UNITED
NATIONS

EP

UNEP(DEPI)/MED WG.409/4

UNEP

**UNITED NATIONS
ENVIRONMENT PROGRAMME
MEDITERRANEAN ACTION PLAN**

5 March 2015
Original: English

Regional joint meeting on environmental sound management and
illegal traffic of chemicals and hazardous waste in the Mediterranean

Istanbul, Turkey, 7- 9 April 2015

Agenda item 4: Review of ESM Guidance and factsheets

Factsheets on PCB Management

UNEP

Strategic Partnership for the Mediterranean Sea Large Marine Ecosystem
MedPartnership
Together for the Mediterranean Sea
GEF UNEP

Factsheet I

PCB AWARENESS RAISING

What are PCBs?

Polychlorinated Biphenyls (PCBs) are chlorinated, colourless liquids. Depending on the number of chlorine atoms in their molecules, their physical, chemical, and toxicological properties vary considerably.

In the 1960s and 1970s maximum PCBs production limits were reached. Between 1983 and 1993 production of PCBs was stopped in most countries.

PCB is one of the Persistent Organic Pollutants (POPs) regulated under the Stockholm Convention, which requires immediate international action. PCBs shall be eliminated by 2028.

Applications of PCBs

Due to their characteristics PCBs mixtures were used in open, partially open and closed systems. It is important to know that PCBs applications can be found throughout all industries and do not only focus on utilities.

Typical applications of PCBs in **closed systems**:

- Insulation and/or cooling fluid in transformers
- Dielectric fluid in caps
- Hydraulic fluid in lifting equipment, trucks and high pressure pumps

Typical applications of PCBs in **open systems**:

- Caulks (sealants)
- Anti-corrosion and surface coatings
- Paints
- Cables and cable sheaths
- Ballasts and small capacitors
- Various others

PCBs Health Risks

PCBs are persistent and transported through air – by evaporating and re-condensing – the so-called “global distillation”. PCBs can be found in any part of the world, and in numerous matrices (air, water, soil, etc.).

Due to its chemical and bio-chemical stability and its high solubility in fatty tissue, the substance has entered the food chain as a bio-accumulator.

PCBs are mainly taken in via stomach and intestine, the skin and respiration.

On the basis of sufficient evidence of carcinogenicity in humans and experimental animals, the International Agency for Research on Cancer (IARC) classified PCB as carcinogenic to humans (Group 1).

Impact on Human Health

Some of potential damages related to long-term exposure of small doses of PCBs are:

- Damage to liver, and kidneys
- Influences on the thyroid hormones, and possible effects on development of the brain
- Influences on the reproductive system and especially unborn children
- Possible carcinogenic effects
- PCBs are highly toxic in case of an acute exposition. The symptoms of an acute poisoning include: *Chloroacne, hair loss, and headaches.*

PCBs in Fires

The highly toxic substances **Dioxin** and **Furan** are unintentionally formed and released from thermal processes (fires) involving PCBs as a result of incomplete combustion. The health effects of such expositions are:

- Influences on the immune system
- Deformations of unborn children
- Chloroacne

PCBs Elimination Network (PEN)

The **PEN** is designed as an equal partnership for stakeholders from different sectors with an interest in the environmentally sound management of PCBs interacting within a voluntary framework. It offers substantial information exchange and support for countries to achieve the goals of the Stockholm Convention related to PCBs.For more information pleasevisit: www.pops.int/pen.

UNEP

Strategic Partnership for the Mediterranean Sea Large Marine Ecosystem
MedPartnership
Together for the Mediterranean Sea
GEF UNEP

Factsheet I

PCB AWARENESS RAISING

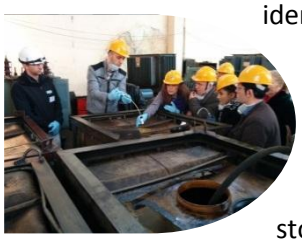
Identification of PCBs

In many cases, the manufacturer provided information about the type of dielectric liquid used in the transformer or capacitor by identification on the nameplate.

There are dozens of PCBs trade names, e.g. *Apirolio, Aroclor, Askarel, Clophen, Kanechlor, Pyralene, Sovol, Sovtol, etc.*

Precautions

Each holder of potentially PCB containing electrical equipment has to make efforts to identifythe type of insulation fluid present in transformers, capacitors, switchers, and regulators as well as spare or waste oil stored on site.



Precautions for Holders of PCBs

- Label electrical devices for easy recognition
- Install a drip tray under the PCBs containing device (ideally made of metal)
- Frequently check the condition of the PCB containing electrical devices (leakage, swelling or deformation, corrosion, etc.)
- Do not store inflammable materials close to PCBs
- Always wear personal protective equipment (PPE) when handling contaminated/leaking PCBs devices (gloves, overall, respiration mask, etc.) and ventilate workplace well
- PCBs and devices containing PCBs must only be disposed of by specialised companies
- Never release PCBs into the environment
- Never abandon PCBs devices (e.g. in the mining industry)
- Never burn PCBs!

