United States Environmental Protection Agency

Office of Information Analysis and Access

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EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT SECTION 313

EPCRA/TRI TRAINING MATERIALS

Reporting Year 2001
Spring 2002

Module 2: PBT and Lead Reporting

TRAINING DISCLAIMER

This document was developed for the sole purpose of helping potential reporters understand and comply with the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA). Nothing in this document is intended to independently alter, supplement, or revoke the statutory and/or regulatory requirements imposed by EPCRA section 313 and the applicable regulations at 40 CFR 372 et seq. Although these training materials provide an overview of the section 313 reporting requirements, facilities should consult the statute and regulations when developing threshold determinations and calculating releases and other waste management amounts. Facilities should be aware that EPA also provides guidance documents containing both sector specific guidance and guidance on specific elements of the EPCRA section 313 program. Covered facilities are encouraged to consult these guidance documents for additional assistance. Facilities may also receive specifically for Reporting Year 2001, for reports due on July 1, 2002. Facilities should be aware that EPA may promulgate regulatory changes to the EPCRA section 313 program that may alter reporting requirements for future reporting years.

REPORTING REQUIREMENTS FOR PERSISTENT, BIOACCUMULATIVE, AND TOXIC (PBT) CHEMICALS: AN OVERVIEW

THE PBT RULE

- PBT chemical rule published in the *Federal Register* (October 29, 1999; 64 FR 58666)
- Rule applied beginning RY 2000
- Rule adds new chemicals to the TRI list
- Rule identifies a subset of chemicals (PBT chemicals) with lower thresholds and special reporting requirements (§372.28)

PBT CHEMICALS

- **Eighteen chemicals and chemical categories are subject to the PBT chemical rule:**
  - **Pesticides - Aldrin, Chlordane, Heptachlor, Isodrin, Methoxychlor, Pendimethalin, Toxaphene, and Trifluralin**
  - **Aromatics - Benzo(g,h,i)perylene, Polycyclic aromatic compounds (PAC) category, Dioxin and dioxin-like compounds category, Hexachlorobenzene, Octachlorostyrene, Pentachlorobenzene, Polychlorinated biphenyls (PCB), and Tetrabromobisphenol A (TBBPA)**
  - **Metals - Mercury and Mercury compounds**

PBT CHEMICALS AND THRESHOLDS

<u>Manufacture, process, and otherwise use thresholds</u>:

■ 100 lbs./yr -	Aldrin	Polycyclic Aromatic Cmpds.
	Methoxychlor	Tetrabromobisphenol A
	Pendimethalin	Trifluralin
■ 10 lbs./yr -	Chlordane	Benzo(g,h,i)perylene
	Heptachlor	Hexachlorobenzene
	Mercury	Mercury compounds
	Toxaphene	Octachlorostyrene
	Isodrin	Pentachlorobenzene
	PCBs	
■ 0.1 g/yr -	Dioxin and dioxin-like compounds	

PBT CHEMICALS

- The following chemicals were NOT designated as PBT chemicals for RY 2000:
  - Vanadium (except when contained in alloy)*
  - Vanadium compounds*
    - * *Vanadium has a new qualifier and vanadium compounds is a new non-PBT listing*
- A separate rulemaking has designated lead and lead compounds as PBT chemicals beginning RY 2001

PBT CHEMICALS AND EXEMPTIONS

- The *de minimis* exemption has been eliminated for PBT chemicals except for purposes of supplier notification
  - Users of mixtures must use best readily available information to determine the PBT chemicals present and their concentrations
- No other Section 313 regulatory exemptions were modified or restricted by the PBT chemical rule

PBT THRESHOLDS

- The combination of the low thresholds and no *de minimis* exemption means that a more thorough review of chemical activities may be needed to achieve compliance with the PBT chemical rule
  - Impurities need to be evaluated regardless of concentration
  - As always, chemicals used in low volumes need to be considered

SUPPLIER NOTIFICATION

- The supplier notification requirements have not changed
- The *de minimis* exemption still applies to supplier notification
- Suppliers can claim a chemical constituent trade secret and provide a generic chemical name
  - If the facility has no information to identify the constituent as a PBT chemical, based on the activity, the 25,000/10,000 pound threshold may be used
  - If the facility has information that the constituent is a PBT chemical but does not know which PBT chemical activity threshold applies (i.e., 0.1 gram, 10 pounds, or 100 pounds), the 100 pound threshold may be used

PBT REPORTING

- EPA has modified the Form R for PBT chemicals
  - Part II, Section 1.4 has been added to Form R
    - » Requires reporting of the distribution of each member of the dioxin and dioxin-like category as percentages among the 17 category members if the data are available
  - When reporting on dioxin and dioxin-like category, TRI-ME/ATRS will automatically recognize units of measure as grams
  - TRI-ME/ATRS will allow for decimal reporting for PBT chemicals (e.g., 9.3 pounds)

PBT REPORTING

- For PBT chemicals, EPA is requiring more precise reporting:
  - EPA has prohibited use of Form As
  - EPA has prohibited use of range codes for reporting releases and other waste management quantities (Part II, Sections 5, 6 of Form R)

DATA PRECISION

- Report releases and other waste management quantities at a level of precision supported by the data and estimation techniques used
  - If 157.243 pounds calculated, report 157.243, 157.24, 157.2, 157, 160, or 200 pounds depending on accuracy/quality of data and estimation techniques used
- For PBT chemicals, 0.1 pound is the smallest amount required to be reported (except for dioxin and dioxin-like compounds)
  - Estimates $\leq$ 0.05 pounds can be rounded down to zero pounds

DATA PRECISION

- For dioxin and dioxin-like compounds, 100 micrograms (equals 0.0001 grams) is the smallest amount required to be reported
  - Estimates $\leq$ 50 micrograms (equals 0.00005 grams) can be rounded to zero grams
- Report releases and other waste management quantities at a level of precision supported by the data and estimation techniques used
  - If 1.57243 grams calculated, report 1.57243, 1.5724, 1.572, 1.57, 1.6, or 2 grams depending on accuracy/quality of data and estimation techniques used

POLYCYCLIC AROMATIC COMPOUNDS (PACs) AND BENZO(G,H,I)PERYLENE

PACs AND BENZO(G,H,I)PERYLENE

- PBT activity threshold
  - PAC category threshold: 100 pounds
  - Benzo(g,h,i)perylene threshold: 10 pounds
- 3-Methylcholanthrene and Benzo(j,k)fluorene (fluoranthene) were added as members of the PAC category
- All members (new and old) of the expanded PAC category are PBT chemicals
- Benzo(g,h,i)perylene is an individually listed polycyclic aromatic hydrocarbon (PAH) that is a PBT chemical
  - Not a member of PAC category

POLYCYCLIC AROMATIC COMPOUNDS

Benzo(a)anthracene
Benzo(b)fluoranthene
Benzo(j)fluoranthene
Benzo(k)fluoranthene
Benzo(j,k)fluorene (fluoranthene)*
Benzo(r,s,t)pentaphene
Benzo(a)phenanthrene (chrysene)
Benzo(a)pyrene
Dibenz(a,h)acridine
Dibenz(a,j)acridine
Dibenzo(a,h)anthracene
7H-Dibenzo(c,g)carbazole
Dibenzo(a,e)fluoranthene
Dibenzo(a,e)pyrene
Dibenzo(a,h)pyrene
Dibenzo(a,l)pyrene
7,12-Dimethylbenz(a)anthracene
Indeno(1,2,3-cd)pyrene
3-Methylcholanthrene*
5-Methylchrysene
1-Nitropyrene

* Newly listed (October 29, 1999; 64 FR 58666)

SOURCES OF POLYCYCLIC AROMATIC COMPOUNDS

- Coal
- Fuel oil and other petroleum products
- Asphalt
- Creosote wood treatment

POLYCYCLIC AROMATIC COMPOUNDS

- PACs are found in coal, fuel oil and other petroleum products
- Default concentrations (weight-based)
  - 10 ppm in No. 2 fuel oil (Ref. 5)
  - 2,461 ppm in No. 6 fuel oil (Ref. 2)
  - Also present in other fossil fuels, petroleum products, coal tars, etc.
- Considered otherwise used if combusted on-site
- Considered processed if distributed in fuels, petroleum products, and other products

POLYCYCLIC AROMATIC COMPOUNDS

- PACs are also coincidentally manufactured during the combustion of fossil fuel
- Default air emission factors:
  - 1.12 pounds per million tons of coal combusted in a boiler with air pollution controls (Ref. 3)
  - 3.15×10^{-5} pounds per million standard cubic feet natural gas burned in a utility boiler (Refs. 3, 4)
  - 0.0165 pounds per million gallons of No. 6 fuel oil burned in a utility boiler (Ref. 3)

POLYCYCLIC AROMATIC COMPOUNDS

- Additional factors for coal and oil combustion available in *Locating And Estimating Air Emissions From Sources Of Polycyclic Organic Matter* (Ref. 4)
  - Includes several factors available for different types of coal, types of boilers, and different types of air pollution control
  - Contains emission factors for several members of the PAC category, benzo(g,h,i)perylene, and other chemicals

BENZO(G,H,I)PERYLENE

- Benzo(g,h,i)perylene is a separately listed polycyclic aromatic hydrocarbon
  - Similar to PACs and found in same materials
  - Benzo(g,h,i)perylene is not a member of the PAC category
- Default concentrations
  - 0.05 ppm in No. 2 fuel oil (Ref. 5)
  - 26.5 ppm in No. 6 fuel oil (Ref. 2)
  - Present in other fossil fuels, petroleum products, coal tars, etc.

