DISCUSSION DOCUMENT

Review of the Definitions of Hazardous Waste and Hazardous Recyclable Materials under the *Cross-Border Movement of Hazardous Waste and Hazardous Recyclable Materials Regulations*

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Table of content

1 Acronyms 1
2 Introduction 2
3 Purpose of this document 2
4 Context 2
5 Scope of the review 4
6 How to submit comments 9
7 Appendix 1: Schedule 1 CEPA Toxic Substances 10
8 Appendix 2: Stockholm Convention Persistent Organic Pollutants 16
9 Appendix 3: Summary of questions 17

1 Acronyms

CCME - Canadian Council of Ministers of the Environment

CEPA - Canadian Environmental Protection Act, 1999

HRM - Hazardous recyclable material

HW - Hazardous waste

OECD - Organisation for Economic Co-operation and Development

POP - Persistent Organic Pollutant

TDGR - Transportation of Dangerous Goods Regulations

US EPA - United States Environmental Protection Agency

WHO - World Health Organization

XBR - Cross-Border Movement of Hazardous Waste and Hazardous Recyclable Material Regulations

2 Introduction

Environment and Climate Change Canada (the Department) is initiating its review of the definitions of hazardous waste (HW) and hazardous recyclable material (HRM) under the Cross-Border Movement of Hazardous Waste and Hazardous Recyclable Material Regulations (XBR) with the goal of developing a proposal for updated definitions. While specific changes were made to the definitions during the development of the XBR, an extensive review was not within the scope of that exercise. There is a need to update these definitions to better reflect the current waste and recyclable materials of concern, to provide greater clarity to both the regulated community and the Department, and to ensure appropriate environmental protection related to the transboundary movement of these HW and HRM.

3 Purpose of this document

The purpose of this document is to:

- Discuss the elements of the current definitions of HW and HRM that are included in the review; and
- Provide an opportunity for stakeholders and interested parties to give feedback on the current definitions as well as to supply information

All comments received will be considered in conducting further consultations and analyzing and developing options to be undertaken as part of the review of the definitions of HW and HRM.

4 Context

Under the *Canadian Environmental Protection Act*, 1999, (CEPA) the Department administers the XBR, which control the transboundary movement of hazardous waste and hazardous recyclable material. These regulations consolidated and replaced the 3 previous regulations: the Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations, the PCB Waste Export Regulations, 1996 and the Interprovincial Movement of Hazardous Waste Regulations. The XBR were published in Canada Gazette, Part II on March 17, 2021 and came into force on October 31, 2021.

The XBR aim to ensure that shipments of HW and HRM crossing Canada's international and inter-provincial or territorial borders reach their intended destination thus reducing the risk of release of contaminants to the environment, in Canada and abroad. They also contribute to Canada's ability to meet its obligations and commitments under three international instruments respecting the management and international movement of hazardous waste and other waste. These instruments are:

- the United Nations Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention)
- the Decision of the Council of the Organisation for Economic Co-operation and Development (OECD Decision) on the Control of Transboundary Movements of Wastes Destined for Recovery Operations, OECD/LEGAL/0266[1]; and
- the Canada-USA Agreement on the Transboundary Movement of Hazardous Wastes (Canada-US Agreement)

[1] OECD, Decision of the Council on the Control of Transboundary Movements of Wastes Destined for Recovery Operations, OECD/LEGAL/0266 https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0266#mainText

In addition, the Stockholm Convention on Persistent Organic Pollutants (POPs) is an international agreement that is relevant to the management of HW and HRM containing POPs.

The definitions of HW and HRM used in Canadian federal legislation have not changed much in the last 15 years. Yet, over the years, the types of HW and HRM being managed have changed in terms of their composition, constituents, and characteristics. This is in addition to new streams of HW/HRM that have been brought into the market in the past 2 decades. Furthermore, during the development of the XBR, the Department received feedback from stakeholders who raised concerns related to the definitions of HW and HRM. While updating the definitions of HW and HRM was not within the scope of the recent development of the XBR, the Department is now initiating a process dedicated to this endeavour.

Moreover, international guidance and standards related to waste and recyclable material have been developed in the coinciding years. Of particular importance, there is ongoing work under the Basel Convention to review annexes of the Convention on disposal operations (Annex IV), categories of waste to be controlled (Annex I), and list of hazardous characteristics (Annex III). Additionally, a number of technical guidelines related to environmentally sound management practises are being developed or have been developed for specific waste streams under the Basel Convention.

