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GUIDANCE AND SUMMARY OF INFORMATION REGARDING THE RCRA USED OIL REBUTTABLE PRESUMPTION

March 2005

Disclaimer

When using this Guidance, remember that it is not legally binding and does not replace the Used Oil Management Standards found at Title 40 of the Code of Federal Regulations, Part 279 or any state and local rules that apply to used oil handlers.

This document does not constitute rulemaking by the EPA and may not be relied upon to create a substantive or procedural right or benefit enforceable at law or in equity, by any person. The EPA may take action at variance with this document and its internal procedures.

Peer Review

The EPA Region 5 Waste, Pesticides and Toxics Division has reviewed this document and approved it for publication. Consistent with the *Science Policy Council Handbook: Peer Review* (EPA 100-B-00-001, December 2000), Region 5 completed an appropriate peer review.

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I. INTRODUCTION

The Used Oil Recycling Act of 1980 is found, in part, at Section 3014[1] of the Resource Conservation and Recovery Act (RCRA). Section 3014 of RCRA directs the Administrator of the U.S. Environmental Protection Agency (EPA) to protect human health and the environment through regulation without discouraging the recovery or recycling of used oil. Used oil is any oil refined from crude oil or any synthetic oil that has been used and as a result of such use is contaminated by physical or chemical impurities. Used oil containing more than 1,000 ppm total halogens is presumed to be a hazardous waste because it has been mixed with a halogenated hazardous waste listed in Subpart D of Part 261. Failure to rebut the presumption means that the used oil must be managed as a hazardous waste under 40 CFR Parts 262-270 instead of under the more favorable used oil management standards of 40 CFR Part 279. This document is designed to help regulators, members of the regulated community, and the public find and understand EPA regulations and policies concerning the used oil rebuttable presumption[2] (the rebuttable presumption). A number of EPA documents mention the rebuttable presumption, including regulations, Federal Register (FR) preambles, letters, and enforcement documents, but up until now an overview of these documents did not exist. This document: (1) summarizes existing regulations and policies regarding the rebuttable presumption, and (2) provides guidance on implementing the rebuttable presumption. This document only applies to used oil containing greater than 1,000 parts per million (ppm) total halogens.

This document itself does not create any legally binding requirements, but rather serves as a useful compendium of legally binding EPA regulations, as well as EPA policies and information, on the rebuttable presumption. The word "should" as used in this document is intended solely to recommend or suggest and does not connote a requirement. If there is a discrepancy between the regulations and this document, the regulations govern. The guidance in this document reflects EPA's present best judgement and information regarding the used oil rebuttable presumption.

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[1] 42 U.S.C. § 6935.

[2] The rebuttable presumption is found at 40 CFR §§261.3(a)(2)(v), 279.10(b)(ii), 279.21(b), 279.44(a) through 279.44(c), 279.53, 279.63, and 279.70(c).

EPA remains open to different approaches in individual cases, except where a specific approach is required by regulations. EPA may revise this document in the future. State environmental regulations and policies may be more stringent than their federal analogues.

This document is organized in the sections below.

- Section II of this document presents background information related to the rebuttable presumption.
- Section III identifies the used oil regulatory exclusions to the rebuttable presumption.
- Section IV discusses rebutting the rebuttable presumption of mixture with a listed waste.
- Section V identifies potential users of this document and its appendices.

Information in Sections II, III, IV and V is presented in a question-and-answer format. General references used to prepare this report are listed at the end of the text. Specific source documents are cited in footnotes.

This document also includes five appendices. Appendix A of the document presents selected total halogen test methods suitable for used oil. Appendix B presents halogenated hazardous constituents excerpted from Appendices VII and VIII to Title 40 of *Code of Federal Regulations* (40 CFR), Part 261, and the associated hazardous waste codes from 40 CFR §§261.24 and 261.31 through 261.33. Appendix C provides tables summarizing the composition, application, and functions of lubricating oil and additives; percentages of chlorinated paraffin in metalworking fluids; typical additives in metalworking fluids; and pesticide products with lubricant applications. Appendix D presents a table of regulatory interpretation letters for used oil. The flowchart in Appendix E is a graphical depiction of Sections II through IV of this document to be used as a quick desk reference.

II. BACKGROUND INFORMATION

A. What is "used oil"?

Used oil is any oil refined from crude oil or any synthetic oil that has been used and as a result of such use is contaminated by physical or chemical impurities. Used oils include spent automotive lubricating oils, spent industrial oils, and spent industrial process oils.[3] The definition of used oil includes oil used for the purpose of lubrication that becomes contaminated as a result of such use and residues and sludges derived from used oil.[4] Used oil is subject to "Standards for the Management of Used Oil" (40 CFR Part 279).

B. What are total halogens?

The halogen family, or Group VIIA on the periodic table of elements, includes fluorine, chlorine, bromine, iodine, and astatine. (Astatine is a radioactive, man-made element with an extremely short half-life, and therefore, not a concern). Chemicals containing both a halogen atom and a carbon atom are called "organic halogens." Examples of organic halogens include short chain alkanes like 1,2-dichloroethane, hexachloroethane, and short chain (C10 - C13) chlorinated paraffins. Chemicals containing an atom from the halogen family but no carbon atoms are "inorganic halogens." Examples of inorganic halogens include sodium chloride (table salt) and thallium chloride. Total halogens include organic and inorganic halogens, except as noted in analytical procedures. EPA proposed regulating total chlorine in used oil but finalized the regulatory term as "total halogens" after comments submitted in response to the proposed rule indicated that most "total chlorine" analytical methods actually measure halogens other than chlorine only.[5]

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[3]More detail is provided in the preamble to the November 29, 1985, final rule on page 50 FR 49174.

[4]More discussion is located in the preambles to the September 10, 1992, final rule on pages 57 FR 41573-41574, and the May 3, 1993, final rule on page 26422.

[5]Reported analytical results for total halogens are determined by an equation that uses the atomic weight of chlorine.

Various regulatory preamble, policy, and enforcement guidance document discussions of total halogens in used oil identify spent solvents, pesticides, and polychlorinated biphenyls (PCB) as contaminants of concern in used oil. Although most of these contaminants contain chlorine, some also contain fluorine and bromine (such as chlorinated fluorocarbons in F001, 1,1,2-trichloro-1,2,2-trifluoroethane in F002, and bromoform in U225).

Used oil handlers may determine whether the total halogen content is above or below 1,000 ppm by (1) testing the used oil or (2) applying knowledge of the halogen content of the used oil in light of the materials or processes used. If testing to determine the total halogen content of a used oil waste stream, handlers should properly sample and analyze the used oil using a total halogen test method. ASTM D4057-95 (2000) Standard Practice for Manual Sampling of Petroleum and Petroleum Products includes sampling methods generally suitable for used oils.[6] Samples should be representative of the waste being tested; this evaluation should include the assistance of a chemist and quality assurance/quality control staff.

Appendix A lists total halogen test methods suitable for used oil from SW-846, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (EPA 1996c). EPA personnel should evaluate a total halogen determination by considering whether a total halogen test method was used. The method used, whether published in SW-846 or not, should be demonstrated to work for its intended application. That is, it should be able to determine the total halogens in used oil (with oil concentrations from less than five percent to 100 percent) at the action limit of 1,000 ppm, within the allowable uncertainty of the application, and on a sample that is representative of the used oil being tested. The smaller the uncertainty, the less likely total halogen results greater than 1,000 ppm will be falsely detected. The December 1996 edition of SW-846 (Revision 3) is available on-line and on CD-ROM and includes guidance on selecting the appropriate methods. In addition, EPA posted in 2001 a table titled "RCRA SW-846 Methods for Determining Chlorine and Other Halogens in Used Oil under Test Methods and Frequently Asked Questions"

[6]The ASTM standard method for sampling extremely viscous liquid, D140, identified in 40 CFR Part 261, App. I, has been withdrawn, and the ASTM standard method for sampling petroleum and petroleum products (ASTM D270) referenced in SW-846, Chapter 9 (EPA 1996c) was discontinued in 1982 and replaced by D4057 and D4177.