BENZO(G,H,I)PERYLENE

- Benzo(g,h,i)perylene is coincidentally manufactured during the combustion of fossil fuel
- Default air emission factors:
  - 0.027 pounds per million tons coal combusted in a boiler with air pollution controls (Ref. 3)
  - 0.00226 pounds per million gallons of No. 6 fuel oil burned in a boiler (Ref. 3)

PACs AND BENZO(G,H,I)PERYLENE EXERCISE

- A facility transitioned from combusting No. 6 fuel oil to combusting No. 2 fuel oil during the reporting year. The facility combusted 3,000 gallons of No. 6 fuel oil and 1,000,000 gallons of No. 2 fuel oil in an utility boiler.
- Has an activity threshold been exceeded?
  - Assume No. 6 fuel oil has a density of 8.0 pounds per gallon and No. 2 fuel oil has a density of 7.0 pounds per gallon.

PACs AND BENZO(G,H,I)PERYLENE

- **For more information:**

1. ***Guidance for Reporting Toxic Chemicals: Polycyclic Aromatic Compounds Category.*** **U.S. EPA, Office of Information Analysis and Access. August 2001. Available at http://www.epa.gov/tri**
2. ***Using Systematic and Comparative Analytical Data to Identify the Source of an Unknown Oil on Contaminated Birds.*** **Wang, Z. et al. *Journal of Chromatography A.* Volume 775, pp. 251-265. 1997.**
3. ***Compilation of Air Pollutant Emission Factors (AP-42),*** **Volume 1, Fifth Edition, Chapters 1.1, 1.3, & 1.4. U.S. EPA, Office of Air Quality Planning and Standards. 1998. Available at http://www.epa.gov/ttn/chief/ap42/index.html**
4. ***Locating And Estimating Air Emissions From Sources Of Polycyclic Organic Matter.*** **U.S. EPA, Office of Air Quality Planning and Standards. 1998. Available at http://www.epa.gov/ttn/chief/le/index.html**
5. ***Transport and Fate of non-BTEX Petroleum Chemicals in Soil and Groundwater.*** **American Petroleum Institute, API Publication Number 4593. 1994. Available at http://global.ihs.com/**

DIOXIN AND DIOXIN-LIKE COMPOUNDS (DLCs)

DIOXIN AND DIOXIN-LIKE COMPOUNDS

- **PBT activity threshold: 0.1 gram**
- **Dioxin and dioxin-like compounds (DLCs) category qualifier reads:**

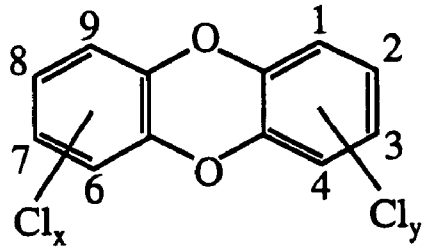
  "Manufacturing; and the processing or otherwise use of dioxin and dioxin-like compounds if the dioxin and dioxin-like compounds are present as contaminants in a chemical and if they were created during the manufacturing of that chemical."

  - **Qualifier designed to focus on new environmental loadings of dioxin and DLCs**

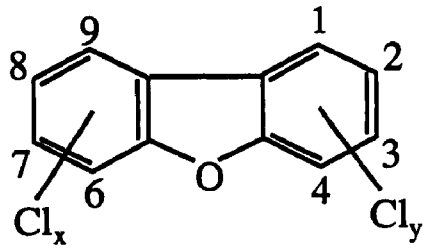
DIOXIN AND DIOXIN-LIKE COMPOUNDS

- **Category includes polychlorinated dioxins and furans with chlorine in at least the 2, 3, 7, and 8 positions**

Dibenzo-p-dioxin



Dibenzofuran



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DIOXIN AND DIOXIN-LIKE COMPOUNDS

- **Reporting must be based on total weight in grams of the members of the dioxin and DLCs category**
  - **Quantities of dioxin and DLCs entered on the Form R or into TRI-ME/ATRS must be in grams by weight**
- **Some literature contains information about dioxin and DLCs emissions in terms of grams TEQ (toxicity equivalency)**
  - **Do not use in threshold determinations**
  - **Do not report these values on Form R**
- **TEQs are based on toxicity equivalency factors (TEFs) for dioxin and DLCs, not just the weight**
  - **TEFs - estimates of the toxicity of dioxin and DLCs relative to the toxicity of 2,3,7,8-TCDD**

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DIOXIN AND DIOXIN-LIKE COMPOUNDS

- **Form R Part II, Section 1.4 requires reporting of the distribution of each member of the dioxin and DLCs category as percentages among the 17 category members. This is only required if such information is available from the facility's data used to report**
  - **Allows conversion of reported quantity into individual chemical estimates and TEQs**
  - **List is in EPA's *TRI Reporting Forms and Instructions* document**
  - **Do not check NA unless you are reporting for dioxin and DLCs**

1.4 Distribution of Each Member of the Dioxin and Dioxin-like Compounds Category.

(If there are any numbers in boxes 1-17, then every field must be filled in with either 0 or some number between 0.01 and 100. Distribution should be reported in percentages and the total should equal 100%. If you do not have speciation data available, indicate NA.)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
NA ☐																	

DIOXIN AND DIOXIN-LIKE COMPOUNDS

Calculating Section 1.4 using EPA's default emission factors for oil-fired utility boilers

No.	*Member Name*	*Concentration (pg/L oil)*	*Relative Percentage*	*No.*	*Member Name*	*Concentration (pg/L oil)*	*Relative Percentage*
1	1,2,3,4,6,7,8-HpCDF	164	5.16%	10	1,2,3,4,6,7,8-HpCDD	477	15.01%
2	1,2,3,4,7,8,9-HpCDF	0	0%	11	1,2,3,4,6,7,8,9-OCDF	0	0%
3	1,2,3,4,7,8-HxCDF	76.5	2.41%	12	1,2,3,4,6,7,8,9-OCDD	2055	64.65%
4	1,2,3,6,7,8-HxCDF	35.4	1.11%	13	1,2,3,7,8-PeCDF	64.1	2.02%
5	1,2,3,7,8,9-HxCDF	0	0%	14	2,3,4,7,8-PeCDF	49.3	1.55%
6	2,3,4,6,7,8-HxCDF	23.8	0.75%	15	1,2,3,7,8-PeCDD	24.7	0.78%
7	1,2,3,4,7,8-HxCDD	63.3	1.99%	16	2,3,7,8-TCDF	0	0%
8	1,2,3,6,7,8-HxCDD	65.8	2.07%	17	2,3,7,8-TCDD	0	0%
9	1,2,3,7,8,9-HxCDD	79.7	2.51%				

Source: EPA's *Guidance for Reporting Toxic Chemicals within the Dioxin and Dioxin-like Compounds Category* (Ref. 1).

1.4 Distribution of Each Member of the Dioxin and Dioxin-like Compounds Category.

(If there are any numbers in boxes 1-17, then every field must be filled in with either 0 or some number between 0.01 and 100. Distribution should be reported in percentages and the total should equal 100%. If you do not have speciation data available, indicate NA.)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
NA ☐	5.16	0	2.41	1.11	0	0.75	1.99	2.07	2.51	15.00	0	64.65	2.02	1.55	0.78	0	0

DIOXIN AND DIOXIN-LIKE COMPOUNDS

- Example calculation of emissions for a system that emits 1 gram per year of Octachlorodibenzofuran (OCDF) and 1 gram per year of 1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin
  - Correct quantity to report on Form R is 2 grams
  - Do not use the TEQ quantity, which is 0.0101 grams (TEFs are 0.0001 and 0.01)

DIOXIN AND DIOXIN-LIKE COMPOUNDS

- Dioxin and DLCs may be manufactured when chlorine-containing materials are involved in combustion or other high-temperature processes
- Default air emission factors (Ref. 1):
  - 1.71 nanograms of dioxin and DLCs per kilogram of coal combusted in an utility boiler (equivalent to 1.55 grams per million tons)
  - 3,178.6 nanograms (or 3.1786 picograms) of dioxin and DLCs per liter of fuel oil combusted in an utility boiler (equivalent to 0.0120 grams per million gallons)
  - 12.2 nanograms of dioxin and DLCs per kilogram of hazardous waste combusted in a boiler or industrial furnace (other than a cement kiln) (equivalent to 11.1 grams per million tons)

DIOXIN AND DIOXIN-LIKE COMPOUNDS

- **Additional default air emission factors (Ref.1):**
  - 89.78 nanograms of dioxin and DLCs per kilogram of copper scrap fed to a secondary copper smelter (equivalent to 0.0815 grams per thousand tons)
  - 16.24 nanograms of dioxin and DLCs per kilogram of wood (dry wt.) combusted in an utility boiler (equivalent to 14.73 grams per million tons)
  - 2.4 nanograms of dioxin and DLCs per kilogram of wood waste and bark (as fired) at pulp mills or lumber and wood product industry facility boilers (equivalent to 2.2 grams per million tons)