4.1 Current definitions

The definitions of HW and HRM in the XBR include anything that is to be disposed of or recycled using an operation specified in Schedule 1 of these regulations, and meets one or more of the following, and to which none of the exclusions listed in subsections 2(2), 4(2) and 4(3) apply:

a) is set out in Column 2 of Schedule 6 (Schedule 6 – listed HW or HRM)
b) the criteria for inclusion in one of Classes 2-6, 8 and 9 as set out in Part 2 of the Transportation of Dangerous Goods Regulations (TDGR)
c) contains a substance set out in column 3 of Schedule 7 that is in a concentration equal to or greater than the concentration set out in column 4 of that Schedule
d) produces a leachate that contains an environmentally hazardous constituent set out in column 3 of Schedule 2 that is in a concentration equal to or greater than the concentration set out in column 4 of that Schedule; or
e) is set out in column 3 of Schedule 8, is either pure or the only active ingredient and is unused

In addition, anything that is to be disposed of or recycled using an operation specified in Schedule 1 of the XBR, if it is to be exported to a country of destination or conveyed in transit through Canada or a foreign country and meets one or more of the following, is considered HW or HRM:

a) it is defined as, or considered to be, hazardous under the legislation of the country of destination or country of transit
b) its import is prohibited under the legislation of the country of destination; or
c) it is one of the hazardous wastes referred to in Article 1, subparagraph 1(a) of the Basel Convention or of the other wastes referred to in Article 1, paragraph 2 of the Convention, with the exception of waste referred to in Article 1, paragraphs 3 and 4 of the Convention – as it reads on May 5, 1992, as amended from time to time, to the extent that the amendments are binding on Canada – and the country of destination is a party to the Convention

5 Scope of the review

The scope of the review includes the following elements of the definitions of HW and HRM in the XBR:

- approach to determining when something is a waste or recyclable material
- lists of HW and HRM - what should be included and how a listing approach can be used
- constituents and substances of concern contained in a waste or recyclable material and the threshold concentrations above which the waste or material would be considered hazardous
- criteria for determining whether a waste or recyclable material exhibits a hazardous characteristic
- how waste subject to the Basel Convention should be captured to improve clarity and facilitate implementation; and
- exclusions from the definitions of HW and HRM

As part of the review, the Department is seeking stakeholders' and interested persons' views on the elements of the definitions of HW and HRM under review. In addition to the guiding questions that are provided at the end of each section, here are some overarching questions that may assist you in formulating your comments:

Overarching questions

Q1. What are some of the challenges you face in relation to the definitions of HW and HRM?

Q2. What are the gaps in the current definitions? How could the definitions be modified to address these gaps?

Q3. Are you aware of technical information (for example risk assessments, toxicity studies) that would be helpful for the review of the definitions?

Upon request, the input that you provide will be treated as confidential business information.

5.1 Approach to identifying waste and recyclable material

The current approach to identify whether something is a waste or recyclable material within the definitions of HW and HRM of the XBR is based on whether it is to be **disposed of** or **recycled** using one of the operations in Schedule 1 of the XBR. Examples for disposal and recycling operations include specially engineered landfilling, such as placement into separate lined cells that are isolated from each other and the environment and recovery of metals and metal compounds, respectively. A similar approach is taken in the Basel Convention and is also how the OECD defines waste.

However, for international exports of waste or recyclable materials, the disposal or recycling operation occurs in another country, and that can make it difficult to confirm which specific operation listed in XBR Schedule 1 is applicable.

The Department wants to provide clarity on what is considered waste and recyclable material under CEPA and the XBR. The goal of the review is to establish criteria that can be assessed in Canada to identify a waste or recyclable material.

The Department is seeking guidance, case studies or sources for selecting criteria or characteristics to define and differentiate waste from recyclable materials.

Guiding question - approach

Q4. What criteria or characteristics should be considered by the Department for further review to define waste and recyclable materials and distinguish them?

5.2 Constituents, substances and associated thresholds

The current lists of constituents, substances and associated thresholds in Schedule 2 and Schedule 7 of the XBR were developed many years ago. In addition, many substances on Schedule 1 of CEPA and persistent organic pollutants are not captured in either Schedule 2 or Schedule 7 of the XBR. Some of these constituents and substances may pose a risk to the environment or human health when found in waste or recyclable material.

The goal of the review of the lists of constituents, substances and associated thresholds is to update thresholds outlined in XBR Schedule 2 and XBR Schedule 7 and to identify additional substances and their associated thresholds for inclusion. There will be a focus on substances listed on Schedule 1 of CEPA and on POPs. Stakeholders and interested parties are encouraged to provide any technical studies on or feedback for constituents, substances and/or their threshold values.

Guiding questions – technical/scientific information

Q5. Based on technical studies, are there substances that should be added to the definitions of HW and HRM?

Q6. Are there thresholds for substances that should be updated based on technical/scientific information?

Q7. What challenges have you encountered when using leachate or concentration thresholds?

