Safe Management of PCBs

Code of Practice

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Preface

This code of practice describes recommended practices for the handling, storage, transport and disposal of polychlorinated biphenyls (PCBs). It is intended for all holders of PCBs and collectors of PCBs, and for all those with statutory or other responsibilities in managing PCBs.

This code of practice gives practical information so those who manage PCBs can carry out their duties in accordance with legislative requirements.

This version replaces the previous Ministry of Health document last published in May 2008. It incorporates changes made to the management regime for PCBs arising from the Hazardous Substances (Storage and Disposal of Persistent Organic Pollutants) Amendment Gazette Notice 2016 (Amendment Notice). This document is not a Code of Practice made under section 78 of the Hazardous Substances and New Organisms Act 1996 (HSNO Act). However, in accordance with clause 5 of the Amendment Notice, Holders and Collectors of PCBs must have regard to it.

Definitions

Collector	Means the person, other than the holder, who collects, transports or stores persistent organic pollutants, for the purpose of disposal, in accordance with the Hazardous Substances (Storage and Disposal of Persistent Organic Pollutants) Notice 2004.
Holder	Means the person in possession of persistent organic pollutants on or after the date the Hazardous Substances (Storage and Disposal of Persistent Organic Pollutants) Notice 2004 comes into force prior to collection by a collector
Polychlorinated biphenyls	Includes any polychlorinated biphenyls that are present at a concentration of more than 50 parts per million, and includes any equipment or material that contains polychlorinated biphenyls at a concentration of more than 50 parts per million.
Persistent organic pollutant	(a) means a substance listed in Schedule 2A;[1] and (b) includes a substance containing 1 or more of those substances; and (ba) includes a manufactured article containing 1 or more of those substances; but (c) does not include a substance occurring in quantities as unintentional trace contaminants in products and articles

[1] Of the Hazardous Substances and New Organisms Act 1996.

1. Introduction

On 1 January 2017, provisions within the Hazardous Substances (Storage and Disposal of Persistent Organic Pollutants) Amendment Notice 2016 (Amendment Notice) came into effect.[2] These provisions had the effect of incorporating the regime for managing Polychlorinated Biphenyls (PCBs) into the Hazardous Substances (Storage and Disposal of Persistent Organic Pollutants) Notice 2004 (POPs Notice).

PCBs must now be managed similarly to other persistent organic pollutants (POPs). This includes requirements for storage and environmentally sound disposal. Further, the requirement under the previous regime for approval of PCB management plans ceased as from 31 December 2016. The relevant controls for managing PCBs now apply under the POPs Notice 2004 (as amended by the Amendment Notice). These are described in greater detail later on in this document. However, PCB Collectors (those collecting, transporting or storing PCBs for disposal) are still required to notify the EPA of quantities of PCBs stored.

As previously, because there are no facilities in New Zealand suitable for the destruction of PCB-containing equipment, such material must be sent to an approved overseas facility for destruction. This requires a permit from the EPA for the export of hazardous waste. Please see this link:

This code of practice contains basic information about PCBs, along with instructions for managing them throughout their life cycle.

[2] The Gazette Notice is available on online at this address.

2. General Information on PCBs

PCBs comprise a group of 209 possible aromatic chlorinated hydrocarbons having the chemical composition C12H10-nCln. Their manufacture produced a mixture of compounds, the properties of each depending on the amount of chlorination. In general, they are thermally and chemically stable, are insoluble in water but can be mixed with oils, and are fire-resistant.

These characteristics led to the use of PCBs in a wide range of products: in transformers and capacitors as dielectrics; as heat transfer fluids; as hydraulic fluids; and as components in brake linings. They were also used in the manufacture of adhesives, sealants, varnishes and printing inks, as plasticisers and in the production of marine antifouling paints.

Unfortunately, the properties that made PCBs so useful meant that they remained intact once their usefulness was over. Concern arose in the 1960s when overseas experience showed that these compounds were widely distributed, persistent and accumulating in the environment.

Overseas experience has shown that, apart from occupational exposure or misadventure, people also suffer harm from consuming PCBs in their diet as the principal source of exposure of PCBs for humans. Fish is the principal source, although PCBs have been found in small concentrations in poultry, meat, produce and dairy products.

PCBs are absorbed by fatty tissues and bi-accumulate; that is, they tend to concentrate up the food chain, particularly in fish-eating birds, animals and humans.

Since the 1980's, the production, importation and use of PCBs have been banned or tightly controlled in many countries. They were considered suitable for use in capacitors and transformers in fire sensitive locations. However, fires involving equipment containing PCBs can produce toxic by-products such as polychlorinated dibenzo-p-dioxins (commonly known as dioxins) and polychlorinated dibenzofurans. Consequently, PCB-containing equipment has been phased out for all uses.

3. Identification of PCBs

PCBs range in appearance from colourless, oily liquids to darker, viscous liquids, to yellow and black resins. The characteristics of the substance depend on the chlorine content. Viscosity varies from highly mobile to very thick and syrupy. Flash points can be as low as 140°C to 200°C; however, most have no flash point at all as measured by the standard test. The vapour is invisible and there is a characteristic strong odour.