DIOXIN AND DIOXIN-LIKE COMPOUNDS

- **Additional default factors (Ref.1):**
  - 105.7 picograms of dioxin and DLCs per liter of waste water from bleached chemical pulp mills discharged to surface water (equivalent to 0.400 grams per million gallons)
  - 500 nanograms of dioxin and DLCs per kilogram of waste water sludge from bleached chemical pulp mills (equivalent to 0.454 grams per thousand tons)

DIOXIN AND DIOXIN-LIKE COMPOUNDS

- **Examples of activities that exceed the 0.1 gram activity threshold:**
  - **64,500 tons of coal need to be combusted in an utility boiler to exceed the threshold**
  - **8.33 million gallons of fuel oil need to be combusted in a utility boiler to exceed the threshold**
  - **1,230 tons copper scrap need to be fed to a secondary copper smelter**

DIOXIN AND DIOXIN-LIKE COMPOUNDS

- **For more information:**

1. ***Guidance for Reporting Toxic Chemicals within the Dioxin and Dioxin-like Compounds Category.*** **U.S. EPA, Office of Information Analysis and Access. December 2000. Available at http://www.epa.gov/tri**

2. ***Exposure and Human Health Reassessment of 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) and Related Compounds. Part 1: Estimating Exposure to Dioxin-Like Compounds. Volume 2: Sources of Dioxin-Like Compounds in the United States.*** **U.S. EPA, Office of Research and Development. 2000. Available at http://www.epa.gov/ncea/pdfs/dioxin/part1and2.htm**

MERCURY AND MERCURY COMPOUNDS

MERCURY AND MERCURY COMPOUNDS

- PBT activity threshold:
  - 10 pounds for mercury
  - 10 pounds for mercury compounds
- Mercury compounds are present in crude oil, fuel oils, and coal
  - Combustion of fuels is expected to be the main source of mercury reporting
- Mercury may be present in mined ores

MERCURY AND MERCURY COMPOUNDS

- **Manufacturing**
  - Fuel combustion
  - Metal mining and beneficiation
  - Petroleum refining

MERCURY AND MERCURY COMPOUNDS

- **Processing**
  - Petroleum refineries and bulk petroleum stations
  - Coal mining and metal mining and beneficiation
  - Carbon black and coke production
  - Cement and clay products
  - Fabricated metal products
  - Electronic and electrical products (e.g., bulbs, switches, batteries)
  - Other products (e.g., thermometers)

MERCURY AND MERCURY COMPOUNDS

- **Otherwise use**
  - Chlor-alkali production
  - Cement and clay products
  - Fabricated metal products
  - Electrical products (e.g., bulbs, switches, batteries)
  - Other products (e.g., thermometers)

MERCURY AND MERCURY COMPOUNDS

- **Mercury concentrations in light bulbs (Ref. 3):**
  - Less than 40 milligrams per 4-foot fluorescent bulb
  - 45–75 milligrams per high intensity discharge lamps
  - 8–25 milligrams in sodium lamps
- **Use of bulbs - generally articles exempt**
  - Articles exemption negated if > 0.5 pounds of Section 313 chemical released (and not recycled) during reporting year from all like items

MERCURY AND MERCURY COMPOUNDS

- **Mercury concentrations in coal and other materials:**
  - **Use the best readily available data. Usually, ICR data for your facility if available**
  - **If ICR data for your facility not available, choices are:**
    - » **Develop an average from ICR data for the type of coal that your facility burns (e.g., Pennsylvania bituminous) (Ref. 5)**
    - » **EPA's *EPCRA Section 313 Industry Guidance: Electricity Generating Facilities* (Ref. 2)**
    - » **U.S. Geological Survey's (USGS) coal quality data base (Ref. 4)**
    - » **Other data**

MERCURY AND MERCURY COMPOUNDS

- **Default concentrations in ash (Ref. 2):**
  - **No. 6 Fuel oil ash: 1 ppm as Hg; 1.04 ppm as Hg_2O**
  - **Coal fly ash: 12 ppm as Hg; 12.5 ppm as Hg_2O**
  - **Coal bottom ash: 4.2 ppm as Hg; 4.37 ppm as Hg_2O**

MERCURY AND MERCURY COMPOUNDS

- **Default air emission factors (Ref. 6):**
  - Fluorescent lamp manufacturing: 8 lbs./ton mercury (uncontrolled)
  - Fluorescent lamp crushing: 1.9 lbs./billion lamps (fabric filter, carbon adsorber)
  - Thermometer manufacturing: 18 lbs./ton mercury (uncontrolled)
  - Coke production: 50 lbs./million ton coke (fabric filter, electrostatic precipitator (ESP))
  - Lime manufacture: 3.0 lbs./million ton lime produced (natural gas-fed vertical kiln)
  - Carbon black manufacture: 300 lbs./million ton carbon black (fabric filter)

MERCURY AND MERCURY COMPOUNDS

- **Default air emission factors (Ref. 7):**
  - Primary copper smelting: 78 lbs./million ton metal
  - Steel mill - electric arc furnace: 72 lbs./million ton scrap feed
  - Ferrous foundries: 348 lbs./million ton metal charged
  - Glass manufacture: 100 lbs./million ton silica (particulate matter (PM) control)
  - Brick manufacture, coal-fired: 96 lbs./million ton brick (uncontrolled)
  - Industrial/hazardous waste incinerators: 5.4 lbs./thousand ton waste incinerated

MERCURY AND MERCURY COMPOUNDS

- **For more information:**

1. ***Guidance for Reporting Toxic Chemicals: Mercury and Mercury Compounds Category.*** **U.S. EPA, Office of Information Analysis and Access. August 2001. Available at http://www.epa.gov/tri**
2. ***EPCRA Section 313 Industry Guidance: Electricity Generating Facilities.*** **U.S. EPA, Office of Pollution Prevention and Toxics. 2000. Available at http://www.epa.gov/tri**
3. ***Mercury Study Report to Congress Volume II: An Inventory of Anthropogenic Mercury Emissions in the United States.*** **U.S. EPA, Office of Air Quality Planning and Standards and Office of Research and Development. 1997. Available at http://www.epa.gov/ttn/atw/112nmerc/mercury.html**
4. ***U.S. Geological Survey Coal Quality (Coalqual) Database: Version 2.0.*** **U.S. Geological Survey. 2000. Available at http://energy.er.usgs.gov/products/databases/CoalQual/**
5. ***Mercury ICR.*** **U.S. EPA, Unified Air Toxics Website. 2000. Available at http://www.epa.gov/ttnuatw1/combust/utiltox/utoxpg.html#DA2**
6. ***Locating & Estimating Air Emissions from Sources of Mercury and Mercury Compounds.*** **U.S. EPA, Office of Air Quality Planning and Standards, 1997. Available at http://www.epa.gov/ttn/chief/le/index.html**
7. ***Emission Factor Database for Alternate Threshold Substances. 2000.*** **Available at http://www.ec.gc.ca/pdb/npri/npri_gdocs_e.cfm**

PESTICIDES

PESTICIDES

- RY 2000 PBT listed pesticides:
  - Pendimethalin
  - Trifluralin
  - Methoxychlor
  - Heptachlor
  - Toxaphene
  - Isodrin
  - Aldrin
  - Chlordane
- All of these pesticides were already on the list of TRI chemicals

PESTICIDES

- Potential reporting facilities include:
  - Manufacturers of the pesticides
  - Processors of the pesticides
  - TSDFs that manage pesticide-containing wastes may be otherwise using the pesticides
- EPA does not expect any additional reports on these pesticides from users of pesticides
  - Most of these pesticides would not be used at reporting facilities
  - Even if a reporting facility used one of these pesticides, the use may qualify for the facility and grounds maintenance exemption if use not process related

PENDIMETHALIN

- PBT activity threshold: 100 pounds
- Pendimethalin is currently being used as an insecticide and herbicide
  - Primarily used as a herbicide on crops
  - 58 pendimethalin products registered for agricultural, domestic, and commercial uses and is applied by broadcasting, directed spray and soil treatment
- Releases of pendimethalin are expected to occur from manufacturing, formulation, packaging, and disposal activities associated with its use

TRIFLURALIN

- PBT activity threshold: 100 pounds
- Trifluralin is a herbicide used primarily on cotton and soybean crops
- Releases of trifluralin are expected to occur from manufacturing, formulation, packaging, and disposal activities associated with its use

METHOXYCHLOR

- PBT activity threshold: 100 pounds
- Methoxychlor is an insecticide used to control insects on agricultural crops, livestock, grain storage, home gardens, and pets
- Methoxychlor may be applied to large areas such as beaches, estuaries, and marshes for control of flies and mosquito larvae
- It may also be used for spray treatment of garbage and sewage areas

HEPTACHLOR

- PBT activity threshold: 10 pounds
- Heptachlor was used as a broad-spectrum insecticide on crops, home and gardens, and as a seed treatment
- Most uses of heptachlor were banned by EPA in 1978
  - Presently used to control fire ants in buried, pad-mounted electric power transformers and in underground cable television and telephone cable boxes
- Manufacture in U.S. ceased in 1997

TOXAPHENE

- PBT activity threshold: 10 pounds
- Toxaphene was used as an insecticide since the late 1940s to control pests on cotton, vegetables, livestock and poultry, and soybeans
- Most domestic uses of toxaphene banned in 1990, but still used as an insecticide on bananas and pineapples in Puerto Rico and the Virgin Islands

ISODRIN

- PBT activity threshold: 10 pounds
- Isodrin is an insecticide no longer manufactured or used commercially in the U.S.
- Isodrin may also be coincidentally manufactured from coal mining, foundries, waste incineration, and nonferrous metals manufacturing

ALDRIN

- PBT activity threshold: 100 pounds
- Aldrin was used as a soil insecticide on crops beginning in the 1950s
- Aldrin is not manufactured or used under any circumstances in the U.S.