5.2.1 Environmental guidelines

The Department has identified guidelines that could be used to update constituents, substances and associated thresholds. These include:

- Canadian Drinking Water Quality Guidelines
- Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines;
- CCME Sediment Quality Guidelines
- CCME Tissue Residue Guidelines
- US EPA Maximum Contaminant Levels in the National Primary Drinking Water Regulations
- World Health Organization (WHO); and
- Relevant Basel Convention Technical Guidelines on the environmentally sound management of wastes

Preliminary analysis on the application of these guidelines has been conducted. However, stakeholders and interested parties are encouraged to provide technical information on how these guidelines might or might not apply to certain types of substances, and propose additional guidelines related to this review.

Guiding questions – environmental guidelines

Q8. What should be considered when using these guidelines to develop/modify thresholds?

Q9. Are there additional guidelines that should be considered in the development of thresholds? If so, why?

5.2.2 CEPA Schedule 1 – Toxic substances list

As part of this review, the Department has started to evaluate whether toxic substances listed in Schedule 1 of CEPA should be included in the definition of HW and HRM. Although some of the CEPA toxic substances are already included in the definitions, a number of them are not (Appendix 1, Table B).

Based on the Department's preliminary review, there are 62 CEPA toxic substances out of 150 included in one of the schedules to the XBR (Appendix 1, A). Of these 62 substances, 22 substances are exclusively included in XBR Schedule 8 in a pure and unused form, while the remaining 40 are spread out across XBR Schedule 2 (20 substances), XBR Schedule 6 (2 substances), or XBR Schedule 7 (19 substances), with some appearing in multiple schedules. The Department is considering whether to include additional substances from Schedule 1 of CEPA to the XBR.

The Department is requesting feedback on the criteria and/or characteristics to be considered to identify substances of concern in waste and whether these substances should be integrated into the XBR and definitions of HW and HRM. In addition, the Department is seeking input on methods to select appropriate and relevant threshold limits for substances of concern in waste.

Guiding questions – CEPA toxics

Q10. Should the definitions of HW and HRM capture additional toxic substances listed in Schedule 1 of CEPA?

- If so, which CEPA toxic substances should be included?
- What criteria should the Department use to make this risk-based evaluation?

Q11. Are there any CEPA toxic substances that are not relevant to waste or recyclable material?

5.2.3 Persistent Organic Pollutants

As part of the review of the definitions of HW and HRM, the Department is reviewing whether additional persistent organic pollutants listed under the Stockholm Convention should be added to the definitions.

Presently, the definitions under the XBR capture 17 of 30 POPs listed under the Stockholm Convention (Appendix B). The Department is considering whether to include additional POPs listed under the Stockholm Convention that are not captured in the XBR (Appendix B).

The Department is also considering adding a threshold based on the low POP content as set out in the Basel Convention technical guidelines, above which the waste or recyclable material would be considered hazardous. The Department is requesting feedback and comments on elements relating to the inclusion of POPs in the definition of HW and HRM.

Guiding questions - POPs

Q12. Should the definitions of HW and HRM capture additional POPs that are listed under the Stockholm Convention?

- If so, which additional POPs should be included? And in what waste streams would they be present?
- What criteria should the Department use to make this risk-based evaluation?

Q13. What are some of the challenges that industry would face by adding POPs?

5.3 Hazardous characteristics

Currently, the definitions of HW and HRM include hazardous characteristics by referencing the criteria for inclusion in Classes 2 to 6, 8 and 9 of the TDGR[2]. These hazardous characteristics are analogous to the Basel Convention Annex III hazardous characteristics H3 to H8. However, additional characteristics could be added to the definitions to account for characteristics that are more focused on chronic effects on human health and the environment.

Specifically, some hazardous characteristics relating to human health that could be further considered include low acute toxicity, serious eye damage/eye irritation, respiratory/skin sensitization, germ cell mutagenicity, carcinogenicity, reproductive toxicity, and specific target organ toxicity. Examples of hazard characteristics related to the environment that can be examined further include ecotoxicity and other delayed or chronic effects such as carcinogenicity.

The goal of the review of hazardous characteristics is to identify criteria that could be used for chronic, longer-term environmental and health impacts, that could be taken into consideration when listing new waste or recycling streams and to identify the advantages and disadvantages of such an approach.

Guiding questions – hazardous characteristics

Q14. How can the definitions of HW and HRM better capture waste and recyclable materials that have chronic long-term effects on human health and/or the environment?

Q15. What new hazardous characteristics (in other words carcinogenicity, reproductive toxicity, chronic toxicity to the aquatic environment) should the Department consider as part of the review to address long-term cumulative environmental and health hazards?

- What are the challenges in integrating these new hazard characteristics into the definitions?

[2] Classes 1 and 7 are controlled under other Canadian legislation.

- For any new hazard characteristic, are there available laboratory test methods, toxicity data or other sources of information for testing?

5.4 Lists of Hazardous waste and Hazardous recyclable materials

The current list of HW and HRM in Schedule 6 of the XBR sets out eight waste and recyclable material streams that are deemed hazardous. Examples include biomedical waste, used oil, batteries, circuit boards and display devices, and some substances that are on Schedule 1 of CEPA such as dioxins and furans.

