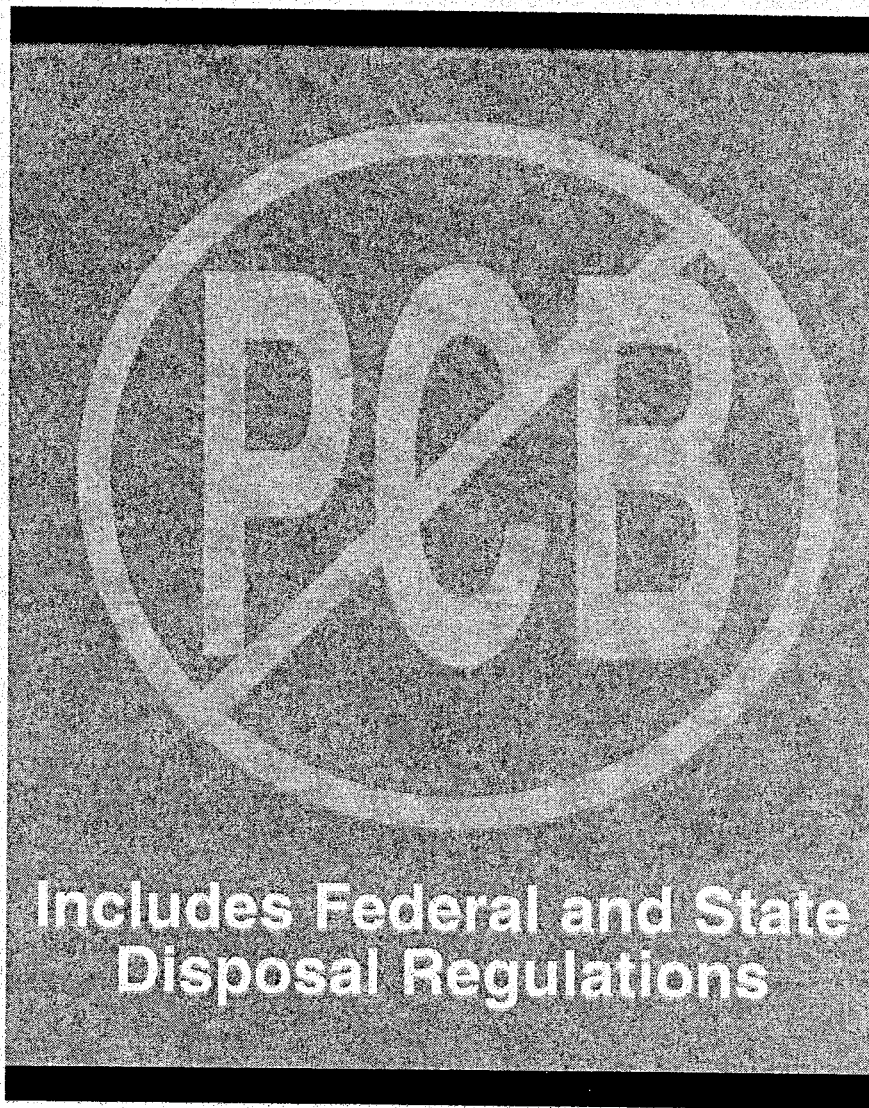
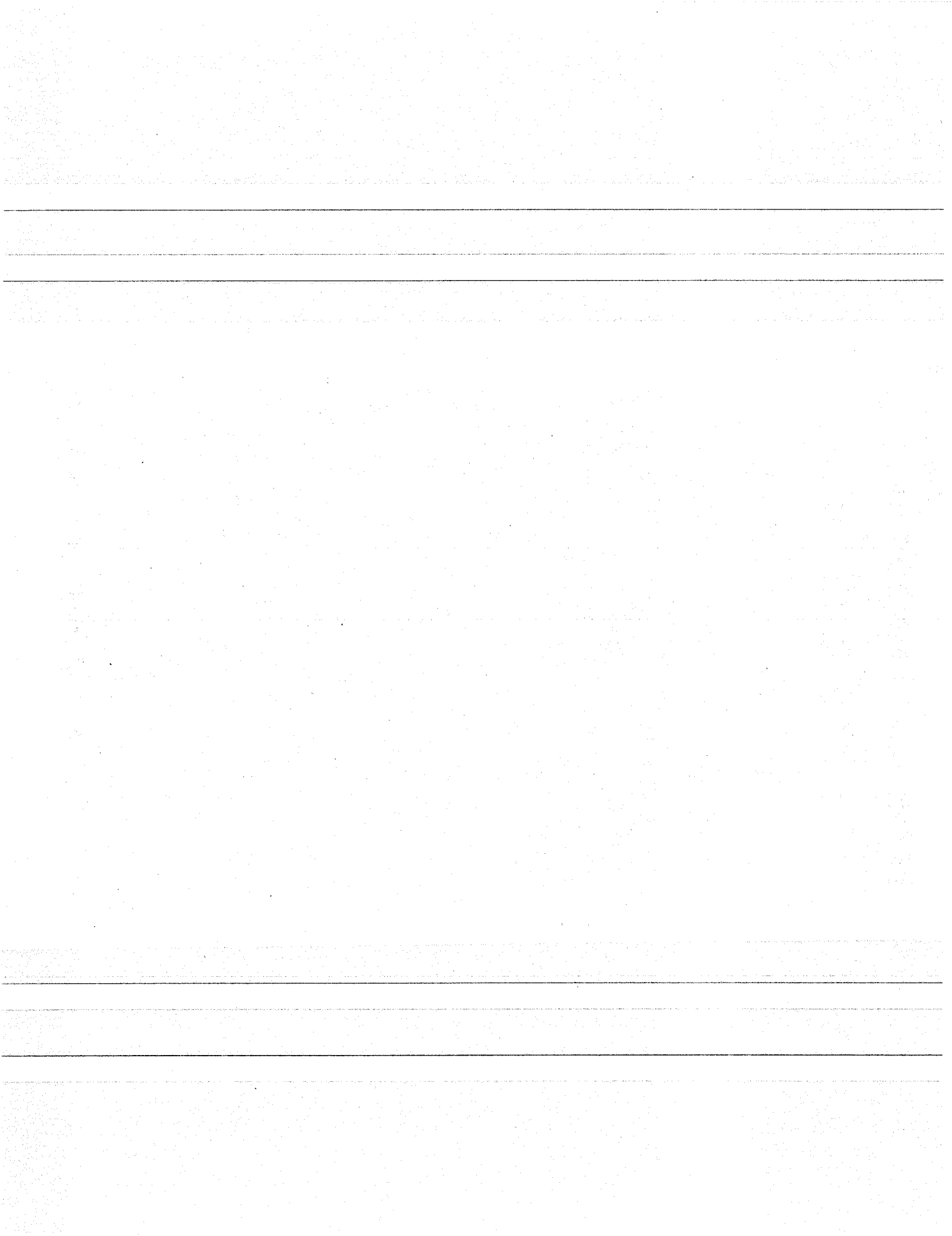


27696 PDF
P-03684

The Practical Guide to Ballast Disposal



Includes Federal and State
Disposal Regulations



FulCircle's Practical Guide to PCB Ballast Disposal

by
Mitchell Dong
and
Brin McCagg

FulCircle Ballast Recyclers

August, 1993
Fourth Edition

Headquarters
509 Manida Street
Bronx, NY 10474
Fax: (718) 328-4462
Tel: (718) 328-4667

Regional Offices
Baltimore
Boston
Detroit
Los Angeles
San Francisco
1-800-775-1516

©Copyright 1992 FulCircle Recyclers, Inc.

