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TOXICS RELEASE INVENTORY

Guidance for Reporting Pesticides and Other Persistent Bioaccumulative (PBT) Chemicals

Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) requires certain facilities manufacturing, processing, or otherwise using listed toxic chemicals to report the annual quantity of such chemicals entering each environmental medium. Such facilities must also report pollution prevention and recycling data for such chemicals, pursuant to section 6607 of the Pollution Prevention Act, 42 U.S.C. 13106. EPCRA section 313 is also known as the Toxics Release Inventory (TRI).

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DISCLAIMER

This guidance document is intended to assist industry with EPCRA section 313 reporting for pesticides and other PBT chemicals. In addition to providing an overview of aspects of the statutory and regulatory requirements of the EPCRA section 313 program, this document also provides recommendations and emissions factors to assist industry with EPCRA reporting. These recommendations do not supersede any statutory or regulatory requirements, are subject to change, and are not independently binding on either EPA or covered facilities. Additionally, if a conflict exists between guidance on this site and the statutory or regulatory requirements, the conflict must be resolved in favor of the statute or regulation.

Although EPA encourages industry to consider these recommendations and emissions factors, in reviewing this document, industry should be aware that these recommendations and emissions factors were developed to address common circumstances at typical facilities. The circumstances at a specific facility may significantly differ from those contemplated in the development of this document. Thus, individual facilities may find that the recommendations and emissions factors provided in this document are inapplicable to their processes or circumstances, and that alternative approaches or information are more accurate and/or more appropriate for meeting the statutory and regulatory requirements of EPCRA section 313. To that end, industry should use facility specific information and process knowledge, where available, to meet the requirements of EPCRA section 313. EPCRA section 313 also provides that, in the absence of such readily available data, a reporting facility may make reasonable estimates to meet those EPCRA section 313 requirements. Facilities are encouraged to contact the Agency with any additional or clarifying questions about the recommendations and emissions factors in this document, or if the facility believes that EPA has incorrectly characterized a particular process or recommendation.

Additional guidance documents, including industry specific and chemical specific guidance documents, are also available on TRI's GuideME website:
https://ofmpub.epa.gov/apex/guideme_ext/f?p=guideme:gd-list

SECTION 1.0 INTRODUCTION

On October 29, 1999, EPA promulgated the Final Rule on Persistent, Bioaccumulative, and Toxic (PBT) chemicals (64 FR 58666). This rule added several chemicals to section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) list of toxic chemicals and established lower reporting thresholds for these and other PBT chemicals that were already reportable under EPCRA section 313. The specific additions/revisions to the Toxics Release Inventory (TRI) reporting requirements for the chemicals covered in this document are summarized below in Table 1-1. Other PBT chemicals include the dioxin and dioxin-like compounds category, mercury, mercury compounds category, and polycyclic aromatic compounds category, these all have their own specific guidance documents.

Table 1-1: Select Chemical Additions/Revisions Based on the PBT Chemical Rule

Chemical Name or Chemical Category	CASRN	Section 313 Reporting Threshold (pounds)
Aldrin	309-00-2	100
Benzo(g,h,i,)perylene[1,2]	191-24-2	10
Chlordane	57-74-9	10
Heptachlor	76-44-8	10
Hexabromocyclododecane[3]	N270	100
Hexachlorobenzene	118-74-1	10
Isodrin	465-73-6	10
Methoxychlor	72-43-5	100
Octachlorostyrene[1]	29082-74-4	10
Pendimethalin	40487-42-1	100
Pentachlorobenzene[1]	608-93-5	10
Polychlorinated biphenyl (PCBs)	1336-36-3	10
Tetrabromobisphenol A[1]	79-94-7	100
Toxaphene	8001-35-2	10
Trifluralin	1582-09-8	100

[1] These chemicals and chemical categories were added to the EPCRA section 313 chemical list as a result of the PBT rule, published on October 29, 1999.
[2] Benzo(g,h,i)perylene is a polycyclic aromatic compound (PAC); however it is listed separately on the EPCRA section 313 chemical list and is not part of the PACs chemical category.
[3] The hexabromocyclododecane was added to the EPCRA section 313 chemical list as a result of the Addition of the Hexabromocyclododecane (HBCD) Category rulemaking, published on November 26, 2016. The HBCD category covers two individually listed chemicals: 1,2,5,6,9,10-Hexabromocyclododecane (CASRN 3194-55-6) and Hexabromocyclododecane (CASRN 25637-99-4).