It is extremely dangerous to smell the vapour in order to identify PCBs. Inhalation should be strictly avoided.

PCBs used as dielectric fluids are usually mixed with organic solvents, such as chlorinated benzenes, that change the fluids' chemical and physical properties. In addition, used PCB fluids may be contaminated with dirt, moisture, black carbon particles and pieces of insulation from the inside of the equipment. This contamination may change the appearance of the fluids.

3.1. Further guidance is available

Further guidance on the identification of, and testing for, PCBs can be found on the website for the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes at their Disposal (Basel Convention) at this link. In particular, the "*Technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with polychlorinated biphenyls, polychlorinated terphenyls or polybrominated biphenyls including hexabromobiphenyl"* (the Basel technical guidelines). This guidance can be viewed at this link.

3.2. Simple test for PCBs

PCBs are heavier than water, whereas mineral oils are lighter than water. This can be used as a simple test to help identify PCBs.

Simple density test

Observe all relevant electrical safety precautions.

1. Clean the drain valve at the base of the transformer with a clean rag. Test the drain valve with a blanking plug in place first to ensure it opens and closes effectively.
2. Drain a few drops of the liquid into a clean glass bottle and add a small amount of water.
3. If the liquid sinks to the bottom, it is a PCB fluid. Dispose of the sample in accordance with the procedures in this code of practice. A positive test will indicate that the liquid is pure PCB liquid.
4. If the liquid is mineral oil it will float. This test may not be conclusive as the mineral oil can be contaminated with PCBs at a level over 50ppm.

Do not pour test material back into the transformer – water will degrade its electrical performance.

Section E of the Basel technical guidelines referenced above in section 3.1 also contains further information on sampling, analysis, and monitoring of PCBs.

3.3. Manufacturers' trade names

PCB fluids were often known by the term askarel, which is a generic name for synthetic electrical insulating material. Askarels generate only non-explosive gases or gaseous mixtures when decomposed by an electric arc.

Commercial mixtures contain PCBs, chlorinated benzenes and contaminants, in a range of concentrations. Manufacturers used a wide variety of trade names, including:

Aroclor	Duconal	Phenoclor
Asbestol	Dykanol	Pyralene
Chlorextol	Elemex	Pyranol
Clorinol	Eucarel	Pyroclor
Chlorinol	Fenclor	Saf-t-Kuhl
Clorphen	Hyvol	Sat-t-America
Diaclor	Inerteen	Sovol
Diconal	Kanechlor	Therminol.
Dk	No-flamol	

A schedule of all known trade names is presented in Appendix A.

Other PCB products and their possible applications included are below:

- Santothern FR (UK) – Heat transfer (prior to 1972)
- Therminol FR (USA) – Heat transfer (prior to 1972)
- Pydraul (USA) – Hydraulic applications (before 1972).

These three trade names may still be in use but now refer to non-chlorinated products. For Santothern and Therminol only the FR series contained PCBs, and present-day products are not labelled as FR. For Pydraul, the present series of hydraulic fluids, which do not contain halogenated compounds, are designated E.

4. Legal Requirements

The Working Safer Reforms have changed the way hazardous substances and workplace safety are managed in New Zealand. The Health and Safety in Employment Act 1992 was replaced with a new Health and Safety at Work (HSW) Act 2015. The main purpose of the HSW Act is to provide a balanced framework to secure the health and safety of workers and workplaces. This includes by protecting workers and other persons against harm to their health, safety and welfare by eliminating or minimising risks arising from work. PCBUs storing PCBs and workers involved in the handling of PCBs must do so in accordance of the general health and safety provisions set out in the HSW Act.

A number of regulations made under the HSW Act have commenced, the HSW Hazardous Substances Regulations will commence at a later date. When these latter regulations come into force, the responsibility for managing hazardous substances in workplaces will move from HSNO to the HSW legislation. The HSNO regime will retain responsibility for:

- assessment and approval of all hazardous substances
- classifying all hazardous substances
- setting controls (EPA controls) that apply to all hazardous substances, including controls for labelling, safety data sheets (SDS), and packaging
- setting environmental controls, disposal controls, non-workplace controls, and content controls.

In 2003, the HSNO Act was amended by the Hazardous Substances and New Organisms (Stockholm Convention) Amendment Act 2003 (Amendment Act) to align with the requirements of the Stockholm Convention on Persistent Organic Pollutants (Stockholm Convention). The Amendment Act prohibits or restricts import and the use of POPs (listed in Schedule 2A of the HSNO Act). The HSNO Act also deals with the disposal of POPs (for PCBs this involves export for destruction to an overseas facility).

More specifically, the Amendment Act means that:

- pesticides and industrial chemicals specified as POPs under the Stockholm Convention (including PCBs) are banned from importation, manufacture and use in New Zealand
- POPs cannot be stored in New Zealand, except in accordance with conditions specified by the EPA in a notice in the *New Zealand Gazette* (Gazette) (or where storage is specified in Schedule 2A of the HSNO Act)
- the EPA may issue a notice in the Gazette, requiring the environmentally sound disposal of POPs
- however, there are exemptions allowing for the importation of POPs for small-scale research and the laboratory use of analytical standards, as provided for under the Stockholm Convention.