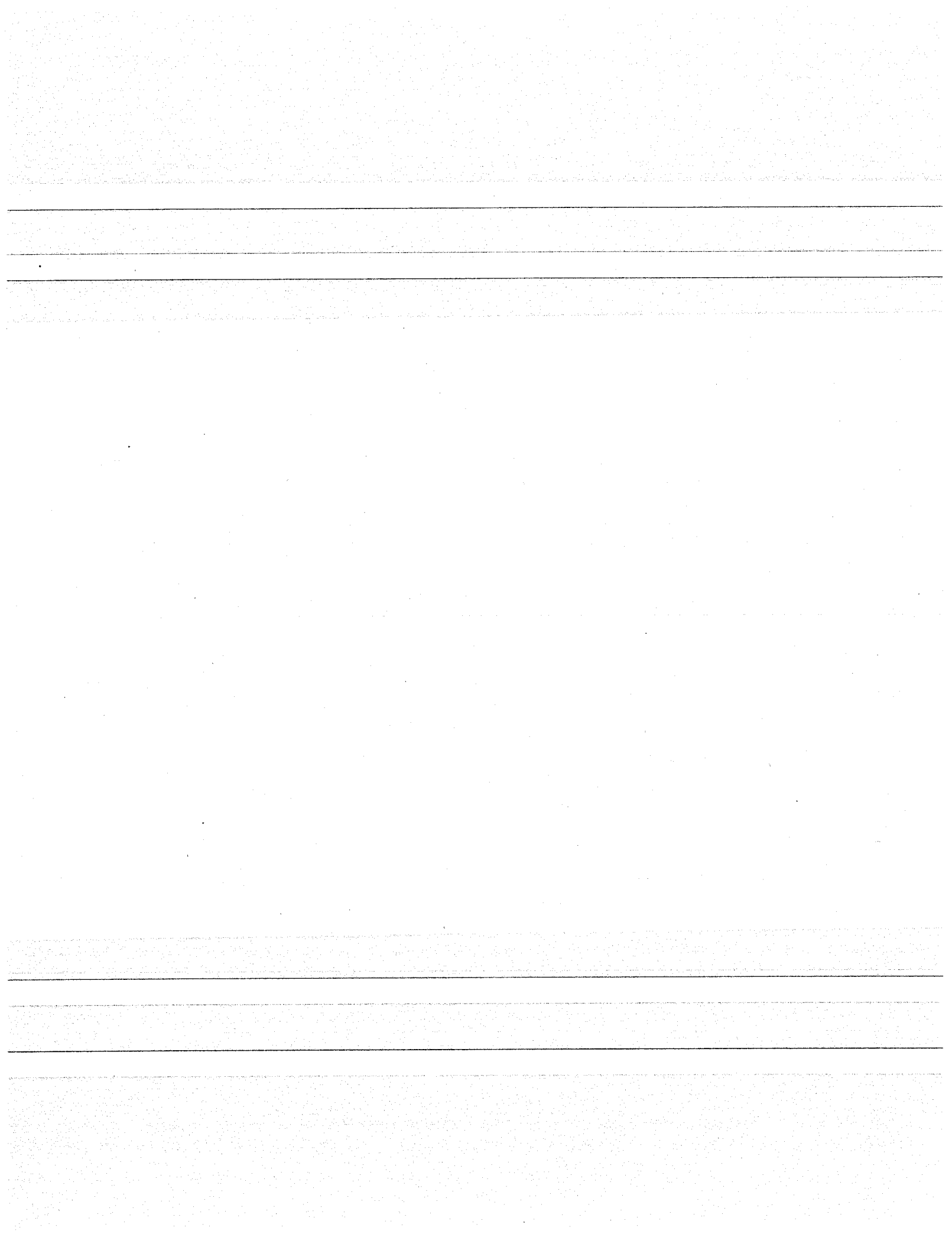
PROLOGUE

Group replacement of PCB ballasts presents a unique opportunity to rid your building of PCBs and dispose of them properly. Without group replacement, disposing of small quantities of pre-1979 ballasts as hazardous waste would be expensive, or alternatively, the ballasts would be discarded in the dumpster. This could result in the contamination of our local landfills and groundwater. However, with group replacement, proper disposal becomes much more economical.

What may seem like an impediment to upgrading your lighting system is actually an opportunity to decontaminate your building of PCBs and dispose of them in an environmentally sound, low cost manner.

Table of Contents

<u>Section</u>	<u>Page</u>
I. Introduction	1
II. Why Should We Worry About PCBs?	1
III. The Large Quantity of PCBs	1
IV. Federal Regulations Concerning the Disposal of PCB Ballasts	2
V. State Regulations Concerning Ballast Disposal	4
VI. How to Identify PCB Ballasts	7
VII. How to Identify Leakers	7
VIII. Tips on Ballast Removal	8
IX. Tips on Packing	9
X. Labelling, Manifesting and Transporting Ballasts	11
XI. Disposal Options	16
XII. Why Recycle?	23
XIII. Non-PCB Ballasts	23
XIV. How to Select a Disposal/Recycling Vendor	24
XV. About FulCircle	27
Appendices	
A. Identifying Fluorescent Light Ballasts Which Contain PCBs	28
B. Specifications For PCB Ballast Disposal	29
C. Correspondence With Various Environmental Regulators	30



I. INTRODUCTION

The subject of PCB ballast disposal is complex and can be expensive if not handled properly. We hope to provide some assistance in this Guide.

The purpose of this Guide is to assist building owners, facility managers, contractors, engineers and electric utilities decide on the best means of disposal for light ballasts. The information provided is based on the experience of FulCircle Ballast Recyclers, a company specializing in PCB ballast disposal.

II. WHY SHOULD WE WORRY ABOUT PCBs?

Polychlorinated biphenyls (PCBs) are toxic chemicals according to the U.S. EPA, suspected of causing cancer in humans. The Centers for Disease Control report that workers exposed to PCBs have developed:

- chloracne (a skin disorder)
- liver injury
- irritation of the skin and mucous membranes
- adverse reproductive effects

Animals exposed to controlled levels of PCBs have developed liver injury. It is likely that humans metabolize PCBs in the same way.

Given the substantial evidence developed by the Centers for Disease Control, there is no need to take any risks with PCBs.

III. THE LARGE QUANTITY OF PCBs

While there is only a small amount of PCBs in each light ballast, there is a huge number of ballasts in the U.S. which aggregate to a large quantity of PCBs in buildings. Please consider the following facts.

- Installed base of ballasts in the U.S. is approximately one billion ballasts
- About half were manufactured prior to 1979 and contain PCBs
- One ounce of virtually pure PCBs per ballast
- Total quantity of PCBs in buildings in the US: 25 million pounds PCBs

This quantity is staggering. The problem is exacerbated because the disposal of PCB ballasts is usually unregulated under Federal law.

IV. FEDERAL REGULATIONS CONCERNING THE DISPOSAL OF PCB BALLASTS

There are two primary Federal laws which affect the disposal of PCB ballasts:

- Toxic Substances Control Act (TSCA)
- Superfund Law (Comprehensive Environmental Response, Compensation and Liability Act or "CERCLA")

Unfortunately, these two laws are conflicting and confusing. TSCA states that it is permissible to dispose of non-leaking ballasts in a sanitary landfill, while Superfund prohibits the disposal of more than one pound of PCBs (16 or more ballasts) in a sanitary landfill. Prudent corporate policy would follow the more stringent of the two regulations.

Each of these laws is discussed in more detail below. The other Federal regulations which refer to PCBs are discussed toward the end of this section.

A. Toxic Substances Control Act

TSCA does not regulate the disposal of non-leaking, intact "Small Capacitors", defined as containing less than 3 pounds of PCB dielectric fluid. Lighting ballasts contain a Small PCB Capacitor and as a result are unregulated for disposal.

The exceptions to this rule are as follows:

- if the Small Capacitor or ballast is leaking PCBs;
- if the ballast is owned by a company which, at any time in the past, manufactured equipment which contained PCBs;
- if the asphalt potting material inside the ballast contains PCBs in excess of 50 ppm.

If a ballast meets any of these criteria, then it must be disposed of by incineration in a TSCA-approved facility or in a chemical waste landfill (after the PCB liquids are drained). The latter is usually impractical for a light ballast. All ballast manufacturers are required to incinerate their ballasts.

