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Reference

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Guidance Booklet
On

**STORAGE AND DISPOSAL OF
POLYCHLORINATED
BIPHENYL (PCB) WASTE**

U.S. Department of Energy
Office of Environmental Policy and Assistance
RCRA/CERCLA Division (EH-413)
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1. Introduction

which PCBs are spilled (e.g., soil, concrete, and debris) are also considered to be PCB waste.

Certain items that become contaminated with PCBs can be regarded as PCB waste because they are prohibited from further use. These items include certain solvents, equipment, tools, machinery, vehicles, and containers in good condition. By being decontaminated, EPA allows for these materials to be used or returned to use (reuse). Because such items are not intended for discard or disposal as waste, they will not be discussed here.

Example of a PCB Item that may no longer be serviced and must be disposed

40 CFR 761.30(a)(2)(ii) prohibits the servicing or rebuilding of any PCB Transformer that requires the removal of the transformer coil from the transformer casing. Therefore, the only alternative left is disposal of the PCB Transformer.

Decontamination will be discussed only if incidentally mentioned as an option or treatment that is a prerequisite to a disposal requirement (e.g., liquid PCB remediation waste may be decontaminated as well as incinerated).

1.5 Characterization of PCB Waste

In order to apply the PCB regulations to PCB waste, you must first characterize the PCB waste as follows:

- Date on which PCBs first became waste,
- Concentration of PCBs, and
- Type of waste (see Chapter 2).

1.5.1 Date on which PCBs First Became Waste

The date on which PCBs became waste [date of removal from service] is needed in order to comply with storage requirements, especially the one-year

storage limit (discussed in Chapter 3). A notation or record of this date must be made on the PCB Container or PCB Item. (PCB Container and PCB Item are discussed in Chapter 2.)

If the PCB waste, such as contaminated environmental media, is from a PCB spill or release, the date of the spill or release (see Exhibit 2-5) is needed to determine whether a spill or release is subject to cleanup as PCB remediation waste (see Section 2.3).

1.5.2 Concentration of PCBs

PCB waste is generally regulated for disposal under TSCA at concentrations of 50 parts per million (ppm) of PCBs or more. Many of the sections within the regulations require ascertaining the specific concentrations of PCBs prior to disposal or cleaning up a contaminated area to a particular concentration level.

Use the nameplate, label, or manufacturer's specifications on a PCB Article (see Section 2.2.1) to ascertain the PCB concentration. If this information is not available, then you may make certain assumptions (see 40 CFR 761.2) about the PCB concentrations in certain electrical equipment (e.g., transformers) until you are able or required to sample and analyze for PCBs. Note that these assumptions do not apply to disposal (63 FR 35389). Near the time of actual disposal, you must determine the actual PCB concentration in order to use the proper disposal method. However, because some PCB Articles (especially capacitors) are not amenable to servicing or sampling of the PCBs, you may use the assumptions made in accordance with 40 CFR 761.2(a)(4) for disposal.

You may assume non-liquid PCBs (i.e., no free-flowing liquids present) to be ≤ 500 ppm or 100 Fg/100 cm² in lieu of sampling and analysis for the purposes of disposal [40 CFR 761.50(a)(5)].

You must determine the concentration of PCBs in contaminated media resulting from a spill or release when cleaning up under 40 CFR 761 Subpart G, "PCB Spill Cleanup Policy," in order to proceed.

1. Introduction

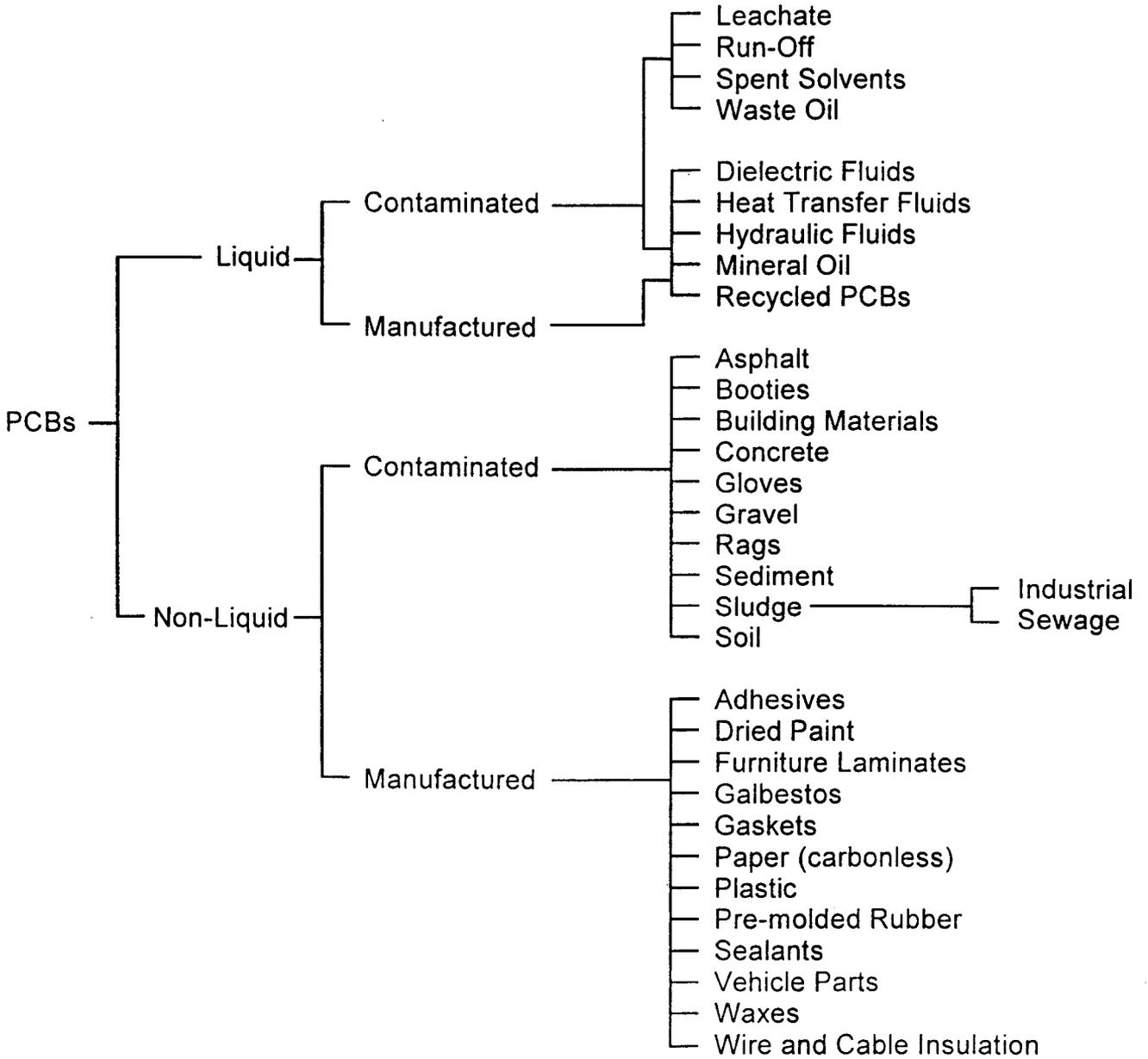
5820.2A, "Radioactive Waste Management," apply to PCB/radioactive waste.

If the PCB/radioactive waste is mixed with RCRA hazardous waste, the entire mixture is subject to AEA, RCRA, and TSCA. In the event that two or more statutes apply, the most stringent one prevails [40 CFR 761.1(e)]. For example, while TSCA does not regulate the disposal of PCB/radioactive waste containing < 50 ppm of PCBs, the waste is still subject to the requirements for disposal of the radioactive component of the waste.

Because certain special provisions and exceptions apply to PCB/radioactive waste, this type of waste is discussed in Section 2.7.