The chemicals presented in Table 1-1 are referred to as "PBT Chemicals" throughout this document. The purpose of this guidance document is to assist facilities in complying with the reporting requirements of EPCRA section 313 for these PBT chemicals. Table 1-1 lists the reporting thresholds for the PBT chemicals discussed in this guidance document. Facilities that meet the EPCRA section 313 employee threshold and industry code requirements, and that exceed the reporting threshold for these PBT chemicals are subject to the lower EPCRA section 313 annual reporting requirements. These lower reporting thresholds were effective beginning with reporting year 2000 (first reports due by July 1, 2001).

The objectives of this guidance document are to:

- Provide explanation and assistance on EPCRA section 313 reporting requirements for select PBT chemicals;
- Promote consistency in the method of estimating annual releases and other waste management quantities of select PBT chemicals for certain industries and industrial classes; and
- Reduce the level of effort expended by those facilities that prepare an EPCRA section 313 report for these PBT chemicals.

Because each facility is unique, the recommendations presented may have to be adjusted to the specific nature of operations at your facility or industrial activity.

Section 1.1 What are the Reporting Thresholds for PBT Chemicals?

Thresholds are specified amounts of listed toxic chemicals manufactured, processed, or otherwise used during the calendar year that trigger reporting requirements. EPCRA section 313 establishes default reporting thresholds, but authorizes EPA to establish lower thresholds for particular chemicals, classes of chemicals, or categories of facilities, if a different threshold is warranted. EPA has used this authority to establish lower thresholds for PBT chemicals (see 40 CFR 370.28; 64 FR 58666). Therefore, provided the facility meets the NAICS code and employee threshold criteria, reporting is required for the PBT chemicals aldrin, methoxychlor, pendimethalin, tetrabromobisphenol A, and trifluralin:

- If a facility *manufactures* more than 100 pounds of that PBT chemical during the calendar year,
- If a facility *processes* more than 100 pounds of that PBT chemical during the calendar year, or
- If a facility *otherwise uses* more than 100 pounds of that PBT chemical during the calendar year.

In addition, provided that the facility meets the industry code and employee threshold criteria, reporting is required for the PBT chemicals benzo(g,h,i)perylene, chlordane, heptachlor, hexachlorobenzene, isodrin, octachlorostyrene, pentachlorobenzene, polychlorinated biphenyl (PCBs), and toxaphene:

- If a facility *manufactures* more than 10 pounds of that PBT chemical during the calendar year.
- If a facility *processes* more than 10 pounds of that PBT chemical during the calendar year.
- If a facility *otherwise uses* more than 10 pounds of that PBT chemical during the calendar year.

The quantities of PBT chemicals included in threshold determinations are not limited to the amounts released to the environment. All PBT chemicals manufactured, processed, or otherwise used are to be counted toward threshold determinations, including any amount of PBT chemicals that may be generated in closed systems. Quantities required to meet the threshold for some fuels and other raw materials may be found in Table 3-1. For more information on threshold determinations for PBT chemicals, see Section 3.1.1.

Section 1.2 What Other Changes to the EPCRA Section 313 Reporting Requirements Apply to PBT Chemicals?

EPA has also made modifications and/or clarifications to certain reporting exemptions and requirements for the PBT chemicals that are subject to the lower reporting thresholds; this includes pesticides and other PBT chemicals compounds category. Please note that for pesticides and other PBT chemicals facilities cannot apply the *de minimis* exemption when making threshold determinations and release and other waste management calculations. PBT chemicals are also excluded from using the Alternate Reporting Threshold and Form A Certification Statement, and from using range reporting options when reporting releases and other waste management activities. More information on reporting PBT chemicals to TRI, or

on the above exemptions and reporting options, can be found in the Reporting Forms and Instructions, available at: https://ofmpub.epa.gov/apex/guideme_ext/f?p=guideme:rfi-home.

SECTION 2.0 SOURCES AND USES OF PESTICIDES AND OTHER SELECT PBT CHEMICALS

The following paragraphs describe pesticides and other select chemicals regulated by the PBT rule. Please be aware that while some historical frequency data are provided below, the lower reporting thresholds now in effect are expected to increase the number of reports submitted for each chemical.