Even though it is legal to dispose of ballasts in a sanitary landfill, the EPA encourages disposers of large quantities of PCB ballasts to treat them as if they were a regulated waste. The preamble to the May 31, 1979 PCB Final Rule in the Code of Federal Regulations (40 CFR Part 761), makes it clear that the intent of the Small Capacitor disposal rule was intended for "random disposal" in landfills by "householders and other *infrequent* disposers". In the case of large quantities of small PCB capacitors by commercial and industrial activities, which "pose a somewhat larger environmental risk", the EPA strongly encourages the voluntary collection and disposal of small PCB capacitors in chemical waste landfills or high-temperature incinerators.

B. Superfund Laws

Under the Superfund laws, PCBs are specifically listed as a hazardous substance. The "release" or "threat of release" of more than one pound of PCBs into the environment triggers a Superfund notification and cleanup requirement.

Since 16 ballasts collectively contain roughly one pound of PCBs, a conservative interpretation is that the disposal of 16 or more ballasts in a landfill triggers a Superfund action. Any sanitary or chemical waste landfill could become a Superfund site.

EPA Region VII in Kansas City issued a memo on July 18, 1991 which concludes that the disposal of 8 or more ballasts in a landfill is subject to the reporting requirement under the Superfund laws. They further state that "reporting places the firm or individual on a list of potential Primary Responsible Parties in any subsequent Superfund cleanup of the landfill. Failure to report places the individual or firm in violation of CERCLA 103" (see Appendix C).

While landfilling has the lowest initial cost, it places those responsible at great risk by creating a large potential cleanup liability. Landfilling in either sanitary or chemical waste facilities has the potential of creating large Superfund-type cleanup costs in the future.

C. Other Federal Laws Affecting Ballast Disposal

The other relevant Federal regulations include the following:

1. Department of Transportation (DOT) regulations - CERCLA requires that DOT list and regulate the transportation of all hazardous materials, including PCBs.
2. Occupational Safety and Health Administration (OSHA) - regulates worker safety and exposure regarding PCBs.
3. Resource Conservation and Recovery Act (RCRA) - regulates hazardous wastes (which fail the Toxic Characteristic Leaching Procedure (TCLP) test) *and* which contain more than 50 ppm PCBs. Wastes are not regulated under RCRA if they contain PCBs and are not otherwise hazardous.

Information on the above is provided in Sections VIII, IX and X.

V. STATE REGULATIONS CONCERNING BALLAST DISPOSAL

In addition to the Federal laws, there are state laws which regulate PCBs. The following 12 states classify PCB ballasts as hazardous, special, regulated or industrial waste, and ban large quantities of PCB ballasts from sanitary or municipal landfills:

<u>Northeast</u>	<u>Middle Atlantic</u>	<u>Midwest</u>	<u>West</u>
Connecticut*	Maryland*	Minnesota	Arkansas
Maine		Wisconsin*	California*
Massachusetts*			Nevada
Rhode Island*			Texas
Vermont			

In these 12 states, PCB ballasts must be disposed of according to that state's hazardous or special waste regulations. The states marked with an asterisk (*) have special procedures for handling PCB ballasts.

In the following 18 additional states (including the District of Columbia), there may be more stringent requirements for disposal. Some require prior approval before landfilling or regulate only leaking ballasts; others have policies which recommend, but do not necessarily require, incineration or chemical waste landfilling for large quantities of ballasts.

<u>Northeast</u>	<u>Southeast</u>	<u>Midwest</u>	<u>West</u>
District of Columbia	Alabama	Indiana	Arizona
New Hampshire	Florida	Iowa	Idaho
New Jersey	Kentucky	Ohio	Kansas
Pennsylvania	S. Carolina		Utah
Virginia	Tennessee		Washington

Some states have special draft regulations or policies pending including Alabama, Pennsylvania and New Hampshire.

Also, EPA Regions X (Seattle), VIII (Denver) and VII (Kansas City) have special policies for PCB ballast disposal.

We recommend that you contact your state environmental agency for specific requirements.

VI. HOW TO IDENTIFY PCB BALLASTS

Nearly all ballasts manufactured prior to 1979 contain PCBs. All PCB ballasts manufactured after July 1, 1978 that do not contain PCBs are required to be clearly marked "No PCBs".

Since most ballasts also contain a date stamp in the metal base plate, we recommend looking for both the "No PCB" label and checking the date stamp to ensure that it was made after 1979 before classifying the ballast as a non-PCB ballast.

Unmarked ballasts or ballasts without a date code should be classified as PCB ballasts.

We recommend sorting PCB and non-PCB ballasts because there is a dramatic difference in the disposal or recycling costs.

Please refer to Appendices A and B for information on individual ballast manufacturers' date codes and when they ceased manufacturing PCB ballasts.

VII. HOW TO IDENTIFY LEAKERS

"Leakers" (leaking ballasts or capacitors) are items in which PCBs have escaped from the interior onto the exterior surface.

PCBs are a clear or yellow oil, and most PCB leaks are visible. If you see oil on the surface of a ballast, you have a leaker.

Many people also classify ballasts with leaking asphalt as leakers. Unless the asphalt potting material is contaminated with PCBs, it is not a leaker. However, it may be advisable to err on the conservative side because the asphalt potting material in ballasts is often contaminated.

FulCircle has observed a leak rate of approximately one per thousand. The next section describes how to handle leakers.

VIII. TIPS ON BALLAST REMOVAL

Electrical contractors are generally very experienced with ballast replacement, so we will only highlight a few safety and efficiency tips as they specifically pertain to PCB ballasts.

- Wear chemically resistant (e.g., rubber) gloves when handling the ballast, as the exterior surface may contain PCBs.
- When handling leakers, a chemically resistant suit (e.g., Tyvek®) and a face mask is also recommended to reduce exposure to PCBs. Dispose of protective equipment as contaminated PCB waste along with the PCB ballasts.
- If there has been a fire in or around the light fixture, assume it is a leaking ballast and handle it with care.
- All leaking ballasts should be placed in a plastic bag. The bag should be immediately placed in steel drums with the other ballasts.
- Don't throw the used ballasts around because this could cause leaks and greatly increase your disposal cost. Treat them with care as if they were new ballasts.
- Clip off the connecting wires on the ballast as close as possible to the PCB ballast. Remember -- ballast disposal services are frequently charged by the pound.
- Do not bend back the ends of the ballasts.
- If the ballast has been burning or smoking, cut the power off at the panel and immediately ventilate and vacate the room. Allow the ballast to cool for 20-30 minutes before replacing.

IX. TIPS ON PACKING

After the ballasts have been removed, they should be taken to the shipping/receiving area, packed in steel drums, and labelled. Most companies use 55-gallon steel drums for packing ballasts, but other DOT containers, including hazardous materials boxes and tippler bins, are acceptable.

Moving Ballasts to Shipping/Receiving Area

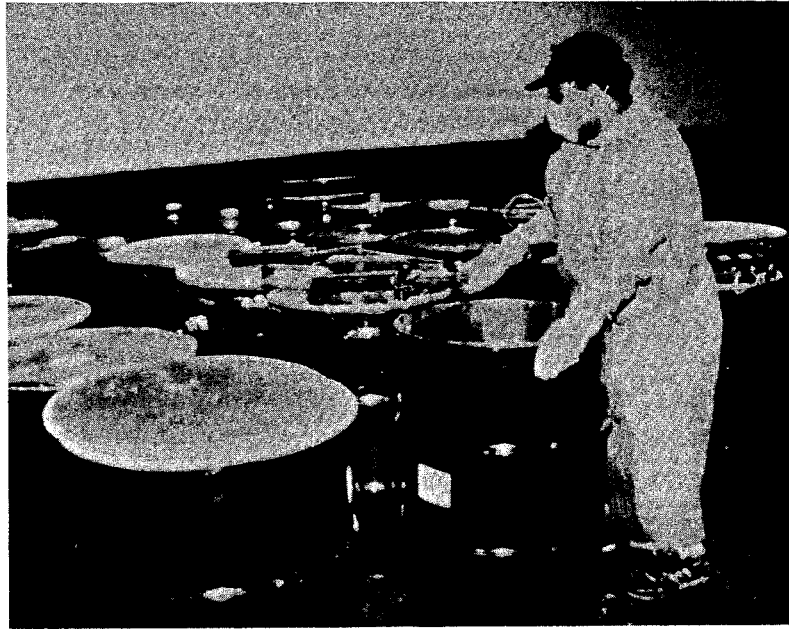
- When moving ballasts within the building, cardboard boxes can be used. Use the same large box in which the new ballasts were packaged.
- Ballasts are heavy, so don't try to load too many into a box (12 F40 ballasts weigh 40-50 pounds).
- Separate leakers as they are removed, and place them in double plastic bags and then into a drum with the other non-leaking ballasts.
- As soon as possible, pack the ballasts into steel drums. Don't let them sit in cardboard boxes too long, just in case there is an unnoticed leaker which could leak PCBs onto your floor.