CHLORDANE

- PBT activity threshold: 10 pounds
- Chlordane was used as a broad-spectrum insecticide on:
  - Crops
  - Gardens
  - Landscaping
  - Termite and ant control
- All end uses of chlordane were banned by EPA in 1988; however, still manufactured for export until 1997

OTHER PBT CHEMICALS

OTHER PBT CHEMICALS

- Polychlorinated biphenyls (PCBs)
- Tetrabromobisphenol A (TBBPA)
- Hexachlorobenzene (HCB)
- Pentachlorobenzene
- Octachlorostyrene (OCS)

POLYCHLORINATED BIPHENYLS (PCBs)

- PBT activity threshold: 10 pounds
- Most manufacture of PCBs banned in 1976
  - Further restrictions on the use of PCBs

M-3

POLYCHLORINATED BIPHENYLS (PCBs)

- Current and/or former products containing PCBs:
  - Dielectric agents
  - Heat transfer agents
  - Lubricants
  - Flame retardants
  - Plasticizers
  - Waterproofing materials
  - Used oils

M-4

POLYCHLORINATED BIPHENYLS (PCBs)

- **Manufacturing**
  - PCBs may be manufactured as a product of incomplete combustion (PICs)
- **Processing**
  - Recycling or reuse of PCBs
- **Otherwise use**
  - Installation of PCBs into electrical equipment
  - On-site treating or disposing PCB-contaminated waste received from off-site
  - Combusting PCB-contaminated oil

POLYCHLORINATED BIPHENYLS (PCBs)

- **<u>Not</u> manufacturing, processing, or otherwise use**
  - On-site disposal or treatment of PCBs not received from off-site
  - Off-site shipment of PCBs for disposal or treatment

POLYCHLORINATED BIPHENYLS (PCBs)

- **Default air emission factors (Ref. 2):**
  - Municipal waste combustion 5.5 lbs./ million ton waste burned
  - Medical waste incineration 46.5 lbs./million ton waste burned
  - Other biological incineration 46.5 lbs./million ton waste burned
  - Sewage sludge incineration 10.8 lbs./million ton dry sludge burned
  - Scrap tire incineration 3.78 lbs./million ton tire burned

POLYCHLORINATED BIPHENYLS (PCBs)

- **Default air emission factors (Ref. 1):**
  - Landfill waste gas flare 6.10 x 10^{-6} lb./million Btu heat input
  - Incineration (refuse derived fuel (RDF)) 180 lbs./million ton RDF burned

POLYCHLORINATED BIPHENYLS (PCBs)

- For more information:
  1. *Guidance for Reporting Toxic Chemicals: Pesticides and Other Persistent Bioaccumulative Toxic (PBT) Chemicals.* U.S. EPA, Office of Information Analysis and Access. August 2001. Available at http://www.epa.gov/tri/guidance.htm
  2. *1990 Emissions Inventory of Section 112(c)(6) Pollutants.* U.S. EPA. 1998. Available at http://www.epa.gov/ttncaaa1/t3/meta/m23804.html

TETRABROMOBISPHENOL A (TBBPA)

- PBT activity threshold: 100 pounds
- TBBPA - flame retardant used in plastics and engineering resins for printed circuit boards and computer equipment
- TBBPA is used in manufacturing polymers, such as
  - Acrylonitrile Butadiene Styrene (ABS)
  - Epoxy and polycarbonate resins
  - High-impact polystyrene
  - Phenolic resins
  - Adhesives
  - Unsaturated polyester resins
  - Thermoplastic polyesters

TETRABROMOBISPHENOL A

- TBBPA - used as a flame retardant two ways
  - Reactive TBBPA - chemically bound to a polymer backbone. TBBPA ceases to exist, except for some small residual amounts
    - » Used in a liquid epoxy mixture to make printed circuit boards
  - Additive TBBPA - added to mixture, but not reacted. TBBPA retains its chemical identity
    - » TBBPA concentrations can exceed 15% in some ABS resins

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TETRABROMOBISPHENOL A

- What facilities are impacted?
  - Manufacturers and processors of TBBPA
  - Processors of plastics containing TBBPA, such as manufacturers of printed circuit boards and computer housings
  - Waste management facilities
- Facilities using computers that contain TBBPA in their housings not impacted
  - Probably qualify for the articles exemption

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HEXACHLOROBENZENE (HCB)

- PBT activity threshold: 10 pounds
- Up until 1985, manufactured as a pesticide/fungicide used to treat wheat seeds, onions, and sorghum
- Manufactured as an impurity or formed as a by-product during production of maleic anhydride and propazine, pentachlorophenol, pesticides, chlorinated organic chemicals, chlorine gas
- Impurity in pesticides (Ref. 4):
  - 1,000 ppm in Dacthal
  - 50 ppm in chlorothalonil and picloram
  - 1 ppm in atrazine and simazine
  - 100 ppm in lindane
  - 500 ppm in pentachloronitrobenzene

HEXACHLOROBENZENE (HCB)

- May be manufactured in refining operations
- May be manufactured in coal-fired boilers
  - 1.2 lbs./million ton coal burned in an utility boiler (Ref. 2)
  - 0.16 lb./million ton coal burned in an industrial boiler (Ref. 2)
- Other combustion
  - Wood/bark waste combustion 0.12 lb./million ton wood waste burned (Ref. 2)

HEXACHLOROBENZENE (HCB)

- Incineration of waste manufactures HCB (Ref. 2):
  - 58.0 lbs./million ton municipal waste burned (single chamber/waterwall with electrostatic precipitator (ESP)/dry scrubber)
  - 1.71 lbs./million ton biomedical waste incinerated
  - 0.660 lb./million ton dry sewage sludge incinerated
  - 538 lbs./million ton wood waste/municipal refuse burned (uncontrolled)

HEXACHLOROBENZENE (HCB)

- May be manufactured in the production of carbon tetrachloride, perchloroethylene, trichloroethylene, ethylene dichloride, and 1,1,1-trichloroethane
  - Usually found in the still bottoms from chlorinated organic chemical purification
  - Is emitted to air from chlorinated organic chemical purification (Ref. 3)
    - » 81.0 lbs. emitted/thousand ton carbon tetrachloride produced
    - » 86.2 lbs. emitted/thousand ton perchloroethylene produced

HEXACHLOROBENZENE (HCB)

- May be manufactured during high-temperature processes involving chlorine atoms
  - Cement manufacturing
    - » 0.34 lb./million ton clinker produced (controlled) (Ref. 2)
- Manufactured at metal foundries/smelters
  - Magnesium production - magnesium chloride reduced at carbon electrode and produces chlorinated organics (Ref.1)

HEXACHLOROBENZENE (HCB)

- For more information:

1. *Guidance for Reporting Toxic Chemicals: Pesticides and Other Persistent Bioaccumulative Toxic (PBT) Chemicals.* U.S. EPA, Office of Information Analysis and Access. August 2001. Available at http://www.epa.gov/tri
2. *Final—Supplementary Guide for Reporting to the National Pollutant Release Inventory—Alternate Thresholds-2000* and *Emission Factor and Database for Alternate Threshold Substances.* Environment Canada, Pollution Data Branch. 2000. Available at http://www.ec.gc.ca/pdb/npri/index.html
3. *Estimation of National Hexachlorobenzene Emissions for 1990.* U.S. EPA, Office of Air Quality Planning and Standards. 1993.
4. *1990 Emissions Inventory of Section 112(c)(6) Pollutants.* U.S. EPA, Emissions, Monitoring and Analysis Division and Air Quality Strategies and Standards Division. 1998. Available at http://www.epa.gov/ttncaaa1/t3/meta/m23804.html

PENTACHLOROBENZENE

- PBT activity threshold: 10 pounds
- Manufactured and processed as an intermediate in pentachloronitrobenzene production
  - Pentachlorobenzene is an impurity in pentachloronitrobenzene
  - Pentachlorobenzene also found in wastes from pentachloronitrobenzene production

PENTACHLOROBENZENE

- Any high-temperature process involving chlorine may manufacture pentachlorobenzene
  - Waste incinerators, cement kilns, and secondary copper production
- Pentachlorobenzene is expected to be found where HCB found

OCTACHLOROSTYRENE

- PBT activity threshold: 10 pounds
- No commercial uses known
- Possible byproduct of chlorine production, chlorination reactions, and metal product/finishing operations
- Manufactured by the high-temperature incineration of chlorinated hydrocarbons
- Octachlorostyrene expected to be found where HCB found

Lead and Lead Compounds:

The New Lead Rule

TOPICS

- Sources of lead and lead compounds
- Overview of the reporting changes
- Alloy qualifications
- Exemptions
- Threshold determinations (example calculations)
- Release and other waste management reporting (example calculations)
- TRI homepage http://www.epa.gov/tri

LEAD AND LEAD COMPOUNDS

- Elemental lead is rarely found in nature; it most commonly occurs as the mineral galena (lead sulfide [PbS])
- Typically combined with other materials for use as an alloy or a lead compound
- Types of lead compounds include:
  - Organolead compounds
  - Lead oxides
  - Lead sulfides
  - Lead salts
- Lead is obtained from mining and recycling

U-3

LEAD IN RAW MATERIALS

- Raw materials processed by a variety of facilities may contain metallic lead or lead compounds:
  - Metal ores
  - Coal
  - Wood
  - Oil
  - Oil products
    - » heating oils
    - » gasolines
- Use (including combustion) of materials containing lead or lead compounds could trigger TRI reporting.

