



## **Screening Assessment**

### **Used and Re-refined Oils Assessment Group**

**Environment and Climate Change Canada  
Health Canada**

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## Synopsis

Pursuant to section 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 eight of nine substances referred to collectively under the Chemicals Management Plan as the Used and Re-refined Oils Group. Substances in this group were identified as priorities for assessment as they met categorization criteria under subsection 73(1) of CEPA.

The ninth substance, lubricant oils, used (CAS RN 70514-12-4), was found to meet the broad classification of used crankcase oils, and is considered to have been addressed through the Priority Substances List Assessment Report of Waste/Used Crankcase Oil in 1994 and the follow-up report in 2005. This substance will not be subject to further risk assessment work at this time under the Chemicals Management Plan (CMP) given previous regulatory activities. Accordingly, this screening assessment addresses the eight substances listed in the table below, which will hereinafter be referred to as the Used and Re-refined Oils Group. The Chemical Abstracts Service Registry Numbers (CAS RN<sup>1</sup>), their *Domestic Substances List* (DSL) names, and their simplified names are listed in the table below.

### Substances in the Used and Re-refined Oils Group

CAS RN <sup>a</sup>	DSL name	Simplified name
68476-77-7	Lubricating oils, refined used	Refined used oil
92045-41-5	Lubricant oils, used, vacuum distd.	Used vacuum gas oil
125471-97-8	Lubricating oils (petroleum), hydrotreated, used, distd., residues	Hydrotreated used residue
129566-94-5	Hydrocarbons, C <sub>12-25</sub> , dehydrated used lubricating oil distillates	C <sub>12-25</sub> used distillate
129893-17-0	Lubricant oils, used, residues	Used oil residue
129893-18-1	Lubricating oils, used, vacuum distd., clay-treated	Clay-treated used oil
132538-91-1	Lubricant oils, used, distd., C <sub>5-18</sub> fraction	C <sub>5-18</sub> used distillate
132538-93-3	Lubricant oils, used, distd., light oil	Used light oil

<sup>a</sup> All CAS RNs are UVCB substances (substances of unknown or variable composition, complex reaction products, or biological materials).

The Used and Re-refined Oils Group includes used oil and substances produced during the re-processing and re-refining process. Used oil refers to all used lubricant oils that

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are collected, transported, and stored. Used oil residue applies to a non-volatile residual stream generated as a by-product of re-refining and re-processing operations. Refined used oil and clay-treated used oil are base oils with commercial and industrial applications, and are the end-product of the re-refining process. The remaining substances are intermediate lubricant oils generated as by-products during the re-refining and/or re-processing operations and have various industrial applications.

The substances in the Used and Re-refined Oils Group have similar physical and chemical properties and uses to the used crankcase oils, asphalts, base oils, and other substances that have been previously assessed under CEPA. Exposures from these uses were characterized in those assessments. No environmental and general population exposures of these eight substances, beyond those that were previously assessed, are expected.

Considering all available lines of evidence presented in this screening assessment, there is low risk of harm to the environment from used oil residue, used vacuum gas oil, C<sub>12-25</sub> used distillate, C<sub>5-18</sub> used distillate, used light oil, hydrotreated used residue, refined used oil and clay-treated used oil. It is concluded that used oil residue, used vacuum gas oil, C<sub>12-25</sub> used distillate, C<sub>5-18</sub> used distillate, used light oil, hydrotreated used residue, refined used oil and clay-treated used oil 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 screening assessment, exposures to used oil residue, used vacuum gas oil, C<sub>12-25</sub> used distillate, C<sub>5-18</sub> used distillate, used light oil, hydrotreated used residue, refined used oil and clay-treated used oil for the general population are not expected. These substances are used as industrial intermediates and do not appear in products available to consumers. It is concluded that used oil residue, used vacuum gas oil, C<sub>12-25</sub> used distillate, C<sub>5-18</sub> used distillate, used light oil, hydrotreated used residue, refined used oil and clay-treated used oil 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 concluded that used oil residue, used vacuum gas oil, C<sub>12-25</sub> used distillate, C<sub>5-18</sub> used distillate, used light oil, hydrotreated used residue, refined used oil and clay-treated used oil do not meet any of the criteria set out in section 64 of CEPA.

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## 1. Introduction

Pursuant to section 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 eight of nine substances referred to collectively under the Chemicals Management Plan as the Used and Re-refined Oils Group to determine whether they 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 (ECCC, HC [modified 2017]).