(EPA 2001). It is similar to Appendix A of this document but also includes limited methods for detecting specific halogenated constituents.

C. What is the rebuttable presumption for used oil?

EPA and used oil handlers sometimes found it difficult to determine if used oil has been mixed with a listed hazardous waste. As a result, EPA decided to use an objective test that focused on the halogen level in used oil. This objective test is known as the rebuttable presumption. As stated in regulation,[7] the rebuttable presumption is as follows:

> Used oil containing more than 1,000 ppm total halogens is presumed to be a hazardous waste because it has been mixed with a halogenated hazardous waste listed in Subpart D of Part 261. Persons may rebut this presumption by demonstrating that the used oil does not contain hazardous waste (for example, by using an analytical method from SW-846, Edition III, to show that the used oil does not contain significant concentrations of halogenated hazardous constituents listed in Appendix VIII of Part 261).[8]

Other regulations provide very specific, limited exemptions from the rebuttable presumption. Those regulations are addressed in Section III of this document.

As discussed above, if used oil contains greater than 1,000 ppm total halogens, EPA presumes that the used oil has been mixed with a listed hazardous waste. If the used oil handler can prove that the used oil is not mixed with a listed hazardous waste (that is, rebut the presumption of mixture), then the used oil management standards apply. Rebuttal of EPA's rebuttable presumption of used oil mixture with a listed halogenated hazardous waste is not required; the alternative to rebuttal is to manage used oils as hazardous waste. When the total halogen concentration is greater than 1,000 ppm, the burden of proof (rebutting the rebuttable presumption) is on the used oil handler.

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[7] The rebuttable presumption is found at 40 CFR §§261.3(a)(2)(v), 279.10(b)(ii), 279.21(b), 279.44(a) through 279.44(c), 279.53, 279.63, and 279.70(c).

[8] The regulation refers to only Appendix VIII of 40 CFR Part 261 as an example. Appendix VII also identifies halogenated constituents as the basis for listing specific hazardous wastes.

D. What is a halogenated hazardous waste?

For purposes of implementing the rebuttable presumption, EPA recommends reference to the RCRA hazardous waste codes defined to include halogenated hazardous constituents to determine the presence of "halogenated hazardous waste." Appendix B of this document is a table listing 161 halogenated hazardous constituents from Appendices VII and VIII of 40 CFR Part 261. The table associates 147 of these halogenated hazardous constituents with one or more of the 160 listed hazardous waste codes (F, K, P, and U) defined to include halogenated hazardous constituents. The remaining fourteen halogenated hazardous constituents listed are not associated with specific listed hazardous wastes. Appendix B will need revision if additional hazardous wastes containing halogenated hazardous constituents are listed.

E. What recordkeeping is required?

Generators, used oil collection centers, and aggregation points are not required to maintain records of the total halogen determination. However, if a subsequent used oil handler needs to rebut the presumption, it may be difficult to do without obtaining certain information[9] from the generator. Used oil transporters and transfer facilities, marketers, and burners are required to maintain records of the information or analyses used to determine total halogen concentrations for a minimum of three years (40 CFR §§ 279.44(b) and 279.44(d), 279.70(c), and 279.63, respectively). Used oil processors and re-refiners must determine whether the total halogen content of used oil managed at the facility is above or below 1,000 ppm and keep a record and results of all analyses performed as described in the analysis plan until closure of the facility (40 CFR §§ 279.53, 279.55, and 279.57(a)).

[9] Appropriate documentation can include, for example, printed lubricant composition before use from the product manufacturer, purchase orders, requisitions, shipping tickets, bills of lading, manifests, generator status and data from government databases, the used oil analysis plan, invoices, canceled checks, a sufficiently detailed description of the process generating the used oil in order to eliminate listed hazardous wastes by knowledge, and photographs.

III. REGULATORY EXCLUSIONS TO THE USED OIL REBUTTABLE PRESUMPTION

A. What regulatory exclusions are available for used oil from specific sources?

Used oil handlers need not rebut the presumption of mixing with a listed hazardous waste if they can document that the used oil waste stream is excluded from regulation as a hazardous waste. Some used oil waste streams are excluded from regulation as hazardous waste even if their total halogen concentration exceeds 1,000 ppm. Relevant exemptions and exclusions are discussed in this section. In addition to the exceptions described in this section, other regulations (e.g., the delisting of a halogenated hazardous waste under §260.22) might determine whether the rebuttable presumption applies to a particular used oil.

The final used oil handler may have a difficult time proving the applicability of any exemptions or exclusions unless documentation of the source of each used oil waste stream is maintained by oil handlers so that the final used oil handler of commingled used oils can prove the applicability of any exemptions or exclusions. Relevant EPA interpretation letters are identified in Appendix D.

1. Metalworking oils/fluids containing chlorinated paraffins

The rebuttable presumption does not apply to used metalworking oils/fluids containing chlorinated paraffins, where the used oils will be processed through a tolling arrangement, as described in 40 CFR §279.24(c), to reclaim metalworking oils/fluids. This exemption from the rebuttable presumption does not apply if the metalworking oils/fluids are recycled in any other manner (e.g., processed into fuel or lubricant) or disposed (40 CFR §279.10(b)(1)(ii)(A)).

2. Used oil contaminated with chlorofluorocarbons (CFCs)

The rebuttable presumption does not apply to used oil contaminated with chlorofluorocarbons (CFCs) removed from refrigeration units where the CFCs are destined for reclamation. This

exemption does not apply if the used oil contaminated with CFCs has been mixed with used oil from sources other than refrigeration units (40 CFR §279.10(b)(1)(ii)(B)).

3. Mixtures of used oil and hazardous waste from conditionally exempt small quantity generators (CESQG)

Mixtures of used oil and hazardous waste only from conditionally exempt small quantity generators (CESQG) (generators of less than 100 kilograms of hazardous waste per month) are regulated as used oil under 40 CFR Part 279 rather than as hazardous waste, consistent with 40 CFR §261.5(j). This rule was revised on July 30, 2003 so that this exclusion applies to all mixtures of used oil and hazardous waste from CESQGs, whether the used oil is burned for energy recovery or recycled in a different way.

4. Mixtures of used oil and TSCA-regulated PCBs

Dielectric fluids containing detectable concentrations of PCBs (a halogenated hazardous constituent) are regulated under the Toxic Substances Control Act (TSCA). These fluids are exempt from RCRA hazardous waste regulation provided they are hazardous only because they exhibit the toxicity characteristic for codes D018 - D043 (i.e., they do not exhibit hazardous characteristics for ignitability, reactivity, corrosivity, or toxicity for D004 through D017) (40 CFR §261.8). If total halogens in used oil exceed 1,000 ppm solely because the used oil was mixed with RCRA-exempt PCB waste, the used oil mixture will not be regulated as hazardous waste, but rather as used oil under both RCRA (when the PCB concentration is less than 50 ppm) and TSCA (40 CFR §279.10(i)).

5. Used oil from "do-it-yourselfers" and farmers

The used oil management standards do not apply to household "do-it-yourselfer" used oil generators (DIY) and farmers who generate an average of 25 gallons per month or less of used oil from vehicles or machinery used on the farm on a calendar year basis, consistent with the exclusion of household solid waste from the definition of hazardous waste at 40 CFR §261.4(b) (40 CFR §279.20(1) and (4)). However, once the DIY used oil is collected by a regulated used

oil generator, collection center, aggregation point, processor/re-refiner, or burner, it is subject to full regulation, including the rebuttable presumption (e.g., see 40 CFR §279.40(a)(4)).