U-4

Typical Concentration of Lead in Raw Materials and Quantity Required to Meet 100 lb. Threshold*

Raw Material	Lead Concentration (ppmw)	Quantity Needed to Meet the 100 lb Lead Threshold
Bituminous coal	3 to 111	3.33×10^7 to 9.01×10^5 lbs
Subbituminous coal	2.07 to 31	4.83×10^7 to 3.23×10^6 lbs
Lignite coal	3.73 to 9.8	2.68×10^7 to 1.02×10^7 lbs
Wood	20	5.00×10^6 lbs

**Emergency Planning and Community Right-to-Know Act-Section 313: Guidance for Reporting Releases and Other Waste Management Activities of Toxic Chemicals: Lead and Lead Compounds*

COMBUSTION OF FUELS CONTAINING LEAD

- Metal compounds and elemental metals in fuel are typically converted to metal oxides during combustion
  - This is considered to be manufacturing
- If no other data are available, assume the compound formed is the lowest molecular weight metal oxide
- Example:
  - Lead in fuel → Assume PbO is manufactured (not PbO_2, Pb_3O_4, etc.)

LEAD RULE REPORTING THRESHOLD

- Reporting threshold lowered to 100 pounds for manufacturing, processing, or otherwise use of lead (except in stainless steel, brass and bronze alloys) or lead compounds.

- Effective for TRI reporting year 2001 (covering activities from January 1 through December 31, 2001), for reports to be filed on or before July 1, 2002.

LEAD/LEAD COMPOUND THRESHOLDS

- There is one TRI listing for *lead*, but three reporting thresholds may apply:
  - For all lead (including lead in stainless steel, brass, and bronze alloys):
    - » 25,000 lbs for manufacturing and processing
    - » 10,000 lbs for otherwise use
  - For lead not in stainless steel, brass, and bronze alloys:
    - » 100 lbs for manufacturing, processing, and otherwise use
- For *lead compounds*, there is only one threshold that applies:
  - » 100 lbs for manufacturing, processing, and otherwise use

OTHER APPLICABLE PBT RULE CHANGES

- **PBT changes for lead (except in stainless steel, brass and bronze alloys) and lead compounds**
  - **Eliminated the *de minimis* exemption for lead and lead compounds**
  - **Eliminated the use of the alternate threshold of 1,000,000 pounds and thus the Form A certification statement**
  - **Eliminated the use of range reporting in Sections 5 and 6 of Part II the Form R**
  - **Adds additional data reporting precision (e.g., to one-tenth of a pound where applicable)**

DATA PRECISION

Scenario	What Is the Smallest Quantity That TRI Reporting Requires?
Lead contained in mixtures (other than the selected alloys) exceeds 100 pounds	0.1 pounds
Lead compounds exceed 100 pounds	0.1 pounds
Lead contained *only* in stainless steel, brass, or bronze	1 pound

"Facilities should report . . . at a level of precision supported by the accuracy of the underlying data and the estimation techniques on which the estimate is based."

ALLOY QUALIFICATION

- What is an alloy?

  A solid mixture containing two or more elements, at least one of which is a metal.

- Why the alloy qualification?

  EPA deferred making a final decision on the lower reporting threshold until a scientific review of the alloy issues is complete.

ALLOY QUALIFICATION

- If you process or otherwise use lead only in stainless steel, brass, and bronze alloys, the lead rule has not changed your reporting requirements.
  - Remember, if some elemental lead is removed from the qualified alloy, such as vaporization during melting of an alloy, the 100 pound threshold applies to the amount of lead removed (e.g., processed) from the alloy.
- You may still report as you did before when you exceed the 25,000 pound threshold for manufacturing and processing or the 10,000 pound threshold for otherwise use.
- The *de minimis* exemption can still be taken; you may still be eligible for the alternate threshold of 1,000,000 pounds and use of the Form A certification statement if applicable, and range reporting can be used in Sections 5 and 6 of Part II of the Form R.

Examples in which lead-containing materials may be exempt* from threshold determinations and release calculations.

The Use of :	Exemption
Bricks used to construct a building	Activity Use – Structural
Lead-acid batteries	Article
Solder used to fix a part on a forklift	Activity Use –Motor Vehicle
A lead-containing mixture used as a reactant in a routine lab analysis	Laboratory Activities
Plant/process intake air or water	Activity Use - Process water and intake air
Charcoal for barbecues	Activity Use - Personal use
*These exemptions do not apply when manufacturing	

THRESHOLD DETERMINATION

- Subsequent threshold determination examples apply specifically to:
  - Lead and lead compounds ⇒ lead/lead compound examples (2)
  - Lead in alloys ⇒ alloy examples (2)
- Each example spans several slides:
  - Each example group has an introduction and conclusion to illustrate key points
  - Each example answers the following questions:
    - » What amount of *lead* or *lead compounds* has been manufactured, processed, or otherwise used?
    - » Has a threshold been exceeded?

THRESHOLD DETERMINATIONS

- Step 1: Identify all activities where the chemical is used at your facility
  - Manufacturing
  - Processing
  - Otherwise use
- Step 2: Obtain or estimate chemical composition data for raw materials and manufactured products
- Step 3: Calculate the amounts of the chemical manufactured, processed, and otherwise used
- Step 4: Compare the calculated amounts used to the respective threshold(s) to determine whether any thresholds have been exceeded, i.e, whether an EPCRA Section 313 Report is required

LEAD/LEAD COMPOUND EXAMPLES

- Lead/lead compound examples #1 & #2:
  - Facilities that manufacture, process, or otherwise use both lead and lead compounds
- Goals:
  - Apply the four basic steps for performing threshold determinations for *lead compounds*
  - Determine whether an EPCRA Section 313 Report is required for each scenario

LEAD/LEAD COMPOUNDS EX. #1

- **Consider a facility that otherwise uses lead and manufactures lead compounds during combustion:**
  - **13,600,000 pounds of coal is used to fire boilers. The coal contains lead at 7.00 ppmw.**
- **Questions:**

  1) What amount of *lead* was otherwise used?

  2) Has a threshold for otherwise using *lead* been exceeded?

  3) What amount of *lead compounds* was coincidentally manufactured?

  4) Has the threshold for manufacturing *lead compounds* been exceeded?

LEAD/LEAD COMPOUNDS EX. #1

- **Consider a facility that otherwise uses lead and manufactures lead compounds during combustion:**
  - **13,600,000 pounds of coal is used to fire boilers. The coal contains lead at 7.00 ppmw.**
- **Question 1: What amount of *lead* was otherwise used?**

LEAD/LEAD COMPOUNDS EX. #1

- Consider a facility that otherwise uses lead and manufactures lead compounds during combustion:
  - 13,600,000 pounds of coal is used to fire boilers. The coal contains lead at 7.00 ppmw.
- Question 1: What amount of *lead* was otherwise used?

Lead in coal:
(13,600,000 pounds) (0.000700%) = 95.2 pounds

LEAD/LEAD COMPOUNDS EX. #1

- Consider a facility that otherwise uses lead and manufactures lead compounds during combustion:
  - 13,600,000 pounds of coal is used to fire boilers. The coal contains lead at 7.00 ppmw.
- Question 2: Has a threshold for otherwise using *lead* been exceeded?

Lead in coal:
(13,600,000 pounds) (0.000700%) = 95.2 pounds
No. 95.2 pounds is less than the 100 pound threshold for otherwise using lead.

LEAD/LEAD COMPOUNDS EX. #1

- Consider a facility that otherwise uses lead and manufactures lead compounds during combustion:
  - 13,600,000 pounds of coal is used to fire boilers. The coal contains lead at 7.00 ppmw. Assume for demonstration purposes in this example that it is elemental lead. However, in a real analysis, it would probably be a lead compound. Lacking better information, assume lowest-weight oxide – PbO.
- Question 3: What amount of *lead compounds* was coincidentally manufactured?

LEAD/LEAD COMPOUNDS EX. #1

- Consider a facility that otherwise uses lead and manufactures lead compounds during combustion:
  - 13,600,000 pounds of coal is used to fire boilers. The coal contains lead at 7.00 ppmw.
- Question 3: What amount of *lead compounds* was coincidentally manufactured?

223 pounds PbO formed for every 207 pounds Pb used.
Total PbO formed = (95.2 pounds)(223/207) = 103 pounds

LEAD/LEAD COMPOUNDS EX. #1

- **Consider a facility that otherwise uses lead and manufactures lead compounds during combustion:**
  - **13,600,000 pounds of coal is used to fire boilers. The coal contains lead at 7.00 ppmw.**
- **Question 4: Has the threshold for manufacturing *lead compounds* been exceeded?**

223 pounds PbO formed for every 207 pounds Pb used.
Total PbO formed = (95.2 pounds)(223/207) = 103 pounds
Yes. 103 pounds is more than the 100 pound threshold for manufacturing lead compounds.