Sources of Steel Drums



- Steel drums can be obtained from local suppliers. Look in your local Yellow Pages under "Barrels" or "Drums".
- When purchasing drums, specify 17C or 17H 55-gallon, open head, steel drums for transporting hazardous materials.
- New drums need not be purchased. Used or reconditioned drums are suitable if they have been properly cleaned, tested and labelled pursuant to DOT regulations. The cost is \$20-\$40 per barrel in metropolitan areas, plus delivery charges.

Packing Ballasts into Drums

- Don't crush the ballasts because this could cause leaks.



DRUMS OF BALLASTS AWAITING PICKUP.

<p>Class B Type 1 Outdoor High Power Factor Sound Rated B Lead-Lag Ballast Min. Starting Temp: 0°F</p> <p>  704G Listed Ballast</p> <p>Made in U.S.A.</p>	<p>CAT. NO. S-275-S-TP FOR TWO 75W 96" T12, 84" T12, 57W 72" T12, 50W 64" T12, or 48W 60" T12 SLIMLINE LAMPS FOR USE IN FIXED EQUIPMENT ONLY</p> <p>No PCB's</p>
---	--

*NOTE " NO PCB's" MARKING ON SAMPLE
MANUFACTURER'S LABEL.*

- A typical drum will hold 150-250 F40 ballasts from 4-foot light fixtures or 60-100 F96 ballasts from 8-foot light fixtures. We have seen as many as 300 F40 ballasts fit into a drum, but we don't recommend putting more than 250 ballasts into a drum.
- A drum filled with ballasts will weigh 600-1000 pounds with 700-800 pounds being an average. Drum weight should not exceed 1000 pounds for safety purposes.
- Do not use any drums larger than 55 gallons in size.
- Some companies only fill half the drum because it is heavy to move manually and requires special equipment.
- If you plan to landfill the non-leaking ballasts, put some absorbent material (kitty litter or sawdust) in the bottom, e.g., 6-12 inches, plus absorbent material in the interstitial areas between ballasts. This is required by Federal law (TSCA).
- If you are sending the ballasts for recycling, do not use absorbent material.
- Don't use plastic liners inside the drums. Do not put the drum inside an "Overpack" drum.

X. LABELLING, MANIFESTING AND TRANSPORTING BALLASTS

This subject is very complex, open to interpretation, and state-specific. We strongly recommend that you check with your local environmental agency to determine your state's requirements.

Under Federal law (TSCA), all regulated "PCB Waste" must be labelled, manifested, transported and disposed of according to the Federal regulations (40 CFR 761). PCB Waste includes:

- leaking ballasts or leaking capacitors
- ballasts owned by a manufacturer of equipment which used PCBs at any time in the past
- ballasts containing asphalt potting material with greater than

- ballasts which fail EPA's TCLP test pursuant to RCRA (40 CFR 261)

In addition to Federal law, in those 12 states which classify PCB ballasts as hazardous, regulated, special or industrial waste, there are usually specific requirements for labelling, manifesting, transportation and disposal. In the 18 additional states which have other requirements, there may be other procedures which must be followed. Please check with your individual state.

Labelling

- All barrels of ballasts from states which regulate ballasts as hazardous waste should bear the yellow "Caution Contains PCBs" label. This is a label is available from most label companies.
- All barrels of non-leaking and leaking ballasts should contain a label with the following information:
 - the name and address of the generator; the date the ballasts were first removed
 - a description of the material (e.g., Discarded Lighting Ballasts with Small PCB Capacitors)
 - EPA regulatory status: disposal requirements pursuant to 40 CFR 761.60 (b)(2)(ii)

Manifesting

- We recommend using a specially designed manifest for ballasts or the Federal Uniform Hazardous Waste Manifest, except in those states which require the state Hazardous Waste Manifest.
- In those 12 states which classify PCB ballasts as hazardous, the use of the state's hazardous waste manifest form is generally required, with some exceptions; such as California, Massachusetts, Connecticut and Rhode Island. California issued new ballast disposal regulations in May, 1993 which exempt generators from the Extremely Hazardous Waste Permit requirements and exempt generators with two drums of ballast or less from using a hazardous waste transporter.

Use this label for states which regulate PCB ballasts as a hazardous waste.

CAUTION
CONTAINS
PCBs
(Polychlorinated Biphenyls)

A toxic environmental contaminant requiring special handling and disposal in accordance with U.S. Environmental Protection Agency Regulations 40 CFR 761—For Disposal Information contact the nearest U.S. E.P.A. Office.

In case of accident or spill, call toll free the U.S. Coast Guard National Response Center:
800:424-8802

Also Contact _____
Tel. No. _____

PCB Printed by LABELMASTER, Div. of AMERICAN LABELMARK CO., CHICAGO, IL 60646 (800) 621-6806

UNIFORM HAZARDOUS WASTE MANIFEST		1. Generator's US EPA ID No. 4.O.C.F.R.P.A.R.T.7.6.1	Manifest Document No. 0.0.0.1.4	2. Page 1 of 6	Information in the shaded areas is not required by Federal law.	
3. Generator's Name and Mailing Address ABC Facility Owner 123 Energy Street Anytown, USA 99999				A. State Manifest Document Number		
4. Generator's Phone (212) 580-5550				B. State Generator's ID		
5. Transporter 1 Company Name XYZ Trucking Company		6. US EPA ID Number N.Y.D.9.7.78.2.2.1.1.1		C. State Transporter's ID		
7. Transporter 2 Company Name N/A		8. US EPA ID Number		D. Transporter's Phone 212-267-4394		
9. Designated Facility Name and Site Address FullCircle Ballast Recyclers 509 Manida Street Bronx, NY 10474		10. US EPA ID Number N.Y.D.9.8.6.9.8.0.2.3.3		E. State Transporter's ID		
				F. Transporter's Phone		
				G. State Facility's ID NYN 200000044		
				H. Facility's Phone 212-328-4667		
11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)		12. Containers		13. Total Quantity		14. Unit Wt/Vol
a. HM		No. Type				I. Waste No.
X RQ Polychlorinated Biphenyls, 9, UN2315, PG II (EPA Waste Code PCB-2)(ERG-31)		2.5 D.M.		9.0.0.0		K
b.						
c.						
d.						
J. Additional Descriptions for Materials Listed Above old DOT description: RQ, Hazardous Substance, N.O.S. (Polychlorinated Biphenyls) NA 9188				K. Handling Codes for Wastes Listed Above		
15. Special Handling Instructions and Additional Information Used fluorescent light ballasts contain non-leaking small capacitors which are not regulated for disposal pursuant to 40 CFR 761.60(b)(2)(ii). Ballasts are being shipped for capacitor removal, metals reclamation and recycling.						
16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national governmental regulations. If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.						
Printed/Typed Name John Smith		Signature John Smith		Month Day Year 10.11.59.3		
17. Transporter 1 Acknowledgement of Receipt of Materials						
Printed/Typed Name Robert Jones		Signature Robert Jones		Month Day Year 10.11.59.3		
18. Transporter 2 Acknowledgement of Receipt of Materials						
Printed/Typed Name N/A		Signature		Month Day Year		
19. Discrepancy Indication Space						
20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19. FullCircle Ballast Recyclers						
Printed/Typed Name John Borrero		Signature John Borrero		Month Day Year 10.11.59.3		

COPY

Storage

- Storage of non-leaking ballasts is not regulated, but it is recommended that they be moved off site as soon as feasible due to the danger of a leak or fire.
- Since PCB incinerators and chemical waste landfills must destroy or dispose of regulated waste, such as leakers, within 1 year of the date the equipment was removed from service, customers who store leaking PCB ballasts for over 6 months may pay a significant premium to dispose of these items.
- Under TSCA, generators are allowed to store leaking ballasts up to 30 days unless they meet the PCB storage requirements outlined in the TSCA regulations. A Notice of PCB Activity (EPA Form 7710-53) must then be filed for the EPA.
- If a generator stores fewer than 10 drums of leaking ballasts, then no EPA approval is required but a Notice of PCB Activity must be filed with the EPA. The generator must meet the storage requirements of the TSCA regulations (40 CFR 761.65). If a generator stores more than 10 drums of leaking ballasts or of any PCB waste, then EPA approval as a Commercial Storer is required.
- Spills of more than 1 pound of PCBs must be reported to the National Response Center (1-800-424-8802) and cleaned up immediately.