The ninth substance is lubricant oils, used (CAS RN 70514-12-4). Used/waste crankcase oils are major components of lubricant oils, used (CAS RN 70514-12-4), with used crankcase oils from engines being a major source (Cheminfo 2016). Used/waste crankcase oils, have been assessed through the Priority Substances List Assessment in 1994 and a follow-up report in 2005, and they were concluded as meeting the toxicity criteria defined under Section 64 of CEPA (Environment Canada, Health Canada 1994; Environment Canada 2005; Environment Canada 2011).

Based on the available information, risks to human health and the environment for lubricant oils, used are considered to have been evaluated through those reports. As such, this substance will not be subject to further assessment at this time.

This screening assessment includes consideration of information on chemical properties, hazards, uses and exposures, including additional information submitted by stakeholders. Manufacturers provided the identity of the CAS RNs produced during their re-refining process. Relevant data were identified up to February 2018. When available and relevant, information presented in assessments from other jurisdictions was considered.

This 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. This assessment has undergone external written peer review and/or consultation. Additionally, the draft of this screening assessment (published on April 6, 2019) was subject to a 60-day public comment period. 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 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<sup>2</sup>. This screening assessment presents the critical information and considerations on which the conclusions are based.

## 2. Substance Identity

The substances identified within the Used and Re-refined Oils Group include used lubricating oils and substances produced during the re-processing and re-refining process for used lubricating oils. Used oil refers to all used lubricant oils that are collected, transported, and stored. Used oil residue applies to a non-volatile residual stream generated as a by-product of re-refining and re-processing operations. Refined used oil and clay-treated used oil are base oils with commercial and industrial applications, and are the end-products of the re-refining process. The remaining substances are intermediate lubricant oils generated as by-products during the re-refining and/or re-processing operations and have various industrial applications.

Re-processing is not as severe a technical procedure as re-refining: re-processing uses chemical and physical treatments to remove some contaminants from used oil in order to clean the oils for less demanding applications that do not require as pure of an oil. Used oil may also undergo treatment at a used oil re-refinery, which uses chemical and physical treatments to remove the contaminants from used oil in order to restore the base oil to a product equivalent in performance to virgin base oil (Environment Canada 2011). Contaminants, including polycyclic aromatic hydrocarbons, are removed during the re-refining process, producing other used oil substances as intermediates until concentrations of contaminants are considered suitable for use as a re-refined base oil (API 2011; Environment Canada, Health Canada 1994). Several of these substances are intermediates within the re-refining process. In addition, many of these CAS RN<sup>3</sup> numbers are used interchangeably with other CAS RNs not assessed as a part of this group, and alternative CAS RNs may be used for certain substances depending on the re-refinery.

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<sup>2</sup>A determination of whether one or more of the criteria of section 64 of CEPA are met is based upon an assessment of potential risks to the environment and/or to human health associated with exposures in the general environment. For humans, this includes, but is not limited to, exposures from ambient and indoor air, drinking water, foodstuffs, and products available to 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. Lubricant oils, used, residues (CAS RN 129893-17-0)

#### 3.1 Substance identity

Lubricating oils, used residues (CAS RN 129893-17-0), henceforth referred to as used oil residue, applies to a non-volatile residual stream generated as a by-product of used lubricating oil re-refining and re-processing operations (Safety-Kleen c.2013-2017b; Asphalt Institute and Eurobitume 2015; ECCC 2018). Used oil residue is a complex combination of hydrocarbons with greater than 25 carbon atoms (C<sub>25</sub>) including polycyclic aromatic hydrocarbons (see Sec. 3.3), and contains spent polymers, organometallic-based additives, and metals such as zinc, calcium, sodium, and magnesium (NCI 2015). CAS RN 8052-42-4 is also used by some re-refineries to identify “used oil residue” produced during the re-refining process (MSDS 2014a). This CAS RN was previously assessed in the Asphalt and Oxidized Asphalt screening assessment (ECCC, HC 2017).

#### 3.2 Sources and uses

Used oil residue is produced by all re-refining and re-processing operations. Used oil residue is sold to road and construction industries where it is mixed at up to 10% w/w with asphalt for use as a flux, sealant, filler, and extender (MSDS 2014a, MSDS 2015a,b, MSDS 2017a, MSDS 2018a). It can also be present in asphalt mixtures used in roofing applications at similar concentrations (MSDS 2015a,c). Used oil residue can also be mixed with other substances and sold as an industrial fuel (MSDS 2017b). There are no additional products available to consumers containing this substance in Canada.

