9	U015	-	Intermediate
94552-05-3	U015	-	Intermediate
124222-16-8	U015	-	Intermediate
124222-19-1	U015 and U023	Further processed on-site	Intermediate
124222-20-4	U015	-	Intermediate
128704-79-0	U015	-	Intermediate
129618-34-4	U015	The substance is consumed during the production of electrolytic Ni and the process is > 99% efficient (ECCC 2016b)	Intermediate
175448-53-0	U015	-	Intermediate
67712-00-9	U015 and U999	U999: recycled for metal recovery	Intermediate

CAS RN	Function code and/or consumer and commercial code	U999 / C999 Details and Other Information	Type
69012-50-6	U015 and U999	U999: further processed. Matte is produced at the smelter and cast into anodes which are consumed at the refinery (ECCC 2016b)	Intermediate
69012-67-5	U015 and U999	U999: recycled for metal recovery	Intermediate
69029-50-1	U015 and U999	U999: further processed on-site	Intermediate
69029-67-0	U015 and U999	U999: further processed, generally on-site	Intermediate
69227-11-8	U015 and U999	U999: further processed on-site	Intermediate
121053-32-5	U015 and U999	Recycled back into the smelter process (ECCC 2016b)	intermediate
124316-01-4	U015 and U999	U999: further processed, recycled. Re-processed on-site to recover Ni/Cu (ECCC 2016b)	Intermediate
69011-50-3	U015	-	Intermediate
69029-52-3	U015 and U999	U999: further processed	Intermediate
69011-54-7	U999	U999: further refined or trans-formed	Intermediate
69011-86-5	U999	U999: further processed	Intermediate
67711-90-4	U015 and U999	U999: recycled for metal recovery. Approximately 95% recycled directly to the smelter; 5% disposed of onsite (ECCC 2016b)	Intermediate or waste
69011-70-7	U015 and U999 / C999	C999: recycled or disposed of. Cadmium products may be sold for further refinement (Cheminfo 2013)	Intermediate or waste
69012-17-5	U015 and U999	Materials not further processed are disposed of on-site (Environment Canada 2013)	Intermediate or waste
69012-48-2	U015 and U999	U999: disposed of. Sludge disposed of at the on-site impoundment area (Hatch 2004)	Intermediate or waste

CAS RN	Function code and/or consumer and commercial code	U999 / C999 Details and Other Information	Type
98072-44-7	U015 and U999 / C999	C999: recycled or disposed of. Residues from precious metal refineries are usually recycled (Environment Canada 2002; GAL & IBI 2009)	Intermediate or waste
98072-60-7	U999 / C999	C999: recycled or disposed of. Residues from precious metal refineries are usually recycled (Environment Canada 2002; GAL & IBI 2009)	Intermediate or waste
98072-61-8	U999 / C999	C999: recycled or disposed of. Substance is refined hydrometallurgically and the resulting product is sent off-site for additional metal recovery (ECCC 2016b).	Intermediate or waste
129618-37-7	U999 / C999	C999: recycled or disposed of. Substance is refined hydrometallurgically and the resulting product is sent off-site for additional metal recovery (ECCC 2016b).	Intermediate or waste
69029-84-1	U015 and U999	U999: waste stored on site	Waste
69012-43-7	U999	U999: waste; stored and managed on-site (Environment Canada 2002)	Waste
69012-69-7	U999	U999: waste; stored and managed on-site (Environment Canada 2002)	Waste
121053-33-6	U999	Sent to the slag storage area onsite (ECCC 2016b)	Waste

Table D-2. Substances associated with the iron and steel manufacturing sector

CAS RN	Function Code and/or Consumer and Commercial Code	U999 and C999 Details and Other Information	Type
69011-50-3	U999 and C999	Created during galvanizing; recycled to recover zinc	Intermediate

CAS RN	Function Code and/or Consumer and Commercial Code	U999 and C999 Details and Other Information	Type
69029-52-3	U999 and C999	Created during galvanizing; recycled to recover lead	Intermediate
84776-00-1	U999 and C999	Created during the coating of steel with tin; recycled to recover tin	Intermediate
85116-70-7	U999 and C999	Created during galvanizing; recycled to recover zinc	Intermediate
65996-69-2	U999 and C204, C999	By-product used as aggregate or other applications (e.g., concrete); waste (EHS 2013)	By-product or Waste
65996-71-6	U999 and C204, C999	By-product used as aggregate or other applications (e.g., concrete); waste (EHS 2013)	By-product or Waste
125408-74-4	U999 and C999	By-product used for other applications	By-product or Waste

Table D-3. Substances associated with the aluminium smelting and automotive parts manufacturing sectors

CAS RN	Function Code and/or Consumer and Commercial Code	U999 and C999 Details	Type
69011-71-8	U999 and C999	Residue that is recycled or disposed of	Waste or Intermediate
69011-72-9	U999 and C999	Cathode used in the electrolysis process / residue	Intermediate
96690-57-2	U999 and C999	Residue / waste	Waste

Table D-4. Substances associated with the pulp and paper manufacturing sector

CAS RN	Function Code and/or Consumer and Commercial Code	C999 Details	Type

CAS RN	Function Code and/or Consumer and Commercial Code	C999 Details	Type
66071-92-9	U015 and C999	Intermediate chemicals manufactured by sulfite mills	Intermediate
68131-30-6	U015 and C999	Intermediate chemicals manufactured by sulfite mills	Intermediate
68131-31-7	U015 and C999	Intermediate chemicals manufactured by sulfite mills	Intermediate

Table D-5. Substances associated with the cement manufacturing sector

CAS RN	Function Code and/or Consumer and Commercial Code	Other Information	Type
68475-76-3	U999 and C204	The substance is identified as a waste produced during cement production which is recycled back into the process, (ECCC 2016a)	Intermediate or waste

Table D-6. Results from DSL IU Phase 2 (year 2011) and from voluntary stakeholder engagement (year 2014-2016) for uses within other sectors of activity (Environment Canada 2013; ECCC 2016b)

Substance (CAS RN)	Import quantity (kg)	Function Codes	Commercial and Consumer Codes
Slags, ferrous metal, blast furnace (CAS RN 65996-69-2)	1000 – 10 000 (year 2011)	**U999** (other) Concrete admixture, Mortar, Cementitious patch, Exterior coating	**C201** Adhesives and sealants; **C202** Paints and coatings; **C204** Building or construction materials not otherwise covered in this table
Sulfite liquors and Cooking liquors, green (CAS RN 68131-30-6)	1000 – 10 000 (year 2011)	CBI	**C202** Paints and coatings
Sulfite liquors and Cooking liquors, green (CAS RN 68131-30-6)	No longer imported in 2015	-	-

Sulfite liquors and Cooking liquors, spent alkali-treated (CAS RN 68131-31-7)	10 000 – 100 000 (2011)	**U999** (other) Concrete admixture **U999** (other) dust control binding agent; **U022** plasticizers; **U007** Corrosion inhibitors and anti-scaling agents	**C204** Building or construction materials not otherwise covered in this table; **C999** (other) product is a binder to control fugitive dust from storage piles and haul roads; CBI
Sulfite liquors and Cooking liquors, spent alkali-treated (CAS RN 68131-31-7)	2014-2016	**U999** (other) Concrete admixture; **U999** (other) dust control binding agent; CBI	**C204** Building or construction materials not otherwise covered in this table; **C999** (other) product is a binder to control fugitive dust from storage piles and haul roads; CBI

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