A listing approach like this one has the advantage of being a simple and straightforward indication of whether a waste or recyclable material is hazardous given that there is no need to determine whether the waste or material exhibits one or more hazardous characteristics. However, a listing approach limits the inclusion of new streams of waste and recyclable material that may exhibit a hazardous characteristic not yet captured on the list. There is also the potential of the list becoming outdated if a listed waste or recyclable material no longer exhibits a hazardous characteristic. The goal of the review of HW and HRM streams is to provide greater flexibility to capture relevant streams.

As part of the review, the Department is evaluating the advantages and disadvantages of a listing approach versus an approach that considers criteria to designate specific streams of waste and recyclable materials as hazardous. For the listing approach, a standard framework for identifying and determining whether specific waste streams should be listed would ensure clarity and consistency. This framework would identify potential waste streams and substances or constituents by considering different factors and/or parameters, such as global concern, environmental threat/risk and/or health concern. The Department is seeking input into/regarding challenges and opportunities for each approach (listing vs criteria) as part of the review.

Guiding questions – listing versus criteria approach

Q16. Should the Department use a listing approach or a criteria approach to designate waste streams as hazardous and why? What are the pros/cons for each approach (listing vs criteria)?

Q17. Which factors or criteria (i.e. health concern, environmental concern, etc) should be considered by the Department to identify and designate certain waste streams as hazardous and why?

5.5 Capturing Basel Convention waste

Under sections 3 and 5 of the XBR, the current definitions of HW and HRM capture waste (including recyclable material) that is subject to the Basel Convention when it is exported to a Basel country. The HW or HRM captured in this manner includes waste that is hazardous under the Convention; waste that is hazardous according to the importing/transit country; waste which is prohibited to be imported in the importing country; and waste that is other waste listed in Annex II of the Convention. This approach requires regulatees to have knowledge of the terminology in the Convention and information on what is hazardous or prohibited in importing countries. The Department is seeking views on how to improve clarity and facilitate implementation in regards to the Basel Convention.

Guiding question – Basel Convention

Q18. How can the implementation of the reference to the Basel Convention be facilitated?

5.6 Exclusions

Currently, there are a number of exclusions from the definitions of HW and HRM under the XBR. For instance, some waste and recyclable materials are excluded because they are managed under other legislation or international agreements. Other recyclable materials are excluded to encourage recycling. The Department review includes a consideration of these exclusions to improve clarity, facilitate implementation of the XBR, and determine if they are still appropriate and needed. The review will also establish criteria to be taken into consideration when identifying new wastes or recyclable materials to be excluded.

Guiding questions - exclusions

Q19. What are some of the challenges or issues facing regulatees in applying the existing exclusions to the definitions?

Q20. What considerations or criteria should the Department contemplate in reviewing exclusions and their appropriateness for Canadian waste streams?

Q21. Are existing exclusions appropriate and needed? Which exclusions should be modified? If so, how?

Q22. Are there any additional exclusions that should be proposed? If so, why?

6 How to submit comments

You are invited to provide comments on this discussion document during the 45-day comment period, which ends on May 23, 2022. In Appendix 3, you will find a summary of all questions listed throughout the document.

A summary of the comments received will be posted on the Department's website. The comments will be considered in the development of further consultations on specific issues and options to be undertaken as part of the review of the definitions of HW and HRM under the XBR.

Please send your comments on this discussion document to the email address below. Please indicate "**HW & HRM Definition**" in the subject line of your message. If you have any questions with respect to the consultation process, the discussion document, or the XBR, please contact us at the email indicated below.

Email: mt-tm@ec.gc.ca

You are welcome to further distribute this document.