6. Mixtures of used oil and residues from empty containers

Used oil mixed with the residues of hazardous waste in empty containers may be excluded from regulation as a hazardous waste by 40 CFR §261.7, the 'residues of hazardous waste in empty containers' rule (40 CFR §279.40(c)) while the mixture remains in the container. If 40 CFR §261.7(a) and (b) apply and there is no other source of halogens, then the mixture is regulated as used oil and the hazardous waste regulations do not apply. If there is another source of halogens for this used oil or if the used oil contained over 1,000 ppm total halogens before storage in an "empty container," it may be difficult to rely on this exclusion without additional documentation. The Agency also has made it clear that when residue is removed from an "empty" container the residue is subject to full regulation under Subtitle C if the removal or subsequent management of the residue generates a new hazardous waste that exhibits any of the characteristics identified in Part 261, Subpart C.[10]

IV. REBUTTING THE PRESUMPTION OF MIXTURE WITH A HALOGENATED, LISTED HAZARDOUS WASTE

A. What factors should be considered in preparing or evaluating an attempt to rebut the rebuttable presumption?

Used oil containing over 1,000 ppm total halogens is presumed to have been mixed with a listed hazardous waste unless the handler can demonstrate otherwise. Persuasive efforts to rebut the rebuttable presumption may include analysis for halogenated hazardous constituents and other kinds of information discussed below. Documenting the composition (e.g., proportions of oil and water) of a generator's used oil waste stream is a typical industry practice for used oil

[10] See 45 FR 78529 (November 25, 1980), where it states "[C]ontainer cleaning facilities which handle only 'empty' containers are not currently subject to regulation unless they generate a waste that meets one of the characteristics in Subpart D."

processors. More detailed waste profile information, such as the process generating the used oil and chemical composition obtained by sampling and analysis of the used oil, can be useful in rebutting the presumption. An analysis plan including data quality objectives, quality assurance, and quality control procedures could (1) assist in rebutting a presumption of mixture if halogenated hazardous constituents are false positive detections and (2) minimize the occurrence of false positive detections.

B. Do analytical data, including appropriate target analytes, identify significant concentrations of halogenated hazardous constituents?

1. Appropriate target analytes

When making a determination as to whether significant concentrations of halogenated hazardous constituents are present in the used oil, target analytes should include those constituents previously detected by EPA in used oil, which include F001 and F002 constituents[11] and PCBs. Individual facilities have detected additional halogenated hazardous constituents, such as ethylidene dichloride, methyl chloride, methyl chloroform, chlorobenzene, pentachlorophenol, cresols, chlordane, and heptachlor. EPA has not required analysis of a used oil sample for all halogenated constituents in Appendix B to date. EPA acknowledged problems with Appendix VIII to Part 261 (Appendix B of this document is a subset of Part 261 Appendices VII and VIII) -- such as a lack of analytical standards, analytical screening methods, listings which are large categories of chemicals, and that it lacks analytical methods for some of the constituents--in the preamble to a final rule updating SW-846[12]. Some of the halogenated constituents in Appendix B are rare and unlikely to be found in used oil, except through mixture. Other halogenated hazardous constituents in Appendix B may not be present in used oil due to dissociation or decomposition.

[11]F001/F002 constituents include tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, carbon tetrachloride, chlorinated fluorocarbons, 1,1,2-trichoroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, ortho-dichlorobenzene, and trichlorofluoromethane.

[12]See 54 FR 40262 (September 29, 1989).

Sampling should be properly conducted (see the guidance provided in Section II.B.). Preparation and analysis methods for halogenated hazardous constituents may include these SW-846 methods, for example: Method 5035 (methanol extraction) and Method 8260B (GC/MS) for volatiles, Method 3580A (waste dilution) and Method 8270D (GC/MS) for semivolatiles, and Method 8082A (GC) for PCBs. Sample preparation and analytical techniques should be selected with knowledge of the used oil's physical composition (e.g., water content) and interfering chemicals. Additional methods are appropriate for different target analytes.

If a halogenated hazardous constituent is detected, Appendix B can assist the reader in identifying the listed hazardous waste codes associated with that constituent. The used oil could be managed as the associated listed hazardous waste or the attempt to rebut the presumption could continue with an argument that the associated listed hazardous waste is not present. If all of the detected halogenated hazardous constituents are not associated with listed hazardous wastes, then the presumption has been rebutted. If, on the other hand, a halogenated hazardous constituent is not detected through appropriate sampling and analysis, then the presumption has also been rebutted.

2. Significant concentration

EPA has discretion in determining what concentration is a "significant concentration." The RCRA regulations do not contain an applicable regulatory threshold for each halogenated hazardous constituent in used oil presumed to be recycled.[13] Concentrations less than 100 ppm may be significant for compounds that you would not expect to find in used oil under normal circumstances unless mixing has occurred, such as chlorophenoxy pesticides. A preamble to a final rule identifies these factors to be considered: the possibility of contamination through use

[13]The Federal Register preamble to the November 29, 1985 final used oil rule identifies spent solvents and chlorinated pesticides as examples of listed hazardous wastes and discusses significant concentrations. The regulatory thresholds for the Toxicity Characteristic (TC) Rule do not apply to used oil being recycled (see 55 FR 11840-11841; March 29, 1990).

versus mixture; significant concentrations depend on the constituent; whether the oil is tested at the point of generation or after mixture with other used oils; and the volume of oil sampled[14].

C. What knowledge may be used to rebut the presumption of mixture if significant concentrations of halogenated hazardous constituents are present?

1. Generator materials and processes used

There is limited guidance in this area. The used oil generator may provide information about the process generating the used oil, composition of the virgin oil, and other materials managed, to subsequent used oil handlers. Evidence that none of the used oil handlers managed any of the listed wastes associated with a particular constituent[15], or evidence that the detected constituent was an ingredient in one of the products before use might be persuasive. EPA has also considered whether the hazardous constituent could be added or have formed during use. The used oil handler may obtain more data through appropriate sampling and analysis (e.g., for F001/F002 constituents and PCBs at a minimum) and repeat the regulatory review in Sections III and IV of this document.

2. Material safety data sheets

In limited circumstances, a detailed material safety data sheet (MSDS) may be helpful in demonstrating that a hazardous constituent is present in the virgin oil formulation and introduced by mixture with a listed hazardous waste. As an example, an MSDS was accepted to rebut the presumption in the following case. The MSDSs for a grease meeting the RCRA definition of "used oil" showed that the grease was formulated with trichloroethylene. The regulatory agency exercised its discretion in agreeing that the trichloroethylene was not present as a result of mixing with listed halogenated hazardous waste (spent solvents). EPA letters explain how a specific

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[14]See the preamble to the November 29, 1985 final 'burning of used oil fuel' rule, 50 FR 49175-49176 and 50 FR 49189 - 49190, and the preamble to the January 11, 1985 proposed 'standards for the management of specific wastes and specific types of facilities' rule at 50 FR 1686.

[15]Identify the listed hazardous waste associated with a particular halogenated constituent by reference to Appendix B and refer to the hazardous wastes listed in 40 CFR 261.31, 261.32, and 261.33 for the definition of a specific listed hazardous waste.

solvent constituent may be present in used oil and still not be a listed waste by regulatory definition (EPA 1996d, EPA1993a). However, the fact that some halogens were present as a result of virgin product formulation does not eliminate the possibility that some halogens might be present from mixture with hazardous waste.

EPA staff have also accepted an MSDS as demonstration that halogens were present from lubricant product additives (e.g., chlorinated paraffins used as extreme pressure additives) and not from mixing with hazardous waste. Appendix C-3 of this document includes formulas for metalworking fluids to illustrate how composition varies depending on the application. Some soluble oils, for example, are supplied as concentrates and may be blended at one part concentrate with 20 parts water. However, EPA believes it would be very difficult to rebut the presumption through a mass balance approach based on MSDS concentrations of extreme pressure additives or biocides[16] if used oils from a variety of applications are commingled.