POSSIBLE OUTCOMES

Outcome of Threshold Determination	What Type of Reporting is Required?
Thresholds not exceeded for either lead or lead compounds	None
Threshold exceeded for lead, but not for lead compounds	Report for lead, but not for lead compounds *
Threshold exceeded for lead compounds, but not for lead	*Report for lead compounds, but not for lead* *
Thresholds exceeded for both lead and lead compounds	Report for both lead and lead compounds, either on a single form (for lead compounds) or on two forms (one for lead and the other for lead compounds) *

*Releases and waste management quantities for lead and lead compounds are expressed as the parent metal, lead.

LEAD/LEAD COMPOUNDS EX. #2

- Consider a facility that processes the following two materials that include lead or lead compounds:
  - 10,000,000 pounds of wood are processed. The wood contains lead at 20 ppmw.
  - In spray booths, 20,000 pounds of paint containing "<2%" lead chromate is applied to furniture products.

- Questions:

  1) What amount of *lead* was processed?

  2) Has a threshold for processing *lead* been exceeded?

  3) What amount of *lead compounds* were processed?

  4) Has the threshold for processing *lead compounds* been exceeded?

LEAD/LEAD COMPOUNDS EX. #2

- Consider a facility that processes the following two materials that include lead or lead compounds:
  - 10,000,000 pounds of wood are processed. The wood contains lead at 20 ppmw.
  - In spray booths, 20,000 pounds of paint containing "<2%" lead chromate is applied to furniture products.

- Question 1: What amount of *lead* was processed?

  (10,000,000 pounds)(0.002%) = 200 pounds

LEAD/LEAD COMPOUNDS EX. #2

- Consider a facility that processes the following two materials that include lead or lead compounds:
  - 10,000,000 pounds of wood are processed. The wood contains lead at 20 ppmw.
  - In spray booths, 20,000 pounds of paint containing "<2%" lead chromate is applied to furniture products.

- Question 2: Has a threshold for processing *lead* been exceeded?

  (10,000,000 pounds)(0.002%) = 200 pounds
  Yes. 200 pounds is more than the 100 pound threshold for processing lead.

LEAD/LEAD COMPOUNDS EX. #2

- Consider a facility that processes the following two materials that include lead or lead compounds:
  - 10,000,000 pounds of wood are processed. The wood contains lead at 20 ppmw.
  - In spray booths, 20,000 pounds of paint containing "<2%" lead chromate is applied to furniture products.

- Question 3: What amount of *lead compounds* was processed?

LEAD/LEAD COMPOUNDS EX. #2

- Consider a facility that processes the following two materials that include lead or lead compounds:
  - 10,000,000 pounds of wood are processed. The wood contains lead at 20 ppmw.
  - In spray booths, 20,000 pounds of paint containing "<2%" lead chromate is applied to furniture products.
- Question 3: What amount of *lead compounds* was processed?

(20,000 pounds)(2%) = 400 pounds

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LEAD/LEAD COMPOUNDS EX. #2

- Consider a facility that processes the following two materials that include lead or lead compounds:
  - 10,000,000 pounds of wood are processed. The wood contains lead at 20 ppmw.
  - In spray booths, 20,000 pounds of paint containing "<2%" lead chromate is applied to furniture products.
- Question 4: Has the threshold for processing *lead compounds* been exceeded?

(20,000 pounds)(2%) = 400 pounds
Yes. 400 pounds is more than the 100 pound threshold for processing lead compounds.

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POSSIBLE OUTCOMES

Outcome of Threshold Determination	What Type of Reporting Is Required?
Thresholds not exceeded for either lead or lead compounds	None
Threshold exceeded for lead, but not for lead compounds	Report for lead, but not for lead compounds *
Threshold exceeded for lead compounds, but not for lead	Report for lead compounds, but not for lead *
Thresholds exceeded for both lead and lead compounds	*Report for both lead and lead compounds, either on a single form (for lead compounds) or on two forms (one for lead and the other for lead compounds) **

*Releases and waste management quantities for lead and lead compounds are expressed as the parent metal, lead.

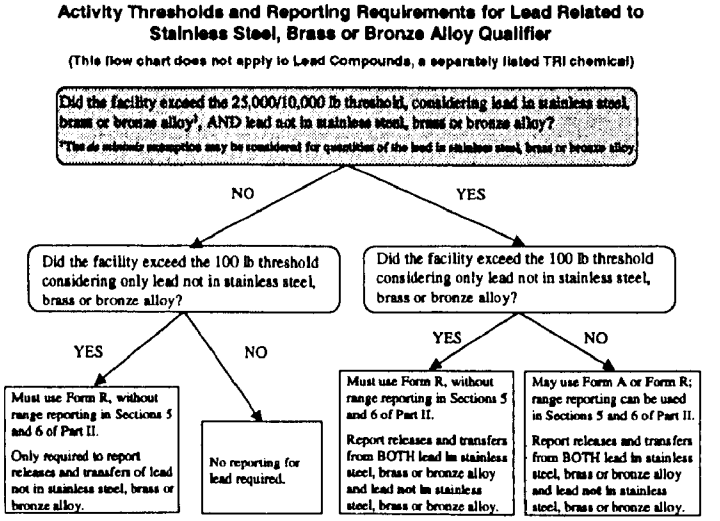
LEAD/LEAD COMP. EX. KEY POINTS

- As appropriate, calculate two thresholds: one for lead and one for lead compounds.
- Consider all known forms of lead compounds in your threshold determinations.
- Sometimes release calculations must be done to determine thresholds.
- Do not add the lead within lead compounds to your threshold for lead.
- Do not add usage of elemental lead to your threshold for lead compounds.
- Base your threshold for lead compounds on the total weight of the compounds, not the lead within the compounds.

LEAD ALLOY EXAMPLES

- **Lead alloy examples #1& #2:**
  - **Facilities that process lead, in varying amounts, both in and not in stainless steel, brass, and bronze alloys**
- **Goals:**
  - **Follow the four basic steps for performing threshold determinations for *lead* both in and not in stainless steel, brass, and bronze alloys**
  - **Determine whether an EPCRA Section 313 Report is required for each scenario**

LEAD THRESHOLD DETERMINATION FLOW CHART



ALLOY EXAMPLE #1

- Consider a facility that processes the following two alloys that include:
  - 20,000 pounds of lead in a stainless steel alloy.
  - 275 pounds of lead in another alloy that is not stainless steel, brass, or bronze.

- Questions:
  1) What amount of *lead* was processed?
  2) Has a threshold for processing (either 25,000 or 100 pounds) *lead* been exceeded?

ALLOY EXAMPLE #1

- Consider a facility that processes the following two alloys that include:
  - 20,000 pounds of lead in a stainless steel alloy.
  - 275 pounds of lead in another alloy that is not stainless steel, brass, or bronze.

- Question 1: What amount of *lead* was processed?

Total processed = 20,000 + 275 = 20,275 pounds

ALLOY EXAMPLE #1

- **Consider a facility that processes the following two alloys that include:**
  - **20,000 pounds of lead in a stainless steel alloy.**
  - **275 pounds of lead in another alloy that is not stainless steel, brass, or bronze.**

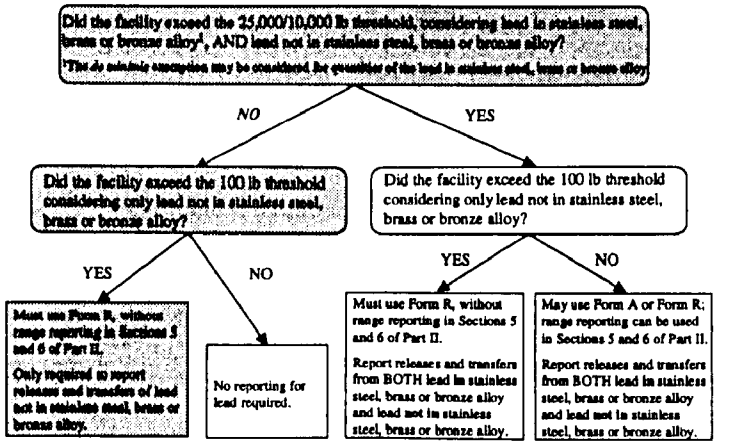
- **Question 2: Has a threshold for processing (either 25,000 or 100 pounds) *lead* been exceeded?**

Total processed = 20,000 + 275 = 20,275 pounds
Yes. Although the 25,000 pound threshold was not exceeded, the 100 pound threshold was exceeded.

LEAD THRESHOLD DETERMINATION FLOW CHART

Activity Thresholds and Reporting Requirements for Lead Related to Stainless Steel, Brass or Bronze Alloy Qualifier

(This flow chart does not apply to Lead Compounds, a separately listed TRI chemical)



ALLOY EXAMPLE #2

- Consider a facility that processes the following two alloys that include:
  - 24,950 pounds of lead in a stainless steel alloy.
  - 75 pounds of lead in another alloy that is not stainless steel, brass, or bronze.