Aldrin

Aldrin is a soil insecticide that was used on crops from the 1950s until the early 1970s, at which time all uses except termite control were canceled. Aldrin is now listed by EPA as a canceled pesticide, and it is no longer manufactured or used in any circumstance in the United States. The collection and eventual destruction of aldrin at Resource Conservation Recovery Act (RCRA) Subtitle C transfer and disposal facilities falls under the TRI reporting requirements. This chemical may still be otherwise used and should continue to be reported to the EPA for TRI purposes. For reporting year 2017, seven Form R reports were submitted for aldrin.

Benzo(g,h,i)perylene

Benzo(g,h,i)perylene is a polycyclic aromatic compound (PAC). It may be found in oil, coal, wood, and natural gas. Formation of benzo(g,h,i)perylene and other PACs occurs as a by-product of incomplete combustion. Fossil fuel combustion for heat and power generation is the primary source of PACs; however, other industrial processes also contribute. For example, benzo(g,h,i)perylene may be manufactured during synthetic fuel production, coal processing, and petroleum refining. For more information on sources of PACs and benzo(g,h,i)perylene, refer to U.S. EPA's *Guidance for Reporting the Polycyclic Aromatic Compounds Category*. Benzo(g,h,i)perylene was added to the EPCRA section 313 list of toxic chemicals in 1999. For reporting year 2017, 1,143 Form R reports were submitted for benzo(g,h,i)perylene.

Chlordane

Chlordane is a broad-spectrum insecticide that was used on agricultural crops, in homes and gardens, for turf and ornamentals, and for termite and ant control. It has been banned from domestic use since 1988, but was manufactured for export up until 1997 by one corporation. Chlordane collected and disposed of at RCRA Subtitle C transfer and disposal facilities should continue to be reported to EPA for TRI purposes. In 2017, 13 Form R report were submitted for chlordane.

Heptachlor

Heptachlor was first registered in the United States in 1952 for use as a broad- spectrum insecticide, but was also used for home and garden insect control, for termite control, and as a seed treatment. It is presently used in the United States only to control fire ants in buried transformer and telephone/cable boxes. The production of heptachlor in the United States ended in 1997, but heptachlor collected and disposed of at RCRA Subtitle C transfer and disposal facilities should continue to be reported to EPA for TRI purposes. For reporting year 2017, 903 Form R reports were submitted for heptachlor.

Hexabromocyclododecane (HBCD) Category

A rule was published on November 28th, 2016, (80 FR 85440) adding an HBCD category to the TRI list of reportable chemicals that covers HBCD as identified through two primary Chemical Abstracts Service Registry Numbers (CASRNs): 3194-55-6 (1,2,5,6,9,10-hexabromocyclododecane) and 25637-99-4 (hexabromocyclododecane). The main use of HBCD is as a flame retardant in expanded polystyrene foam (EPS) and extruded polystyrene foam (XPS). EPS and XPS are used primarily for thermal insulation boards in the building and construction industry. HBCD may also be used as a flame retardant in textiles including: upholstered furniture, upholstery seating in transportation vehicles, draperies, wall coverings,

mattress ticking, and interior textiles, such as roller blinds. In addition, HBCD is used as a flame retardant in high impact polystyrene (HIPS) for electrical and electronic appliances, such as audio-visual equipment as well as for some wire and cable applications. Reporting forms on HBCD were first due July 1, 2018, for 2017 data. For reporting year 2017, four Form R reports were submitted for HBCD.

Hexachlorobenzene

Hexachlorobenzene was produced up until 1985 as a pesticide/fungicide used to treat wheat seeds, onions, and sorghum. It is no longer used as an active ingredient; however, it is contained as an impurity or formed as a by-product during the manufacturing of several common pesticides currently in use including atrazine, lindane, maleic anhydride, and propazine.

Hexachlorobenzene may also be produced as a by-product in the manufacture of chlorinated organics (such as carbon tetrachloride, perchloroethylene, trichloroethylene, ethylene dichloride, and 1,1,1-trichloroethane), in certain metal smelting and refining operations, during the combustion of chlorinated organic chemicals, and in coal-fired utility boilers. It is usually found in the still bottoms generated during chlorinated organic chemical purification and may be emitted from distillation columns. Hexachlorobenzene may also be indirectly produced during chlorine manufacturing, tire manufacturing, and some metal manufacturing operations (metallic magnesium and aluminum foundries/smelters) (1,3,4). For reporting year 2017, 64 Form R reports were submitted for hexachlorobenzene.