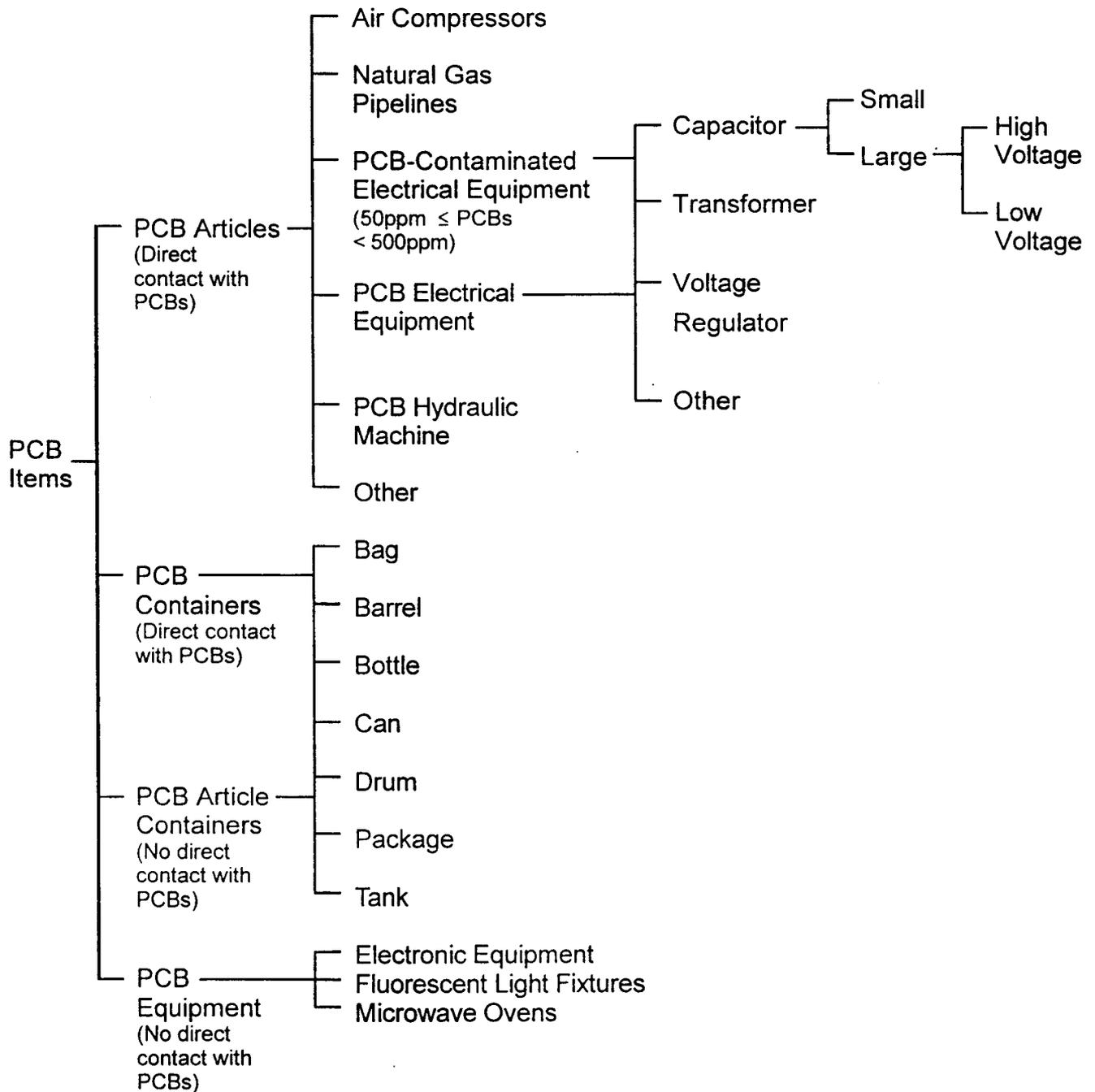
2. Types of PCB Waste

Exhibit 2-2. Examples of Liquid and Non-Liquid PCBs



2. Types of PCB Waste

Exhibit 2-3. Hierarchy of PCB Items



2. Types of PCB Waste

piece of equipment with PCBs. PCB Equipment includes microwave ovens, electronic equipment, and fluorescent light fixtures.

A PCB Article of common concern in PCB Equipment is the capacitor. If it is an intact and non-leaking small capacitor, the small capacitor does not need to be removed, and the PCB Equipment is not subject to further regulation for storage and disposal (check Section 4.3.1.3 to be sure). PCB Large (Low or High Voltage) Capacitors need to be removed from PCB Equipment if the equipment is to be stored or disposed as an unregulated item.

A type of PCB Equipment of concern is fluorescent light fixtures. Generally, the controlling factor in the storage and disposal of these fixtures is the PCB Small Capacitor. If the small capacitor is intact and non-leaking, the fixture is not subject to further regulation for storage and disposal. If the potting material in the ballast of the fixture contains ≥ 50 ppm PCBs, the ballast --not the intact and non-leaking capacitor--becomes the controlling factor in disposal of the fixture, and such ballasts or fixtures (if such ballasts are not removed from the fixtures) are regulated as PCB bulk product waste (see Section 2.4).

However, if the capacitor is not intact or leaking, regardless of the PCB concentration of the potting material, the fluorescent light fixture must be disposed as a PCB liquid (see Section 4.2) whenever the leak is confined to the inside of the fixture, or as a PCB remediation waste (see Section 4.4.2) whenever the leak extends to the outside of the fixture.

Exhibit 2-5 summarizes how a fluorescent light ballast should be disposed that contains both a PCB capacitor and potting material.

2.3 PCB Remediation Waste

PCB remediation waste encompasses soil, rags, and other debris generated as a result of any PCB spill not cleaned up under Subpart G but cleaned up under 40 CFR 761.61 (including materials from "old spills" in Exhibit 2-6) or from other unauthorized

disposal. Such waste includes, but is not limited to, those items identified in Exhibit 2-7.

PCB remediation waste may contain either or both liquid and non-liquid PCBs. For purposes of cleaning, decontaminating, or removing PCB remediation waste, there are five general waste categories: bulk PCB remediation waste, non-porous surfaces, porous surfaces, liquid PCB remediation waste, and cleanup waste (see Exhibit 2-7).

2.3.1 Bulk PCB Remediation Waste

Bulk PCB remediation waste includes, but is not limited to, the following non-liquid materials which are contaminated with PCBs: soil, sediments, dredged materials, muds, sewage sludge, and industrial sludge [40 CFR 761.61(a)(4)(i)].

2.3.2 Non-Porous Surface

Non-porous surface means a smooth, unpainted, solid surface that limits penetration of liquid containing PCBs beyond the immediate surface. Some examples are as follows: smooth uncorroded metal, smooth glass, smooth glazed ceramics, impermeable polished building stone (e.g., marble or granite), and high-density plastics (e.g., polycarbonates and melamines) that do not absorb organic solvents.

2.3.3 Porous Surfaces

Unlike non-porous surfaces, porous surfaces do not prevent or minimize penetration of PCBs beyond the immediate surface. Examples are concrete, cement, asphalt, plaster, paint or coating on metal, corroded metal, fibrous glass, glass wool, unglazed ceramics, porous building stone, low-density plastics (e.g., styrofoam, polyethylene), paper, cardboard, and tar paper (see Exhibit 2-7).

2.3.4 Liquid PCB Remediation Waste

Liquid PCB remediation waste [40 CFR 761.61(a)(4)(iv) and (a)(5)(iv)] includes but is not limited to water removed from the dewatering of

2. Types of PCB Waste

Exhibit 2-6. Spills Covered by PCB Remediation Waste

Date of PCB Spill	Was Source of Spilled PCBs an Authorized Use?	Existing PCB Concentration	PCB Concentration of Source
before 04/18/1978	yes	≤ 50 ppm	any
on or after 04/18/1978 and before 07/02/1979	yes	any	≤ 500 ppm
on or after 07/02/1979	yes	any	≤ 50 ppm
any	no	any	any

Note: When complete information cannot be obtained to use the table to determine whether a spill is subject to cleanup as PCB remediation waste, assume that the material from the spill or release is subject to cleanup as PCB remediation waste. Source: 63 FR 35438

bulk PCB remediation waste, aqueous decantate from sediment, leachate collected from on-site storage of bulk PCB remediation waste, and run-off from fire suppression involving PCBs.

2.3.5 Cleanup Wastes

Cleanup wastes [40 CFR 761.61(a)(5)(v)] include non-liquid cleaning materials and personal protective equipment waste at any concentration. Examples are rags, gloves, booties, and other disposable items. Cleaning solvents, abrasives, and equipment used in cleanup constitute a subcategory of cleanup wastes.