- Questions:
  1) What amount of *lead* was processed?
  2) Has a threshold for processing (either 25,000 or 100 pounds) *lead* been exceeded?

ALLOY EXAMPLE #2

- Consider a facility that processes the following two alloys that include:
  - 24,950 pounds of lead in a stainless steel alloy.
  - 75 pounds of lead in another alloy that is not stainless steel, brass, or bronze.

- Question 1: What amount of *lead* was processed?

Total processed = 24,950 + 75 = 25,025 pounds

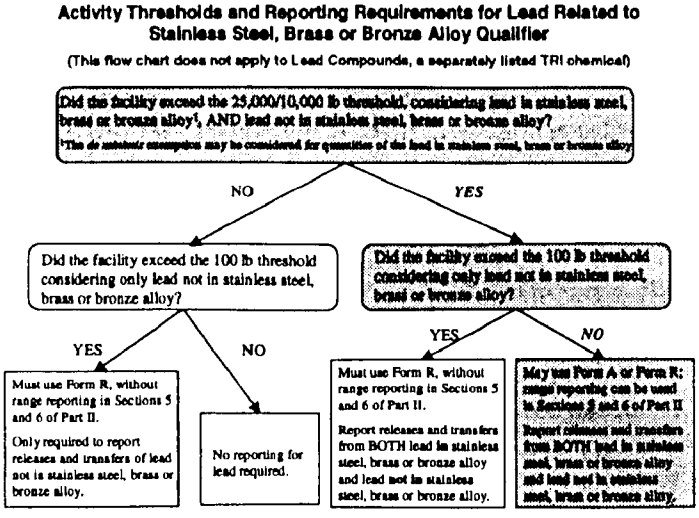
ALLOY EXAMPLE #2

- Consider a facility that processes the following two alloys that include:
  - 24,950 pounds of lead in a stainless steel alloy.
  - 75 pounds of lead in another alloy that is not stainless steel, brass, or bronze.

- Question 2: Has a threshold (either 25,000 or 100 pounds) for processing *lead* been exceeded?

Total processed = 24,950 + 75 = 25,025 pounds
Yes. 25,025 pounds is more than the 25,000 pound threshold for processing lead.
The 100 pound threshold was not exceeded.

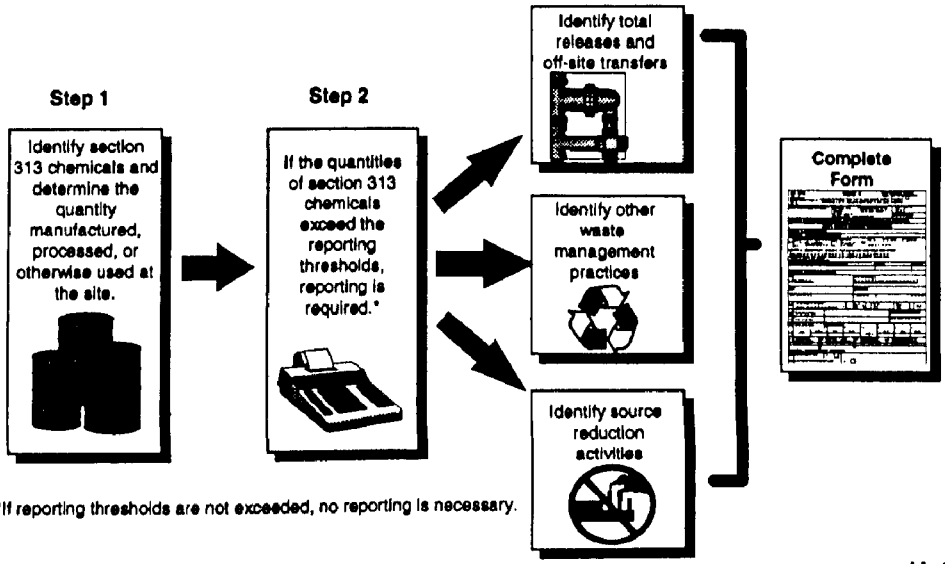
LEAD THRESHOLD DETERMINATION FLOW CHART



ALLOY EXAMPLE KEY POINTS

- **Lead in stainless steel, brass, and bronze alloys is not exempt from TRI reporting: the 25,000 and 10,000 pound thresholds still apply.**
- **Count together all lead used at the facility (regardless of whether it is found in stainless steel, brass, and bronze alloys) when evaluating the 25,000 and 10,000 pound thresholds.**
- **Stainless steel, brass, and bronze alloys contain lead, not lead compounds.**

TRI REPORTING PROCESS



*If reporting thresholds are not exceeded, no reporting is necessary.

EXAMPLE RELEASE CALCULATIONS

- Example calculations #1 and #2:
  - Facilities that manufacture, process, or otherwise use lead and lead compounds, but not in stainless steel, brass, or bronze alloys
- Goals:
  - Review approaches for estimating releases and characterizing waste management activities
  - Address some specific issues pertaining to the new lead rule

EXAMPLE RELEASE CALCULATIONS

- Step 1: Identify all waste streams and waste management activities for the chemical
  - On-site: air (fugitive and stack), surface water, underground injection, land, and waste management activities
  - Off-site: POTW and transfers for treatment, disposal, recycling, and energy recovery
- Step 2: Determine the most appropriate approach for estimating releases and amounts managed as waste
- Step 3: Calculate releases and amounts managed as waste

EXAMPLE RELEASE CALCULATION #1

- Consider a facility that otherwise uses lead only in the following activity:
  - 13,600,000 pounds of coal are used to fire boilers. The coal contains lead at 7.00 ppmw.
- Questions: What amount of *lead compounds* were manufactured? Was the reporting threshold exceeded?

(13,600,000 pounds of coal)(0.000700% Pb) = 95.2 pounds Pb

223 pounds PbO formed for every 207 pounds Pb used.
Total PbO formed = (95.2 pounds)(223/207) = 103 pounds
Lead compounds threshold *was* exceeded.

EXAMPLE RELEASE CALCULATION #1

- Step 1: Identify release streams and waste management activities
  - Assume that the only release generated by the boiler is air emissions and the facility determined that 0.25 pounds of lead were present in the boiler ash
- Step 2: Determine approaches for estimating releases
- Step 3: Calculate releases and amounts managed as waste

EXAMPLE RELEASE CALCULATION #1

- Options for estimating air releases from the coal-fired boiler (assume it is uncontrolled):
  - Mass balance—all lead that was in the coal is emitted through the stack
  - Emission factor—multiply the amount of coal burned by a factor that estimates lead emissions per ton of coal burned
- How do these approaches differ? Which approach should be used?

EXAMPLE RELEASE CALCULATION #1

- Mass balance calculation:

Lead in coal: (13,600,000 pounds) (0.000700%) = 95.2 pounds
Assume all lead in the coal (less that in ash, 0.25 lbs) is emitted through the stack: 94.95 pounds of lead emissions

- Emission factor calculation:

Total coal burned = 13,600,000 pounds = 6,800 tons
Emission factor = 0.0133 pounds lead emitted per ton burned
90.4 pounds of lead emissions

- Use your judgment to select most appropriate approach based on the best available information

Report releases and waste management activities of *lead only*, even if reporting for lead compounds

EXAMPLE RELEASE CALCULATION #2

- Consider a facility that processes the following two materials that include lead or lead compounds:
  - 10,000,000 pounds of wood are processed. The wood contains lead at 20 ppmw.
  - In spray booths, 20,000 pounds of paint containing "<2%" lead chromate is applied to furniture products.
- Thresholds were exceeded for both lead and lead compounds.
- Assume facility will submit one Form R (for lead compounds).

EXAMPLE RELEASE CALCULATION #2

- For the wood processing, make the following assumptions:
  - All wood is processed in a closed system
  - The only waste generated is wood chips and dusts, all of which are collected and sent to an off-site wood-fired boiler
- For the spray painting, make the following assumptions:
  - All spraying is done with spray guns with a transfer efficiency of 80%
  - All spraying occurs in enclosed spray booths
  - All spray booth exhaust is captured and vented through particulate filters with 90% collection efficiency
  - Spent filters are disposed off-site

EXAMPLE RELEASE CALCULATION #2

- Calculation for processing of wood chips:
  - Shipping logs indicate that the facility sends (on average) 6,500 pounds of wood wastes to the wood-fired boiler per month
  - Concentration of lead in wood is 20 ppmw
- What is the total quantity of lead sent to the off-site wood-fired boiler?
- How would this amount be reported on the Form R?

EXAMPLE RELEASE CALCULATION #2

- What is the total quantity of lead sent to the off-site wood-fired boiler?