7 Appendix 1: Schedule 1 CEPA Toxic Substances

7.1 CEPA Toxic Substances Captured in definition of XBR

#	CEPA Toxic #	XBR Substance	XBR Schedule
1	36	1,2-Dichloroethane	Schedule 2
2	26	Benzene	Schedule 2
3	43*	Benzo[a]pyrene	Schedule 2
4	31	Cadmium	Schedule 2
5	56*	Chloramine	Schedule 2
6	33*	Chromium	Schedule 2
7	37	Dichloromethane	Schedule 2
8	40	Fluoride	Schedule 2
9	144	Selenium	Schedule 2
10	16, 17	Polychlorinated dibenzo dioxins and furans	Schedule 2, Schedule 6
11	69	Dichlorodiphenyltrichloroethane (DDT)	Schedule 2, Schedule 7, Schedule 8
12	28	Arsenic	Schedule 2, Schedule 8
13	18	Carbon tetrachloride	Schedule 2, Schedule 8
14	39	Hexachlorobenzene	Schedule 2, Schedule 8
15	66	Hexachlorobutadiene	Schedule 2, Schedule 8
16	7	Lead	Schedule 2, Schedule 8
17	8	Mercury	Schedule 2, Schedule 8
18	44	Tetrachloroethylene	Schedule 2, Schedule 8
19	45	Trichloroethylene	Schedule 2, Schedule 8
20	9	Vinyl chloride	Schedule 2, Schedule 8
21	3	Polybrominated biphenyls	Schedule 6
22	5	Polychlorinated terphenyls	Schedule 6
23	53	Ammonia; Ammonia solutions	Schedule 7
24	141*	Cobaltous bromide	Schedule 7
25	141*	Cobaltous formate	Schedule 7
26	141*	Cobaltous sulphamate	Schedule 7
27	42*	Nickel ammonium sulphate	Schedule 7
28	42*	Nickel chlorides	Schedule 7
29	42*	Nickel hydroxides	Schedule 7
30	42*	Nickel sulphates	Schedule 7
31	1	Polychlorinated biphenyls	Schedule 7
32	127	Quinoline	Schedule 7
33	48	Acetaldehyde	Schedule 7, Schedule 8
34	52	Acrolein, stabilized	Schedule 7, Schedule 8
35	50	Acrylonitrile, stabilized	Schedule 7, Schedule 8
36	29*	Benzidine	Schedule 7, Schedule 8

37	34	Creosote	Schedule 7, Schedule 8
38	58	Formaldehyde	Schedule 7, Schedule 8
39	88	Naphthalene	Schedule 7, Schedule 8
40	121	Vanadium pentoxide, non-fused form	Schedule 7, Schedule 8
41	114	Benzene, (chloromethyl-)	Schedule 8 - Part 1
42	28*	Arsenic acid (H_3AsO_4)	Schedule 8 – Part 1
43	28*	Arsenic oxide (As_2O_3)	Schedule 8 – Part 1
44	28*	Arsenic oxide (As_2O_5); Arsenic pentoxide	Schedule 8 – Part 1
45	42*	Nickel carbonyl ($Ni(CO)_4$), (T-4)-	Schedule 8 – Part 1
46	42*	Nickel cyanide (Ni(CN)	Schedule 8 – Part 1
47	62	Nitric oxide	Schedule 8 – Part 1
48	63	Nitrogen dioxide	Schedule 8 – Part 1
49	59	N-nitrosodimethylamine	Schedule 8 – Part 1
50	22	Methyl bromide	Schedule 8 - Part 2
51	19	Methyl chloroform	Schedule 8 - Part 2
52	72*	1,2,4,5-tetrachlorobenzene	Schedule 8 – Part 2
53	110	2-propenamide	Schedule 8 – Part 2
54	35	3,3'-Dichlorobenzidine	Schedule 8 – Part 2
55	24	Chloromethyl methyl ether	Schedule 8 – Part 2
56	57	Ethylene oxide	Schedule 8 – Part 2
57	99	Oxirane, (chloromethyl)-	Schedule 8 – Part 2
58	73	Pentachlorobenzene	Schedule 8 – Part 2
59	115	Propane, 2-nitro-	Schedule 8 – Part 2
60	109	Sulfuric acid, dimethyl ester	Schedule 8 – Part 2
61	97	Thiourea	Schedule 8 – Part 2
62	89	Toluene diisocyanate	Schedule 8 – Part 2

*The CEPA toxic entry is broader than the XBR entry.

7.2 CEPA Toxic Substances Not Captured in definition of XBR

#	CEPA Toxic #	CEPA Toxic substance
1	2	Dodecachloropentacyclo [5.3.0.$0^{2,6}$.$0^{3,9}$.$0^{4,8}$] decane (Mirex)
2	6	Asbestos
3	10	Bromochlorodifluoromethane that has the molecular formula CF_2BrCl
4	11	Bromotrifluoromethane that has the molecular formula CF_3Br
5	12	Dibromotetrafluoroethane that has the molecular formula $C_2F_4Br_2$
6	13	Fuel containing toxic substances that are dangerous goods within the meaning of section 2 of the Transportation of Dangerous Goods Act, 1992 and that (a) are neither normal components of the fuel nor additives designed to improve the characteristics or the performance of the fuel or (b) are normal components of the fuel or additives designed to improve the characteristics or performance of the fuels, but are present in quantities or concentrations greater than those generally accepted by industry standards
7	14	Dibenzo-para-dioxin that has the molecular formula of $C_{12}H_8O_2$