#### 3.3 Environmental and human health risk characterization

Exposures and hazards associated with asphalt uses of this substance are described in the Asphalt and Oxidized Asphalt screening assessment (ECCC, HC 2017). As described in that assessment, cured asphalt is likely to entrap contaminants and other petroleum substances, and the release of polycyclic aromatic hydrocarbons (PAHs) from asphalts to the environment is considered to be low based on experimental studies.

There are further studies that show that the concentration of PAHs leaching out of the reclaimed asphalts are usually near the detection limits attainable from most analytical methods, which are in the ppb range. The Asphalt Institute (2016) conducted a study on the use of “re-refined engine oil bottoms” (REOB) and “vacuum tower asphalt extender” (VTAE) blended with asphalt and the PAH leaching potential from asphalt. Their results show that asphalts with REOB / VTA contain PAHs (in the ppm range), but that this PAH content did not change appreciably in asphalts as the percent REOB changed from 0 to 9%. Furthermore, the leachable PAHs in asphalt with 9% REOB had PAHs in the ppb range or below the detection limit. A study by Legret et al. (2005) tested



reclaimed asphalt for leaching of PAHs. They added different amounts of reclaimed asphalt (0 to 30%) to new asphalt samples and performed leaching experiments. There is no mention of extender oils having been added to the mixture. In their reclaimed asphalt samples, they detected PAHs in the original asphalt mixtures, but did not see any PAHs, to the ppb level, leached from the reclaimed asphalt samples (Legret et al. 2005). A University of Wisconsin study showed that recycled asphalt pavement (RAP) did not leach PAHs down to the ppb level (Shedivy et al. 2012). It is expected that the use of used oil residue as an additive in roofing applications would similarly not result in increased exposure to PAHs.

There are no additional products available to consumers containing used oil residue in Canada. On the basis of limited exposure, the potential to cause harm to the environment or to human health for the general population of Canada from used oil residue is expected to be low.

## **4. Intermediates of re-refined used lubricating oils (CAS RN 92045-41-5, 129566-94-5, 132538-91-1, 132538-93-3)**

### **4.1 Substance identity**

Several intermediates are produced during the re-refining of used lubricating oils, including lubricant oils, vacuum distd. (CAS RN 92045-41-5), hydrocarbons, C<sub>12-25</sub>, dehydrated used lubricating oil distillates (CAS RN 129566-94-5), lubricant oils, used, distd., C<sub>5-18</sub> fraction (CAS RN 132538-91-1), and lubricant oils, used, distd., light oil (CAS RN 132538-93-3).

Lubricant oils, vacuum distd., henceforth referred to as used vacuum gas oil, refers to the vacuum gas oil produced during the vacuum distillation process during certain re-refining processes (ECCC 2018; MSDS 2018b). Used vacuum gas oil is a complex combination of hydrocarbons with a carbon range of C<sub>11</sub> to C<sub>21</sub> and a boiling point range of approximately 200 to 360°C (NCI 2015). Used vacuum gas oil is produced following vacuum distillation and thin film evaporation during the re-refining process, and is used as the feedstock for the hydrotreater at the re-refinery (ECCC 2018; MSDS 2018b; personal communication, email from Veolia North America to the Ecological Assessment Division, ECCC, dated July 28 2017; unreferenced).

Hydrocarbons, C<sub>12-25</sub>, dehydrated used lubricating oil distillates, henceforth referred to as C<sub>12-25</sub> used distillate, is a gas oil stream distilled from dehydrated used lubricating oils (NCI 2015). C<sub>12-25</sub> used distillate has a hydrocarbon range that is predominantly C<sub>12</sub> to C<sub>25</sub> with a boiling point range of approximately 150 to 400°C and a flash point greater than 40°C (NCI 2015).

Lubricant oils, used, distd., C<sub>5-18</sub> fraction, henceforth referred to as C<sub>5-18</sub> used distillate, is a light fuel produced during the re-refining process (personal communication, email from Terrapure to the Ecological Assessment Division, ECCC, dated January 29<sup>th</sup> 2018;

unreferenced). C<sub>5-18</sub> used distillate has a carbon range predominantly C<sub>5</sub> to C<sub>18</sub>, which is similar to, but with a slightly wider range than the previously assessed Low Boiling Point Naphthas, which are predominantly C<sub>4</sub>-C<sub>12</sub> (Environment Canada, Health Canada 2013b). C<sub>5-18</sub> used distillate and C<sub>12-25</sub> used distillate are the first and second hydrocarbon fractions removed prior to the vacuum distillation process from thin film evaporators respectively (personal communication, email from Terrapure to the Ecological Assessment Division, ECCC, dated January 29<sup>th</sup> 2018; unreferenced).