Use of an MSDS as knowledge, to demonstrate the absence of halogenated hazardous constituents and to rebut the presumption of mixing, assumes that the MSDS provides more information than is required by regulation. Occupational Safety and Health Administration (OSHA) regulations (29 CFR §1910.1200) suggest that mixture components of 1 percent (which equals 10,000 ppm) or less need not be identified when the component is not a carcinogen, and carcinogenic mixture components need not be identified when present at 0.1 percent (1,000 ppm) or less. An MSDS that provides only as much detail as required by OSHA would, therefore, be helpful in rebutting the presumption of mixture if only one halogenated carcinogenic component is present and it is also the sole halogenated compound causing the used oil to exceed 1,000 ppm total halogens. An MSDS that provides only as much detail as required by OSHA would not be helpful in rebutting the presumption of mixture if several halogenated carcinogenic components are present at levels less than 1,000 ppm and total halogens are greater than 1,000 ppm. In the

[16]Halogenated biocides used in lubricants are registered with the EPA pursuant to the Federal Insecticide, Fungicide, and Rodenticide Act and are identified in Appendix C-4. Biocides are used in low concentrations (typically 50-125 ppm) in the oil/water emulsion type lubricants according to the Independent Lubricant Manufacturers Association (ILMA).

latter example, the MSDS would not identify the carcinogenic halogenated hazardous constituents even if they were present.

3. Inorganic total halogen concentration

Another approach has been to use the total organic halogen content to rebut the presumption of mixture for marine used oils. Total halogen tests measure both organic and inorganic halogens, without accounting for the fact that most halogenated hazardous constituents identified in 40 CFR Part 261 (see Appendix B) are organic compounds. Therefore, used oils that have a significant content of inorganic halogens relative to organic halogens can test greater than 1,000 ppm of total halogens, triggering the rebuttable presumption. One EPA region accepted a total organic halogen field test result of less than 1,000 ppm as an adequate rebuttal with the understanding that the used oil was contaminated with sea salt and not halogenated hazardous constituents. EPA agreed with this approach in an interpretive letter (EPA 1986b).

4. Product additive information

In 2002, the Independent Lubricant Manufacturers Association's (ILMA) Safety, Health, Environmental, and Regulatory Affairs (SHERA) and the American Chemistry Council Additives Panel Health Environmental and Regulatory Task Group (HERTG) reviewed a draft version of Appendix B and identified only one halogenated hazardous constituent, p-chloro-m-cresol, a biocide, as a lubricant additive. Biocides are typically used at low concentrations (typically at 50 to 125 parts per million) in the oil-water emulsion type lubricants, according to SHERA. According to biocide label instructions and EPA pesticide product managers, metalworking fluid products generally consist of less than one percent biocide.[17] SHERA also stated that the inorganic chloride content of the lubricants from raw materials is not likely to exceed 100-200 parts per million. Finally, SHERA identified the only chlorinated substances used in high concentrations in certain metalworking fluids as chlorinated waxes or paraffins and chlorinated fats and vegetable oils. SHERA estimated that these are used in 10% or less of metalworking fluids in the United States.

[17]Tetra Tech 2002a.

To the HERTG's knowledge, halogenated chemicals are not typically used in automotive applications or for industrial applications outside of metalworking with the exception of extreme pressure agents sold in the automotive aftermarket (i.e., through auto parts stores). In light of these statements, it appears unlikely that a halogenated hazardous constituent would be present in a virgin oil product, except for the biocide specifically mentioned above. Appendix C provides tables of lubricant additives.

EPA independently confirmed that halogenated hazardous constituents are not typical ingredients in engine flush products and aftermarket lubricant additives. EPA also reviewed the registered uses for pesticide halogenated hazardous wastes and did not find any historic lubricant applications for these pesticide active ingredients, which are regulated by the Federal Insecticide, Fungicide, and Rodenticide Act. Therefore, it is EPA's present judgment that the appearance of virtually any halogenated hazardous constituent in used oil suggests mixture with a hazardous waste.

5. Mismanaged PCB-containing oils

PCB-containing used oils may contain greater than 1,000 ppm total halogens. In order to assess the likelihood that the presence of total halogens at concentrations greater than 1,000 ppm could be caused by PCBs, in 2002, EPA tabulated the number of PCB-containing used oil shipments that were received in EPA Region 5[18] from 1994 through 2001, but not manifested as PCB waste.[19] TSCA rules found at 40 CFR §761.210 require the reporting of manifest discrepancies (unannounced PCB "hot loads"). Over 500 manifest discrepancies were reported to Region 5 during those eight years, and 59 of these discrepancies were used oil shipments, a very small proportion of all used oil shipments. The number of PCB-contaminated used oil shipments was highest in 1999 and 2000, with 19 shipments in those years, corresponding to total quantities of 289,156 and 290,106 pounds, respectively. Only one shipment of PCB-contaminated used oil per year was reported to Region 5 for 1994, 1995, and 1996. The fact that PCB use and

[18]U.S. EPA Region 5 includes Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin.

[19]Tetra Tech EM, 2002a.

manufacture has been regulated by TSCA since 1979 does not eliminate the possibility of mixture with used oil. An opinion that no PCBs are present can be contradicted by sampling and analytical detections of PCBs.

D. What is the case law on the rebuttable presumption?

There is very little case law on the rebuttable presumption and none on the implementation of the rebuttable presumption. Although there are two federal cases and one EPA administrative case referencing the rebuttable presumption, these cases do not address or discuss the actual implementation of the rebuttable presumption. See *U.S. v. Eastern of New Jersey, Inc.*, 770 F. Supp. 964 (D.N.J. 1991), and *U.S. v. Domestic Industries, Inc., et al.*, 32 F. Supp. 2d 855 (E.D.V., N.D.). See also *In the Matter of Dearborn Refining Compan*y, RCRA-05-2001-0019 (Initial Decision, August 18, 2003) and *In re: Dearborn Refining Company*, RCRA (3008) Appeal No. 03-04 (Final Order, September 10, 2004)[20].

V. CONCLUSIONS

A. How does this document make the rebuttable presumption easier to implement?

This document collects statements from existing EPA documents and updates lubricant additive information previously summarized by EPA. We expect that the flowchart in Appendix E will assist the reader in identifying the Parts 279 and 261 rules affecting implementation of the rebuttable presumption. Appendix B crosswalks the Appendix VII and VIII halogenated constituents with hazardous wastes listed in 40 CFR §§261.31 to 261.33–in order to provide guidance on the terms "halogenated hazardous waste" and "halogenated hazardous constituents" in the rebuttable presumption. Appendix B is intended to encourage used oil recycling by coordinating knowledge of listed hazardous wastes and generator processes in order to eliminate

[20] Administrative Law Judge Gunning's intial decision is available via the Internet at http://www.epa.gov/oalj/orders/dearborn-id.pdf. The Environmental Appeals Board decision is available via the Internet at http://www.epa.gov/boarddec/orders/dearborn.pdf.

at least some listed hazardous wastes from consideration as a source of halogens in individual cases. CAS numbers are provided in Appendix B so that chemicals with several names can be more easily identified by non-chemists. Misuse of Appendix B could discourage used oil recycling, if analyses were required for too many of the halogenated hazardous constituents. Misuse of Appendix B could also undermine the RCRA hazardous waste program, if too few constituents are identified as target analytes and significant concentrations of halogenated hazardous wastes are not detected. The composition of lubricant additives (Appendix C) can explain, at least in part, why total halogen concentrations greater than 1,000 ppm may be present in some used oils that have not been mixed with a listed hazardous waste. Appendix D identifies select Agency interpretations relevant to the rebuttable presumption.