Isodrin

Isodrin is an insecticide that is no longer manufactured or used commercially in the United States. Small releases or other waste management activities of isodrin may be reported in TRI as remaining stockpiles are collected for destruction. In addition to any residual release or other waste management activities from the manufacture and use of isodrin, it may also be indirectly created/released from coal mining, foundries, waste incineration, and nonferrous metals manufacturing. For reporting year 2017, two Form R reports were submitted for isodrin.

Methoxychlor

Methoxychlor is currently used as an insecticide to control flies, mosquitoes, cockroaches, chiggers, and a variety of other insects. Methoxychlor and other related methoxychlor products are used on fruits, vegetables, and other plants (10). Reporting is expected during manufacturing, formulation, packaging, and disposal of methoxychlor. For reporting year 2017, 11 Form R reports were submitted for methoxychlor.

Octachlorostyrene

Octachlorostyrene is not manufactured as a commercial product, and no commercial uses of octachlorostyrene are known. It is a possible by-product of chlorine production, metal product/finishing operations, pesticide manufacturing, and high-temperature incineration of chlorinated hydrocarbons (especially plastic wastes). It has been identified as a by-product from the manufacture of carbon tetrachloride and perchloroethylene. Due to its structural similarity to hexachlorobenzene it may be manufactured as a by-product in many of the same processes as hexachlorobenzene. For reporting year 2017, four Form R reports were submitted for octachlorostyrene.

Pendimethalin

Pendimethalin is currently used as an insecticide and herbicide on a variety of agricultural crops. It is currently registered as the active ingredient in 58 pesticide products intended for agricultural, domestic, and commercial uses. Reporting of pendimethalin is expected to occur from manufacturing, formulation, packaging, and activities associated with its use. For reporting year 2017, 23 Form R reports were submitted for pendimethalin.

Pentachlorobenzene

Pentachlorobenzene is used exclusively as an intermediate in the production of the fungicide pentachloronitrobenzene (quintozene). It is found in the quintozene process waste stream as an unreacted intermediate and in the final product as an impurity. Pentachlorobenzene may be produced whenever organic compounds are burned in the presence of a chlorine source, as well as in small quantities in waste incineration, cement kilns, and secondary copper production processes.

Information on releases of pentachlorobenzene is limited. However, it is structurally similar to hexachlorobenzene and may be a by-product in chemical reactions that are known to produce hexachlorobenzene as a by-product. For reporting year 2017, 16 Form R reports were submitted for pentachlorobenzene.

Polychlorinated Biphenyls (PCBs)

PCBs (Chemical Abstract Service Registry Number 1336-36-3) are a group of over 200 synthetic halogenated aromatic hydrocarbons that were commercially used and sold as a mixture of isomers. Since the 1930s, PCBs have been used as dielectric agents (high- and low- voltage power capacitors and small industrial capacitors in equipment such as air conditioners, pumps, and fans), heat transfer agents, lubricants, flame retardants, plasticizers, and waterproofing materials. Depending on conditions, PCBs may be inadvertently created in some chlorinated organic chemical processes.

While many boilers and other combustion facilities burn virgin oil, some do not. That is, some facilities use fuel which has been gathered from other locations by oil recyclers; this fuel is commonly called "used oil". In some instances, used oil may contain PCBs. If your facility combusts used oil and you do not have better data, assume that the upper bound concentration of PCBs is 2 ppm. If, for example, a boiler is a TSCA-qualified combustion facility, then the concentration of PCBs may be greater than 2 ppm.

Domestic production of PCBs was banned in 1976. In 1979, the PCB Ban Rule was issued requiring all non-totally enclosed PCB activity to be authorized by EPA. Examples of authorized activities include servicing PCB transformers and PCB-contaminated transformers, servicing railroad transformers and mine equipment, and use in heat transfer and hydraulic systems.

In general, PCBs may be released from the authorized handling of PCBs in the activities described above, the waste management activities associated with PCB-contaminated wastes, and from combustion processes. Specific activities that might lead to releases of PCBs include used oil handling at bulk stations and bulk terminals, residual oil combustion, waste incineration (tires, medical/biological/hazardous/municipal waste, and sewage sludge), and any waste management activities in which PCB-contaminated soil, transformers, capacitors, or other materials are handled. For reporting year 2017, 83 Form R reports were submitted for PCBs.