2.4 PCB Bulk Product Waste

PCB bulk product waste is ≤50 ppm PCB waste derived from manufactured products containing non-liquid PCBs (see Section 2.1.2 for the definition of non-liquid PCBs). PCB bulk product waste excludes PCB Items, PCB remediation waste, PCB household waste [40 CFR 761.63], and wastes from research and development activities (see Section 2.6).

Examples of PCB bulk product waste (see Exhibit 2-8) include but are not limited to:

- C Non-liquid bulk waste or debris from building demolition that contains PCBs. (PCB bulk product waste excludes debris from the

demolition of buildings or other man-made structures from which spilled PCBs have not been removed);

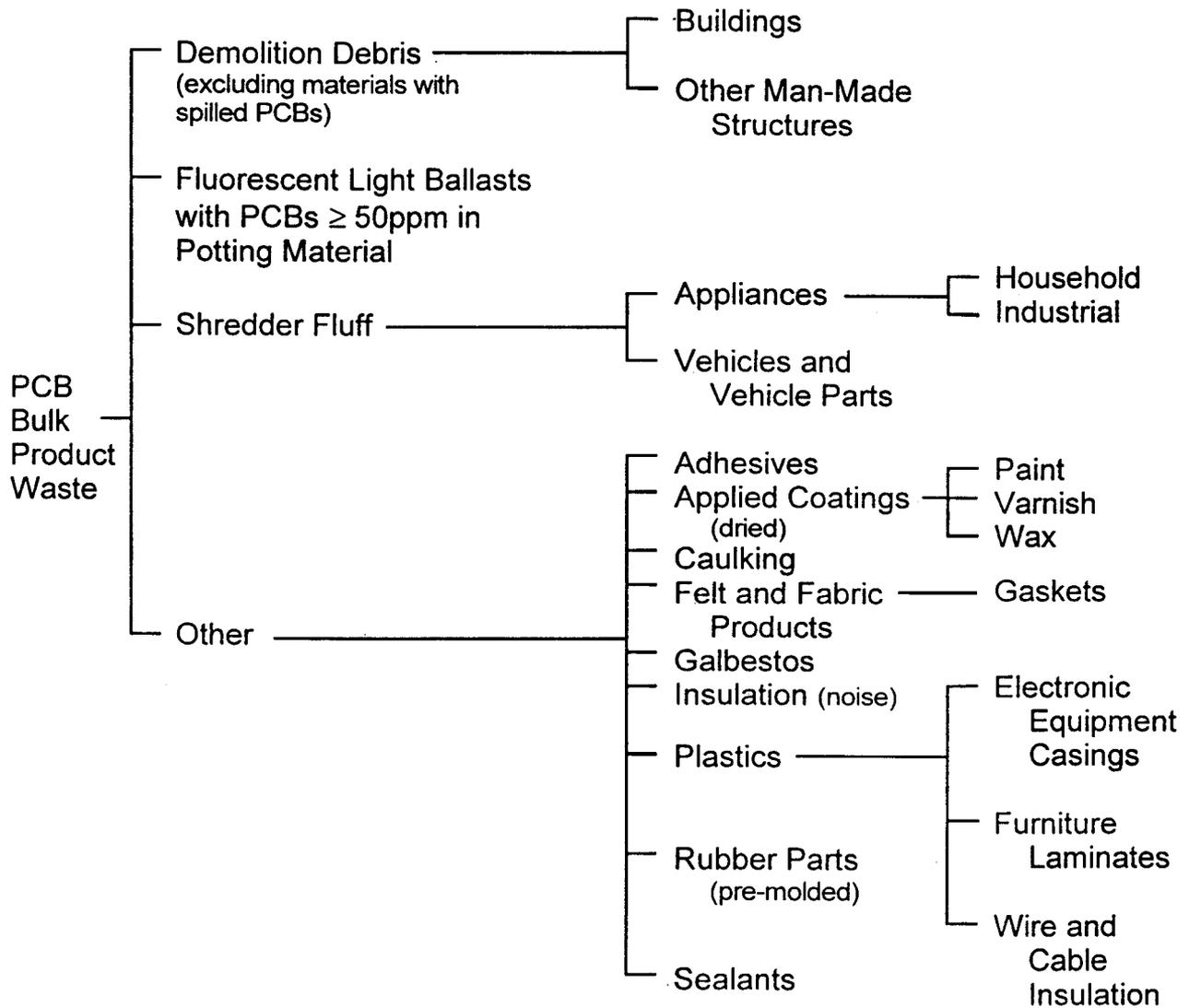
- C Fluorescent light ballasts containing PCBs in the potting material;
- C PCB-containing wastes from the shredding of automobiles and appliances (shredder fluff); and
- C Plastics, preformed or molded rubber parts, applied dried paints, sealants, caulking, adhesives, paper, Galbestos, noise insulation, and felt or fabric products such as gaskets from air-handling system gaskets.

2.5 PCB/Radioactive Waste

PCB/radioactive waste is a PCB waste that also contains a radioactive constituent (see Section 1.6.2) and is not mutually exclusive of the other types of waste. For example, a PCB remediation waste can also be a PCB/radioactive waste. Furthermore, any of the other types of waste to be discussed (waste from research and development activities and decontamination waste and residue) can also be a PCB/radioactive waste. If a PCB waste is also a PCB/radioactive waste, the storage and disposal regulatory provisions for PCB/radioactive waste apply as well as those for the other waste type.

2. Types of PCB Waste

Exhibit 2-8. PCB Bulk Product Waste



3. Storage of PCB Waste

recordkeeping, periodic reporting, or financial assurance to ensure that the waste does not pose an unreasonable risk of injury to health or the environment. In deciding whether to grant an extension, EPA will consider whether relevant treatment or disposal options are being pursued, additional storage time poses an unreasonable risk of injury, there is an absence of approved treatment technology, or additional time is needed to complete treatment or destruction process.

3.1.3 Temporary Storage

EPA allows temporary storage of PCB wastes in units whose specifications [40 CFR 761.65(c)(1)] are less stringent than those for general storage units or alternate storage units described in Sections 3.1.4 and 3.1.5, respectively. Temporary storage must meet two conditions:

- Storage of no longer than 30 days from the date of removal from service, and
- Notation of the date of removal from service attached to the PCB Container or PCB Item stored for disposal.

You may place the following PCB Items into temporary storage:

- Liquids with PCBs \leq 50 ppm in a U.S. Department of Transportation specified container (see Section 3.1.6) and under a Spill Prevention Control and Countermeasures Plan [40 CFR Part 112] for the area;
- PCB Containers with non-liquid PCBs, such as contaminated soil, rags, and debris;
- Non-leaking PCB Articles and PCB Equipment; and/or
- Leaking PCB Articles and PCB Equipment if
 - Placed into non-leaking PCB Containers, and

- Sufficient sorbent materials are inserted to absorb any remaining PCB liquids.

3.1.4 General Storage Units

Units for storing PCB waste beyond 30 days must meet all of the following criteria [40 CFR 761.65(b)(1)(i) to (b)(1)(v)]:

- Adequate roof and walls to prevent rain from reaching the PCB waste;
- Adequate floor with 6-inch high, continuous curbing. (a special exception is provided for PCB/radioactive waste; see Section 3.6.2);
- Floor and curbing providing a containment volume equal to the greater of
 - Two times the internal volume of the largest PCB Article or PCB Container, or
 - 25% of the total internal volume of all PCB Articles or PCB Containers stored;
- No drain valves, floor drains, expansion joints, sewer lines, or other openings that would permit liquids to flow from the curbed area;
- Floors and curbing constructed of Portland cement, concrete, or a continuous, smooth, non-porous surface (see index), which prevents or minimizes penetration of PCBs; and
- On a site above the 100-year floodplain.

