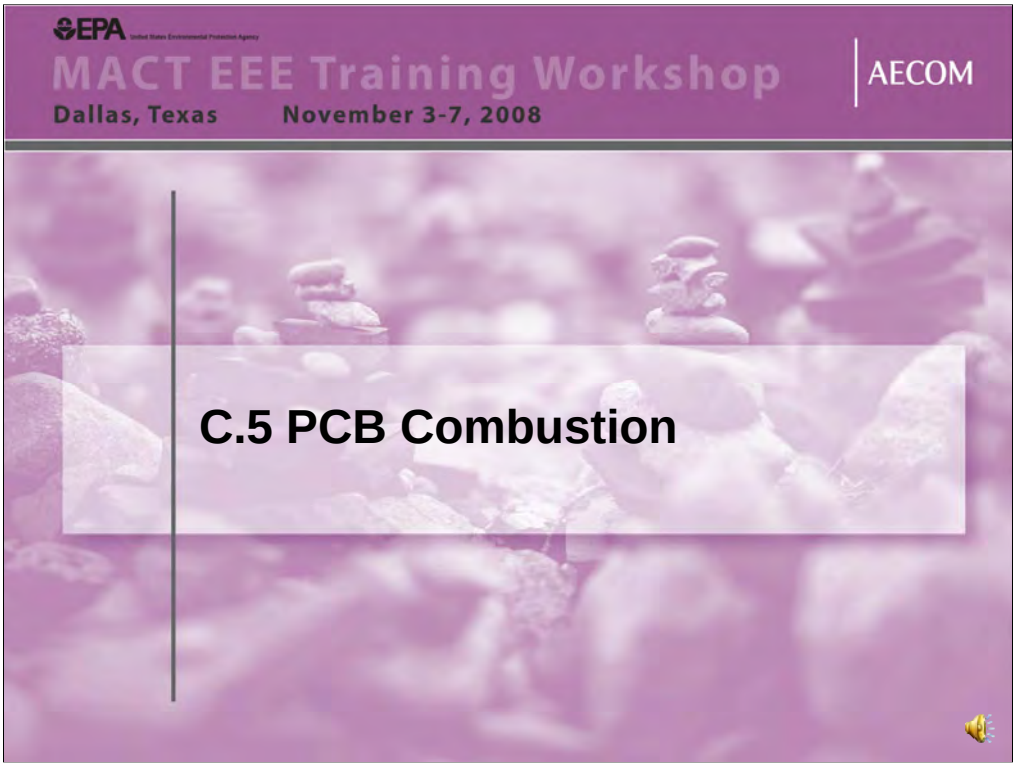


This module discusses some issues related to the combustion of PCBs here in the US.

Presentation Overview

- What are PCBs
- Why are they of concern in the environment
- What is the manufacturing history
- What is their status today
- How are they regulated
- What are the specific requirements regarding incineration
- Interaction of PCBs and MACT regulations

The topics included on this slide will be discussed.

What are PCBs

- Family of 209 different groups (call "congeners") that are chlorinated organic compounds
- Produced widely for use in a variety of products because of
  - Stability
  - Fire retardant
  - Insulating properties
  - Relative safety in handling
- Discontinued in commerce under TSCA in mid-1970's for some of the same reasons
  - Persistent, bioaccumulative and toxic (PBT)
  - Longer term studies showed a variety of human and animal affects
- Also present as impurities in certain manufacturing processes such as chlorinated solvents