Tetrabromobisphenol A

Tetrabromobisphenol A (TBBPA) is the largest globally produced brominated flame retardant. It is often used in plastics and engineering resins for printed circuit boards and computer equipment. TBBPA may be used as a reactive or additive flame retardant in acrylonitrile-butadiene-styrene (ABS) resins, epoxy and polycarbonate resins, high-impact polystyrene, unsaturated polyester resins, and thermoplastic polymers. When TBBPA is used as a reactive flame retardant, it is chemically transformed into another substance. In this instance, TBBPA is not present in the finished substance, except as trace amounts of unreacted starting material.

TBBPA is currently only produced at two facilities in the United States. TBBPA releases and other waste management activities associated with these facilities should be reported to TRI. Other reporting is expected from facilities using TBBPA in the manufacture of consumable goods such as televisions,

VCRs, computer wire and cable, printed circuit boards, and computer housings. Many products containing TBBPA may be subject to the EPCRA section 313 article exemption. For reporting year 2017, 53 Form R reports were submitted for TBBPA.

Toxaphene

Toxaphene is a polychlorinated camphene that was first commercialized in 1948 and became one of the most widely used chlorinated pesticides in the history of U.S. agriculture. It was used on a variety of crops as well as on livestock and poultry. All domestic uses of toxaphene were banned in 1990, but it is still used as an insecticide on bananas and pineapples in Puerto Rico and the Virgin Islands. Efforts made in several states to collect out of date and banned pesticides have resulted in the collection of tens of thousands of pounds of toxaphene, which were presumably sent to RCRA Subtitle C transfer and disposal facilities. For reporting year 2017, 12 Form R reports were submitted for toxaphene.

Trifluralin

Trifluralin is a pre-emergent fluorinated dinitroaniline herbicide registered for use to control annual grasses and broadleaf weeds on a variety of food crops and non-food uses, including residential uses. Based on data from 2006-2010, the annual total agricultural usage averaged approximately 6 million pounds of active ingredient trifluralin. The crops with the most use are cotton, soybeans, and alfalfa. Just under 1 million pounds were used for non-agricultural usage in 2005. (14) As this herbicide continues to be manufactured, releases and waste management activities associated with its manufacture and distribution should continue to be reported in TRI. For reporting year 2017, 40 Form R reports were submitted for trifluralin.

SECTION 3.0 GUIDANCE ON ESTIMATING ENVIRONMENTAL RELEASES OF PBT CHEMICALS

Section 3.1 General Guidance

EPA is providing the following guidance for use by facilities in estimating and reporting annual releases and other waste management quantities for PBT chemicals. It is not designed to provide exhaustive guidance for all situations involving PBT chemicals. Guidance documents for reporting the following PBT chemicals are also available: polycyclic aromatic compounds, mercury and mercury compounds, and dioxin and dioxin-like compounds. Please consult industry specific guidance documents applicable to your facility for more detailed guidance. Additional information and guidance is also available from the EPA's EPCRA Hotline, 1-800-424-9346, and the Toxics Release Inventory (TRI) website at https://www.epa.gov/toxics-release-inventory-tri-program. EPA also publishes an annual guidance document for EPCRA section 313 reporting entitled *Toxic Chemical Release Inventory Reporting Forms and Instructions* available at: https://ofmpub.epa.gov/apex/guideme_ext/f?p=guideme:rfi-home. You should consult the most current version before preparing any report for your facility.

This document includes concentration and emissions factor data which may be used as default values in calculating activity thresholds, releases and other waste management quantities. EPA recommends that facilities complete these calculations using best readily available information applicable to their operations, even when it differs from the data provided herein. EPA also recommends that facilities maintain documentation of the basis for making these estimates. Facilities are not required to perform additional testing for EPCRA section 313 reporting.

3.1.1 Threshold Determination

As mentioned previously, EPA lowered the reporting threshold for PBT chemicals for each of the reporting activities (manufacturing, processing, and otherwise use). Each activity threshold is determined independently. When determining if a threshold is exceeded for PBT chemicals, you should calculate the amount of each PBT chemical manufactured, the amount of each PBT chemical processed, and the amount of each PBT chemical otherwise used. Quantities required to meet the threshold for some fuels and other raw materials may be found in Table 3-1. The following example illustrates how to determine if a threshold has been exceeded for a PBT chemical.