Exceptions to the criteria for storage unit requirements are discussed in Section 3.1.3, "Temporary Storage," Section 3.1.5, "Alternate Storage Units," Section 3.3.1.1, "PCB Large High Voltage Capacitors and PCB-Contaminated Electrical Equipment," Section 3.4, "PCB Remediation Waste," Section 3.5, "PCB Bulk Product Waste," and Section 3.6, "PCB/radioactive

3. Storage of PCB Waste

3.1.6.2 Old DOT Specification Containers

In adopting the DOT container requirements, EPA is also adopting a particular requirement regarding use of old DOT Specification containers for storage purposes. Transportation of PCBs in the old DOT Specification 5, 5B, 6D, 17C, and 17E containers has been illegal since October 1, 1996, except on a transitional basis [defined in 49 CFR 173.14(a)(2)]. (A special exception has been provided for PCB/radioactive waste; see Section 3.6.3.2.)

3.1.6.3 PCB Waste < 20 ppm or 1 Pound

Because of the Anti-Dilution Rule and because DOT does not regulate < 20 ppm or < 1 pound of PCBs, EPA may require DOT containers in situations where DOT may not. In fact, EPA requires waste of < 20 ppm of PCBs or < 1 pound of PCBs to be in Packing Group III containers, unless other hazards present in the PCB waste compel a more stringent Packing Group (i.e., a Packing Group I or II) container.

For the purposes of describing PCB waste not subject to DOT regulation but still subject to EPA regulation, on a manifest, use the term, "Non-DOT Regulated PCBs."

3.1.7 Checking for Leaks

All PCB Items (PCB Articles, PCB Containers, and PCB Article Containers) in storage must be checked for leaks at least once every 30 days [40 CFR 761.65(c)(5)]. In the event of a leak, you should:

- Transfer any leaking PCB Container or PCB Article and the contents to properly marked non-leaking containers;
- Cleanup and dispose any spilled or leaked material per Subpart G, "PCB Spill Cleanup Policy"; and
- Keep records of inspections, maintenance, cleanup, and disposal [40 CFR 761.180(a)(1)(iii) and (b)(1)(iii)].

3.1.8 Dating

All PCB Containers storing bulk PCB liquid wastes for disposal and PCB Items (PCB Articles and PCB Article Containers) in storage for disposal must be dated. For bulk PCB liquid wastes, a record of the following information must be maintained that tracks each batch added or removed from the container:

- Date added or removed,
- Quantity added or removed, and
- Disposition of the batch (only for a removed batch).

PCB Items (including PCB Article Containers and PCB Articles) must be marked with the date on which they were removed from service for disposal. The storage of PCB Items must be managed in such a way that a PCB Item can be located by date.

See also record retention requirements at 40 CFR 761.180(a) and (b). Dating and management of stored PCB Containers and PCB Items by date are required by 40 CFR 761.65(c)(8).

3.1.9 Marking

All storage areas [including temporary storage areas (Section 3.1.3), general storage areas (Section 3.1.4), and alternate storage units (Section 3.1.5)] must be marked [40 CFR 761.40(a)(10) and 40 CFR 761.65(c)(3)].

3.1.10 Removal of Equipment

If movable equipment (e.g., forklifts) came into direct contact with PCBs while handling PCB waste in a storage area [including temporary storage areas (Section 3.1.3), general storage areas (Section 3.1.4), and alternate storage units (Section 3.1.5)], they must be decontaminated per 40 CFR 761.79(c)(2) before being removed from the storage area. Decontamination is required by 40 CFR 761.65(c)(4).

3. Storage of PCB Waste

has to be marked as required in 40 CFR 761.40(a)(10).

DOE Still Phasing Out Large Capacitors

Because the original phaseout date of October 1, 1988, for most uses of PCB Large High Voltage Capacitors had passed, EPA proposed to delete the provision allowing pallet storage of these articles during the PCB Disposal Amendments rulemaking. However, DOE EH-413 commented that the Oak Ridge K-25, Portsmouth, and Paducah sites have over 9,000 PCB Large High Voltage Capacitors that are in the process of being phased out (under a Federal Facilities Compliance Agreement). Needless to say, deleting the provision for pallet storage prior to disposal would have created undue hardship. At this time Paducah has already completed removal of its capacitors.

3.3.1.2 Drained PCB-Contaminated Electrical Equipment

PCB-Contaminated Electrical Equipment drained of all free-flowing dielectric fluid is not subject to any of the requirements for the storage for disposal of PCBs (40 CFR 761.65). The reference for this provision is 40 CFR 761.60(b)(6)(ii)(B) and 761.65(c)(2).

3.3.2 PCB Containers

Requirements for containers with PCB liquids have already been covered in Sections 3.1 to 3.2. Empty, unrinsed containers that came into direct contact with PCB liquids should be stored the same way as containers with PCB liquids. Empty, decontaminated, or uncontaminated PCB Containers are not regulated for storage.

3.3.3 PCB Article Containers

Prior to the PCB Disposal Amendments Rule, 40 CFR 765.65(c)(5) and (c)(8) inadvertently omitted "PCB Article Containers" as being subject to the requirements of checking for leaks (see Section 3.1.7) and dating (see Section 3.1.8). EPA rectified this loophole by requiring PCB Items (which by definition includes PCB Articles, PCB Article Containers, and PCB Containers) to be checked for leaks and dated.

PCB Article Containers that come into direct contact with PCBs (because of a leaking PCB Article within the PCB Article Container) should be handled the same way as containers with PCB liquids (see Section 3.2) because they become PCB Containers by definition [see 40 CFR 761.3]. Empty, decontaminated, or uncontaminated PCB Article Containers are unregulated for storage.

3.4 PCB Remediation Waste

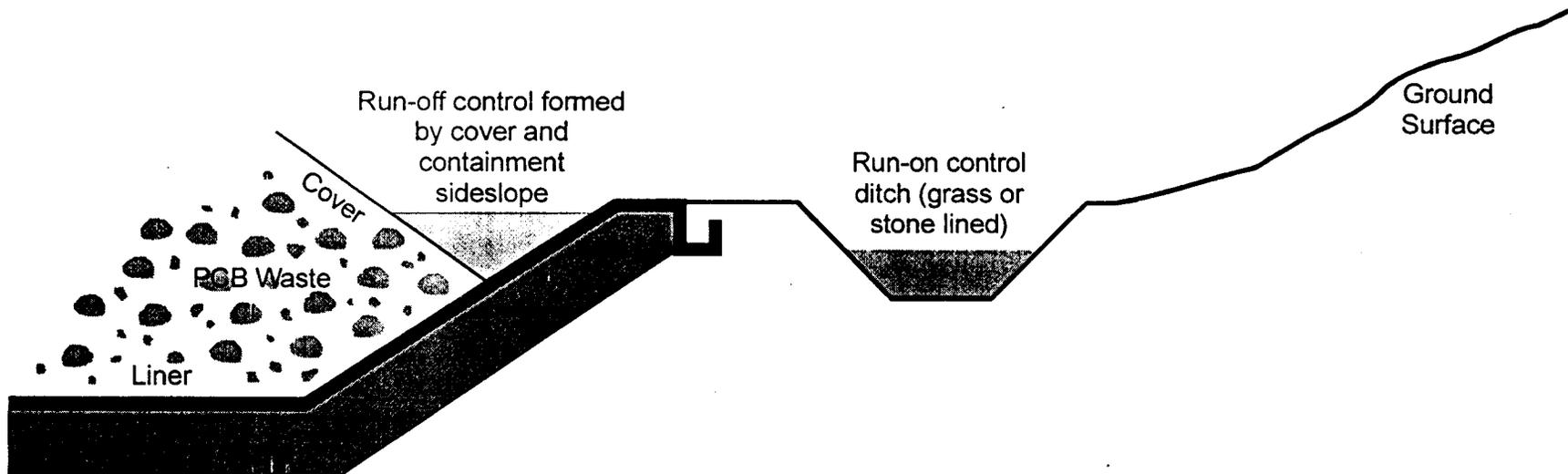
If PCB remediation waste is stored for 30 days or less, it may be placed in temporary storage (see Section 3.1.3). For more than 30 days, there is an alternative to storing this waste in a general storage or alternate storage unit (see Section 3.1.4 or 3.1.5).

In the PCB Disposal Amendments Rule, EPA added 40 CFR 761.65(c)(9) to provide for on-site storage of bulk PCB remediation waste under all of the following conditions:

- Storage for no longer than 180 days;
- Wind dispersal of piled waste controlled by means other than wetting;
- No generation of leachate through decomposition or other reactions; and
- Storage site with a liner, cover, and run-on control system.