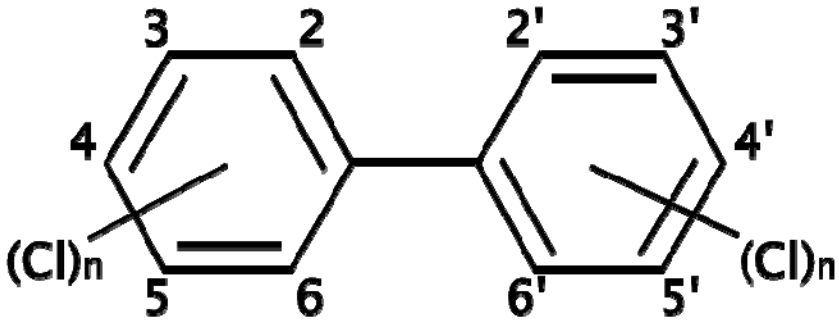
Let's start with an overview of what PCBs are. Polychlorinated bi-phenyls or PCBs are a gamily of 209 groups of chlorinated organic compounds grouped by "congener groups" of similar compounds. PCBs were first produced in the 1930's and were widely used in a variety of applications due to their physical, chemical and dielectric properties. In addition, initially, they were considered very safe to handle because they were very difficult to burn and generally quite safe to handle. In the mid 20th century as environmental and toxicological sciences developed a better understanding of many of the chemicals in commerce, it became apparent that PCBs were persistent in the environment and did not degrade, they moved up through the food chain, a term called "bio-accummulatve and were toxic via some of the more subtle mechanisms. Classified as a "PBT-Persistent, Bioaccumulative and Toxic" compound, EPA banned the their use in commerce under the Toxic Substance Control Act or TSCA in the mid '70's. In addition to originally being manufactured for specific use (e.g., transformer fluids), they are also known to still be present today as impurities in certain manufacturing processes such as the production of chlorinated solvents.

What Types of Products used PCBs

- Transformer fluids
- Hydraulic fluids
- Insulating applications – for wire, in tape
- Electrical ballasts in lights
- Lots of trade names – Arochlor, Askarel are two of more common ones

PCBs have been used in a wide variety of applications, industrial, commercial and residential. While they are no longer produced and their presence dramatically reduced, they still be present in lighting fixtures and wiring systems in older buildings, particularly those 40 years or more older that have not been renovated.

Structure of PCBs



PCBs are close cousins to dioxins and furans as can be seen in this slide. They are comprised of two benzene rings connected by a carbon-carbon bond and chlorinated with one or more chlorines.

Management and Disposal

- Once production was halted, management and disposal program of remaining PCB containing equipment was established under TSCA
  - Labeling and maintenance of PCB containing equipment
  - Strict requirements for phase out from use
  - Strict requirements for disposal
- October 2007, responsibility for PCB disposal was transferred from OPPT to OSW

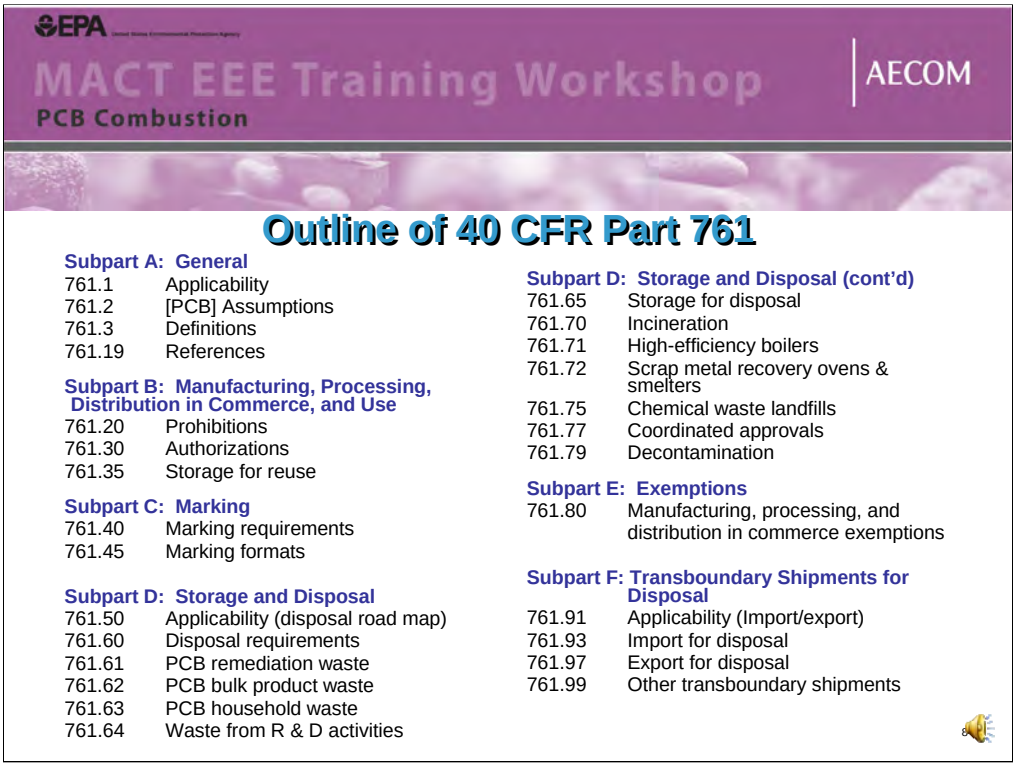
Once production of PCBS was halted, a nationwide management and disposal program was established under TSCA that required labeling and maintenance of PCB containing equipment, market phase out requirements and strict disposal regulations. Historically, this program has been managed strictly at the national level (versus the regions or states) by USEPA's Office of Pollution prevention and Toxics, however, in late 2007, this responsibility was transferred to the Office of Solid Waste.