In this context, the POPs Notice (as amended by the Amendment Notice) sets out:

- that PCBs must be stored in suitable containers and kept in buildings and places which are:
    - secure and suitable for the purpose taking into account the quantities stored, moisture control, ventilation and spill containment
    - sited so that the risk of contamination of people, crops, animals and the environment is minimized
- that Collectors of PCBs must comply with the controls set out in the schedule to the Gazette Notice and must have regard to this Code of Practice
- that Collectors of PCBs must notify the EPA in writing of certain matters (see section 8.1)
- the methods that comprise environmentally sound disposal of PCBs.

In addition, under the Imports and Exports (Restrictions) Act 1988 import/export controls can also be put in place by Order in Council, as required under the Stockholm Convention. Under this authority the Imports and Exports (Restrictions) Prohibition Order (No. 2) 2004 (the Order) came into force on 29 July 2004. The Order allows for the export of a POP as provided for under Article 3.2 of the Stockholm Convention, and also requires that POP waste be dealt with as hazardous waste in accordance with the requirements of the Basel Convention, for the purpose of environmentally sound disposal.

The permitting system is administered by the Environmental Protection Authority (the EPA) and requires permits from the EPA to import or export hazardous waste in line with the Basel and Stockholm Conventions. This means if you wish to export hazardous waste (including POPs) from New Zealand then you need to contact the EPA and complete an application and notification form. Dependent on the EPA being satisfied that the application is complete, it will be sent to all the other countries (transit and importing) for their consideration. These countries must agree to receive your shipment(s) before the EPA can issue you with a permit. These countries may ask for more information and may consent to or reject your application. Further information about the process, reporting requirements, and forms can be found here.

More generally, the HSNO Act 1996 is administered by the Ministry for the Environment, while the Imports and Exports (Restrictions) Act 1988 is administered by the Ministry of Business, Innovation and Employment. The New Zealand Customs Service (Customs) is the border enforcement agency and monitors the cross-border movement of goods for compliance with the relevant legislative requirements.

5. Adverse Health Effects

The acute toxicity of PCBs is relatively low, with an LD50 ranging from 1 to 4 g per kg of body weight in rats. Therefore few concerns were originally raised about the possible effects of PCBs on human health.

PCBs accumulate in the fatty tissues of humans and animals. PCB exposure has caused toxic effects in both, particularly where repeated exposure occurred. The skin and liver are the major target organs. The most commonly observed adverse health effects in humans exposed to large amounts of PCBs are skin conditions such as acne and rashes. The International Agency for Research on Cancer (IARC) has also determined that PCBs are probably carcinogenic to humans, based largely on animal evidence of liver cancer. A few studies of workers indicate that PCBs are associated with certain kinds of cancer in humans, such as cancer of the liver and biliary tract.

Some studies in exposed workers have shown changes in biochemical indices measured in blood and urine that may indicate liver damage. In the Yusho and Yu-Cheng incidents, each involving about 2000 cases, Japanese and Taiwanese people were exposed to high concentrations of PCBs and polychlorinated dibenzo-furans (PCDFs) through consumption of contaminated rice oil. Among other complaints, fatal liver diseases were significantly more frequent than national rates in both cohorts.

PCB exposures in the general population are not likely to result in skin and liver effects. Most of the studies of health effects of PCBs in the general population have examined the children of mothers who were exposed to PCBs, which showed that PCBs may be associated with developmental or endocrine effects. Women who were exposed to relatively high levels of PCBs in the workplace or ate large amounts of fish contaminated with PCBs had babies that weighed slightly less than babies of women who did not have such exposure. Babies born to women who ate PCB-contaminated fish also showed abnormal responses in tests of infant behaviour. Some of these behaviours, such as problems with motor skills and a decrease in short-term memory, lasted for several years.

5.1. Exposure pathways

The general population's main risk of exposure to PCBs has been via air, drinking water and soil, and the consumption of contaminated foods. Evidence suggests that the main non-occupational intake of PCBs comes from consuming fish.

The volatility of PCBs is known to be low; however they have been found in high concentrations in workroom air in areas subject to long-term open use of PCBs, and in the air during acute or temporary events where evaporation was possible.

Soot produced in emergency situations such as fire and/or explosions may contain high levels of PCBs. In these situations, ingestion, skin contamination (including from surfaces and tools) or inhalation of soot particles can result in serious exposure.

Providing that the safety precautions outlined in this document are followed, it is unlikely that occupational exposure will occur through preparing items containing PCBs for export for destruction.

5.2. First aid

Contact with clothes

Remove contaminated clothing promptly.

Contact with skin

Wipe off any splashes. Wash thoroughly with soap or detergent and water or a waterless cleaner. Apply cold cream (skin lotion) to reduce the irritation, particularly if PCBs have contacted open cuts or abrasions. See a medical practitioner immediately.

Contact with eye(s)

Irrigate immediately with a gentle stream of lukewarm water for 15 minutes, keeping the eyes open while flushing. See a medical practitioner immediately.