8	15	Dibenzofuran that has the molecular formula $C_{12}H_8O$
9	20	Bromofluorocarbons other than those set out in items 10 to 12
10	21	Hydrobromofluorocarbons that have the molecular formula $C_nH_xF_yBr_{(2n+2-x-y)}$ in which $0<n\leq3$
11	23	Bis(chloromethyl) ether that has the molecular formula $C_2H_4Cl_2O$
12	25	Hydrochlorofluorocarbons that have the molecular formula $C_nH_xF_yCl_{(2n+2-x-y)}$ in which $0<n<3$
13	27	(4-Chlorophenyl)cyclopropylmethanone,O-[(4-nitrophenyl)methyl]oxime that has the molecular formula $C_{17}H_{15}ClN_2O_3$
14	30	Bis(2-ethylhexyl)phthalate
15	32	Chlorinated wastewater effluents
16	38	Effluents from pulp mills using bleaching
17	41	Refractory ceramic fibre
18	46	Tributyltetradecylphosphonium chloride that has the molecular formula $C_{26}H_{56}P\cdot Cl$
19	47	Bromochloromethane, that has the molecular formula CH_2BrCl
20	49	1,3-Butadiene, which has the molecular formula C_4H_6
21	51	Respirable particulate matter less than or equal to 10 microns
22	54	Nonylphenol and its ethoxylates
23	55	Effluents from textile mills that use wet processing
24	60	Gaseous ammonia, which has the molecular formula $NH_3(g)$
25	61	Ozone, which has the molecular formula O_3
26	64	Sulphur dioxide, which has the molecular formula SO_2
27	67	Particulate matter containing metals that is released in emissions from copper smelters or refineries, or from both
28	68	Particulate matter containing metals that is released in emissions from zinc plants
29	70	2-butoxyethanol, which has the molecular formula $C_6H_{14}O_2$
30	71	2-methoxyethanol, which has the molecular formula $C_3H_8O_2$
31	74	Carbon dioxide, which has the molecular formula CO_2
32	75	Methane, which has the molecular formula CH_4
33	76	Nitrous oxide, which has the molecular formula N_2O
34	77	Hydrofluorocarbons that have the molecular formula $C_nH_xF_{(2n+2-x)}$ in which $0<n<6$
35	78	The following perfluorocarbons: (a) those that have the molecular formula C_nF_{2n+2} in which $0<n<7$ (b) octafluorocyclobutane, which has the molecular formula C_4F_8
36	79	Sulphur hexafluoride, which has the molecular formula SF_6
37	80	Methanone, bis[4-(dimethylamino)phenyl]-, which has the molecular formula $C_{17}H_{20}N_2O$
38	81	2-Butanone, oxime, which has the molecular formula C_4H_9NO
39	82	n-Butyl glycidyl ether, which has the molecular formula $C_7H_{14}O_2$
40	83	Polybrominated diphenyl ethers that have the molecular formula $C_{12}H_{(10-n)}Br_nO$ in which $4\leq n\leq10$
41	84	Perfluorooctane sulfonate and its salts

42	85	Compounds that contain one of the following groups: $C_8F_{17}SO_2$, $C_8F_{17}SO_3$ or $C_8F_{17}SO_2N$
43	86	Methyloxirane, which has the molecular formula C_3H_6O
44	87	Ethyloxirane, which has the molecular formula C_4H_8O
45	90	1,2-Benzenediol, which has the molecular formula $C_6H_6O_2$
46	91	1,4-Benzenediol, which has the molecular formula $C_6H_6O_2$
47	92	Hexane, 1,6-diisocyanato-, homopolymer, reaction products with alpha-fluoro-omega-2-hydroxyethyl-poly(difluoro- methylene), C16-20-branched alcohols and 1-octadecanol
48	93	2-propenoic acid, 2-methyl-, hexadecyl ester, polymers with 2-hydroxyethyl methacrylate, gamma-omega-perfluoro-C10-16-alkyl acrylate and stearyl methacrylate
49	94	2-propenoic acid, 2-methyl-, 2-methylpropyl ester, polymer with butyl 2-propenoate and 2,5-furandione, gamma-omega-perfluoro-C8-14-alkyl esters, tert-Bu benzenecarboperoxoate-initiated
50	95	2-propen-1-ol reaction products with pentafluoroiodoethane tetrafluoroethylene telomer, dehydroiodinated, reaction products with epichlorohydrin and triethylenetetramine
51	96	Phenol, 4,4′ -(1-methylethylidene)bis-, which has the molecular formula $C_{15}H_{16}O_2$
52	98	1,3-Butadiene, 2-methyl-, which has the molecular formula C_5H_8
53	100	Colour Index Pigment Yellow 34
54	101	Colour Index Pigment Red 104
55	102	Cyclotetrasiloxane, octamethyl-, which has the molecular formula C8H24O4Si4
56	103	Phenol, 2,4,6-tris(1,1-dimethylethyl)-, which has the molecular formula $C_{18}H_{30}O$
57	104	Ethanol, 2-methoxy-, acetate, which has the molecular formula $C_5H_{10}O_3$
58	105	1-Propanol, 2-methoxy-, which has the molecular formula $C_4H_{10}O_2$
59	106	2-Naphthalenol, 1-[(4-methyl-2-nitrophenyl)azo]-, which has the molecular formula $C_{17}H_{13}N_3O_3$
60	107	Ethanol, 2-(2-methoxyethoxy)-, which has the molecular formula $C_5H_{12}O_3$
61	108	Sulfuric acid, diethyl ester, which has the molecular formula $C_4H_{10}O_4S$
62	111	Ethanol, 2-chloro-, phosphate (3:1), which has the molecular formula $C_6H_{12}Cl_3O_4P$
63	113	Tributyltins, which contain the grouping $(C_4H_9)_3Sn$
64	114	Tetrabutyltins, which have the molecular formula $(C_4H_9)_4Sn$
65	117	Benzene, 1-methyl-2-nitro-, which has the molecular formula $C_7H_7NO_2$
66	118	Phenol, 2,6-bis(1,1-dimethylethyl)-4-(1-methylpropyl)-, which has the molecular formula $C_{18}H_{30}O$
67	119	Methylium, [4-(dimethylamino)phenyl]bis[4-(ethylamino)3-methylphenyl]-, acetate, which has the molecular formula $C_{27}H_{34}N_3.C_2H_3O_2$
68	120	Chlorinated alkanes that have the molecular formula $C_nH_xCl_{(2n+2-x)}$ in which $10 \leq n \leq 20$
69	121	Benzene, 1,2-dimethoxy-4-(2-propenyl)-, which has the molecular formula $C_{11}H_{14}O_2$