Regulatory History

- 1978 regulations included the performance requirements for the approval of incineration high efficiency boilers and chemical waste landfills. These have not been revised
- 1983 regulations split approval authorities between the HQ and the Regions.
- 1998 regulations (Megarule) provided for risk-based approvals, coordinated approvals, scrap metal recovery ovens, and self-implementing procedures for activities which previously required approvals.

7

PCB regulations have been in place since the late 1970's. First, strict requirements were established on incineration, one of the primary treatment approaches for PCBs, and landfills. In 1983, approval authority for some decisionmaking, which had historically been strictly the purview of headquarters, was delegated to EPA regions. In 1998, EPA promulgated the so called "Megarule" that provided for risk based and coordinated approvals for certain activities like scrap metal recovery ovens and also established self-implementing procedures for certain other activities which had previously required agency approval. These are further described on the next couple of slides.



This slide provides a summary of the specific regulations that pertain to the management and disposal of PCBs.

40 CFR 761 Subpart D - Disposal

- .50 Applicability (general + road map)
- .60 - .64 Disposal requirements by waste
- .65 Storage of waste
- .70 - .75 Disposal technology requirements
- .77 Coordinated Approvals
- .79 Decontamination

Subpart D provides the detailed regulation covering management and disposal of PCB wastes.

Types of PCB Wastes

- Bulk liquids – transformer and other oils
- Components – light ballasts
- Commercial products
- Transformer carcasses
- Manufacturing process wastes that contain PCBs at > 50 ppm
- Remediation waste

There are several different waste types that contain PCBs that range from pure technical grade PCBs, such as found in transformers to electrical light ballasts and other types of commercial products, like wiring, that contain PCBs. In addition, transformer carcasses formerly containing PCBs, certain manufacturing process wastes and remediation wasts can be regulated under the TSCA programs.

How to Dispose of PCB Waste

- Incineration is generally the preferred technology for handling waste containing > 50 ppm PCBs
- Must be performed in a facility having a specific disposal approval for PCBs under TSCA
  - These must have demonstrated 99.9999% DRE under TSCA Trial Burn
- Units include
  - rotary kiln incinerators
  - Liquid incinerators
  - Boilers
  - Halogen acid furnaces
  - Metal recovery ovens
  - Indirect thermal treatment of remediation waste

Incineration is generally considered to be the preferred method of disposal for PCB waste with > 50 ppm of PCBs. However, any incineration facility intended to be used for handling PCB wastes must be specifically licensed to do so by having passed a TSCA Trial Burn where a 6-9's DRE (or 99.9999% DRE) was demonstrated. There are a number of different technologies that have demonstrated this capability and have been licensed for handling these wastes.