Example 1: Threshold Determination Using Published Data

This sample calculation illustrates the use of published chemical-specific concentration data to determine threshold quantities.

Your facility has a primary NAICS Code covered by EPCRA section 313 reporting requirements and has over 200 full-time employees. Your facility requires large quantities of steam in the manufacturing process generated by oil-fired boilers. The No. 6 fuel oil you purchase to use in the boilers contains trace amounts of benzo(g,h,i)perylene. The combustion of the fuel oil constitutes otherwise use of benzo(g,h,i)perylene. You need to determine if your facility otherwise uses benzo(g,h,i)perylene in an amount exceeding the annual reporting threshold of 10 pounds.

To determine if your facility exceeds the otherwise use threshold for benzo(g,h,i)perylene, you must determine the amount of benzo(g,h,i)perylene present in the No. 6 fuel oil you purchased. Using the concentration in Table 3-1, benzo(g,h,i)perylene is present in residual fuel at a concentration of 26.5 ppm. The density of No. 6 fuel oil is 8 lb/gal, and your facility used 144,000 gallons of No. 6 fuel oil during the reporting year.

The quantity used to determine if you are required to report may be calculated as follows:

(144,000 gal/yr oil consumed) × (26.5 lb benzo(g,h,i)perylene/1E+6 lb residual oil) × (8 lb/gal oil density) = 30.5 lb/yr benzo(g,h,i)perylene used

Your facility exceeded the otherwise used threshold of 10 lb/year and is required to report.

The concentration of an EPCRA Section 313 PBT chemical may be known as a specific concentration, as an average, as a range, or as an upper or lower boundary. If you know the specific concentration of the EPCRA Section 313 chemical in the stream, you must use that value (40 CFR 372.30 (b)(i)). If only an average concentration is provided (e.g., by the supplier), use that value in the threshold calculation. If only the upper bound concentration is known, you must use that value in the threshold calculation (40 CFR 372.30(b)(3)(ii)). If only the lower bound concentration is provided or the concentration is given as a range or an upper and lower boundary, EPA has developed the following guidance on the use of this type of information in threshold determinations:

- If the concentration is given as a range or an upper and lower boundary, EPA recommends that you use the mid-point in your calculations.
- If only the lower bound concentration of the EPCRA Section 313 chemical is given and the concentrations of the other components are given, EPA recommends that you subtract the other component total from 100% to calculate the upper bound of the PBT chemical concentration. EPA then recommends that you should then determine the mid-point for use in your calculations.
- If only the lower bound concentration of the EPCRA Section 313 chemical is given and the concentration of the other components is not given, EPA recommends that you assume the upper bound for the PBT chemical is 100% and use the mid-point. Alternatively, product quality requirements or information available from the most similar process stream may be used to determine the upper bound of the range.

Chemical production facilities may manufacture PBT chemicals for other industry use. Production records are a great source for determining the amount manufactured. You must also include the importing of PBT chemicals in your manufacturing threshold determination. (EPCRA Section 313 (b)(l)(c)(i)). You should easily obtain these amounts from purchasing records.

Table 3-1 provides concentrations of benzo(g,h,i)perylene in fuels. EPA recognizes that the scientific literature shows that there is significant variability in the concentrations of benzo(g,h,i)perylene in fuels. As always, facilities should use the best available information that is applicable to their operations. In the absence of better data, EPA recommends using the default values listed in Table 3-1 for these commonly used fuels.

Diesel fuel is also a likely source of benzo(g,h,i)perylene; EPA does not have a default value for sites to use at this time.

Table 3-1: Quantity of Benzo(g,h,i)perylene Required to Meet the Reporting Threshold in Common Fuels

Fuel Type	Benzo(g,h,i)perylene Concentration (ppm)	Reference	Quantity Needed to Meet Threshold (gallons)[b]
No. 2 Fuel Oil	0.05	11	2.82×10^7
No. 6 Fuel Oil (Bunker C)	26.5	12	4.78×10^4
Gasoline	2.55	13	7.00×10^5
Paving Asphalt	1.2	6	7.69×10^5
Crude Oil	[a]		

[a] Benzo(g,h,i)perylene concentration in crude oil depends on the crude oil type. Additional benzo(g,h,i)perylene may be formed during petroleum refining operations.
[b] Assumes the following densities: No. 2 Fuel Oil = 7.1 lb/gallon; No. 6 Fuel Oil = 7.9 lb/gallon; gasoline = 5.6 lb/gallon; and paving asphalt = 10.84 lb/gallon.