Lubricant oils, used, distd., henceforth referred to as used light oil, is a gas oil that has a boiling point range from 206 to 475°C (NCI 2015), which based on its equivalent carbon number (i.e., the boiling point range for n-alkanes), corresponds roughly to a carbon range of C<sub>12</sub> to C<sub>33</sub>. This substance consists of a variety of petroleum aliphatic and aromatic hydrocarbons.

Due to the interchangeability between different CAS RNs to describe petroleum substances, there are several alternative CAS RNs used to describe the intermediates produced during the re-refining or used lubricating oils (see Table A-1 in Appendix A).

## 4.2 Sources and uses

As all of these substances are intermediates, they are consumed within the facility as a fuel or transported to another facility where the CAS RN is further processed to a different substance (personal communication, email from Terrapure to the Ecological Assessment Division, ECCC, dated January 29<sup>th</sup> 2018; unreferenced).

## 4.3 Environmental and human health risk characterization

Exposures and hazards associated with uses of substances similar to used vacuum gas oil, C<sub>12-25</sub> used distillate, C<sub>5-18</sub> used distillate, and used light oil are described in the Low Boiling Point Naphthas and Gas Oils screening assessments (Environment Canada, Health Canada 2013b,c). Environmental releases of used vacuum gas oil, C<sub>12-25</sub> used distillate, C<sub>5-18</sub> used distillate, and used light oil from industrial facilities are expected to be low as they are industry-restricted substances that are internally consumed (ECCC 2018, personal communication, email from Terrapure to the Ecological Assessment Division, ECCC, dated January 29<sup>th</sup> 2018; unreferenced, Cheminfo 2016; MSDS 2018c). For re-refineries that sell or ship these substances for further processing, release to the environment may occur via spills during transport between facilities. Based on provincial spill databases, there were a total of 9 gas oil and kerosene spills from 2012 to 2016 across Ontario, Alberta, Saskatchewan, B.C, Nunavut, Yukon, and the Northwest Territories (Government of Alberta 2016; British Columbia 2017; Government of Saskatchewan 2017; NWT 2017; Ontario 2017). The low frequency of spills of gas oils in general (i.e., virgin and/or re-refined products) as reported from provinces and territories indicate that exposures to the environment from spills are low. An analysis of the frequency and volume of spills of Low Boiling Point Naphthas also

indicates that releases to the environment via spills are low (Environment Canada, Health Canada 2013b).

In terms of risks to human health, these four substances are used in industry as intermediate products and do not enter products available to consumers. Since these substances are industry-restricted, exposure to the general population in Canada is not expected and is considered to have been assessed as part of the Industry-restricted Low Boiling Point Naphthas (Environment Canada, Health Canada 2013b) and Industry-restricted Gas Oils (Environment Canada, Health Canada 2013c) assessments.

On the basis of limited exposure, the potential to cause harm to the environment or to human health for the general population of Canada from used oil residue is expected to be low.

## **5. Lubricating oils (petroleum), hydrotreated, used, distd. residues (CAS RN 125471-97-8)**

### **5.1 Substance identity**

Lubricating oils (petroleum), hydrotreated, used, distd. residues (CAS RN 125471-97-8), henceforth referred to as hydrotreated used residue, is residue produced from high temperature distillation of used lubricating oils and are composed primarily of carbon, spent additives, and detergents, but can also contain elements such as lead, sodium, phosphorus, sulfur, and nitrogen (NCI 2015).

### **5.2 Sources and uses**

Hydrotreated used residue is likely produced from a re-refining process that applies hydrogenation prior to the vacuum distillation process, which is not currently employed by Canadian oil re-refineries (Safety-Kleen c.2013-2017b; ECCC 2018; Cheminfo 2016). Canadian refineries do not use hydrotreated used residue to describe their vacuum distillation residue (MSDS 2014a; ECCC 2018; personal communication, email from Veolia North America to the Ecological Assessment Division, ECCC, dated July 28 2017; unreferenced). Additionally, MSDS searches found no products in Canada containing hydrotreated used residue. There are no products available to consumers containing this substance in Canada.