B. Who should use this document?

1. Regulators

This document is for EPA staff providing compliance assistance and evaluating attempts to rebut the presumption during compliance evaluation and case development inspections for individual used oil handlers. EPA RCRA program personnel should review the used oil handler's analytical records and other information used to make a total halogen determination. Superfund program staff may refer to this document when characterizing used oils prior to removal and off-site shipment. Air program staff may compare the halogenated constituents identified in 40 CFR Part 261 (see Appendix B) to the National Emissions Standards for Hazardous Air Pollutants (NESHAP) for off-site waste recovery operations (40 CFR Part 63, Subpart DD) and refer to EPA implementation guidance for overlap between RCRA and the Clean Air Act. For more detail, see the "Implementation Guidance for Off-site Waste and Recovery Operations (OSWRO) NESHAP, Interrelationships with Other Related EPA Air Rules," U.S. EPA Office of Enforcement and Compliance Assurance (2224A), EPA-305-00-006, September 2000. Water program staff may be interested in the additives expected in used oil waste streams (see Appendix C) because used oil processors may also process used oil-contaminated wastewater. The Clean Water Act's Centralized Waste Treatment rules are found at 40 CFR Part 437. Used oil processors may be subject to the 40 CFR Parts 136 and 437 Effluent Limitations Guidelines,

Pretreatment Standards, and New Source Performance Standards for the Centralized Waste Treatment Point Source Category, either as direct dischargers or as industrial users of publicly owned treatment works.

EPA may use this document for used oil fuels produced from December 9, 1985, to the present. EPA may also use this document for all used oils presumed to be recycled in states where EPA has authorized the State and approved the state's used oil management standards as being substantially equivalent to the 1992 Federal Standards for the Management of Used Oil. Approved state hazardous waste management programs are identified in 40 CFR Part 272. The used oil management program is part of the hazardous waste management program. State regulators may also use this document.

2. Used oil handlers

The rebuttable presumption applies to all used oil fuel handlers, as well as used oil handlers, including used oil generators, subject to the 1992 used oil management standards (40 CFR Part 279). Used oil transporters and transfer facilities, used oil processors and re-refiners, used oil burners who burn off-specification used oil for energy recovery, and used oil marketers are required to determine whether the used oil they handle contains greater than 1,000 ppm total halogens. Sections II and V discuss analytical requirements in 40 CFR §279.55, and Section V discusses potential means of rebutting the presumption.

Used oil processors and re-refiners can study the pre-existing guidance and factors to be considered presented in this document to evaluate new waste streams in addition to handler-specific, non-RCRA-regulated physical parameters such as percent oil or percent solids. Used oil processors and re-refiners can also consider this document in order to comply with the analysis plan requirement at 40 CFR §279.55(a).

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VIII. APPENDICES

Appendix A. Total Halogen Test Methods for Used Oil

Sample Preparation	Analytical Procedure for Quantifying Total Halogens in Used Oil	Halogens Detected
5050, a bomb combustion method	9253, a silver nitrate titrimetric analysis	Cl, Br, I
5050, a bomb combustion method	9056, anion chromatography	F, Cl, Br, I[21]
none required	9077, field test kits	F, Cl, Br, I
none required	9076, oxidative combustion and microcoulometry	Cl, Br, I
none required	9075, x-ray fluorescence spectrometry	Cl

Source: EPA, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,* SW-846. At the time of document preparation, the SW-846 total halogen test methods for used oil are addressed in these Federal Register notice pages: 50 FR 49189 (November 29, 1985); 56 FR 42506 (August 27, 1991); 58 FR 46052 (August 31, 1993); 60 FR 30889 (January 13, 1995); 62 FR 32451-32463 (June 13, 1997); 65 FR 70678-70682 (November 27, 2000) and 67 FR 66252-66301 (October 30, 2002).

[21] Iodide is typically not included in results because the analytical system must be reconfigured for a second analysis of the combustate. For all practical purposes, this is not normally done since the contribution from iodide is considered to be minimal. Therefore, Method 9056 will predominately measure chloride, fluoride, and bromide as total halogens.

Appendix B. Halogenated Hazardous Constituents in Appendices VII and VIII to 40 CFR Part 261 and Associated Hazardous Waste Codes

Halogenated Hazardous Constituent and Chemical Abstract Service No.	Characteristic	F-listed	K-listed	P-listed	U-listed
Acetyl chloride, 75-36-5					U006
Aldrin, 309-00-2		F039		P004	
Allyl chloride, 107-05-1 (3-chloropropene)		F024 F025			
Aramite, 140-57-8		F039			
Benzal chloride, 98-87-3			K015		U017
Benzenesulfonyl chloride, 98-09-9					U020
Benzotrichloride, 98-07-7			K015 K149		U023
Benzyl chloride, 100-44-7			K015 K085 K149	P028	
Bromoacetone, 598-31-2				P017	
Bromoform, 75-25-2					U225
4-Bromophenyl phenyl ether, 101-55-3		F039			U030
Carbamic acid, (3-chlorophenyl)-, 4-chloro-2-butnyl ester, 101-27-9					U280
Carbon oxyfluoride, 353-50-4					U033
Carbon tetrachloride, 56-23-5	D019	F001 F024 F025 F039	K016 K019 K020 K021 K073 K116 K150 K151 K157		U211
Chloral, 75-87-6					U034
Chlorambucil, 305-03-3					U035
Chlorobenzene		F024			
Chlordane, 57-74-9	D020	F039	K097		U036
Chlordane, alpha & gamma isomers 5103-71-9 & 5566-34-7					U036
Chlorinated benzenes, N.O.S.			K085		
Chlorinated ethane, N.O.S.			K073		

Halogenated Hazardous Constituent and Chemical Abstract Service No.	Characteristic	F-listed	K-listed	P-listed	U-listed
Chlorinated fluorocarbons, N.O.S.		F001			
Chlorinated naphthalene, N.O.S.					
Chlorinated phenol, N.O.S.					
4-Chloro-o-toluidine, hydrochloride, 3165-93-3					U049
Chlornaphazin, 494-03-1					U026
Chloroacetaldehyde, 107-20-0			K010	P023	
Chloroalkyl ethers, N.O.S.					
p-Chloroaniline, 106-47-8		F039		P024	
Chlorobenzene, 108-90-7	D021	F002 F024 F025 F039	K015 K105 K149 K015		U037
Chlorobenzilate, 510-15-6		F039			U038
2-chloro-1,3-butadiene, 126-99-8 *See Chloroprene*					
Chloroethylene *See Vinyl chloride*					
p-Chloro-m-cresol, 59-50-7		F039	K001		U039
2-Chloroethyl vinyl ether, 110-75-8					U042
Chloroform, 67-66-3	D022	F024 F025 F039	K009 K010 K019 K020 K021 K029 K073 K116 K149 K150 K151 K158		U044
Chloromethane, *See Methyl chloride*					
Chloromethyl methyl ether, 107-30-2					U046
beta-Chloronaphthalene, 91-58-7		F039			U047
o-Chlorophenol, 95-57-8		F039	K001		U048
1-(o-Chlorophenyl)thiourea, 5344-82-1				P026	
Chloroprene, 126-99-8		F024 F025 F039			