Transporting Ballasts (Each state has its own requirements.)

- The 12 states which classify PCB ballasts as hazardous waste require a hazardous waste transporter, with some exceptions. Other states may also have additional requirements or may also require a hazardous waste transporter.
- A hazardous waste transporter must be licensed with the states in which it picks up and disposes of hazardous or regulated waste. Each state has many requirements for the types of trucks, maintenance, placarding, training of drivers, safety and contingency plans, financial assurances, insurance, etc.

- Lists of hazardous waste transporters are available from your state environmental agency.
- Under Federal law (TSCA), a transporter which hauls PCB waste must file a Notification of PCB Activity with EPA.

XI. DISPOSAL OPTIONS

There are at least 7 disposal options.

- A. Leaving the disconnected PCB ballast in the ceiling (not recommended)
- B. Sanitary landfill (not recommended)
- C. Municipal incinerator or resource recovery facility (not recommended)
- D. Chemical waste landfill (recommended with reservations)
- *E. Whole ballast incineration in PCB incinerator (recommended)
- *F. Capacitor removal/incineration and recycling (highly recommended)
- G. Chopping open the ballast (not recommended)

*Only options E and F can be fully recommended.

A. Leaving the PCB Ballast in the Ceiling - Not Recommended

This practice may be inexpensive in the short term, but it is really only deferring the cost of removal and disposal. It is dangerous because, in the event of a building fire, the PCBs in the ballast may volatilize and contaminate large portions of the building.

If the building is ever sold or mortgaged, environmental auditors often require the removal of PCB ballasts along with other hazardous materials, e.g., asbestos or lead paint. Hiring a contractor to first remove ballasts will be much more expensive than removing them while they are doing a lighting upgrade.

Utilities offering rebates do not favor this option since it is too easy to re-connect the old, inefficient ballast when the new ballast fails. This would defeat the purpose of their original rebate.

B. Sanitary Landfills - Not Recommended

Even though landfilling is low in short-term costs, it is not recommended for environmental reasons and has potentially large contingent liabilities. It is illegal to dispose of PCB ballasts in a sanitary landfill if the asphalt potting material has in excess of 50 ppm PCBs, which is after the case.

Sanitary landfills are not designed to handle liquid PCBs in steel cans which will eventually corrode or break, causing PCB leaks. This could lead to future Superfund liability for you or your company.

As discussed earlier, some regulators consider the disposal of 16 or more PCB ballasts (or 8 ballasts in EPA Region VII) a Reportable Event under the Superfund laws.

Disposal of large quantities of PCB ballasts in sanitary landfills is not permitted in the 12 states which classify PCB ballasts as hazardous waste, and may not be allowed in the other 18 states which may have special requirements for PCB ballasts.

Disposal of leaking ballasts is not allowed in sanitary landfills under Federal law (TSCA).

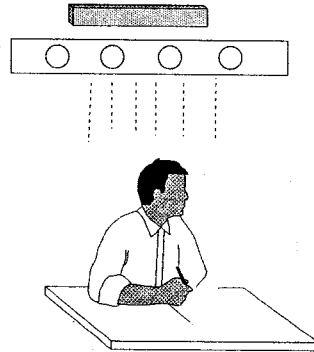
C. Municipal Incinerator or Resource Recovery Facilities - Not Recommended

These facilities are not designed to handle PCB ballasts, which are over 80% metal. Because of the solid metal mass and the fact that the PCBs are contained inside steel cans, a municipal incinerator cannot destroy all of the PCBs. It is likely that the ash will contain PCBs and unburned metal parts. In addition, many incinerators burn at lower temperatures or do not have the specialized control and monitoring systems required of PCB incinerators.

In a PCB incinerator, the ballast or capacitor is shredded prior to incineration. During incineration, combustion conditions are carefully monitored to ensure a 99.9999% (six nines criteria) destruction of the PCBs, and the ash is carefully tested. A municipal incinerator or modern resource recovery facility is not specifically designed to destroy PCBs or handle large metal objects.

CURRENT PCB DISPOSAL OPTIONS

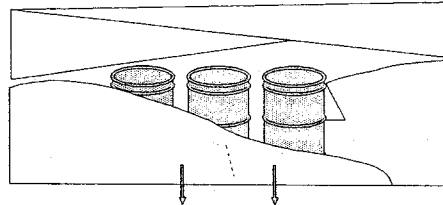
Option A. Leave Disconnected PCB Ballasts in Ceiling



Disadvantages:

Possibility of PCB fires
Future disposal liability

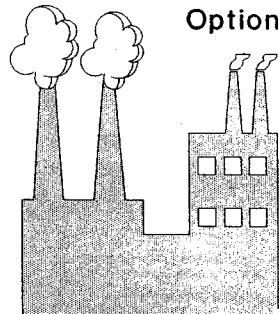
Option B: Landfilling



Disadvantages:

Possible contamination
of groundwater and soil
Potential Superfund liability

Option C: Whole Ballast Incineration



Disadvantages:

Air pollution, hazardous ash
high fuel usage, high cost
Wasteful of valuable
commodities

D. Chemical Waste Landfills - Acceptable but Not Recommended

Many PCB ballasts are disposed of in this manner because of its relatively low cost (\$1-\$2 per F40 ballast from a 4-foot fixture). However, secure chemical waste landfills are not designed to handle PCB liquids and materials with over 500 ppm PCBs, and a PCB ballast has both. PCB ballasts contain PCB liquids of virtually pure PCBs (e.g., 700,000 to 1,000,000 ppm PCBs) and pose risks to chemical landfills.

The Superfund laws still apply even if this option is permissible under TSCA.

Leaking ballasts and capacitors are regulated PCB Articles containing over 500 ppm of PCBs and therefore cannot be disposed of in a chemical waste landfill. They must be incinerated.

Many chemical waste landfill operators require that PCB liquids be drained prior to landfilling. Draining the ballasts or capacitors is not practical and some chemical waste landfills will not accept ballasts.

If you do decide to landfill, put absorbent material at the bottom of the drum and in the interstitial areas between the ballasts.

The EPA has a list of chemically secure landfills which can be obtained by calling the TSCA Hotline (1-800-835-6700).

E. Whole Ballast Incineration at a PCB Incinerator - Recommended

This option involves sending the entire ballast to a permitted, PCB solids incinerator. The only five facilities which can accept PCB ballasts for incineration are:

Rollins Environmental Services
Deer Park, Texas
(713) 930-2334

Aptus Environmental Services
Coffeyville, Kansas
1-800-292-2558

and

Chemical Waste Management
Port Arthur, Texas
(409) 736-2821

Aragonite, Utah
1-800-531-4200

Clive Incineration Facility - USPCI
Lakepoint, Utah
(801) 595-4400

The advantage of this option is the permanent destruction of PCBs by incineration. The risk of future Superfund liabilities is minimal.

The disadvantage is the high expense, e.g., \$5-8 per F40 ballast from a 4-foot fixture. Incineration also generates a great deal of ash and air pollution because the ballast is 80% metal and is difficult to burn. It is also wasteful of valuable metals which can be recycled.