There are requirements, in turn, for the liner, cover, and run-on control system. These components are discussed in the following sections and illustrated in Exhibit 3-1.

Exhibit 3-1. Cross-Section of 180-Day On-Site PCB Waste Storage Unit



3. Storage of PCB Waste

may be used if there are data to demonstrate to the EPA Regional Administrator and other appropriate regulatory authorities (e.g., Nuclear Regulatory Commission, DOT, and DOE) that the containers are protective of health, safety, and the environment.

- Used on a transitional basis as prescribed by 49 CFR 171.14(a)(2) (for example, the filling of these containers prior to October 1, 1996 without emptying and refilling them after that date).

Note that non-DOT containers must still meet other applicable Federal and State regulations governing radioactive materials.

3.7 Waste from Research and Development Activities

In accordance with 40 CFR 761.30(j)(2), all wastes resulting from research and development activities (including clothing) must be stored in a general storage unit (Section 3.1.4) or an alternate storage unit (Section 3.1.5).

3.6.3.2 Old DOT Specification Containers

The other exception is that the old DOT Specification containers (as described in Exhibit 3-2) may be used for PCB/radioactive wastes under one of the following conditions:

- Used for storage (and not for transportation regulated by DOT – for example, movement from one facility to another without crossing a public road); or

Exhibit 3-2. Old DOT Specification Containers

DOT Specification Container	Description	Liquids	Non-Liquids
5	5- to 110- gallon steel drum without removable head	yes	yes
5B	5- to 110-gallon steel drum without removable head	yes	yes
6D with 2S or 2L liner	5- to 55-gallon cylindrical steel overpack with polyethylene liner	yes	no
17C	5- to 55-gallon steel drum	no	yes
17	5- to 55-gallon steel drum	yes	no

4. Disposal of PCB Waste

liquid or non-liquid PCBs into a disposal unit is an operating parameter, the rate is subject to such as approval.

On the other hand, processing activities primarily associated with and facilitate storage, transportation, and that disposal do not require approval. These activities include repackaging, consolidating, pumping, draining, dismantling, and disassembling.

4.2 PCB Liquids

PCB liquids must be disposed by combustion; alternative technology for combustion must be approved by EPA. Incidental or so-called "environmental" PCB-contaminated liquids may be landfilled under certain conditions.

4.2.1 Combustion

Liquids with ≤ 50 ppm of PCBs must be disposed in an incinerator [40 CFR 761.70] as specified in 40 CFR 761.60(a).

However, you may also dispose a liquid with PCBs at a concentration ≤ 50 ppm and < 500 ppm in a:

- High-efficiency boiler specified in 40 CFR 761.71(a), if a mineral oil dielectric fluid, or
- High-efficiency boiler specified in 40 CFR 761.71(b), if **not** a mineral oil dielectric fluid.

4.2.2 Alternatives to Combustion

In order to use an alternative method of destroying PCBs [40 CFR 761.60(e)], you must submit a written request to the EPA Regional Administrator or Director, National Program Chemicals Division at EPA Headquarters. (Send requests to use such a method in more than one region to the latter.) You must demonstrate that the alternative method:

- Achieves a level of performance equivalent to:
 - High-efficiency boiler [40 CFR 761.71],
or

- Incinerator [40 CFR 761.70], and

- Does not present an unreasonable risk of injury to health or the environment.

Upon approval of an alternative method, EPA will set forth in writing all the conditions with which you must comply. Do not use the alternate method prior to approval.

4.2.3 Landfilling of PCB Liquids

Generally, PCB liquids are banned from landfills. However, concern expressed about incidental PCB liquids associated with non-liquid wastes, which are usually of an aqueous nature, led EPA to insert the following provision [40 CFR 761.60(a)(3)]:

A PCB-Contaminated liquid (i.e., < 500 ppm of PCBs) may be placed in a chemical waste landfill approved under 40 CFR 761.75 if all four of the following conditions are met:

- It is from an incidental or "environmental" source, such as
 - Precipitation,
 - Condensation,
 - Leachate, or
 - Load separation;
- It is associated with PCB Articles or non-liquid PCB wastes; and
- You provide the owner/operator of the landfill with information showing that the liquid is
 - < 500 ppm of PCBs and
 - Not an ignitable waste [see 40 CFR 761.75(b)(8)(iii)].

Note that this landfill provision does not apply to PCB liquids (Section 4.2.1) or liquid PCB remediation waste (Section 4.4.2).

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- Incinerator specified in 40 CFR 761.70; or
- Chemical waste landfill approved under 40 CFR 761.75 provided that
 - S The interstitial space in the container has been filled with sufficient absorbent to take up any PCB liquids remaining in the PCB small Capacitors, and
 - S EPA has published a notice declaring the availability of such landfills, and the terms and conditions for landfilling are followed.

Notwithstanding, if you generated large amounts of Small PCB Capacitor waste that qualify for municipal solid waste (because they are intact and non-leaking), EPA encourages you to dispose the waste in either an incinerator or chemical waste landfill under the above conditions.

The reference for disposal of Small PCB Capacitors is 40 CFR 761.60(b)(2)(ii), (iv), (v), and (vi).

Large Capacitors

PCB Large Capacitors consist of PCB Large High Voltage and PCB Large Low Voltage Capacitors. Dispose PCB Large Capacitors with ≥ 500 ppm of PCBs in either an incinerator or chemical waste landfill under the same conditions as described above for small PCB Capacitors that may not be disposed as municipal solid waste. Dispose PCB Large Capacitors with ≤ 50 ppm and < 500 ppm of PCBs in an approved PCB disposal facility (see Exhibit 4-1).

The reference for disposal of PCB Large Capacitors (≥ 500 ppm of PCBs) is 40 CFR 761.60(b)(2)(iii), (v), and (vi) and that for disposal of PCB Large Capacitors (≤ 50 and < 500 ppm of PCBs) is 40 CFR 761.60(b)(4).

4.3.1.4 PCB Hydraulic Machines

PCB hydraulic machines (such as die casting machines) containing ≥ 50 ppm of PCBs must be drained of all free-flowing liquid [40 CFR 761.60(b)(3)]. You must dispose the liquid as a PCB liquid (see Section 4.2.1). You may then dispose the drained carcass as described below.

If the liquid contained $\geq 1,000$ ppm of PCBs, an additional step (see Exhibit 4-2) is required in which the carcass must be:

- Decontaminated per 40 CFR 761.79, or
- Flushed with a solvent (1) in which PCBs are readily soluble (e.g., kerosene, xylene, or toluene) and (2) that contains originally < 50 ppm of PCBs; dispose the spent solvent as a PCB liquid (see Section 4.2.1) or decontaminate it (per 40 CFR 761.79).

You must dispose the drained carcass (see Exhibit 4-2) via any of the following:

- Decontamination per 40 CFR 761.79 (not necessary if initial decontamination was performed adequately);

Exhibit 4-1. List of PCB Disposal Facilities Approved under Subpart D

Incinerators	40 CFR 761.70
High-Efficiency Boilers	40 CFR 761.71
Scrap Metal Recovery Ovens and Smelters	40 CFR 761.72
Chemical Waste Landfill	40 CFR 761.75

4. Disposal of PCB Waste

- Municipal solid waste management facility (excluding thermal treatment units and subject to 40 CFR Part 258) permitted, licensed, or registered by a state;
- Non-municipal, non-hazardous waste management facility (excluding thermal treatment units and subject to 40 CFR 257.5 through 257.30) permitted, licensed, or registered by a state;
- Scrap metal recovery oven or smelter as specified in 40 CFR 761.72 (also see discussion in Section 4.3.1.1); or
- Disposal facility approved in 40 CFR Part 761 (see Exhibit 4-1).

4.3.1.5 PCB-Contaminated Electrical Equipment (except capacitors)

PCB-Contaminated Electrical Equipment (except capacitors) must be drained of all free-flowing liquid [40 CFR 761.60(b)(4) and (b)(6)(ii)]. Dispose the liquid as PCB liquid (see Section 4.2.1). Dispose the drained carcass in any of the following:

- Decontamination per 40 CFR 761.79 [40 CFR 761.60(b)(4) and 761.60(b)(6)(ii)(A)],
- Municipal solid waste management facility (excluding thermal treatment units and subject to 40 CFR Part 258) permitted, licensed, or registered by a state;
- Non-municipal, non-hazardous waste management facility (excluding thermal treatment units and subject to 40 CFR 257.5 through 257.30) permitted, licensed, or registered by a state;
- Scrap metal recovery oven or smelter as specified in 40 CFR 761.72 (also see discussion in Section 4.3.1.1); or
- Disposal facility approved in 40 CFR Part 761 (see Exhibit 4-1).