### **5.3 Environmental and human health risk characterization**

No information was found that suggests hydrotreated used residue is currently being used or produced in Canada. This substance does not appear in any products available to consumers in Canada. Therefore, there are no known sources of exposure to the environment or the general population.

Exposure to this substance is not expected. On the basis of limited exposure, the potential to cause harm to the environment or to human health for the general population of Canada from hydrotreated used residue is expected to be low.

## **6. Lubricating oils, refined used (CAS RN 68476-77-7)**

### **6.1 Substance identity**

Lubricating oils, refined used (CAS RN 68476-77-7), henceforth referred to as refined used oil, is the final, finished base oil product of re-refineries that have vacuum distillation and hydrotreatment processes; it can be equivalent in quality to virgin base oils (MSDS 2016a,b,c; NCI 2015). When produced in North American re-refineries, this substance can be sufficiently re-refined to meet the requirements for API Group II base oils [Safety-Kleen c.2013-2017a; ECCC 2016; i.e., less than 10% aromatics, 0.03% or less sulphur, and a viscosity index of 80 – 120 (API 2016)].

Refined used oil is a complex combination of hydrocarbons obtained by subjecting used motor oil to precipitation, filtration, catalytic hydrotreatment and distillation to remove heavy metals and additive components (NCI 2015). It consists mostly of hydrocarbons having carbon numbers predominantly in the range of C<sub>20</sub> through C<sub>40</sub> and with a viscosity of at least 100 SUS at 104°F (19 cSt at 40°C) and a boiling point of over 340°C (NCI 2015).

CAS RN 64742-58-1 [lubricating oils (petroleum), hydrotreated spent] is another CAS RN that is used interchangeably with CAS RN 68476-77-7 to describe the final, hydrotreated base oil product from re-refineries (ECCC 2018; MSDS 2018d). CAS RN 64742-58-1 is defined as a complex combination of hydrocarbons obtained by treating a spent lube oil with hydrogen in the presence of a catalyst, consisting mostly of hydrocarbons having carbon numbers predominantly in the range of C<sub>15</sub> through C<sub>50</sub> (NCI 2015). Both refined used oil and lubricating oils (petroleum), hydrotreated spent have chemical and physical properties consistent with base oils (ECCC, HC 2018a).

### **6.2 Sources and uses**

Canadian re-refineries recover approximately 23 million litres of used base oils and lubricants each year (Terrapure c.2015-2017). Identified uses of refined used oil include as an electronic power steering fluid (MSDS 2014b), metalworking fluid (MSDS 2017c; MSDS 2017d), hydraulic oil (MSDS 2004; MSDS 2013; MSDS 2016d), boiler fuel and as lubricating base stocks (MSDS 2016a,b,c). Appropriately re-refined used oil can be used in similar applications as identified for base oils. (ECCC, HC 2018a). However, a search of databases of products indicates that this CAS RN is not listed specifically as a component in products available to the consumer in Canada. This substance is additionally considered a List 2 formulant (formulants that are potentially toxic) by Health Canada's Pest Management Regulatory Agency (PMRA) (PMRA 2017).

## 6.3 Environmental and human health risk characterization

Exposures and hazards to those of base oils are described in the Base Oils draft screening assessment (ECCC, HC 2018a). Refined used oil can be equivalent in quality and specifications to virgin API group II base oil (i.e., has a low aromatic content) and is highly purified before returning into the production stream of base oils used in products available to the general population (Safety-Kleen c.2013-2017a; ECCC 2016). Based on an analysis of spills reported to Environment and Climate Change Canada between 2008 and 2012, only one spill was found for base oils (ECCC, HC 2018a). Furthermore, no acute or chronic studies on the toxic effects on aquatic organisms were found for lubricating oil base stocks, which include base oils (API 2011).

Base oils have been assessed and those base oils which appear in products available to the consumer have been proposed to have a low potential to cause harm to the environment or to human health through exposure to products available to the consumer and environmental media (ECCC, HC 2018a). In the EU, no hazards have been classified for lubricating oils, refined used (ECHA 2018).

On the basis of limited exposure to the industrial products where this substance is found to be used, the potential to cause harm to the environment or to human health for the general population of Canada for this substance is expected to be low.