Ingestion

Do not cause vomiting. Do NOT drink anything. Thoroughly rinse mouth with water. Proceed to a hospital emergency department or a medical practitioner immediately. Take information on the PCB, both brand name and PCB content if known, with the patient.

Inhalation

Get fresh air. See a medical practitioner immediately. Note: Any person developing skin irritation or a respiratory tract irritation should be placed under the supervision of a medical practitioner.

5.3. Protective clothing

In situations where workers may come in direct contact with liquids containing PCBs, they should wear protective clothing impervious to PCBs. The proper clothing and gear will vary with the circumstances, such as quantity and concentration of PCBs.

Protective gear and clothing should be available in all areas where there are significant amounts of PCB liquids, whether in service, in store, or while being transported.

Protective clothing consists of gloves, gumboots or overshoes, overalls and bib-type aprons that cover the boot tops. Safety glasses with side shields, chemical safety goggles, or face shields should also be worn. Impervious coveralls made of butyl rubber, neoprene, nitrile rubber, polyvinyl alcohol, viton, saranex or teflon (not ordinary rubber) should be worn when handling PCB liquids. A respiratory protection device with a full face mask and a cartridge or canister suitable for use with PCBs is required when handling PCBs liquids hotter than 55°C, where there is a significant amount of PCB liquid exposed to the air, or where adequate ventilation is not possible. In a fire situation involving PCBs, self-contained breathing apparatus should be used.

Any reusable protective equipment should be thoroughly cleaned after use with paper tissues and soapy water. No attempt should be made to wash PCB contaminated clothing for reuse. If available, lightweight disposable clothing should be used and then stored with other solid PCB waste for safe disposal.

Hands should be washed thoroughly with warm water and soap, detergent or industrial hand cleansers before eating, drinking, smoking or using toilet facilities. Because people may need to drink copious amounts while working in protective clothing, they should be provided with plenty of beverages that can be drunk with straws (fruit juice in cartons, for example).

Advice on protective gear may be obtained from any safety equipment company.

Under the Health and Safety at Work (General Risk and Workplace Management) Regulations 2016, employees must be provided with personal protective equipment and this must be worn. Additionally, PCBUs must ensure workers have adequate training or supervision so they can work safely.

5.4. Safe handling of PCBs

When working with PCBs, certain precautions should be taken to protect the health of personnel:

- working areas must be well-ventilated
- working areas should be bunded to contain any spills and any drains in the working area should be blocked to prevent spills escaping
- PCB liquids should be pumped and not poured, to minimise splashes and spills
- all equipment used with PCBs should be regularly inspected and replaced if necessary
- pumps and hoses used for PCB liquids should not be used for other purposes
- careful consideration should be given to the type of pump used for handling hot oils containing PCB liquids.

5.5. Training

Before staff carry out work on PCB-filled equipment they should understand the safety procedures to be followed in handling PCBs and the emergency and first aid requirements (see sections 5.2, 5.3 and 5.4). Managers or supervisors should ensure that all employees are trained in the procedures specified in this code of practice.

All major PCB handling and dismantling projects should be well organised in advance and properly engineered so that all risk contingencies are addressed. Part of this planning is to identify the safe work procedures to be followed and the staff training that will be required.

Staff needing to use protective clothing should be trained in its use. Employers are responsible for providing training courses.

It should be noted in general that under the HSW Act, a PCBU must provide any information, training, instruction, or supervision that is necessary to protect all persons from risks to their health and safety arising from work carried out as part of the conduct of the business or undertaking. Additionally, PCBUs must, so far as is reasonably practicable, make sure its workers and others are provided training, information, instruction or supervision to protect them from risks to health and safety. The draft Health and Safety at Work (Hazardous Substances) Regulations 2016 also contain provisions regarding training and worker responsibility, at the time writing these have not been finalised.

6. Management of PCBs

6.1. Precautions against leaks or spills

At all locations where PCB-filled equipment is located, the following steps should be taken:

- warning notices should be placed near drain valves on transformers
- all drain valves should be securely closed in a way that will prevent inadvertent or unauthorized opening
- regular inspection should be undertaken to look for early signs of weeping or leakage
- spill containment measures such as curbs or dykes, metal drip trays, stand pipes or absorbent mats should be fitted to installations where appropriate
- floor drains should be able to be controlled in the event of a spill, or arranged so that PCB oil interceptor tanks are fitted before the drain reaches natural outfalls or sewers **(remember that PCBs are heavier than water)**
- facilities for recovery and clean-up work must be available.

A contingency plan should be prepared and known to all staff (see section 10).

Any leakage or spillage of PCB liquid should be cleaned up and stored as outlined in sections 8 and 10. PCB liquids should only be moved in sealed metal containers, which should not be used for any other liquid.

6.2. Decommissioning

No PCB equipment may be removed for reinstallation or resale.

PCB equipment can only be removed from service to be stored while awaiting disposal or to be transported for disposal.

When PCB-filled capacitors have to be taken out of service, do not drain them unless they are leaking. If they need to be drained, the precautions given in section 5.3 and 5.4 should be taken. The drained unit should be sealed or plugged.