4.3.1.6 Other PCB Articles

PCB Articles (other than those previously described, namely, PCB Transformer, capacitor, PCB hydraulic machines, and PCB-Contaminated Electrical Equipment) having ≥ 500 ppm of PCBs must be disposed [40 CFR 761.60(b)(6)(i)] in any

- Incinerator as specified in 40 CFR 761.70, or
- Chemical waste landfill approved under 40 CFR 761.75 provided that all free-flowing liquid is drained and the liquid is disposed as a PCB liquid (as specified in Section 4.2.1).

PCB Articles (other than those previously described) having ≥ 50 ppm but < 500 ppm of PCBs must be disposed [40 CFR 761.60(b)(6)(ii)] by draining all free-flowing liquid and disposing the liquid as a PCB liquid (as specified in Section 4.2.1) prior to disposing the drained carcass via any of the following:

- Decontamination per 40 CFR 761.79;
- Municipal solid waste management facility (excluding thermal treatment units and subject to 40 CFR Part 258) permitted, licensed, or registered by a State;
- Non-municipal, non-hazardous waste management facility (excluding thermal treatment units and subject to 40 CFR 257.5 through 257.30) permitted, licensed, or registered by a State;
- Scrap metal recovery oven or smelter as specified in 40 CFR 761.72 (also see discussion in Section 4.3.1.1); or
- Disposal facility approved in 40 CFR Part 761 (see Exhibit 4-1).

Note that all persons directly involved in the disposal of PCB Articles must don personal protective clothing or equipment to avoid dermal contact with or inhalation of PCBs [40 CFR 761.60(b)(8)].

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See text box, “761.61 versus Subpart G.” Exhibit 4-3 provides a comparison of the cleanup under Subpart G and 761.61.

cleanup and disposal of PCB remediation waste for media **other than the following:**

- Surface or ground waters,
- Sediments in marine or freshwater ecosystems,
- Sewer or sewage treatment systems,
- Drinking water sources or distribution systems (regardless of private or public),
- Grazing lands, or
- Vegetable gardens.

4.4.2 PCB Remediation Waste

PCB remediation waste may be disposed via the self-implementing, performance-based, or risk-based option.

4.4.2.1 Self-implementing Option

Applicability

The self-implementing option may be used for

**Exhibit 4-3.
Comparison of Cleanup under the PCB Spill Cleanup Policy
and the Self-Implementing Cleanup of PCB Remediation Waste**

Qualifications and Conditions	Spill Cleanup Policy	Self-Implementing Disposal
When can the spill have occurred?	Fresh spills.	No restriction.
When must cleanup begin?	Within 24/48 hours of the spill.	No limit.
Site size restrictions	Approximately 20 feet in diameter.	None, designed for moderate sized sites (less than one acre).
Notification to EPA required?	If greater than 10 pounds of PCBs spilled, yes, if not no.	Always, regardless of the amount of PCB.
Cleanup levels	Depends on where the spill is and the kind of material (soil or impervious surface).	Depends on where the spill is and the kind of material (bulk PCB remediation waste/porous surface, non-porous surface, or liquid).
Post-Cleanup Verification Sampling	Triangular grid, maximum number of samples is 40, options for other procedures.	Square-based grid, no limit on number of samples, options for other procedures.
Penalty for spill?	No.	Possible.
Disposal of cleanup wastes	Based on the concentration of the original spilled material.	Based on the concentration of the waste as found.

4. Disposal of PCB Waste

- Summary of procedures for sampling the site and its surroundings (including sample collection procedures and analysis dates);
- Map or table showing concentration levels from site characterization (the EPA Regional Administrator may require more details, such as sample identification numbers used in site characterization);
- Location and extent of the contamination, including topographic maps cross-referencing sample identification numbers;
- Cleanup plan for the site, including the
 - § Schedule,
 - § Disposal technology, and
 - § Approach.

The plan should discuss options and contingencies, such as when obstacles or unexpectedly high concentrations are encountered.

The property owner of the cleanup site and the party conducting the cleanup both must sign a written certification. The certification must state that following are available for EPA inspection at the place stated by the signatories:

- Sampling plans, and
- Procedures for sample collection, preparation, extraction, and instrumental/chemical analysis.

If alternate methods for chemical extraction and chemical analysis are used, include in the certification a statement about the

- Use of such methods, and a
- Comparison study showing that the requirements of Subpart Q (40 CFR 761.320 through 761.326) are met or exceeded.

Records on both the alternate methods and the comparison study, which must be completed before the verification sampling, must be on file.

The EPA Regional Administrator should respond in writing within 30 calendar days of receiving the notification. If not, assume that the cleanup plan is complete and proceed with the plan.

Provide any proposed changes from the notification to the EPA Regional Administrator in writing no less than 14 calendar days prior to executing the changes.

Emergencies

A waiver is not necessary in the event of an emergency. Emergency cleanup is appropriate where there is imminent danger to health and the environment without containment or treatment. It is not appropriate for avoiding additional cleanup costs, business costs, or the 30-day wait.

In the event of an emergency, emergency response personnel should communicate directly with the EPA Region on proposed remedial actions.

The EPA Regional Administrator should respond verbally to the changes within 7 calendar days and in writing within 14 calendar days of receiving the changes. If there is neither verbal nor written response, assume the changes are complete and acceptable and proceed with the changes.

If you receive a separate waiver from each of the agencies required to be notified, you may obtain a waiver of the 30-day notification requirement.

Cleanup Levels

Cleanup levels (in terms of PCB concentrations) and conditions are given as a function of the type of occupancy (high or low) and PCB remediation waste for a given site [40 CFR 761.61(a)(4)]. Note

4. Disposal of PCB Waste

Exhibit 4-5.
Table of Cleanup Requirements for Liquid PCB Remediation Waste
 (Same as decontamination standards for liquids with PCBs)

Type of PCB Remediation Waste	Occupancy	Cleanup Level for PCBs	Condition
Liquid PCB Remediation Waste	High or Low	< 200 Fg/L (< 200 ppb) in water	Non-contact use in a closed system with no releases 40 CFR 761.79(b)(1)(i)
		< 3 Fg/L (<3 ppb) in water or discharge limit in Clean Water Act Section 307(b) or 402 permits	Discharge to treatment works or navigable waters [40 CFR 761.79(b)(1)(ii)]
		# 0.5 Fg/L (# 0.5 ppb) in water	No further conditions [40 CFR 761.79(b)(1)(iii)]
		< 2mg/kg (< 2 ppm) in organic and non-aqueous inorganic liquids	No further conditions [40 CFR 761.79(b)(2)]

Note: Associated with decontamination are several important requirements:
 40 CFR 761.79(e)(1) requires taking the necessary measures to prevent direct release of PCBs to the environment.
 40 CFR 761.79(e)(2) requires wearing personal protective equipment to guard against dermal contact with or inhalation of PCBs.
 40 CFR 761.79(f) requires sampling and analysis per 40 CFR 761.269 and 761.272 (both in Subpart N) in order to confirm decontamination levels are achieved. In addition, written records of sampling and analysis must be kept at least 3 years from the date of decontamination. Upon request, the records must be made available to EPA. Wastes generated by decontamination are subject to the disposal requirements and the recordkeeping requirements of 40 CFR 761.180(a).

office space in a warehouse. The occupancy rates are given for individuals not wearing dermal and respiratory protection against exposure to PCBs. Where there is a change in the land use of a site from low-occupancy to high-occupancy and the site was cleaned up at a low-occupancy level, the site must be re-cleaned up to the high-occupancy level. A notation recorded in the deed (or comparable instrument) for the property is required (see subsection, Deed Restrictions below).

Where a cleanup condition in Exhibit 4-4 requires a cap, also read the subsections, Cap Requirements and Deed Restrictions below. Moreover, where a

cleanup condition in Exhibit 4-4 requires a fence, also see the subsection, Deed Restrictions, below. The Deed Restriction subsection describes the conditions under which a cap or fence may be removed.