## 7. Lubricating oils, used, vacuum distd., clay-treated (CAS RN 129893-18-1)

### 7.1 Substance identity

Lubricating oils, used, vacuum distd., clay-treated (CAS RN 129893-18-1), henceforth referred to as clay-treated used oil, is a complex combination of hydrocarbons primarily in the range of C<sub>20</sub> to C<sub>40</sub> (NCI 2015).

### 7.2 Sources and uses

Clay-treated used oil is obtained by subjecting used oil to a vacuum distillation process followed by a clay treatment (NCI 2015). A clay polishing system similar to clay-treatment with the exception of using activated bauxite instead of clay has been used by recyclers in Canada, but the company that sold the systems has closed permanently (personal communication, email from REDRAGON Corporation to the Ecological Assessment Division, ECCC, dated February 5, 2018; unreferenced). Clay treatment is currently not employed by re-refineries in Canada (ECCC 2018; Safety-Kleen c.2013-2017b). Additionally, MSDS searches found no products in Canada containing clay-treated used oil.

### 7.3 Environmental and human health risk characterization

No information was found indicating that clay-treated residue is currently used or produced in Canada. There are no known sources of exposure to the environment or to the general population from this substance. On the basis of limited exposure, the potential to cause harm to the environment or to human health for the general population of Canada is expected to be low.

## 8. Conclusion

Considering all available lines of evidence presented in this screening assessment, there is low risk of harm to the environment from used oil residue, used vacuum gas oil, C<sub>12-25</sub> used distillate, C<sub>5-18</sub> used distillate, used light oil, hydrotreated used residue, refined used oil and clay-treated used oil. It is concluded that used oil residue, used vacuum gas oil, C<sub>12-25</sub> used distillate, C<sub>5-18</sub> used distillate, used light oil, hydrotreated used residue, refined used oil and clay-treated used oil 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 screening assessment, it is concluded that used oil residue, used vacuum gas oil, C<sub>12-25</sub> used distillate, C<sub>5-18</sub> used distillate, used light oil, hydrotreated used residue, refined used oil and clay-treated used oil 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 concluded that used oil residue, used vacuum gas oil, C<sub>12-25</sub> used distillate, C<sub>5-18</sub> used distillate, used light oil, hydrotreated used residue, refined used oil and clay-treated used oil do not meet any of the criteria set out in section 64 of CEPA.

## References

[API] American Petroleum Institute. 2011. High production volume (HPV) challenge program. Lubricating oil basestocks category assessment document. Washington (DC): American Petroleum Institute. [accessed 2018 April 4]

[API] American Petroleum Institute [internet]. 2016. Annex E—API base oil interchangeability guidelines for passenger car motor oils and diesel engine oils. Washington (DC): API.

Asphalt Institute. 2016. State of the Knowledge. The use of REOB/VTAE in asphalt. Asphalt Institute. Lexington, KY. [accessed 2018 March 28]

Asphalt Institute and Eurobitume. 2015. The Bitumen Industry- A Global Perspective: Production, chemistry, use, specification and occupational exposure. 3<sup>rd</sup> edition. The Asphalt Institute, Lexington, Kentucky.

[British Columbia] Province of British Columbia. 2017. Past Spill Incidents. [accessed August 15 2017].

Canada. 1999. Canadian Environmental Protection Act, 1999. S.C. 1999, c.33. Canada Gazette Part III, vol. 22, no. 3.

[Cheminfo] Cheminfo Services Inc. 2016. Technical Study on the Use, Exposure, and Release Potential of Used Lubricating Oils. Unpublished report. Markham(ON): Sponsored by Health Canada.

[ECCC] Environment and Climate Change Canada. 2016. Site Visit Report: Safety-Kleen-Breslau (ON). Unpublished. Ottawa (ON): Government of Canada.

[ECCC] Environment and Climate Change Canada. 2018. Safety-Kleen Canada Inc. -Breslau Re-refinery process flow and products. Unpublished. Ottawa (ON): Government of Canada.

[ECCC, HC] Environment and Climate Change Canada, Health Canada. 2016. Screening Assessment Petroleum Sector Stream Approach: Heavy Fuel Oils [Stream 4]. Ottawa (ON): Government of Canada.

[ECCC, HC] Environment and Climate Change Canada, Health Canada. modified 2017. Categorization. Ottawa (ON): Government of Canada. [accessed 2017 July 28].

[ECCC, HC] Environment and Climate Change Canada, Health Canada. 2017. Screening Assessment Petroleum Sector Stream Approach: Asphalt and Oxidized Asphalt [Stream 4]. Ottawa (ON): Government of Canada.