Halogenated Hazardous Constituent and Chemical Abstract Service No.	Characteristic	F-listed	K-listed	P-listed	U-listed
3-Chloropropionitrile, 542-76-7				P027	
Cyanogen bromide, 506-68-3					U246
Cyanogen chloride, 506-77-4				P033	
2,4-D, 94-75-7	D016				U240
2,4-D, salts, esters					U240
DDD,72-54-8		F039			U060
DDE, 72-55-9		F039			
DDT, 50-29-3		F039			U061
Diallate, 2303-16-4					U062
1,2-Dibromo-3-chloropropane, 96-12-8		F039			U066
o-Dichlorobenzene, 95-50-1		F002 F039	K085 K042 K105		U070
m-Dichlorobenzene, 541-73-1		F039	K085 K105		U071
p-Dichlorobenzene, 106-46-7	D027	F039	K085 K105 K149 K150		U072
Dichlorobenzene, N.O.S., 25321-22-6		F024 F025	K085 K105		
3,3'-Dichlorobenzidine, 91-94-1					U073
1,4-Dichloro-2-butene, 764-41-0					U074
Dichlorodifluoromethane, 75-71-8		F039			U075
1,1-Dichloroethane, *See Ethylidene dichloride*					
1,2-Dichloroethane, *See Ethylene dichloride*					
Dichloroethylene, N.O.S., 25323-30-2			K073		
1,1-Dichloroethylene, 75-35-4	D029	F024 F025	K019 K020 K029		U078
1,2-Dichloroethylene, 156-60-5		F024 F025			U079
Dichloroethyl ether, 111-44-4		F039	K017		U025
Dichloroisopropyl ether, 108-60-1					U027

Halogenated Hazardous Constituent and Chemical Abstract Service No.	Characteristic	F-listed	K-listed	P-listed	U-listed
Dichloromethane, *See Methylene chloride*					
Dichloromethoxy ethane, 111-91-1					U024
Dichloromethyl ether, 542-88-1			K017	P016	
2,4-Dichlorophenol, 120-83-2		F039	K043 K099		U081
2,6-Dichlorophenol, 87-65-0		F039	K043		U082
Dichlorophenylarsine, 696-28-6				P036	
Dichloropropane, N.O.S., 26638-19-7		F024 F025			
Dichloropropanol N.O.S., 26545-73-3			K017		
Dichloropropene, N.O.S., 26952-23-8		F024 F025			
1,3-Dichloropropene, 542-75-6					U084
Dieldrin, 60-57-1		F039		P037	
Diisopropylfluorophosphate, 55-91-4				P043	
Endosulfan, 115-29-7				P050	
Endrin, 72-20-8	D012	F039		P051	
Endrin metabolites				P051	
Epichlorohydrin, 106-89-8			K017		U041
Ethylene dibromide, 106-93-4		F039	K117 K118 K136		U067
Ethylene dichloride, 107-06-2	D028	F024 F025 F039	K018 K019 K020 K029 K030 K096		U077
Ethylidene dichloride, 75-34-3		F024 F025 F039			U076
Fluorine, 7782-41-4				P056	
Fluoroacetamide, 640-19-7				P057	
Fluoroacetic acid, sodium salt, 62-74-8				P058	
Formetanate hydrochloride, 23422-53-9				P198	
Halomethanes, N.O.S.					

Halogenated Hazardous Constituent and Chemical Abstract Service No.	Characteristic	F-listed	K-listed	P-listed	U-listed
Heptachlor, 76-44-8	D031		K097	P059	
Heptachlor epoxide, 1024-57-3	D031				
Heptachlor epoxide (alpha, beta, and gamma isomers)	D031				
Heptachlorodibenzofurans, 67562-39-4, 70648-25-8, 69698-58-4		F032			
Heptachlorodibenzo-p-dioxins, 35822-46-9		F032			
Hexachlorobenzene, 118-74-1	D032	F024 F025	K016 K018 K030 K042 K085 K149 K150 K151		U127
Hexachlorobutadiene, 87-68-3	D033	F024 F025	K016 K018 K030		U128
Hexachlorocyclopentadiene, 77-47-4		F024 F025	K032 K033 K034		U130
Hexachlorocyclohexane [1,2,3,4,5,6-hexachlorocyclohexane, 608-73-1]		F024			
Hexachlorodibenzo-p-dioxins, 34465-46-8, 39227-28-6		F021 F022 F026 F027 F028 F032			
Hexachlorodibenzofurans, 5568-94-1		F021 F022 F024 F025 F026 F027 F028 F032			
Hexachloroethane, 67-72-1	D034		K106 K030 K073		U131
Hexachlorophene, 70-30-4					U132
Hexachloropropene, 1888-71-7					U243
Hydrogen fluoride, 7664-39-3					U134
Isodrin, 465-73-6				P060	

Halogenated Hazardous Constituent and Chemical Abstract Service No.	Characteristic	F-listed	K-listed	P-listed	U-listed
Kepone, 143-50-0					U142
Lindane, 58-89-9	D013				U129
Melphalin, 148-82-3					U150
Methoxychlor, 72-43-5	D014				U247
Methyl bromide, 74-83-9					U029
Methyl chloride, 74-87-3		F024 F025	K009 K010 K149 K157		U045
Methyl chlorocarbonate, 79-22-1					U156
Methyl chloroform, 71-55-6		F001 F002 F024 F025 F039	K019 K020 K028 K029 K096		U226
4,4'-Methylenebis(2-chloroaniline), 101-14-4					U158
Methylene bromide, 74-95-3			K132 K131		U068
Methylene chloride, 75-09-2		F001 F002 F024 F025 F039	K009 K010 K150 K156 K157 K158		U080
Methyl iodide, 74-88-4					U138
Mustard gas, 505-60-2					
Nitrogen mustard, 51-75-2					
Nitrogen mustard, hydrochloride salt, 55-86-7					
Nitrogen mustard N-oxide, 126-85-2					
Nitrogen mustard, N-oxide, hydro-chloride salt, 302-70-5					
Pentachlorobenzene, 608-93-5		F024 F025	K085 K149 K150		U183

Halogenated Hazardous Constituent and Chemical Abstract Service No.	Characteristic	F-listed	K-listed	P-listed	U-listed
Pentachlorodibenzo-p-dioxins, 36088-22-9		F020 F021 F022 F023 F026 F027 F028 F032			
Pentachlorodibenzofurans		F020 F021 F022 F023 F026 F027 F028 F032			
Pentachloroethane, 76-01-7		F024 F025			U184
Pentachloronitrobenzene, 82-68-8					U185
Pentachlorophenol, 87-86-5	D037	F021 F027 F028 F032	K001		
Phosgene, 75-44-5				P095	
Polychlorinated biphenyls, N.O.S., 1336-36-3					
Pronamide, 23950-58-5					U192
Propylene dichloride, 78-87-5					U083
Silvex, 93-72-1	D017	F027			
Sodium pentachlorophenate, 131-52-2		F027			
TCDD, 1746-01-6		F020 F022 F023 F026 F027 F032			
Tetrachlorobenzene [1,2,3,4-Tetrachlorobenzene, 634-66-2 and 1,2,4,5-Tetrachlorobenzene, 95-94-3]		F024 F025			
1,2,4,5-Tetrachlorobenzene, 95-94-3			K149 K150 K151		U207

Halogenated Hazardous Constituent and Chemical Abstract Service No.	Characteristic	F-listed	K-listed	P-listed	U-listed
Tetrachlorodibenzo-p-dioxins		F020 F022 F023 F026 F027 F032			
Tetrachlorodibenzofurans		F020 F022 F023 F026 F027 F032			
Tetrachloroethane, N.O.S., 25322-20-7					
1,1,1,2-Tetrachloroethane, 630-20-6		F024 F025 F039	K019 K020 K030 K095		U208
1,1,2,2-Tetrachoroethane,79-34-5		F024 F025 F039	K019 K020 K030 K073 K095 K150		U209
Tetrachloroethylene, 127-18-4	D039	F001 F002 F024 F025 F039	K016 K019 K020 K073 K116 K150 K151		U210
2,3,4,6-Tetrachlorophenol, 58-90-2		F020 F023 F027 F028	K001		
2,3,4,6-Tetrachorophenol, potassium salt, 53535-27-6		F020 F023 F027 F028	K001		
2,3,4,6-Tetrachlorophenol, sodium salt, 25567-55-9		F020 F023 F027 F028	K001		
Thallium chloride, 7791-12-0					U216
o-Toluidine hydrochloride, 636-21-5					U222
Toxaphene, 8001-35-2	D015		K098 K041	P123	