Qualified Incinerator

- (1) An incinerator approved under the provisions of §761.70. Any level of PCB concentration can be destroyed in an incinerator approved under §761.70.
  - > 500 ppm
- (2) A high efficiency boiler or industrial furnace which complies with the criteria of §761.71(a)(1), and for which the operator has given written notice to the appropriate EPA Regional Administrator in accordance with the notification requirements for the burning of mineral oil dielectric fluid under §761.71(a)(2).
  - >50 ppm and < 500 ppm

There are a couple of different classifications for treating PCB wastes provided for in the regulations and these are summarized in this slide. These units are qualified to treat PCB wastes at two concentration ranges. A fully approved incinerator can handle any type of PCB wastes and certain boilers or industrial; furnaces meeting the provisions of 40 CFR §761.71(a)(1) can treat wastes with PCB levels < 500 ppm, but > 50 ppm

Qualified Incinerator cont'd

- (3) An incinerator approved under section 3005(c) of the Resource Conservation and Recovery Act (42 U.S.C. 6925(c)) (RCRA).
  - < 50 ppm and > 2 ppm
- (4) Industrial furnaces and boilers which are identified in 40 CFR 260.10 and 40 CFR 279.61 (a)(1) and (2) when operating at their normal operating temperatures (this prohibits feeding fluids, above the level of detection, during either startup or shutdown operations).
  - < 50 ppm and > 2 ppm

In addition, there are other units allowed to treat PCB waste < 50 ppm that operate under the requirements of RCRA/Subpart EEE.

Approval Authorities

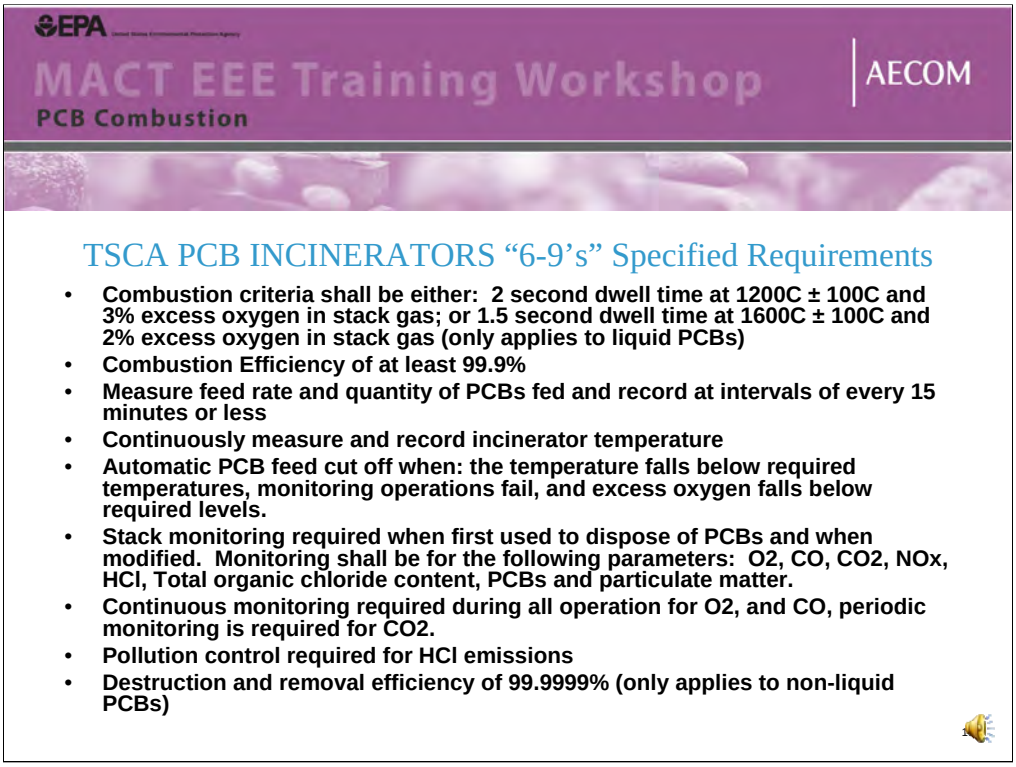
- OSW---mobile units, transportable technologies, and non-unique fixed site facilities
- RA --unique fixed site facilities
- Cannot be delegated to the States

There are strict approval protocols that must be adhered to by regulatory agencies and only headquarters or EPA regions have the authority to grant these.