70	123	Oxirane, 2,2′,2″,2‴-[1,2-ethanediylidenetetrakis (4,1-phenyleneoxymethylene)]tetrakis-, which has the molecular formula C38H38O8
71	124	Bromic acid, potassium salt, which has the molecular formula $KBrO_3$
72	125	Polychlorinated naphthalenes, which have the molecular formula $C_{10}H_{8-n}Cl_n$ in which “n” is greater than 1
73	126	Hydrazine, which has the molecular formula N_2H_4
74	127	Hexabromocyclododecane, which has the molecular formula $C_{12}H_{18}Br_6$
75	129	Perfluorooctanoic acid, which has the molecular formula $C_7F_{15}CO_2H$, and its salts
76	130	Compounds that consist of a perfluorinated alkyl group that has the molecular formula C_nF_{2n+1} in which n = 7 or 8 and that is directly bonded to any chemical moiety other than a fluorine, chlorine or bromine atom
77	131	Perfluorocarboxylic acids that have the molecular formula $C_nF_{2n+1}CO_2H$ in which 8 ≤ n ≤ 20 and their salts
78	132	Compounds that consist of a perfluorinated alkyl group that has the molecular formula C_nF_{2n+1}in which 8 ≤ n ≤ 20 and that is directly bonded to any chemical moiety other than a fluorine, chlorine or bromine atom
79	133	Plastic microbeads that are ≤ 5 mm in size
80	134	The following petroleum and refinery gases:*
81	135	Hexanedioic acid, bis(2-ethylhexyl) ester, which has the molecular formula $C_{22}H_{42}O4$
82	136	Reaction products of 2-propanone with diphenylamine
83	137	2-Naphthalenol, 1-[[4-(phenylazo)phenyl]azo]-, which has the molecular formula $C_{22}H_{16}N_4O$
84	138	Fuel Oil No. 2
85	139	Natural gas condensates (a complex combination of hydrocarbons primarily in the carbon range of C5 to C15 that are condensed during production at a well head, in a natural gas processing plant, natural gas pipeline or straddle plant), including any of their liquid distillates that are primarily in the carbon range of C5 to C15
86	140	Phenol, 5-chloro-2-(2,4-dichlorophenoxy)-, which has the molecular formula $C_{12}H_7Cl_3O_2$
87	141	Acetamide, N-[4-[(2-hydroxy-5-methylphenyl)azo]phenyl]-, which has the molecular formula $C_{15}H_{15}N_3O_2$
88	143	N,N′-mixed phenyl and tolyl derivatives of 1,4-benzenediamine
89	144	Benzene, 1-chloro-2-[2,2-dichloro-1-(4- chlorophenyl)ethyl]-, which has the molecular formula $C_{14}H_{10}Cl_4$
90	147	Benzene, 1,1′-methylenebis[4-isocyanato-, which has the molecular formula $C_{15}H_{10}N_2O_2$
91	148	Benzene, 1,1′-methylenebis[2-isocyanato-, which has the molecular formula $C_{15}H_{10}N_2O_2$
92	149	Benzene, 1-isocyanato-2-[(4-isocyanatophenyl)methyl]-, which has the molecular formula $C_{15}H_{10}N_2O_2$
93	150	Benzene, 1,1′-methylenebis[isocyanato- (non-isomeric-specific), which has the molecular formula $C_{15}H_{10}N_2O_2$
94	151	Isocyanic acid, polymethylenepolyphenylene ester, which has the molecular formula $C_{15}H_{10}N_2O_2$•$[C_8H_5NO]$n in which 0 ≤ n ≤ 4
95	163	Plastic manufactured items

*The list of petroleum and refinery gases can be found in the Toxic substances list: schedule 1 of CEPA.