Under no circumstances should drained capacitor cans be reused.

Sealed small capacitors and small transformers may be stored or transported without draining. They should be wrapped in a heavy plastic bag and placed into UN rated 1A2 full open head 205 litre steel drums. Capacitors should be placed in the drums with the terminals upwards to prevent leakage. As many

capacitors as space allows may be placed in one drum. If multiple layers are stacked in the drums, rigid dividers such as plywood must be placed between the layers with blocks under the plywood to ensure the terminals below are not load bearing. Small numbers of small ballasts may be packed in DG rated 20 litre plastic pails, no more than 20kgs in each pail. The drum/pail should be packed with absorbent material (for example, diatomaceous earth) to stop any movement during transport and so that any leaks will be absorbed. The drum/pail should then be sealed and labelled in accordance with NZS 5433:2012.

Large transformers should be drained and the PCB liquid stored in double-bung steel drums. Spill containment measures must be in place while this is being done. Precautions given in section 5.3 and 5.4 should be observed while removing the PCBs.

Transformers, capacitors and contaminated solid waste that cannot fit into 205 litre drums should be stored in steel spill-pans that have welded seams and are leak-proof. The sides must be at least 800mm high, in accordance with the transport requirements in the Basel Convention.

The PCB liquid should be stored in suitable drums as follows:

- as new UN rated 1A1 closed head 205 litre steel drums must be used
- spouts or valves should be removed and replaced with leak-proof bungs. These should be tight
- all drums should be properly and securely labeled. Paint over any old non-relevant drum markings
- an air space of 7 to 10 centimeters should be left in the drum to allow for liquid expansion.

Once the PCB liquid has been drained out of the transformer over a period of 48 hours, all openings should be capped or sealed. The equipment should then be placed in containment for protection against weather and other damage, with sufficient material to absorb the remaining liquid.

It is preferable to replace the whole transformer to ensure that PCB contamination does not remain. Retro-filling with non-PCB fluid is not recommended.

6.3. Identification duties of collectors

Collectors of PCBs also have identification duties for PCBs. The Hazardous Substances (Identification) Regulations 2001 apply to PCBs, which are deemed to have hazard classifications of 6.8A, 6.9A and 9.1A. Further guidance information on labelling requirements is available on the EPA website.

7. Transportation of PCBs

The following guidelines are intended to protect transport company staff and communities en route, and to ensure that the PCBs are transported safely.

7.1. Before transport

All transport operations involving PCBs should comply with the requirements of the Land Transport Rule – Dangerous Goods 2005 (Rule 45001/1), and with NZS 5433: 2012.

NZS 5433 states that PCBs are not subject to the Standard when in concentrations of not more than 50mg/kg (special provision 305).

Sealed small capacitors and small transformers may be transported without draining. They should be packed as described in section 6.2 in suitable drums. Large transformers should be drained and packed as described in section 6.2. Precautions given in section 5.3 should be observed during this operation. Note that this is only acceptable if the capacitor is not leaking and is not bulging as a result of internal failure. Otherwise, the capacitor must be drummed or secured in a tight container.

The owner should arrange transportation with a company that is experienced in handling hazardous materials and has the necessary equipment and staff to comply with this code. If the owner chooses to provide transportation, the requirements of this code must be met as well as any other legal requirements.

A second support vehicle is not required when the volume of PCB being carried is less than two 200-litre drums. However, all spill containment and contingency equipment should be carried.

If the goods are being transported to storage, the owner should ensure that personnel at the destination are prepared to receive the PCBs. Transport for disposal is usually organised by the company that is exporting the wastes. In all cases, proper consignment notices are required during transport.

It is advisable to inform local authorities and the Commercial Vehicle Investigation Unit of the Police of your intention to transport PCBs and to provide details of the route, destination and date of transport.

7.2. Loading the PCBs

The vehicle driver should be told:

- what is in the load
- what emergency equipment is provided and how to use it
- what to do in the event of an accident or incident
- the requirements in terms of this document and appropriate legislation.

The Emergency Procedure Guide (EPG) should be prepared for each consignment of PCBs, as set out in *NZS 5433:2012 The Transport of Dangerous Goods on Land*. Emergency Procedure Guides are also available in SNZ HB76 Guide # 48.

A vehicle with tray sides at least two-thirds the height of the largest item and in any event at least 800mm high should be used. If the vehicle has a metal-lined tray, line the tray of the truck with heavy plastic sheeting with plywood over the top of the plastic.

Strap all drums vertically to pallets and horizontally to each other. Secure the load to the tray, then cover. Check documentation.

Security of loads on vehicles is covered by the Truck Loading Code, which is a code of practice for the safety of loads on heavy vehicles.

7.3. During transport

The security of the load should be checked every two hours or 100 km, whichever is sooner. Special attention should be paid to any signs of leakage.

The driver should adhere strictly to safe driving practices appropriate to road conditions and the vehicle.

PCB materials should only be transported between 9.00 am and 4.00 pm Monday to Friday, but not on public holidays.

Information about what to do in the event of an emergency is given in section 10.