Note that the EPA Regional Administrator may require cleanup of a site to a level more stringent than that given in Exhibit 4-4 for sites near human and animal populations. Areas with human and animal populations include residential dwellings, hospitals, schools, nursing homes, playgrounds, parks, daycare centers, endangered species habitats, estuaries, wetlands, national wildlife refuges,

4. Disposal of PCB Waste

**Exhibit 4-6.
Table of Disposal Methods for PCB Remediation Waste**

Type of PCB Remediation Waste	Method	Conditions
Bulk PCB Remediation Waste (soil)	soil washing or on-site cleaning	<ol style="list-style-type: none"> 1. Use non-chlorinated solvents, 2. Use an ambient-temperature process, 3. Use a non-exothermic process, 4. Use a process not requiring external heat, 5. Prevent releases through secondary containment, and 6. Dispose/recover/reuse solvent per 40 CFR 761.79 or 761.61(b) or (c) approvals.
	off-site decontamination followed by disposal	<ol style="list-style-type: none"> 1. Dewater the waste on-site or ship in DOT containers for off-site dewatering; 2. Dispose removed water as PCB liquid (Section 4.2) or decontaminate (see Exhibit 4-5), and dispose dewatered waste as follows: <ul style="list-style-type: none"> \$ If PCB concentration not characterized, assume ≤ 50 ppm \$ If PCBs < 50 ppm, see "Non-Liquid Cleanup Materials" in this table below \$ If PCBs ≤ 50 ppm, put in a RCRA Subtitle C Landfill accepting PCB waste or an approved PCB disposal facility (see Exhibit 4-1) \$ If shipping to off-site disposal facility with no TSCA approval, give written notice [quantity & highest PCB concentration determined by extraction (EPA method 3500B/3540C or 3500B/3550B) followed by analysis (EPA 8082 in SW-846)] at least 15 days before first shipment to the facility
	on-site decontamination and disposal	Decontaminate per 40 CFR 761.79
Non-porous Surfaces	cleaning followed by on-site or off-site disposal	<ol style="list-style-type: none"> 1. Decontaminate per 40 CFR 761.79, 2. Use a combustion alternative method (see Section 4.2.2), or 3. Use a method approved under the risk-based option (see Section 4.4.4).
	cleaning followed by off-site disposal	<ol style="list-style-type: none"> 1. If surface < 100 μg PCBs/100 cm^2, see "Non-Liquid Cleanup Materials" below 2. If surface ≤ 100 μg PCBs/100 cm^2, place in a RCRA Subtitle C Landfill accepting PCB waste or an approved PCB disposal facility (see Exhibit 4-1)
	metals – thermal decontamination	<ol style="list-style-type: none"> 1. If surface < 100 μg PCBs/100 cm^2, decontaminate per 40 CFR 761.79(c)(6)(i) 2. If surface ≤ 100 μg PCBs/100 cm^2, decontaminate per 40 CFR 761.79(c)(6)(ii)
	use or reuse	Decontaminate per 40 CFR 761.79(b)(3) or (c)

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Exhibit 4-7. Cap Requirements

Type of Requirement	Specifications
Design and Construction	<ol style="list-style-type: none"> 1. Provide long-term minimization of liquid migration 2. Function with minimum maintenance 3. Promote drainage and minimize erosion or abrasion of cover 4. Accommodate settling and subsidence to maintain integrity of cover 5. Have permeability # that of bottom liner system or natural subsoil present <p style="text-align: right;">[40 CFR 264.310(a)(1) through (a)(5)]</p>
Soil (high clay and silt content) Parameters	<ol style="list-style-type: none"> 1. Permeability # 1.0×10^{-7} cm/sec 2. Percent soil passing No. 200 sieve > 30 3. Liquid limit > 30 4. Plasticity index > 15 <p style="text-align: right;">[40 CFR 761.75(b)(1)(ii) through (b)(1)(v)]</p>
Minimum Thickness of Cap	<ol style="list-style-type: none"> 1. Soil (compacted): 25 cm (10 in.) 2. Concrete or Asphalt: 15 cm (6 in.) <p style="text-align: right;">[40 CFR 761.61(a)(7)]</p>
Strength	<p>Sufficient to maintain cap effectiveness and integrity during use of the cap surface which is exposed to the environment.</p> <p style="text-align: right;">[40 CFR 761.61(a)(7)]</p>
PCB Contamination in Cap	<p>< 1 ppm per Aroclor (or equivalent) or per cogener</p> <p style="text-align: right;">[40 CFR 761.61(a)(7)]</p>
Maintenance	<p>Repair within 72 hours of discovery of any breaches that would impair integrity of cap; maintain cap in perpetuity.</p> <p style="text-align: right;">[40 CFR 761.61(a)(7) & (a)(8)]</p>

Deed Restrictions

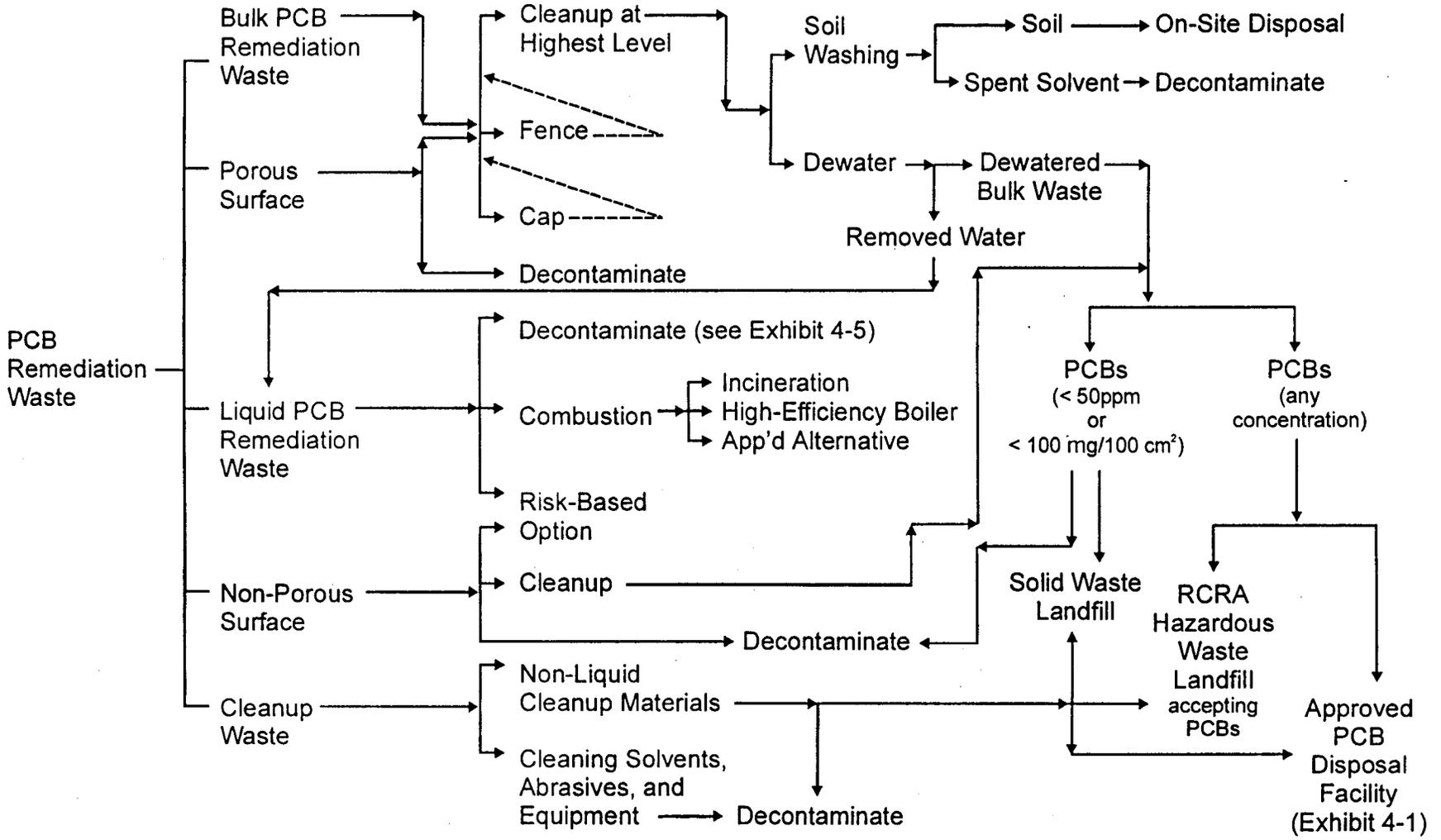
Restrictions must be placed on the deed [40 CFR 761.61(a)(8)] for a property containing a site which has been remediated if the site is:

- c Capped,
- c Fenced, or a
- c Low-occupancy area.