If you perform threshold calculations for benzo(g,h,i)perylene, you should also perform threshold calculations for the polycyclic aromatic compounds (PACs) category. Benzo(g,h,i)perylene (a PAC) is reported separately from the PACs chemical category. The reporting threshold for benzo(g,h,i)perylene is 10 lb/yr and the reporting threshold for the PACs category is 100 lb/yr. If you exceed a reporting threshold for both benzo(g,h,i)perylene and the PACs category, separate Form Rs must be submitted. For more information on the PACs chemical category, refer to the EPCRA Section 313 *Guidance for Reporting Releases and Other Waste Management Quantities of Toxic Chemicals: Polycyclic Aromatic Compounds Category.*

3.1.2 Exemptions

EPA has established four classes of exemptions: *de minimis*, article, facility/laboratory related, and activity related. Chemicals or chemical categories that qualify for these exemptions may be excluded from threshold determinations and release or other waste management estimations.

The PBT final rule states that the *de minimis* exemption does not apply to PBT chemicals or chemical categories (40 CFR 372.38(a)).

For purposes of the article exemption (40 CFR 372.38(b)), an article is defined as a manufactured item that:

- Is formed to a specific shape or design during manufacture;
- Has end-use functions dependent in whole or in part upon its shape or design; and
- Does not release an EPCRA Section 313 chemical or chemical category under normal conditions of processing or otherwise use of the item at the facility (40 CFR 372.3).

If you receive a manufactured article from another facility (e.g., a transformer containing PCBs), the PBT chemical in that article may be exempt from threshold determinations and release and other waste management calculations if you meet the following:

- You process or otherwise use it without changing the shape or design; and
- Your processing or otherwise use does not result in the release of more than 0.5 pound of the PBT chemical or any other TRI chemical in a reporting year from all like articles.

COMMON ERROR - PCBs in Articles

EPA has stated that transformers are *articles* (and thus exempt from threshold determinations), but that the *release* or removal of fluid from the transformer negates the *article* status. The *article* status of only those transformers that have fluids removed (e.g., servicing or retro filling), or have fluids escape are affected. However, the PCBs are still not considered towards the reporting threshold if no new PCB-containing fluid is added, since the threshold determination is based on fluid added, not lost.

EPA has stated that disposal or removal of *articles* does not constitute a *release*. Therefore, disposal on site, or off-site transfer of the whole transformer with fluid content undisturbed, does not negate the *article* status. The transformer is not included in threshold determinations and does not have to be reported as a *release* or an off-site transfer of PCBs for purposes of section 313 reporting.

When calculating the threshold for *otherwise use*, a facility must consider only the amount of PCBs added to transformers during the reporting year (e.g, "topping off" a transformer), not the amount of working fluid contained in the transformer.

For more information, see Articles Exemption guidance at:
https://ofmpub.epa.gov/apex/guideme_ext/f?p=guideme:gd:::::gd:articles

Any PBT chemicals manufactured, processed, or otherwise used in laboratories under the supervision of a technically qualified individual may be exempt from threshold determinations and release and other waste management calculations (40 CFR 372.38(d)).

The activity-related exemptions are available for PBT chemicals (see 40 CFR 372.38).

Section 3.2 Methods for Calculating Annual Releases and Other Waste Management Quantities of PBT Chemicals

You must estimate release and other waste management quantities if the reporting threshold for one of the manufacturing, processing, or otherwise use activities is exceeded. For general reporting instructions, please see the Toxic Chemical Release Inventory Reporting Forms and Instructions, available at: https://ofmpub.epa.gov/apex/guideme_ext/f?p=guideme:rfi-home.

Air emission monitoring for PBT chemicals may be required under industry National Emission Standards for Hazardous Air Pollutants (NESHAPs), referred to as Maximum Achievable Control Technology (MACT) Standards. The HAP list includes PCBs, chlordane, heptachlor, hexachlorobenzene, methoxychlor, toxaphene, and trifluralin. Standards have been finalized for some industry source categories and additional categories are upcoming.

Emissions factors that may apply to the PBT chemicals addressed in this document are presented in Table 3-2. Note that emissions factor units vary from one factor to another.