Halogenated Hazardous Constituent and Chemical Abstract Service No.	Characteristic	F-listed	K-listed	P-listed	U-listed
Triallate, 2303-17-5					U389
1,2,4-Trichlorobenzene, 120-82-1		F025	K150		
1,1,1-Trichloroethane, 71-55-6 *See Methyl chloroform*					
1,1,2-Trichloroethane, 79-00-5		F002 F024 F025	K020 K095 K096		U227
Trichloroethylene, 79-01-6	D040	F001 F002 F024 F025	K018 K019 K020		U228
Trichloromethane, *See Chloroform*					
Trichloromethanethiol, 75-70-7				P118	
Trichloromonofluoromethane 75-69-4		F002 F039			U121
2,4,5-Trichlorophenol, 95-95-4	D041	F020 F023 F027 F028	K001		
2,4,6-Trichlorophenol, 88-06-2	D042	F020 F023 F027 F028	K001 K043 K099		
2,4,5-T, 93-76-5		F027			
Trichloropropane, N.O.S., 25735-29-9					
1,2,3-Trichloropropane, 96-18-4					
1,1,2-Trichloro-1,2,2-trifluoroethane, 76-13-1		F002 F039			
Tris(2,3-dibromopropyl) phosphate 126-72-7					U235
Uracil mustard, 66-75-1					U237
Vinyl chloride, 75-01-4	D043	F024 F025	K019 K020 K028 K029		U043
Vinylidene chloride, 75-35-4			K019 K020 K029		

Appendix C. Tables of Lubricant Additives

Appendix C-1. Typical Additives in Lubricants for Automotive Applications (Including Aftermarket Products)

Name of Additive	Function	Composition	
		1984 data[a]	2002 data[b,c]
Antifoam	To permit air bubbles to separate from oil	Silicones, synthetic polymers, waxes	Polysiloxanes, polyacrylates, silicone polymers, synthetic polymers, organic copolymers, waxes
Antiodorant	To mask odors	Perfumes, formaldehyde compounds	Perfumes, essential oils
Antioxidant	To inhibit oxidation of oil	Sulfides, phosphites, amines, phenols, dithiophosphates	Alkyl sulfides, alkyl phosphites, aromatic amines, alkyl phenols, hindered phenols, metal dithiophosphates, metal dithiocarbamates, sulfurized phenols
Antiwear Additive	As above except for running condition	Chlorinated waxes, organic phosphates, lead napthenate	Chlorinated waxes, alkyl phosphites and phosphates, lead napthenate, metal triborates, metal and ashless dithiophosphates
Biocide	To inhibit microorganisms	Alcohols, phenols, chlorine compounds	***
Color Stabilizer	To stabilize oil color	Amine compounds	Aromatic amine compounds
Corrosion Inhibitor	To react with metal surfaces to form a corrosion resistant film	Zn and Ba dithiophosphates, dithiocarbamates, metal sulfonates, and sulfurized terpenes	Metal dithiophosphates, metal dithicarbamates, metal sulfonates, thiadiazoles, and sulfurized terpenes

Name of Additive	Function	Composition	
		1984 data[a]	2002 data[b,c]
Detergent	To neutralize acids in crankcase oils to form compounds suspended in oil	Sulfonates, phosphonates, phenates, alkyl substituted salicylates combined with barium, magnesium, zinc calcium	Alkyl sulfonates, phosphonates, alkyl phenates, alkyl phenolates, alkyl carboxylates, and alkyl substituted salicylates (all combined with barium, magnesium, zinc, calcium or magnesium)
Dispersant	To disperse contaminants in the lubricant	Alkenyl succinimides, alkyl-acrylic polymers, ashless compounds	Alkenyl succinimides, succinate esters, alkyl-acrylic polymers, ashless compunds, mannic reaction products
Emulsifier	To reduce interfacial tension and permit formation of water-oil emulsion	Surfactants, sulfonates, napthenates and fatty acid soaps	Fatty acids, fatty amides, and fatty alcohols
Extreme Pressure Additives	To form low-shear-strength film providing lubrication at startup and at high bearing loads	Organic compounds with sulfur, phosphorous, nitrogen, halogens, carboxyl or carboxalate salt	Alkyl sulfides, polysulfides, sulfurized fatty oils, alkyl phosphites and phosphates, metal and ashless dithiophosphates and carboxylates, metal dithiocarbamates, and metal triborates
Metal Deactivator	To form protective film on running surfaces to inhibit corrosion reaction	Organic dihydroxyphosphines, phosphites, and sulfur compounds	Metal dithiophosphates, metal phenates, aromatic amines, phosphites, organic complexes containing nitrogen or sulfur
Pour Point Depressant	To prevent congealing of oil at low	Polymethacrylates, polyacrylamides, alkylated napthalenes and phenols	Polymethacrylates, polyfumarates, polystryrene esters, alkylated naphtalenes, and oligomerized alkyl phenols

Name of Additive	Function	Composition	
		1984 data[a]	2002 data[b,c]
Rust Inhibitor	To react chemically with steel surfaces to form an impervious film	Sulfonates, alkylamines, amine phosphates, alkenylsuccinic acids, fatty acids, and acid phosphate esters	Metal alkylsulfonates, alkylamines, alkyl amine phosphates, alkenylsuccinic acids, fatty acids, alkylphenol ethoxylates, and acid phosphate esters
Seal Swell Agents	To swell elastomeric seals	***	Organic phosphates, aromatic hydrocarbons
Tackiness Agent	To improve adhesive qualities of base oil	Polyacrylates and polybutenes	Polyacrylates and polybutenes
Viscosity Index Improver	To retard loss of viscosity at high temperatures	Isobutylene polymers and acrylate copolymers	Polyisobutylene, polymethacrylates, styrene-diene copolymers, stryrene polyesters, polyacrylates, and olefin copolymers

Sources:

a. *Composition and Management of Used Oil Generated in the United States, Table 10*

b. American Chemistry Council

c. Lubrizol Corporation

Appendix C-2. Typical Additives in Metalworking Fluids

Additive	Function	Composition
Alkaline reserve	Maintains fluid pH	Alkanolamines (monoethanolamine, triethanolamine), polymers, amides, organic esters, alkali hydroxides (Na, K)
Antifoamant	Prevents the formation of foam	Silicone polymers, methyl acrylic polymers, stearates long chain fatty alcohols, waxes, calcium nitrate, acetate
Antimist Agent	Reduces aerosol formation	Polyisobutylene polymer, apolyacrylates, polyethylene oxide
Antiodorant	Improves odor	Citrus products, aldehydes, natural or synthetic aromatic compounds
Antioxidant	Reduces oxidation of fluid	Alkylated phenol
Biocide	Control bacteria and mold	Triazine, oxazolidine, nitromorpholine, sodium omadine, polymeric quats, bromonitriles, phenols (substituted including p-chloro-m-cresol), halogen substituted carbamates, isothiazolone derivatives
Chelator	Reduces hard water effects	Sodium EDTA, phosphonates, gluconates
Corrosion Inhibitor	Prevents oxidation on parts and machines	Calcium sulfonate, sodium sulfonates, fatty acid soaps, amine salts of boric acid, carboxylic acids
Coupling Agent (hydrotropes)	Improves the solubility of the various additives	Hexylene glycol, fatty alcohols, short chain ethers
Dispersant	Suspends fluid contaminants	Polyamides, sulfonates
Dye	Aesthetic, identification	Azo types, fluorescein
Emulsifier	Disperses oil in water, improves wetting of part	Petroleum sulfonate, sodium sulfonates, synthetic sulfonates, fatty acid salts and amides, nonionic surfactants, nonionic ethoxylates, amphoterics