8 Appendix 2: Stockholm Convention Persistent Organic Pollutants

8.1 Stockholm Convention POPs Captured in the XBR (17 of 30)

- Aldrin
- Dieldrin
- Chlordane
- Endrin
- Heptachlor
- Lindane
- Toxaphene
- Hexachlorobenzene (HCB)
- Hexachlorobutadiene (HCBD)
- Pentachlorophenol and its salts and esters
- Polychlorinated dibenzo-p- Dioxins (PCDD)
- Polychlorinated dibenzo furans (PCDF)
- Chlordecone
- Dichloro-diphenyl-trichloroethane (DDT)
- Dicofol
- Technical endosulfan and its related isomers
- Polychlorinated Biphenyls (PCB)

8.2 Stockholm Convention POPs Not Captured in XBR (13 of 30)

- Mirex
- Alpha hexachlorocyclohexane
- Beta hexachlorocyclohexane
- Hexabromobiphenyl
- Hexabromocyclododecane (HBCD)
- Hexabromodiphenyl ether and heptabromodiphenyl ether (commercial octabromodiphenyl ether)
- Pentachlorobenzene
- Perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride (PFOSF)
- Polychlorinated Naphthalenes
- Tetrabromodiphenyl ether and pentabromodiphenyl ether (commercial pentabromodiphenyl ether)
- Decabromodiphenyl ether (Commercial mixture, cDecaBDE)
- Short-chain chlorinated paraffins (SCCPs)
- Perfluorooctanoic acid (PFOA), its salts and PFOA-related compounds

9 Appendix 3: Summary of questions

9.1 Overarching questions

- Q1. What are some of the challenges you face in relation to the definitions of HW and HRM?
- Q2. What are the gaps in the current definitions? How could the definitions be modified to address these gaps?
- Q3. Are you aware of technical information (for example risk assessments, toxicity studies) that would be helpful for the review of the definitions?

9.2 Guiding questions

9.2.1 Approach

- Q4. What criteria or characteristics should be considered by the Department for further review to define waste and recyclable materials and distinguish them?

9.2.2 Technical/scientific information

- Q5. Based on technical studies, are there substances that should be added to the definitions of HW and HRM?
- Q6. Are there thresholds for substances that should be updated based on technical/scientific information?
- Q7. What challenges have you encountered when using leachate or concentration thresholds?

9.2.3 Environmental guidelines

- Q8. What should be considered when using these guidelines to develop/modify thresholds?
- Q9. Are there additional guidelines that should be considered in the development of thresholds? If so, why?

9.2.4 Canadian Environmental Protection Act, 1999 toxics

- Q10. Should the definitions of HW and HRM capture additional toxic substances listed in Schedule 1 of CEPA?
    - If so, which CEPA toxic substances should be included?
    - What criteria should the Department use to make this risk-based evaluation?
- Q11. Are there any CEPA toxic substances that are not relevant to waste or recyclable material?

9.2.5 Persistent Organic Pollutants

- Q12. Should the definitions of HW and HRM capture additional POPs that are listed under the Stockholm Convention?
    - If so, which additional POPs should be included? And in what waste streams would they be present?
    - What criteria should the Department use to make this risk-based evaluation?
- Q13. What are some of the challenges that industry would face by adding POPs?

9.2.6 Hazardous characteristics

- Q14. How can the definitions of HW and HRM better capture waste and recyclable materials that have chronic long-term effects on human health and/or the environment?
- Q15. What new hazardous characteristics (that is carcinogenicity, reproductive toxicity, chronic toxicity to the aquatic environment) should the Department consider as part of the review to address long-term cumulative environmental and health hazards?
    - What are the challenges in integrating these new hazard characteristics into the definitions?

- For any new hazard characteristic, are there available laboratory test methods, toxicity data or other sources of information for testing?

9.2.7 Listing versus criteria approach

- Q16. Should the Department use a listing approach or a criteria approach to designate waste streams as hazardous and why? What are the pros/cons for each approach (listing vs criteria)?
- Q17. Which factors or criteria (that is health concern, environmental concern, etc.) should be considered by the Department to identify and designate certain waste streams as hazardous and why?

9.2.8 Basel Convention

- Q18. How can the implementation of the reference to the Basel Convention be facilitated?

9.2.9 Exclusions

- Q19. What are some of the challenges or issues facing regulatees in applying the existing exclusions to the definitions?
- Q20. What considerations or criteria should the Department contemplate in reviewing exclusions and their appropriateness for Canadian waste streams?
- Q21. Are existing exclusions appropriate and needed? Which exclusions should be modified? If so, how?
- Q22. Are there any additional exclusions that should be proposed? If so, why?