F. PCB Removal, Incineration and Recycling - Highly Recommended

The best option, in our opinion, is the removal of the 4-ounce capacitor and asphalt potting material from the 3.5-pound ballast, incinerating only the PCB-contaminated material, and recycling the remaining uncontaminated metals (copper, steel and aluminum). Over 80% of the ballast by weight is recoverable.

This option ensures permanent destruction of the PCBs by incineration and is 30-50% lower in cost than whole ballast incineration. It also generates less air pollution and ash, uses less fuel, and reclaims valuable commodities.

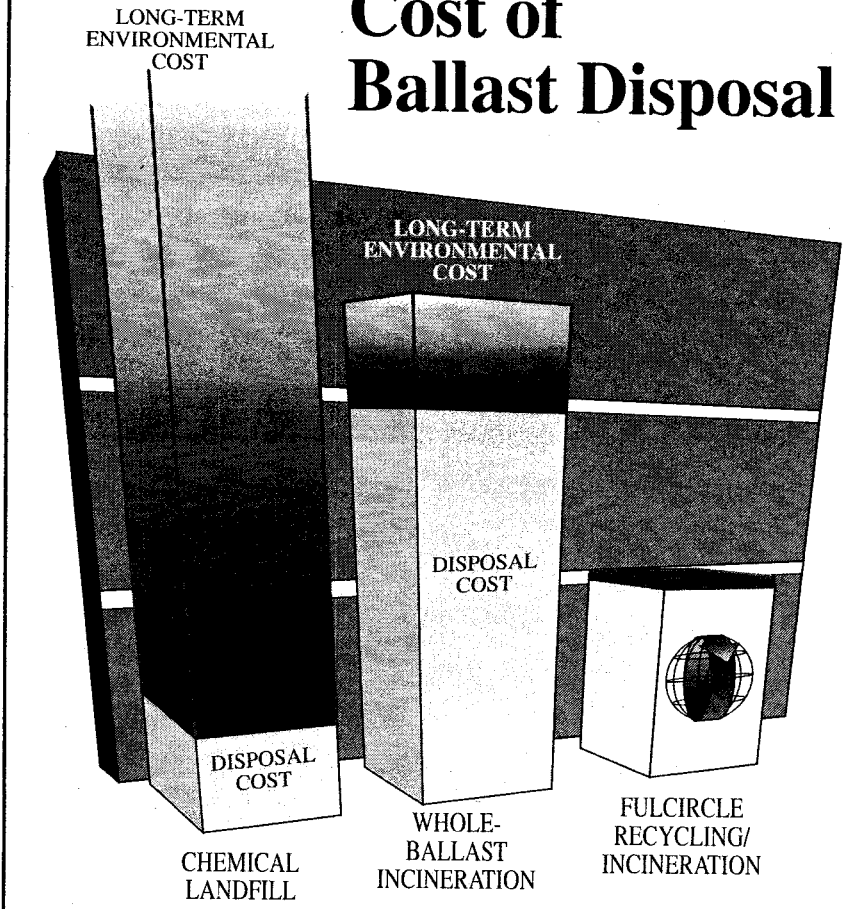
G. Cutting Open the Ballast - Not Recommended

Some companies saw the ballast open and dispose of the portion containing the capacitor as hazardous waste (incineration or chemical waste landfill). The other section is sent to a sanitary landfill.

Chopping open a ballast with a saw or guillotine without proper safety devices is a dangerous practice and can result in a PCB spill. A rupture of the capacitor could expose workers to PCBs and result in a release of PCBs into the air or onto the ground. In addition, sawing the ballast releases PCB-contaminated asphalt dust into the air which spreads contaminants and is very dangerous to the workers.

Also, this practice does not deal with the problem of PCB-contaminated asphalt. This must be treated as hazardous waste if the asphalt contains over 50 ppm PCBs, as is usually the case.

Cost of Ballast Disposal



ECONOMIC EVALUATION OF DISPOSAL OPTIONS

<u>Option</u>	<u>Disposal Cost</u>	<u>Environmental Cost</u>	<u>Overall</u>
A. Leaving in ceiling	deferred	high	not recommended
B. Sanitary landfill	10-20¢ per ballast	high	not recommended
C. Municipal solid waste incineration	10-20¢ per ballast	high	not recommended
D. Chemical waste landfill	\$1-2 per ballast	medium	acceptable, but not the best option
E. Whole ballast incineration	\$5-8 per ballast	low	recommended
F. PCB removal incineration and recycling	\$3-5 per ballast	very low	strongly recommended; best option
G. Chop shop	\$3-5 per ballast	high	not recommended; dangerous

Note: These disposal costs are for an F40 ballast from a 4-foot fixture and for quantities of 1000 or more ballasts in major metropolitan areas. Disposal costs for an F96 ballast from an 8-foot fixture are typically 2-3 times greater because of the greater weight. High Output (HO) and Very High Output (VHO) ballasts are even heavier and cost more to dispose of.

XII. WHY RECYCLE?

We believe that capacitor removal/incineration and recycling of the non-contaminated components is the best disposal option of the 7 discussed in the previous section because:

- Incineration of the PCB components results in the permanent destruction of PCBs.
- It is lower in cost (30-50% lower) than whole ballast incineration, and does not create a potential future cleanup cost as is the case with landfilling or leaving the ballasts in the ceiling.
- It conserves valuable resources. Reclaiming copper, steel and aluminum displaces the use of virgin materials, saving energy and natural resources.
- It saves landfill space. Whether you are planning to landfill the ballast or incinerate it whole, re-use of the metal keeps it out of the landfill.
- Compared to whole ballast incineration, recycling generates less air pollution and ash. In addition, it uses much less fuel to burn $\frac{1}{2}$ pound of PCB material than a 3.5-pound ballast, which is 80% metal.

Recycling is the right thing to do. Some governmental entities have recycling mandates as goals. Recycling ballasts helps meet these goals.

XIII. NON-PCB BALLASTS

Non-PCB ballasts (made after 1979) should be recycled, too. What is the environmental concern about a non-PCB ballast?

Most non-PCB ballast made until 1984 contain a wet capacitor, and some made after this date still contain a wet capacitor. In these wet capacitors, the replacement dielectric fluid for PCBs is mineral oil and solvents. Some of the solvents are hazardous, e.g., trichlorobenzene or diethylhexyl phthalate (DEHP). Under the Resource Conservation Recovery Act (RCRA), it is not permissible to discard these materials in a sanitary landfill.

Depending on the quantity, it generally costs \$1 to \$2 per ballast to recycle a non-PCB ballast.

Recycling a non-PCB ballast involves the following:

- capacitor removal and disposal as a hazardous waste
- recycling the remaining components - asphalt, copper, steel and aluminum.

Certain states also currently regulate waste oil from electrical equipment as hazardous or special waste and ban it from their sanitary landfills. Please check with your state agency.

XIV. HOW TO SELECT A DISPOSAL/RECYCLING VENDOR

The short answer is: Very Carefully! Remember - if the vendor contaminates the environment, you may be responsible for cleaning up his mess!

Please consider the following checklist when selecting a company which removes the PCB capacitor from a ballast and recycles the remaining material. This checklist is not intended for selecting a PCB incinerator or a landfill.

Permits and Regulations

1. Is the facility a Commercial Storer under EPA's TSCA regulations? Does it have the necessary state and local permits?
2. Check with local, state and Federal environmental agencies for information on past violations. Is the company viewed favorably by its regulators?

Safety Precautions

1. Is the facility a chop shop? How does it remove the capacitor? Does it use a saw or guillotine without proper safety precautions?
2. How does the facility remove the asphalt potting material? Are they aware that it is often contaminated with PCBs? Do they burn it off? How do they ensure that the metals are clean of contaminated asphalt?

3. Does the facility have \$5 million of pollution liability insurance (or environmental impairment liability coverage)?
4. How does the company test for PCB contamination? Does the company have an in-house lab or contract with an outside lab? Does it follow EPA method 8080 for PCB testing?
5. Does the facility have the following planning documents?
 - Closure Plan, funded with a bond, trust fund or escrow account
 - Hazard Communication Plan
 - Spill Prevention and Countermeasure (Contingency) Plan
 - Quality Assurance/Quality Control (QA/QC) Program
 - Worker Safety Training Program
6. Is proper protective equipment available and used by the employees?