[ECCC, HC] Environment and Climate Change Canada, Health Canada. 2018a. Draft Screening Assessment Petroleum Sector Stream Approach: Base Oils. Ottawa (ON): Government of Canada.

[ECCC, HC] Environment and Climate Change Canada, Health Canada. 2018b. Draft Screening Assessment Petroleum Sector Stream Approach: Gas Oils and Kerosenes. Ottawa (ON): Government of Canada. Environment Canada. 2005. Follow-up Report on a PSL 1 Substance For Which There Was Insufficient Information to Conclude Whether the Substance Constitutes a Danger to the Environment-Waste/Used Crankcase Oils. Ottawa (ON). Government of Canada.

Environment Canada. 2011. Follow-Up on the Final Decision on the Assessment of Releases of Used Crankcase Oils to the Environment. Ottawa (ON): Government of Canada.

Environment Canada, Health Canada. 1994. Waste Crankcase Oils. Priority Substances List Assessment Report. Ottawa, ON [Accessed 2017, July].

Environment Canada, Health Canada. 2013a. Final Screening Assessment Petroleum Sector Stream Approach: Heavy Fuel Oils [Industrial-Restricted]. Ottawa (ON): Government of Canada.

Environment Canada, Health Canada. 2013b. Final Screening Assessment Petroleum Sector Stream Approach: Low Boiling Naphthas [Industrial-Restricted]. Ottawa (ON): Government of Canada:

Environment Canada, Health Canada. 2013c. Final Screening Assessment Petroleum Sector Stream Approach: Gas Oils [Industrial-Restricted]. Ottawa (ON): Government of Canada.

[ECHA] European Chemicals Agency. 2018. Lubricating oils, refined used. Helsinki (FI): ECHA. Updated 2018 Apr 2; accessed 2018 May 1]

Government of Alberta. 2016. Reporting Spills and Releases. [accessed 15 Aug 2017]

Government of Saskatchewan. 2017. Spills data obtained from Spills database search. [accessed 15 Aug 2017]

Legret M, Odie L, Demare D, Jullien A. 2005. Leaching of heavy metals and polycyclic aromatic hydrocarbons from reclaimed asphalt pavement. *Water Res.* 39: 3675-3685.

[MSDS] Material Safety Data Sheet. 2004. Grizzly Anti-Wear Hydraulic Oil 32, 46, 68: Premium Canada Winfield, BC. [accessed 2018 April 19].

[MSDS] Material Safety Data Sheet. 2013. Firebird ® AW Hydraulic Oil: Phillips 66 Lubricants, Houston, TX.

[MSDS] Material Safety Data Sheet. 2014a. Produite asphaltique. Montreal, (QC): Veolia ES Canada Industrial Services Inc. [accessed 2017 August 4].

[MSDS] Material Safety Data Sheet. 2014b. SeaStar EPS Fluid. Richmond, (BC): SeaStar Solutions. [accessed 2017 September 6].

[MSDS] Material Safety Data Sheet. 2015a. BUR Type III. Montreal (QC): Bitumar Inc. [accessed 2017 September 13].

[MSDS] Material Safety Data Sheet. 2015b. EcoAddz. Richardson, (TX): Safety-Kleen Systems, Inc. [accessed 2017 September 13].

[MSDS] Material Safety Data Sheet. 2015c. TruLo Asphalt. Toledo, (OH): Owens Corning Roofing and Asphalt, LLC. [accessed 2017 September 5].

[MSDS] Material Safety Data Sheet. 2016a. HT 100. Terrapure Environmental. [accessed 2018 February 9].

[MSDS] Material Safety Data Sheet. 2016b. HT 150. Terrapure Environmental. [accessed 2018 February 9].



[MSDS] Material Safety Data Sheet. 2016c. HT 450. Terrapure Environmental. [accessed 2018 February 9].

[MSDS] Material Safety Data Sheet. 2016d. Anti-Wear (AW) Hydraulic Oil – ISO 32. Terrapure Environmental.

[MSDS] Material Safety Data Sheet. 2017a. EcoAddz. Richardson, (TX): Safety-Kleen Systems, Inc. [accessed 2017 September 13].

[MSDS] Material Safety Data Sheet. 2017b. Eco Ultra #4 Fuel. Safety-Kleen Systems, Inc. [accessed 2017 September 6].