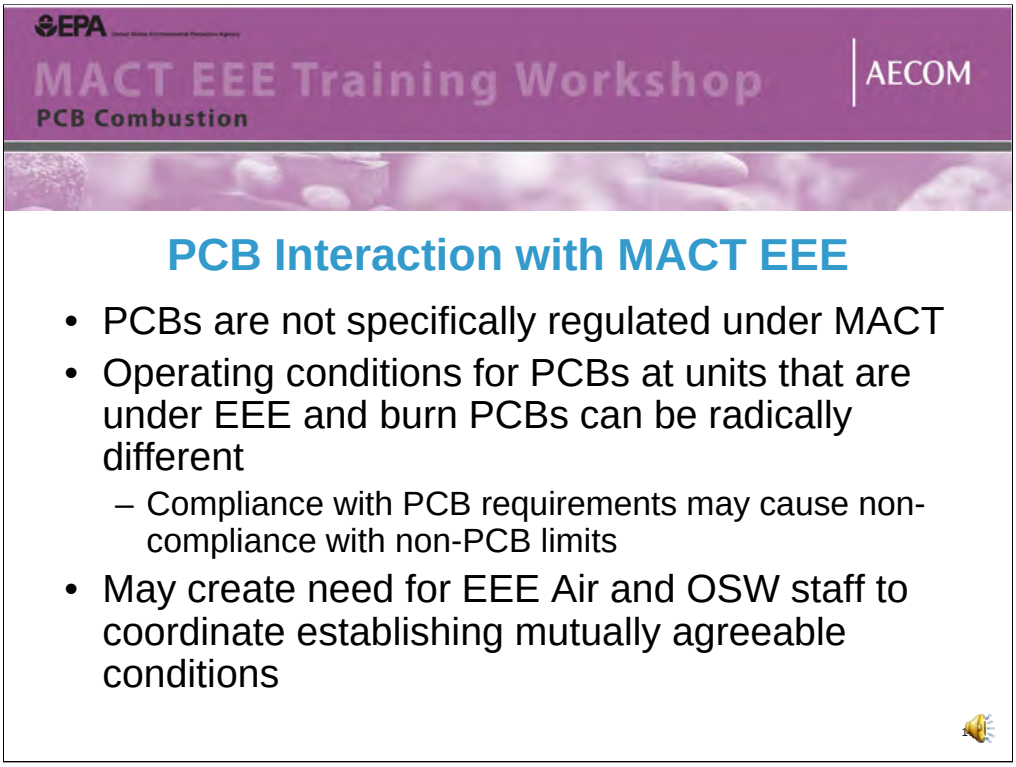
DRE Testing for PCBs

- Why 6-9's DRE?
  - PCBs considered persistent, bioaccumulative and toxic (PBT) themselves
  - D/Fs are significant PICs
- Selecting a POHC
  - Thermal stability -
  - Heat of combustion – 4,500-6,500 Btu/lb
  - Physical form and availability

The regulations require such a high level of DRE because PCBs are considered to be "PBT-Persistent, Bioaccumulative and Toxic" chemicals and there is a concern that dioxins and furans can be created as PICs due to chemical similarity. For selecting a "principal organic hazardous constituent" or POHC for PCB trial burns, this is done the same way as for other combustion systems under RCRA or Subpart EEE – by considering the thermal stability and/or heat of combustion of candidate test compounds. Generally, it is desired to select a POHC which satisfies either or both of these criteria, matches the physical form being burned and is available on the market. Common candidates include the various chlorinated benzenes, particularly di, tri or tetra chlorobenzene as these are chemical similar.



In addition to meeting the TSCA DRE requirements, there are additional specific regulatory requirements that must be met and these are summarized in this slide.



Since PCBs themselves are not regulated under Subpart EEE, conflicts can exist if a unit burns both PCBs and other hazardous waste as operating limits may not be compatible under the two modes of operation. Should this situation arise, it will likely be essential for agency staff from both programs to work with the facility to establish workable operating conditions.

Where Can you Find Information on PCBs

- Winston Lue: lue.winston@epa.gov
- http://www.epa.gov/pcb/

Mr. Winston Lue is the primary PCB contact at EPA headquarters and additional information can be found at the website address provided on this slide.