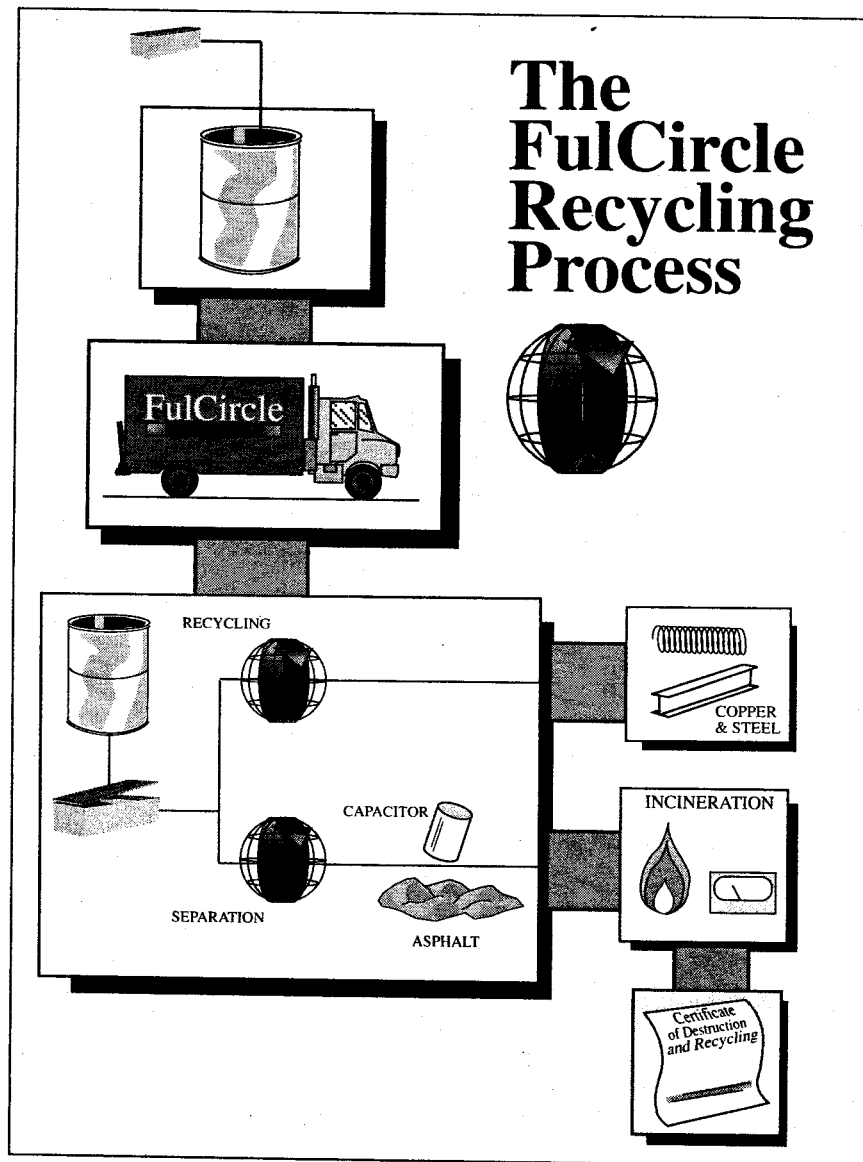
Disposal/Recycling Outlets

1. What is the recycler's reputation with its PCB incineration company? How much material has been shipped there?
2. Does the facility have contracts with foundries or mills for copper, steel and aluminum? Has the company completed an environmental audit of these facilities?
3. How is the metal cleaned of asphalt before it is reclaimed?
4. How does the facility dispose of its asphalt?

Facility Cleanup

1. What type of monitoring is conducted to prevent and detect PCB contamination?

The FulCircle Recycling Process



2. How often are wipe tests performed on facility floors?
3. How often are the floors cleaned? How are tools cleaned? What is done with the sweepings or wash water?

Experience

1. How many Fortune 500 companies are on the recycler's customer list?
2. What volume of ballasts has the recycler processed?

XV. ABOUT FULCIRCLE

FulCircle is a fully licensed contractor permitted to dispose of and recycle PCB and non-PCB ballasts. The company has a 13,500-foot² facility in the Hunts Point area of the Bronx in New York City.

In FulCircle's process, the ballast is disassembled carefully. The capacitor is removed, packaged in steel drums, and shipped off-site for destruction by incineration. Contaminated asphalt is incinerated and the metals are cleaned and tested before being recycled. The clean metals are sent directly for smelting and reuse in new metal products.

For nationwide service or a quotation on handling your ballasts, FulCircle can be reached at:

Boston	Tel: (617) 876-2229
Baltimore	Tel: (717) 932-1022
Detroit	Tel: (313) 651-6589
San Francisco	Tel: (916) 649-9194
Los Angeles	Tel: (714) 921-0137

APPENDIX A: Identifying Fluorescent Light Ballasts Which Contain PCBs

Advance Transformer

Stopped using PCBs in 1978-1979.

Ballasts stamped with a date earlier than 1978 should be assumed to contain PCBs.

Ballasts which do not contain PCBs will state on the label "No PCB".

General Electric (which sold its ballast business to Valmont Electric in the early 1980's)

Used in all high power factor (HDF) ballasts made between 1953-1979.

Date of manufacture is stamped on ballast using a letter date code (see next page).

Changed from PCB to non-PCB during 1977-1978.

HDF ballasts made during 1977-1978 which do not contain PCBs will have a "W" added after the catalog number.

All ballasts made after 1979 will state "No PCB" on label.

Jefferson Electric (now owned by MagneTek, Inc.)

Stopped using PCBs during 1977-1979.

Non-PCB ballasts made during 1977-1979 will be marked with a green dot and possibly marked "No PCB" on label.

Ballasts stamped with a date prior to 1977 contain PCBs.

Ballasts made after 1979 will be marked "No PCB" on label.

Universal (now owned by MagneTek, Inc.)

Ballasts made prior to January, 1979 contain PCBs.

Ballasts made starting January, 1979 will state "No PCB" on label.

Source: Wisconsin Department of Natural Resources, Advance Transformer, General Electric and MagneTek.

**APPENDIX B: SPECIFICATIONS FOR PCB BALLAST DISPOSAL
BY INCINERATION AND RECYCLING**

What is "proper disposal"? Federal and State regulations are both lax and confusing and can not be relied upon to answer this question.

Building owners, architects and engineers should be concerned about proper disposal because of future Superfund clean-up liability. This spec. is designed to protect customers from improper disposal.

This specification is also designed to create a level playing field among electrical contractors bidding on lighting retrofit projects.

The following is a short form, standard clause for inclusion in contracts between building owners and electrical contractors involved with a lighting retrofit project. It can also be used by utilities offering rebates for lighting improvements.

All PCB-contaminated materials shall be incinerated pursuant to the U.S. Environmental Protection Agency Final Rules 40 CFR 761.70. All uncontaminated (less than 50 ppm PCBs) metal components of the ballast shall be recycled, recovered or reclaimed as per FulCircle Ballast Recyclers or equivalent. Contractor shall provide a manifest and certificate of destruction pursuant to 40 CFR 761 Subpart K. Contractor disposing of PCB ballasts shall have at least \$5 million of pollution liability insurance and a fully funded closure plan pursuant to 40 CFR 761.65 (c) (7) (ii), and a Hazard Communication Program pursuant to 29 CFR 1910.1200.

APPENDIX C: Correspondence With Various Environmental
Regulators

U.S. EPA - Region VII

U.S. EPA - Green Lights Program - Region X



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VII
726 MINNESOTA AVENUE
KANSAS CITY, KANSAS 66101

JUL 18 1991

MEMORANDUM

SUBJECT: Recently Acquired Information Concerning the
Landfilling of Small Capacitors

FROM: Robert W. Jackson
Chief, Toxic Substances Control Section

TO: TSCS Staff

Section 102 of CERCLA (40 C.F.R. 302.4) lists reportable quantities of various substances when they are landfilled.