Additive	Function	Composition
Extreme Pressure Agent	Provides lubrication under high pressure	Sulfurized fatty acid esters, sulfurized hydrocarbons, chlorinated paraffins and waxes, chlorinated fats and esters, phosphate esters, phosphorus derivatives
Humectants	Reduce tackiness on machines and parts	Polymeric esters, polymeric ethers
Metal Passivator	Protects newly exposed metal from corrosion	Triazol
Oiliness/Lubricity Agent	Increases film strength	Vegetable oil, fatty acid esters, high molecular weight esters, glycol esters, ethylene oxide-propylene oxide (EO/PO) block copolymers, naturally occurring triglycerides, graphite, molybdenum disulfide, polytetrafluoroethylene (PTFE)
Plasticizer	***	Glycol ether
Surfactant	Improve wetting and cleaning	Alkoxylated alcohols, alkoxylated nonylphenols
Thickener	Increase viscosity	Polyethers, polyvinyl alcohols, acrylic acid esters

Sources: OSHA's *Metalworking Fluids: Safety and Health Best Practices Manual, Appendix 2* (2001), Industrial Lubricant Manufacturers Association (ILMA), and Lubrizol Corporation

Appendix C-3. Percentages of Chlorinated Paraffin in Metalworking Fluids [a,b]

Metal Working Fluid	Formula 1	Formula 2	Formula 3
Drawing compounds	20.0 %	10.0 %	NL
Soluble oil for cutting fluids	NL	3.0%	11.5 %
Soluble oil for special and severe grinding operations	15.0 %	6.0 %	18.0 %
Semi-synthetic cutting fluids	NL	4.0 %	NA

Notes:

NA = Not Applicable
NL = Not listed as an ingredient

a. Chlorinated paraffin is a 60% chlorinated paraffin solution
b. Percentages indicate percent by weight

Appendix C-4. Halogenated Biocide Additives for Lubricants and Chemical Compound Active Ingredients

Product Name	Chemical Compound	PC Code[a]
DOWICIL 150 ANTIMICROBIAL	CHLOROALLYL)-3,5,7-TRIAZA-1-AZONIAADAMANTANE CHLORIDE	017902
DOWICIL 75 PRESERVATIVE	TRIAZA-1-AZONIAADAMANTANE	017901
A-261 A-265 BIOBROM C-103L BIOBROM C-100G BIOSPERSE 244 BULAB 6087 DEARCIDE 723 DOW ANTIMICROBIAL 7287 DOW ANTIMICROBIAL 8536 DOW TIME-RELEASE ANTIMICROBIAL MWF H-434 MICROBIOCIDE IPC 8950 SLIMICIDE 508 X-CIDE 5009 BACTERICIDE XD-8259	DIBROMO-2-CARBAMOYLACETONITRILE	101801

Product Name	Chemical Compound	PC Code[a]
ACTICIDE WP ACTICIDE 14F ACTICIDE RS-F ACTICIDE SPX AMERSTAT 251 BETZ DE-5556 BIOBAN 2000 BIOCHEK 430 BIOSPERSE 250 BIOSPERSE 4505 BODOXIN BPC 68915 BUSAN 1174 ISOCIL MW-14 ISOCIL IG-C KATHON 886 MW KATHON 886 MW 1.5% KATHON 886F MERGAL K12N NIPACIDE CBX NIPACIDE CI NIPACIDE CI 15 SF-886 TECHNICAL INDUSTRIAL MICROBICIDE TROY MERGAL K14 WSKT WSKT-10 X-CIDE 207 INDUSTRIAL MICROBIOCIDE	ISOTHIAZOLONE, 5-CHLORO-2-METHYL	107103
2K7 BUGSTICK BETZ DE-5556 BRONOPOL PRESERVATIVE MERGAL K12N MYACIDE S1 MYACIDE S2 MYACIDE S15 MYACIDE S30	BROMO-2-NITRO-1,3-PROPANEDIOL	216400
CANGUARD 777	BENZENE, (2-BROMO-2-NITROETHENYL)	101401

Product Name	Chemical Compound	PC Code[a]
KATHON 287T	ISOTHIAZOLONE, 4,5-DICHLORO-2-OCTYL	128101
B-7-1 B-7-2 B-7-3 B-7-4 B-7-5 B-7-6 B-7-7 B-7-8 B-7-9 B-7-10 B-7-11 B-7-12 B-7-13 B-7-14 B-7-15 B-7-16 B-7-17 B-7-18 B-7-19 B-7-20 B-7-21 B-7-22 B-7-23 B-7-24 B-7-25 BUSAN 77 WSCP 15 WSCP 20 WSCP 30 WSKT WSKT-10	POLY(OXY-1,2-ETHANEDIYL(DIMETHYLIMNIO)1,2-ETHANEDIYL(DIMETHYLIMNIO)-1,2-ETHANEDIYL DICHLORIDE)	069183
BUSAN 1024	METHYL-3,5,7-TRIAZA-1-AZONIAADAMANTANE CHLORIDE	128889

Product Name	Chemical Compound	PC Code[a]
BIOCHEK 410 BIOCHEK 430 TEKTAMER 38 TEKTAMER 38 LIQUID CONCENTRATE TEKTAMER 38 A.D.	BROMO-2-(BROMOETHYL)GLUTARONITRILE	111001
THE CLEANER	C12-16-ALKYLBENZYLDIMETHYLAMMONIUM CHLORIDE	069105
DANTOGARD PLUS LIQUID	CARBAMIC ACID, BUTYL-, 3-IODO-2-PROPYNYL ESTER	107801
ANTHIUM DIOXCIDE CARNEBON 200 2% AQUEOUS-STABILIZED CHLORINE DIOXIDE OXINE	CHLORINE OXIDE	020503
CHEMSICO SURFACE DISINFECTANT	BTC 2125, COMPONENT OF (WITH 069111)	069104
CHEMSICO SURFACE DISINFECTANT	C12-14-ALKYL(ETHYLBENZYL) DIMETHYL AMMONIUM CHLORIDES	069154
PREVENTOL BP, 75% IN ISOPROPANOL	BENZYL-P-CHLOROPHENOL	062201
PREVENTOL CMK PRESERVATIVE	CHLORO-M-CRESOL	064206
PREVENTOL CMK 40 PREVENTOL CMK-NA FORMULATION- INTERMEDIATE PREVENTOL WB PLUS	SODIUM 4-CHLORO-3-CRESOLATE	064205
ASEPTROL WTS-7.05	SODIUM CHLORITE	020502
VANTOCIL IB MICROBIOCIDE	POLY (HEXAMETHYLENEBIGUANIDE HYDROCHLORIDE)	111801

a. The PC Code is EPA's Office of Pesticide Programs unique chemical identifier.

Appendix D. EPA Letters that Address the RCRA Used Oil Rebuttable Presumption

The widespread use of the Internet has eased the distribution of letters prepared by Office of Solid Waste program staff in response to fact-specific inquiries. Many of the letters are available to the public through the following RCRA on-line Internet address: http://www.epa.gov/rcraonline/index.htm. Sixteen letters specifically address the RCRA used oil rebuttable presumption and are identified below. The letters have been grouped by the more specific topics below.

Used Oil Rebuttable Presumption Topic	Date	Faxback Numbers
Mixtures of used oil and hazardous waste	October 22, 1984 May 15, 1989 February 8, 1996	12319 13282 14058
"significant concentrations"	February 28, 1986 April 8, 1986 December 1, 1992 March 1, 1999	12567 12608 13579 15000
CFC and HCFC recycling	April 5, 1993 July 11, 1994 December 1, 1996 August 1, 1999	11735 11850 14051 14400
Household hazardous waste exclusion	April 8, 1994 September 28, 1994	11828 11875
Inorganic halogens for rebuttal	September 15, 1986	12738
Used oil tank bottoms and TC	September 1, 1994	13697
Used oil and "RCRA empty"	September 12, 1994	11870

Appendix E. Rebuttable Presumption Flowchart