(Refer to the subsection, Cleanup Levels, above, for more information on caps, fences, and low-occupancy areas.) Within 60 days of completing a self-implemented cleanup of a PCB remediation waste site, the owner must record a notation on the property deed (or comparable instrument that is normally examined during title searches) and submit a certification to the EPA Regional Administrator.

The purpose of the notation is to provide, in perpetuity, information to any potential purchaser of the property. The notation to be recorded (in a

Exhibit 4-8. PCB Remediation Waste Self-Implementation Flow Chart



4. Disposal of PCB Waste

- Galbestos;
- Non-liquid building demolition debris; and
- Shredder fluff [such as shredding from automobiles or household appliances from which PCB Small Capacitors have been removed. If a PCB Small Capacitor is shredded such that PCBs are no longer enclosed, dispose the shredding under the performance-based or risk-based option (Sections 4.5.1 or 4.5.3, respectively)].

All other PCB bulk product waste [sampled per Subpart R (40 CFR 761.340 to 761.359)] that leaches < 10 μg of PCBs /L of water using a procedure to simulate leachate generation may be also be disposed in the aforementioned landfills.

If you dispose at such a landfill that is off-site without a commercial PCB storage or disposal approval, you must notify the landfill at least 15 days prior to the first shipment of the waste. The written notice must state that the PCB bulk product waste:

- May include components with PCBs at \leq 50 ppm based on
 - S** General knowledge of the waste stream based on prior testing by the disposer or others,
 - S** Sampling per Subpart R followed by analysis, or
- Is presumed or known to leach < 10 μg of PCBs /L.

A one-time notification is required for each wastestream [40 CFR 761.62(b)(4)(i)]. However, if the wastestream changes (e.g., from automobiles to household appliances), a new one-time notification must be sent for the new wastestream. Each different demolition project is considered a new or different wastestream.

The owner/operator of the landfill is responsible for cleanup of any releases of PCBs (including leachate) from the landfill. Releases of PCBs

(including the leachate) from the landfill are cleaned up as PCB remediation waste (see Section 4.4.2) [40 CFR 761.62(b)(3)].

4.5.2.2 Leaching \leq 10 μg of PCBs /L

Examples of materials presumed or known to leach \leq 10 μg of PCBs /L include paper or felt gaskets contaminated with PCBs and fluorescent light ballasts with PCB potting material. Such materials may be placed [40 CFR 761.62(b)(2)] into a landfill that is permitted, licensed, or registered by a state to manage municipal solid waste under 40 CFR Part 258 or non-municipal, non-hazardous waste under 40 CFR 257.5 through 257.30 provided that:

- PCB bulk product waste is segregated from organic liquids disposed in the landfill, and
- Leachate is collected from the landfill and is monitored for PCBs.

Releases of PCBs (including the leachate) from the landfill are cleaned up as PCB remediation waste (see Section 4.4.2) [40 CFR 761.62(b)(3)].

If you dispose at such a landfill that is off-site without a commercial PCB storage or disposal approval, you must notify the landfill at least 15 days prior to the first shipment of the waste and with each shipment thereafter [40 CFR 761.62(b)(4)(ii)]. The written notice must state that the PCB bulk product waste:

- May include components with PCBs at \leq 50 ppm based on general knowledge or analysis of the waste, and
- Is presumed or known to leach \leq 10 μg of PCBs /L.

Unlike the one-time notification for PCB bulk product waste presumed or known to leach < 10 μg of PCBs /L, notification must be made with every shipment to a landfill of PCB bulk product waste presumed or known to leach \leq 10 μg of PCBs /L.

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Exhibit 4-9. PCB/Radioactive Waste that May Be Put into Radioactive Waste Landfills without Further Regard to PCBs

Type of PCB/Radioactive Waste	Examples	CFR Citation
Dewatered Bulk PCB Remediation Waste with < 50 ppm of PCBs	soil contaminated with heat transfer fluid	40 CFR 761.61(a)(5)(i)(B)(2)(ii)
Drained carcass of PCB-Contaminated Electrical Equipment	transformer, voltage regulator	40 CFR 761.60(b)(4) 40 CFR 761.60(b)(6)(ii)(A)
PCB Bulk Product Waste leaching < 10 µg of PCBs/L	concrete coated with fire-retardant paint	40 CFR 761.62(b)(1)(i)
Non-liquid cleaning materials and personal protective equipment wastes at any PCB concentration from decontamination	brushes, booties, gloves, rags	40 CFR 761.79(g)(6)
Non-liquid cleaning materials and personal protective equipment waste at any PCB concentration from self-implementing remediation site cleanups	brushes, booties, gloves, rags	40 CFR 761.61(a)(5)(v)(A)
Non-liquid wastes from research and development activities	glassware, tubing, spatulas, filter paper	40 CFR 761.64(b)(2)

For example, PCB bulk product waste, which is also PCB/radioactive waste (which may be put into a solid waste landfill if nonradioactive) must be disposed in a landfill approved under the Atomic Energy Act (DOE Order 435.1 or other applicable implementing provisions). In the event a PCB/radioactive waste may be put into a chemical waste landfill, if nonradioactive, then you must use a landfill that is approved under both TSCA (40 CFR 761.75) and the Atomic Energy Act (DOE Order 435.1 or other applicable implementing provisions).

4.7 Waste from Research and Development Activities

Waste from research and development activities is defined in Section 2.6. [Note that waste from activities conducted for purposes of research and development into PCB disposal [described in 40 CFR 761.60(j)] are covered in Section 4.9]. The

disposal requirements for such waste are based on size. If the size is greater than the portion designated by a particular method, the disposal depends on whether the waste is liquid or non-liquid.

4.7.1 Size

Portions of samples of a size designated in a chemical extraction and analysis method for PCBs and extracted for purposes of determining the presence of or concentration of PCBs are unregulated for PCB disposal. This waiver is set forth at 40 CFR 761.64(a).

4.7.2 Liquids

Liquid solutions, including rinse solvents, generated from research and development activities, are disposed as liquid PCB remediation wastes (see Section 4.4.2.1 and Exhibit 4-5). You may dispose

4. Disposal of PCB Waste

disposal [40 CFR 761.60(j)]. Use of PCBs for research and development for other purposes are provided for elsewhere. [See 40 CFR 761.30(j) for the use of PCBs for chemical analysis, health effects studies, and environmental fate. See 40 CFR 761.30(k) for the use of PCBs in scientific instruments (e.g., mounting media for microscopy).]

EPA has prescribed several requirements under the self-implementing option for research and development of methods specifically for PCB disposal. These requirements include maximum amounts and notification.

The maximum amounts that may be used or treated in research and development studies are 500 gallons/year (liquid) and 70 cubic feet/year (non-liquid), neither of which may exceed 10,000 ppm of PCBs. The purpose of these maximum amounts is to limit the potential risk from incomplete or unsuccessful disposal of PCBs undertaken during research and development studies. The use of PCBs beyond these maximum amounts require an approval from the appropriate EPA Region [40 CFR 761.60(j)(2)].

Prior to exercising the self-implementing option, obtain an EPA Identification Number for a PCB waste handling activity if the site (where the research and development will occur) does not already have such a number. The number may be obtained by submitting a Form 7710-53 [40 CFR 761.205]. Once you have received a number, notify in writing the appropriate EPA Region and the state and local environmental protection agencies. The notification must provide the EPA Identification Number for the site, quantity of PCB waste to be treated, the types of disposal technology to be used, the general properties of the PCB waste to be treated, and estimated duration of the research and development. The notification must be submitted 30 days prior to commencing the self-implementing option but may be waived at EPA's discretion.