The reportable quantity for PCBs is one pound.

Each fluorescent light ballast contains approximately one and one half ounces of pure PCBs; therefore, anyone disposing of eight or more light ballasts is subject to reporting requirements.

Reporting places the firm or individual on a list of potential Primary Responsible Parties in any subsequent Superfund clean-up of the landfill.

Failure to report places the individual or firm in violation of CERCLA 103.



United States
Environmental Protection
Agency

Region 10
1200 Sixth Avenue M/S: AT-083
Seattle WA 98101

Alaska
Idaho
Oregon
Washington

EPA

May 1991

Dear Green Lights Participant:

Re: DISPOSAL OF PCB-CONTAINING FLUORESCENT LIGHT BALLASTS

Most older fluorescent light ballasts have small capacitors which contain high concentrations of PCBs (polychlorinated biphenyls). Any ballast which was manufactured before 1978 and/or does not carry a "NO PCBs" sticker is suspect. EPA regulations do not require the removal of non-leaking, PCB-containing fluorescent light ballasts. However, when ballast removal occurs as part of a relamping or removal project—such as in the Green Lights Program—even non-leaking and intact PCB small capacitors should be disposed of in an EPA-approved chemical waste landfill or incinerator because of the large quantities of PCBs which may be involved in such a program.

Although there is a provision in the PCB Regulations to allow non-leaking PCB small capacitors to go to municipal solid waste landfills, this was based on the premise that persons other than capacitor manufacturers would dispose of only one or a few small capacitors at a time. Since one of the primary objectives of the PCB regulations is to get PCBs permanently out of the environment, the disposal of significant quantities of small capacitors at municipal landfills contravenes regulatory intent since such landfills are not designed to handle toxic materials. Large capacitors are always required to be sent for disposal to EPA-approved sites only, and, from a practical and environmental standpoint, there is no difference in the potential hazard from one large capacitor or a number of small capacitors which have the same total volume.

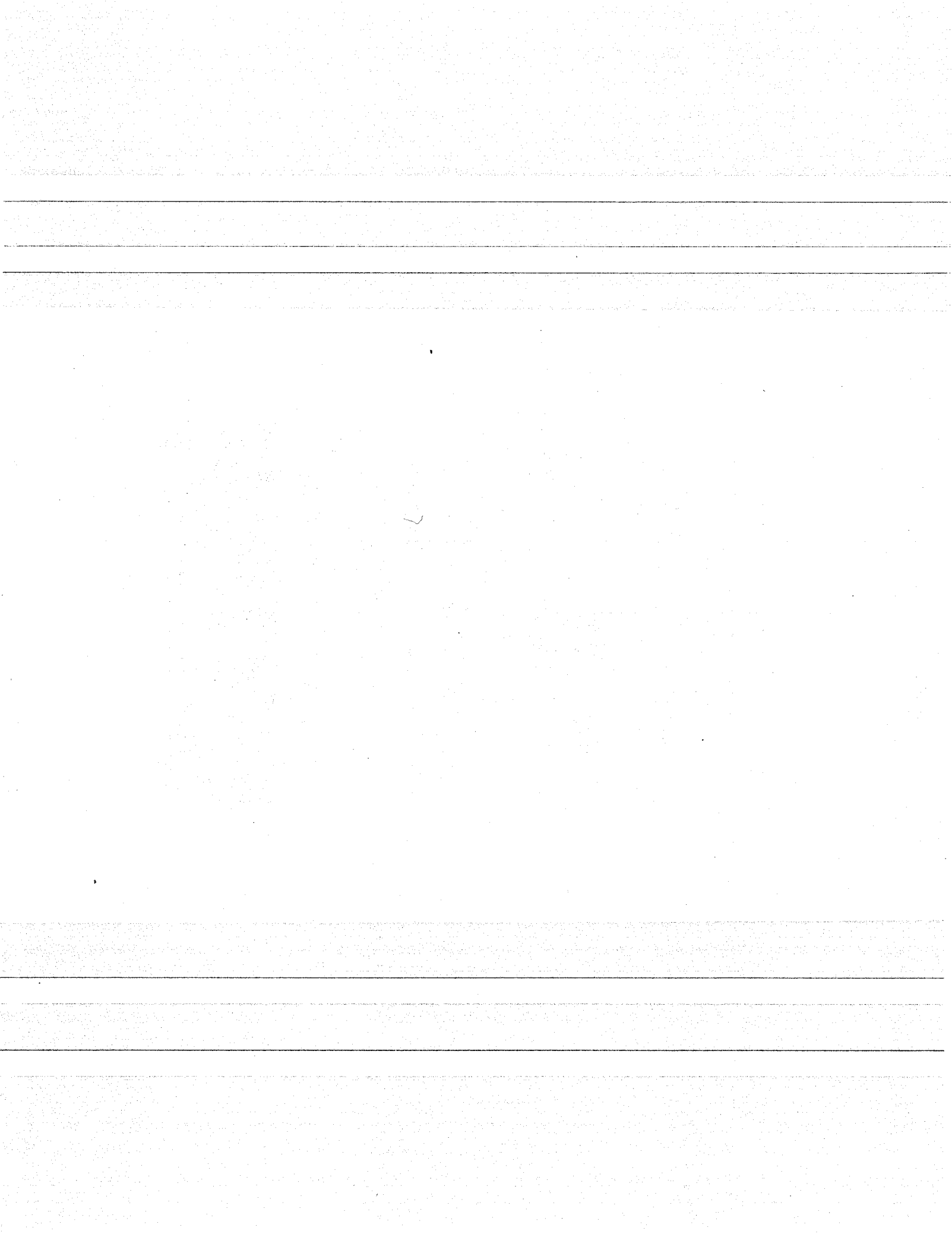
Region 10 EPA has an established policy which limits the number of ballasts/capacitors which a company or individual can dispose of at a municipal landfill: Anyone disposing of 5 or more small capacitors per year may not send them to a municipal landfill. Companies and organizations participating in the Green Lights Program are generally likely to exceed this limit and should, therefore, ensure that both leaking and non-leaking ballasts/capacitors be sent for disposal at EPA-approved chemical waste landfills or high temperature incinerators. Although proper disposal will somewhat increase the overall cost of a fluorescent relamping program, the additional increment of cost is unlikely to substantially affect project

(over)

economics or payback period. In addition, we should also point out that proper disposal allows companies to avoid the substantial economic liability that could otherwise result from having sent PCB capacitors to a municipal landfill that becomes a Superfund cleanup site in the future.

You should also be aware that, effective last year (February 5, 1990), leaking PCB small Capacitors must be manifested for disposal, and any transporter used to transport such leaking equipment from the generator to either a PCB storage or disposal facility must have formally notified EPA of its PCB transportation activity and received an EPA identification number pursuant to the Toxic Substances Control Act (TSCA). It would be prudent to confirm that any such firm with which you are doing business has properly notified EPA of its activity. In addition, when a leak has occurred, the PCB regulations require prompt and thorough clean up of contaminated surfaces and materials, and proper disposal. Information on general cleanup procedures for PCB-containing ballasts, as well as specific numerical cleanup standards, is available from the PCB Team at EPA Region 10; phone (206) 553-1270.

Attached is a list of all EPA-approved chemical waste landfills and incinerators in the U.S., and PCB brokers in the Pacific Northwest who can assist with proper disposal of PCB-Containing Ballasts.

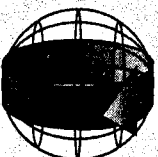


DISPOSING OF PCB BALLASTS?

Recycle with FulCircle!

- Eliminate potential Superfund liability associated with landfilling your PCB ballasts.
- Save 30% off the cost of whole ballast incineration.

FulCircle's recycling solution safely segregates and incinerates all PCBs, and recovers 90% of the ballast material for recycling. It's the environmentally responsible solution to one of your toughest disposal problems.



FulCircle
Ballast
Recyclers

Call 1-800-775-1516

New York Boston Baltimore
Detroit San Francisco Los Angeles