7.4. Transfer of load

When the destination is reached and the PCB material is safely unloaded, the driver should hand over the transport documentation.

Any contingency materials used during the journey should be placed in drums and labelled as PCB-contaminated material. Tools used should be cleaned thoroughly with solvent.

Check that the vehicle is clean.

8. Storage of PCBs

Storage is required for a wide range of PCB materials.

- discarded articles such as capacitors and transformers
- PCB liquid wastes drained from equipment and collected from drip trays
- PCB-contaminated materials such as soil, absorbent material, clothing, rags and handling equipment.

The PCB storage facility will need appropriate signage. Advice on signage can be found at this link, it gives advice on signs for premises storing hazardous substances.

Storage installations must be well away from food processing/preparation facilities.

8.1. Notification of storage of PCB requirements

The Gazette Notice (as amended by the Amendment Notice) requires that Collectors notify the EPA of the storage of PCBs. Any Collector who stores PCB's must notify the EPA in writing of:

- their name and address
- the location at which the PCBs are being stored
- the amount of PCBs being stored at that location.

8.2. Drum storage

PCB materials should be stored after being packed in the manner described in section 6.2. UN rated 1A1 closed head (liquids) and UN rated 1A2 full open head (solids) steel drums with close-fitting lids must be used. Solids and liquids should be stored in separate drums. Storage drums and labelling should comply with NZS 5433:2012 Transport of Dangerous Goods on Land.

The drums should be clearly labelled and numbered with details of:

- type of PCB (if known)
- type of solid contaminated material, oil, rags, soil, sawdust, clothing, etc
- percentage of PCB and solvent (where totally in liquid form)
- solvent type
- origin of PCBs such as: from XYZ Co, factory transformer type, serial number.

Labelling during transport must comply with the current NZS 5433:2012 Transport of Dangerous Goods on Land. Suitable labels are available from commercial suppliers.

Proper shipping names are:

- UN2315 POLYCHLORINATED BIPHENYLS, LIQUID, Class 9, Packing Group II

- UN3432 POLYCHLORINATED BIPHENYLS, SOLID, Class 9, Packing Group II.

The Hazchem emergency information label should also be attached to each drum of PCB waste during transport.

8.3. Small storage facility

If owners of PCB materials have two or fewer 200-litre drums of material for storage, then they do not need to provide a special purpose-built store.

The drums should be stored in a securely locked place under cover, with plenty of ventilation, and raised on a pallet to prevent condensation and corrosion under the drums. The storage area should be isolated from the active areas of the site. Drums must be secured in such a manner that they will not be displaced during an earthquake nor be damaged by unsecured falling objects.

The pallet should be placed over a steel drip tray with sufficient capacity to hold 125 percent of the total volume of liquid.

Emergency equipment, including protective clothing, should be stored nearby. Records of the holdings must be maintained and the store inspected at regular intervals, at least monthly.

An international shipping container with a suitable steel pan as a floor may be used as an alternative form of storage.

8.4. Special storage facility

The store should be sited away from manufacturing and other routine activities, and be securely locked. Access must be restricted so that only personnel trained in handling PCBs and responsible for the operation of the store are allowed into the storage area.

The store should be indoors. If the store must be outside, the storage area should be covered with a waterproof barrier, and be adequately ventilated.

The store building should have bunding facilities that will trap twice the liquid content of the largest piece of equipment or container, or up to 25 percent of the total quantity of PCB stored, whichever is larger. In the event of any accidental spillage, precautions should be taken to block off any drains that would allow the PCB to escape into storm water drains. The floor should be a sealed surface, allowing for easy cleaning.

There should be no storage of combustibles within 10 metres of a PCB store.

As for the small store, drums should not be stacked, in case they fall, and should be secured against risk or earthquake.

Labelling must comply with the Hazardous Substances (Identification) Regulations 2001, see section 6.3. A notice should be placed where the fire brigade can easily read it, stating where the code of practice and protective clothing are held. PCB caution notices should be mounted at all entrances to the PCB store, and should specify who is in charge of the store.

Drip trays must be placed under all drain valves or leaks on stored transformers. Valve handles should be removed before long-term storage. Spill clean-up facilities (clothing, absorbent material and tools) must be kept in the PCB store.

9. Disposal of PCB Wastes

PCBs must be disposed of in an environmentally sound manner, as per clause 5 of the POPs Notice (as amended by the Amendment Notice). . For PCBs this means exporting them from New Zealand as waste for treatment at an overseas facility. Any such export must comply with the relevant requirements of the Basel Convention, the Stockholm Convention and the OECD Decision C (2001)107 on the Control of Transboundary Movement of Wastes Destined for Recovery Operations. Pursuant to the Amendment Notice, PCBs can now also be imported into New Zealand for subsequent export from New Zealand as waste in accordance with the above. For both import and export of hazardous wastes, a permit is required from the EPA under the Imports and Exports (Restrictions) Prohibition Order (No. 2) 2004. Additionally, the import of any POPs (including PCBs) for subsequent export as wastes also requires an approval from the EPA under section 29B of the HSNO Act. More information can be found on the EPA's website at this link.