[MSDS] Material Safety Data Sheet. 2017c. EcoCut SCM. Fuchs Lubricants Canada Ltd. [accessed 2017 February 1].

[MSDS] Material Safety Data Sheet. 2017d. RENOCAST GREEN. Fuchs Lubricants Canada Ltd..

[MSDS] Material Safety Data Sheet. 2018a. Asphalt Flux. Safety-Kleen Systems, Inc. [accessed 2018 February 8].

[MSDS] Material Safety Data Sheet. 2018b. VACUUM GAS OIL. Safety-Kleen Systems, Inc. [accessed 2018 February 8].

[MSDS] Material Safety Data Sheet. 2018c. VFS DISTILLATE. Safety-Kleen Systems, Inc. [accessed 2018 February 8].

[MSDS] Material Safety Data Sheet. 2018d. KLEEN PERFORMANCE PRODUCTS BASE OIL VISCOSITY GRADES 110 AND GREATER. Safety-Kleen Systems, Inc. [accessed 2018 February 8].

[NCI] National Chemical Inventories [database on a CD-ROM]. 2015. Issue 2. Columbus (OH): American Chemical Society, Chemical Abstracts Service. [accessed 2017 July 27].

NWT [Northwest Territories] Environment and Natural Resources. 2017. Hazardous Materials Spills Database. [accessed 15 Aug. 17]

[Ontario] Ontario Ministry of the Environment and Climate Change. 2017. Spills Database. 2012-2016. Toronto (ON): Ontario Ministry of the Environment. Unpublished.

[PMRA] Pest Management Regulatory Agency. 2017. PMRA list of formulants. Ottawa (ON): Health Canada, Pest Management Regulatory Agency. [accessed 2018 April 23].

[Safety-Kleen] Base Oil. c2013-2017a. Richardson (TX): Safety-Kleen Systems, Inc., [accessed 2017 September 13].

[Safety-Kleen] Re-Refining Process. c2013-2017b. Richardson (TX): Safety-Kleen Systems, Inc., [accessed 2017 July 27].

Shedivy R, Meier A, Ma J, Tinjum JM, Edil TB, Benson CH, Chen J, Bradshaw S. 2012. Leaching characteristics of recycled asphalt pavement used as unbound road base. University of Wisconsin System Solid Waste Research Program. University of Wisconsin-Madison. [accessed 2018 March 29]

[Terrapure] Environmental Services. c2015-2017. Vancouver (BC). Terrapure Environmental [2017 July 28].

## Appendix A

**Table A-1. Alternative CAS RNs for intermediates used in the re-refining process**

<b>Alternative CAS RN</b>	<b>Corresponding CAS RN from Used and Re-refined Oils Group</b>	<b>Use</b>	<b>Reference</b>	<b>Assessment Status</b>
64741-58-8	92045-41-5	Mixed with a light vacuum gas oil mixture and sold as fuel and sent to another facility for further processing	Personal communication, email from Veolia North America to the Ecological Assessment Division, ECCC, dated July 28 2017; unreferenced	Being assessed in Gas Oils and Kerosenes Group (ECCC, HC 2018b)
64741-57-7	92045-41-5	Sold as fuel and transported to another facility for further processing	Personal communication, email from Veolia North America to the Ecological Assessment Division, ECCC, dated July 28 2017; unreferenced	Previously assessed in Stream 4 Heavy Fuel Oils screening assessment (ECCC, HC 2016)
68783-08-4	129566-94-5	Mixed with light fuel CAS RN 132538-91-1 and sold as a distillate fuel	Personal communication, email from Terrapure to the Ecological Assessment Division, ECCC, dated January 29 <sup>th</sup> 2018; unreferenced	Previously assessed in Industry-Restricted Heavy Fuels Oils screening assessment (Environment Canada, Health Canada 2013a)
8006-61-9	132538-91-1	Used internally at a re-refinery as a fuel	Personal communication, email from Veolia North America to the	N/A

			Ecological Assessment Division, ECCC, dated July 28 2017; unreferenced	
68476-30-2, 64741-89-5, 8008-20-6, 8030-30-6, 64741-42-0, 25551-13-7, 90-12-0, 91-57-6, 108-11-2, 108-94-1, 108-67-8, 95-63-6, 108-88-3, 1330-20-7, and 7783-06-4	132538-93-3	Fuel used in industrial boilers or furnaces	ECCC 2018; MSDS 2018c	N/A

Abbreviation: N/A, not applicable