Table 3-2: Published Emissions Factors for Select PBT Chemicals

PBT Chemical	Source Category	Emissions Factor	Emissions Factor Units	Reference[1]
PCBs	Hazardous waste incineration	2.0×10^{-3}	lb/ton PCB burned	2
	Residual oil combustion	1×10^{-6}	lb/lb PCB burned	2

PBT Chemical	Source Category	Emissions Factor	Emissions Factor Units	Reference[1]
Hexachlorobenzene	Secondary aluminum casting (using hexachloroethane for hydrogen degassing), controlled	1.00×10^{-2}	lb/ton Al produced [2]	5
	Secondary copper smelting/refining (charge with scrap copper and brass: cupolas), controlled	7.80×10^{-5}	lb/ton scrap feed [2]	5
	Incineration (industrial/hazardous waste), miscellaneous controls	3.80×10^{-5}	lb/ton waste feed [2]	5
	Primary iron (windbox, discharge end, sinter breaker), controlled	3.00×10^{-6}	lb/ton sinter produced [2]	5
	Cement manufacturing (kilns including preheater/precalciner kiln, including fuel supplement wastes), controlled	9.2×10^{-7}	lb/ton clinker produced [2]	5
	Cement manufacturing (kilns including preheater/precalciner kilns, excluding fuel supplement wastes), controlled	3.40×10^{-7}	lb/ton clinker produced [2]	5
	Coal combustion (utility), controlled	1.2×10^{-6}	lb/ton coal burned [2]	5
	Coal combustion (industrial), uncontrolled or low efficiency particulate controls	1.6×10^{-7}	lb/ton coal burned [2]	5
	Wood/bark waste combustion, controlled	1.20×10^{-7}	lb/ton wood waste burned [2]	5
	Carbon tetrachloride production	4.05×10^{-5}	lb HCB/lb production	7
	Perchloroethylene production	4.31×10^{-5}	lb HCB/lb production	7
	1,1,1-trichloroethane production	1.08×10^{-6}	lb HCB/lb production	7
	Ethylene dichloride production	8.50×10^{-7}	lb HCB/lb production	7
	Trichloroethylene production	6.86×10^{-7}	lb HCB/lb production	7
Benzo(g,h,i)perylene	Controlled coal combustion	2.7×10^{-8}	lb/ton coal combusted	9
	Wood waste combustion (with PM controls, 50% moisture basis; 4500 Btu/lb higher heating value)	1.41×10^{-6}	lb/ton wood waste burned	9
	No. 6 Fuel oil combustion	2.26×10^{-6}	lb/1,000 gal oil combusted	9

PM - Particulate Matter HCB - hexachlorobenzene

[1] Corresponds to references listed in Section 4.0.

[2] Converted from metric units

The use of one of these factors is illustrated in the following example:

Example 2: Release and Other Waste Management Estimation

This sample calculation illustrates how you might estimate release and other waste management quantities for Form R reporting.

The threshold determination in Section 3.1.1 showed that you otherwise used a total of 30.5 pounds of benzo(g,h,i)perylene during the combustion of 144,000 gallons of residual fuel oil. Using an emission factor of

2.26×10^{-6} lb benzo(g,h,i)perylene/1000 gal residual oil combusted, air emissions may be calculated as follows:

Quantity released $= (2.26 \times 10^{-6}$ lb benzo(g,h,i)perylene /1000 gal oil) × (144,000 gal oil)

$= 3.25 \times 10^{-4}$ lb/yr

Since this is less than 0.1 pounds, you need only report zero pounds in Part II, Sections 5.2 and 8.1 of the 2000 Form R.

In cases where testing is available, releases may be quantified as shown in the following example:

Example 3: Release and Other Waste Management Estimation (Waste Treatment)

Your facility is a RCRA Subtitle C transfer and disposal facility that collects and treats a variety of hazardous wastes, including hexachlorobenzene. During the reporting year, your facility accepted 10,000 pounds of hexachlorobenzene in various industrial wastes. You have tested your thermal incinerators and have found you can achieve 99.999% removal and destruction efficiency for all organics.

Quantity treated on site = 10,000 (lb hexachlorobenzene incinerated/year × (0.99999)
= 9,999.9 (lb/year)

You should report this amount as being treated on site in Part II, Section 7A of the Form R.

The amount released through the incinerator stack is the difference between the amount incinerated and the amount treated, or 0.1 (lb/year). You should report this amount in Part II, Sections 5.2 and 8.1d of the Form R.

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