Total waste: (6,500 lbs/month)(12 months)=78,000 lbs
Lead in waste: (78,000 lbs)(0.0020%)=1.6 lbs

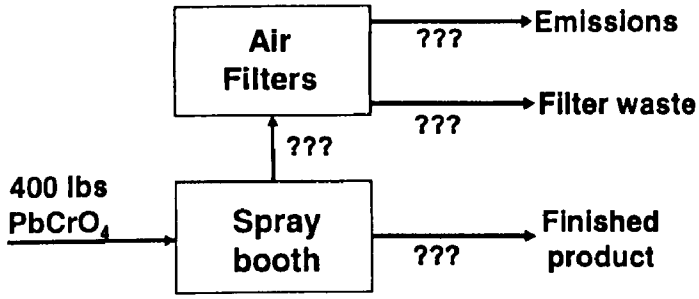
- How would this amount be reported on the Form R?
  - Elemental lead is not combusted and therefore cannot be claimed as energy recovery
  - In this case, lead in the waste wood chips and dusts must be classified as an off-site transfer for disposal

EXAMPLE RELEASE CALCULATION #2

- Identify all release streams and waste management activities
- What releases and waste management activities should be included for the spray painting?
- Remember the following assumptions:
  - All spraying is done with spray guns with a transfer efficiency of 80%
  - All spraying occurs in enclosed spray booths
  - Spray booth exhaust is vented through particulate filters with 90% collection efficiency
  - Spent filters are disposed off-site

EXAMPLE RELEASE CALCULATION #2

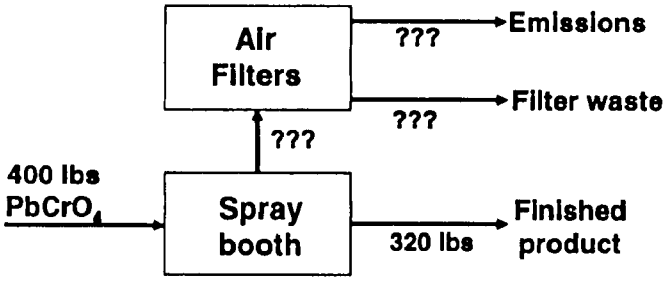
- Conceptual approach for characterizing uses in the spray booth:



- Based on the information provided, how much lead chromate do you think is at each point in the process?

EXAMPLE RELEASE CALCULATION #2

- Conceptual approach for characterizing uses in the spray booth:

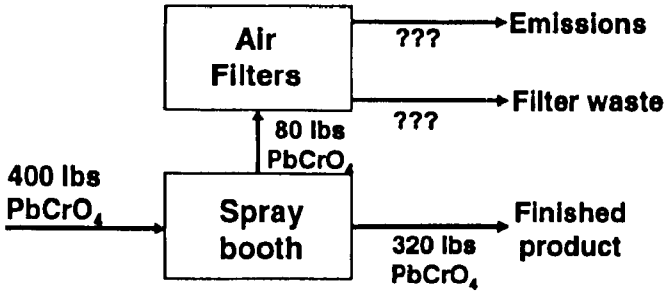


Lead chromate in finished product:
(400 lbs $PbCrO_4$)(0.8)=320 lbs $PbCrO_4$

U-57

EXAMPLE RELEASE CALCULATION #2

- Conceptual approach for characterizing uses in the spray booth:

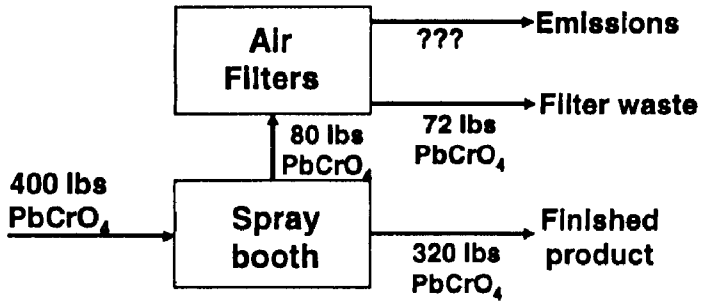


Lead chromate that flows to the inlet of the air filters:
(400 lbs $PbCrO_4$)-(320 lbs $PbCrO_4$)=80 lbs $PbCrO_4$

U-58

EXAMPLE RELEASE CALCULATION #2

- Conceptual approach for characterizing uses in the spray booth:

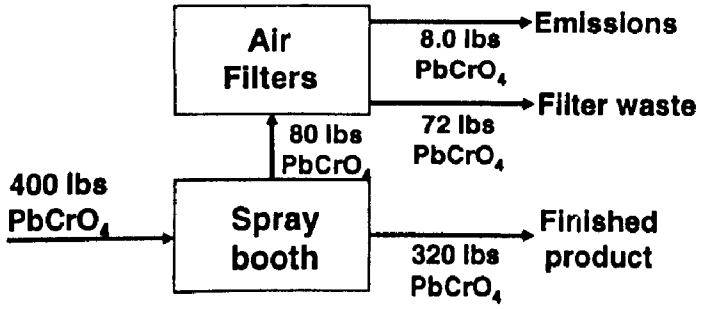


Lead chromate collected by the air filters:
(80 lbs $PbCrO_4$ enter filters)(0.9)=72 lbs $PbCrO_4$

U-59

EXAMPLE RELEASE CALCULATION #2

- Conceptual approach for characterizing uses in the spray booth:



Lead chromate emitted to the air:
(80 lbs $PbCrO_4$ enter filters)-(72 lbs $PbCrO_4$ collected)=
8.0 lbs $PbCrO_4$ of stack emissions

U-60

EXAMPLE RELEASE CALCULATION #2

Question	Response for Quantities in Air Emissions
Where does the amount get reported on the Form R?	
How much should be reported?	
What was the basis for determining this amount (M,C,E,O)*?	

*Monitoring data, mass balance, emission factor, or other approaches and engineering estimates

EXAMPLE RELEASE CALCULATION #2

Question	Response for Quantities in Air Emissions
Where does the amount get reported on the Form R?	Section 5.2 (Part II) Section 8.1 (Part II)
How much should be reported?	5.1 pounds *of lead*
What was the basis for determining this amount (M,C,E,O)?	O (Engingeering calculations)

Lead chromate is 64.1% lead by weight.

EXAMPLE RELEASE CALCULATION #2

Question	Response for Quantities in Filter Waste
Where does the amount and activity get reported on the Form R?	
How much should be reported?	
What was the basis for determining this amount (M,C,E,O)*?	

*Monitoring data, mass balance, emission factor, or other approaches and engineering estimates

EXAMPLE RELEASE CALCULATION #2

Question	Response for Quantities in Filter Waste
Where does the amount and activity get reported on the Form R?	Section 6.2 (Part II) Section 7A (Part II) Section 8.1 (Part II)
How much should be reported?	46 pounds *of lead* (plus amount from wood chips sent to boiler)
What was the basis for determining this amount (M,C,E,O)?	O (Engingeering calculations)

Lead chromate is 64.1% lead by weight.

EXAMPLE RELEASE CALCULATION #2

Question	Response for Quantities In Finished Product
Where does the amount get reported on the Form R?	
How much should be reported?	
What was the basis for determining this amount (M,C,E,O)*?	

*Monitoring data, mass balance, emission factor, or other approaches and engineering estimates

EXAMPLE RELEASE CALCULATION #2

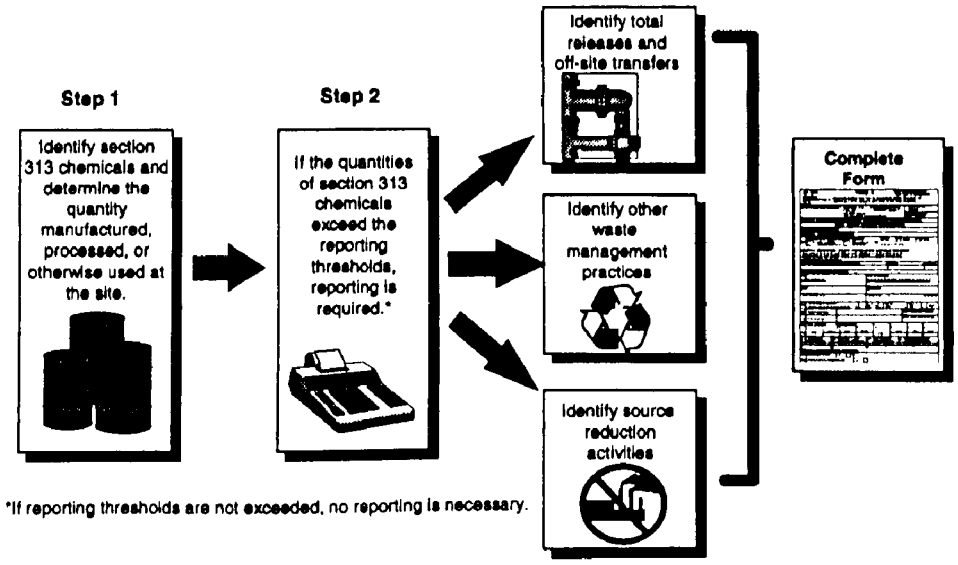
Question	Response for Quantities in Finished Product
Where does the amount get reported on the Form R?	NOWHERE!
How much should be reported?	NONE!
What was the basis for determining this amount (M,C,E,O)?	NOT APPLICABLE!

Those quantities used to make product count towards ***thresholds*** but do not count towards ***releases.***

KEY POINTS

- Identify all release points
- For both lead and lead compounds, only report releases and waste management activities for *lead*
- If thresholds for both lead and lead compounds are exceeded, facilities may submit a single Form R (for lead compounds) that covers both
- Classify releases and waste management activities carefully on the Form R
  - Lead cannot be destroyed and should never be reported in Section 8 as being treated for destruction
  - Lead should not be reported in Section 8 for energy recovery
- Document calculations and assumptions

TRI REPORTING PROCESS—REVISITED



*If reporting thresholds are not exceeded, no reporting is necessary.