PCB materials for disposal should be decommissioned as described in section 6.2 and prepared for transport as described in section 7. All necessary documentation must be completed in accordance with the disposal facility chosen. The contractor undertaking the removal to disposal should be able to assist with this. Owners of small quantities of PCBs are advised to co-operate in removal to lessen the costs of disposal.

10. Emergency Response and Preparedness

Because of the known persistent nature of PCBs and their tendency to bio-accumulate, it is important to prevent entry of PCBs into the environment. Specifically:

- it is essential to prevent PCBs leaking into drains or natural waterways
- all wastes and residues containing PCBs should be collected for disposal
- carry out necessary recording and notification as set out in section 4 of this code of practice.

In general, the Hazardous Substances (Emergency Management) Regulations 2001 apply to PCBs which are deemed for this purpose to have hazard classifications of 6.8A, 6.9A and 9.1A. The EPA website [LINK] has further guidance on emergency management and links to the Worksafe's website. This can be found at this link.

10.1. Recommended equipment for holders and collectors of PCBs

The following emergency equipment must be available when handling/storing/transporting PCBs.

- 'Do Not Approach' notices (for use in the event of a spill).
- disposable polylaminated coveralls
- handy plastic rubbish bags (2 packs)
- broom (2)
- waterless hand cleaner
- gloves (viton or nitrile or vitrile) (3 pairs)
- gumboots (3 pairs)
- sawdust or sand (200- litre drum) or 200 kg diatomaceous earth ('kitty litter')
- paper towels (2 packs)
- solvent such as hexane, turpentine, or kerosene for wiping contaminated areas
- 50 kg bale of cotton waste for use with the solvent
- shovels (2)
- a quantity of plastic sheeting (sufficient for the surface area of vehicle)
- 24-hour emergency telephone contact list
- copy of this document.
- Spare empty drums (wide mouth type) and hand operated pump and hose.
- Full face mask fitted with a canister suitable for organic vapours.
- Two 10 kg dry-powder fire extinguishers.

10.2. Emergency procedure priorities

In the event of serious PCB discharge, the following priority steps should be taken:

- wear protective clothing
- stop the flow of PCBs
- contain PCBs
- report the incident to the New Zealand Fire Service (NZFS) so that the hazardous substances technical liaison committee (HSTLC) is activated
- keep non-essential staff away from affected area
- recover all PCB contaminated material.

10.3. Protection of personnel

Protection of personnel:

- all non-essential personnel should be kept out of the immediate leak or spill area. The area should be roped off to prevent any spread of PCB material by vehicle or pedestrian traffic
- personnel entering the leak or spill area shall be provided with and use protective equipment, as set out in section 5.3
- only personnel familiar with PCB safety procedures will be used to shut off the source of the PCB spill, contain the spilt PCB, and carry out recovery and clean-up work
- the repair of equipment or the clean-up of spillages and leaks containing PCBs should be carried out by competent staff only. Protective clothing as described in section 5.3 must be worn
- where a significant area of PCB liquid is exposed to the air in an indoor situation or where adequate ventilation is not possible, supplied air breathing apparatus must be worn
- contaminated clothing that cannot be effectively cleaned for reuse is to be placed into storage containers as described in section 6.2
- attention must be paid to personal hygiene.

10.4. Priority actions in the event of a leakage or spillage

Stop the flow of PCBs:

- re-position the drum to stop the flow
- if possible, stop the leakage
- if necessary, transfer fluid to spare drum.

Contain the PCBs:

- dyke major spills with soil or other material
- if at all possible, prevent PCBs spilling onto the ground or, entering drains or waterways
- use sand or sawdust to absorb and recover the PCB, all of this to be recovered into the wide mouth drum
- recover any PCB-contaminated soil
- if leaking from the truck tray, drive the vehicle onto a sheet of plastic to contain the PCBs.

Report any spillage of PCB to the relevant regional council as soon as practicable after the spillage, providing details on the estimated volume spilt and to what extent it has been recovered and the exact location of the spillage. WorkSafe should be notified if the incident meets the criteria for a notifiable event as defined under the HSW Act. Please see this link for information on what notifiable events are.

Keep non-essential staff and the public away from the affected area. If possible use a rope barrier to outline the contaminated area. 'Do Not Approach' notices should be displayed at the boundary of the affected area.

Recover all PCB-contaminated material, protective clothing and equipment and pack into suitably labelled drums.

Spill staff should wash thoroughly after the clean-up is completed (see section 10.4 for further details).

10.5. Handling PCB spills and leaks

If PCBs leak or are spilt, the following steps shall be taken.

Shut off the source of the leak or prevent further spillage. Failing this, make arrangements to collect and contain the PCB. Specifically:

- equipment filled with PCB that is found leaking should be removed from service as soon as possible to staunch the leak. Where this cannot be done immediately, some means of collecting the PCB should be used. Polyethylene sheeting or metal trays can be used as temporary containment for leaking capacitors or transformers. Regular supervision of the containment is necessary
- if applicable, the area of the leak or spill should be adequately ventilated to prevent the accumulation of any vapours
- liquid PCB should be collected or absorbed using dry sawdust, diatomaceous earth ('kitty litter'), rags or sand. As much free liquid should be recovered as possible for disposal (see section 9)
- if there is going to be any delay in cleaning up the PCB spillage, the affected area should be roped off to prevent persons entering the contaminated site and 'Do not Approach' signs erected
- all Steps must be taken to prevent any spillage or accidental loss of PCBs, either by drainage into the sewer systems or percolation into the ground
- all PCB liquid and contaminated material must be collected for disposal. This may include the top layer of switchyard gravel in the affected area. Care should be taken to avoid stirring up subsoil layers. The work is best done by using hand shovels
- where any spillage of a PCB fluid occurs, the equipment involved and the floor should be wiped clean using rags or absorbent material such as sawdust or sand, then solvents such as kerosene can be used to flush PCBs from crevices etc and the PCB-contaminated material collected for disposal. Ensure that the area is well ventilated while using solvents.

10.6. Notification and reporting of leaks or spillage

Notification and reporting of leaks or spillage:

- the regional council should be notified of any PCB spills or leakages that occur. WorkSafe should be notified if the incident meets the criteria for a notifiable event as defined under the HSW Act
- the local company manager or supervisor must be immediately informed when any PCB spill is discovered
- a report must be filed in company records, recording all spillage of PCBs and subsequent clean-up procedures
- ongoing monitoring of a spill area may be required.

10.7. Precautions in the event of fire

In the event of a fire in an area containing PCBs, NZFS personnel must be warned of the special danger and advised which equipment contains PCB. A notice should be located beside the main fire hydrant close to any PCB equipment stating the location of the PCB equipment.

In a major fire it is possible that toxic decomposition products, such as polychlorinated dibenzofurans and dibenzodioxins, may be produced from the incomplete combustion of the material.

If PCBs have been subjected to fire in a building, no access should be allowed to the building without breathing apparatus and protective clothing until it has been confirmed that it is safe to re-enter. The building may require decontamination and checking via swab tests and analysis that residue levels are below a level that pose a health risk to people in the building. It may be advisable to ask other parties to provide expert advice, for example the medical officer of health.

Appendix A: Trade Names for PCBs

Further lists of common trade names for PCBs can be found in guidance documentation to support the Basel Convention at this link.

Askerals	Manufacturer	Askerals	Manufacturer
Abestol	American Corp, USA	No-Flamol	Wagner Electric,USA
Asbestol	Monsanto, USA	Phenoclar DP6	Baylor, Germany
Auxol	Monsanto, USA	Phenoclar DP6	Prodelec, France
Aceclor	ACEC, Belgium	Pyroclar	Monsanto, UK
Aroc(h)lor 1221, 1232/1248, 1254, 1260, 1268, 1270, 1342, 2565/4465/ 5460	Monsanto, USA PR Mattory& CO, USA	Pyroclor Pyrochlor Pyronal	Monsanto, US General Electric, USA
Apirollo	Caffaro, Italy	Pysanol	
Apirollo	Caffaro, Italy	Pydraul†	Monsanto, USA
Bakola 131	Monsanto, USA	Physalen	
Chlorextol	Allis Chalmers, USA	Pyralene 1460	Prodelec, France
Chloroextol	Allis Chalmers, USA	Pyralene 1500, 1501	Prodelec, France
C(h)lophen A30	Bayer, Germany	Pyralene 3010, 3011	Prodelec, France
C(h)lophen A50	Bayer, Germany	Pyralene T1	Prodelec, France
Chloresil*		Pyralene T2	Prodelec, France
Cloresil		Pyralene T3	Prodelec, France
Chlorintol	Sprayue Electric Co, USA	Safe-T-America Safe-T-Kuhl	 Kuhlman Electric, USA
Clorinal		Sant(h)osafe	Mitsubishi, Japan
Delor		Santosol	
Diachlor	Sangamo Electric	Santowax	
Di(a)conal		Sant(h)otherm FR	Mitsubishi, Japan
Dykanol	Cornell Dubille, USA	Saut(h)otherm	Mitsubishi, Japan
Ducanol		Sorol	So(l)vol, USSR
DK	Caffaro, Italy	Sovol	So(l)vol, USSR
DP3, 4, 5, 6.5		Therminol FR	Monsanto, USA

E(d)ucarel	Electrical Utilities Corp, USA	Terpenylchlore	PCT, France
Electrophenyl	PCT, France	Chlorphen	Jard Corp, USA
Elaol	Bayer, Germany	Clophen	Bayer, Germany
Elemex	McGraw Edison, USA	EEC-18	Power Zone Transformer, USA
Fenclor 42, 54, 64, 70	Caffaro,Italy	Inclar	Caffaro, Italy
Hydol		Nepolin	USA
Hyvol	Aerovox, Italy/USA	Non-flammable Liquid	ITE Circuit Breaker, USA
Inerteen 300, 400, 600	Westinghouse, USA	Phyralene	Prodelec, France
Kan(e)c(h)lor (KC) 200-600	Kanegafuchi Japan	Santovac	Monsanto, USA
Kennechlor	Kanegafuchi Japan	Solvol	
Leromoll			