First Aid

- **Liquid PCBs on the skin:**
  Use water and soap to wash thoroughly
- **Liquid PCBs in the eyes:**
  Rinse eyes with lukewarm jets of water for 15 minutes, always keeping eyes wide open
- **Liquid PCBs in the mouth:**
  Rinse mouth with water, do not drink anything, consult doctor immediately
- **Highly concentrated vapours of PCBs:**
  Take affected people outside in the open area

Emergency Measures

Emergency Actions for Cold Incidents (Spills)

- Call Safety Officer immediately
- Call fire/chemical brigade immediately
- Inform the doctor in charge and equip the chemical response team with personal protective equipment
- Switch off the power supply to the concerned device and check grounding
- Limit the spreading of the seeping oil by sealing the leak and using absorbing materials (sand, sawdust) or by pumping the oil in appropriate containers - if possible, a drip tray can be placed under theleak
- Prevent the contamination of watercourses

Emergency Actions for Hot Incidents (Fires)

- Call Safety Officer immediately
- Call fire/chemical brigade immediately
- Inform the doctor in charge
- Switch off the power supply
- Hermetically seal off the affected rooms or the entire building, switch off ventilation systems
- Evacuate people from all concerned buildings or areas, and on a larger scale in the direction of the wind

Disposal of PCBs

In general, waste streams may involve equipment and oil contaminated with PCBs. The various existing disposal and treatment technologies can be grouped into combustion and non-combustion methods.

All types of PCB recycling, treatment and disposal technologies involve considerable costs.

In order to be able to choose the technically and economically best option, a reliable and complete national inventory is the basis!

Factsheet I

PCB AWARENESS RAISING

Country Profile

Text to be provided by the countries based on their specific national management system and related project (s).

To write the overview we suggest to use **the 5W &H method**. The content should be specific to the country highlighting the aim of the activity and more importantly showcasing its impact.
The examples given here are only indicative. Writers of this section are free to add whatever detail they deem appropriate

Overview of the activity implemented in the country:

Country and specific location

Brief introduction about the country Reason for undertaking this activity (EX: country electricity companies still using PCB contaminated equipment in producing XX% of their power etc…)

Information about projects' timeframe and procedures, and phases of the activities undertaken

Impact: end result of the activity and its impact on the country

The conclusion could be about future needs or challenges.

Factsheet I

PCB AWARENESS RAISING

UNEP/MAP- MedPartnership

The Strategic Partnership for the Mediterranean Sea Large Marine Ecosystem (MedPartnership) is a collective effort of leading environmental institutions and organizations together with countries sharing the Mediterranean Sea to address the main environmental challenges that Mediterranean marine and coastal ecosystems face. The project is led by UNEP/MAP and is financially supported by the Global Environment Facility (GEF) and other donors, including the European Commission and all participating countries.

The MedPartnership's overarching goal is to enable a coordinated and strategic approach to catalyze the policy, legal and institutional reforms, and the investments necessary to reverse the degradation trends affecting the Mediterranean, including its coastal habitats, pollution and biodiversity.

Within the framework of the project, UNEP/MAP, through its MEDPOL programme, aims to support countries in the implementation of the SAP-MED (Strategic Action Programme to address pollution from land-based activities in the Mediterranean Region) and associated National Action Plans adopted in accordance with Land Based Sources and Activities Protocol of the Barcelona Convention. The project is supporting the ESM disposal of up to 870 tons PCB as well as undertaking important capacity building activities in four Mediterranean countries, including the preparation of ESM Guidelines for PCB.

The SAP-Med provides for the disposal of all hazardous wastes in a safe and environmentally sound manner and in conformity with the provisions of the Land Based Sources and Activities Protocol of the Barcelona Convention and other international agreed provisions by 2025.

Links

Country links:

Text to be provided by the countries:

Links to country institutions/projects dealing with PCBs management

Other links:

www.unepmap.org
www.themedpartnership.org
www.basel.int
www.chm.pops.int
www.pic.int

Please insert the PCB network website
Watch the PCB documentary

Contact

For further information please contact:
(key persons in the country/ministry

Country:

National MED POL Focal Point,
Other contacts and focal points

Strategic Partnership for the Mediterranean Sea Large Marine Ecosystem
MedPartnership
Together for the Mediterranean Sea

Factsheet II

IDENTIFICATION OF PCB TRANSFORMERS

Sampling Material

- Absorbent pads / rugs
- Drip trays (metal or PE)
- Glass vials, 30-50 ml (robust, wide opening)
- Flexible plastic hoses, 5mm
- Syringes, 10-100 mm
- Hand pumps
- Funnels
- Carrying box (incl. racks for vials/bottles)
- Sampling labels (for vials, transformer, report)
- Waterproof pens
- Sampling/Inventory reports

Personal Protective Equipment and Tools

- One-way protective gloves (Nitrile, PVC, Neoprene or rubber)
- Safety goggles
- Toolbox with set of maintenance tools (screwdrivers, pincers, locking pliers, hammer)

Caution!

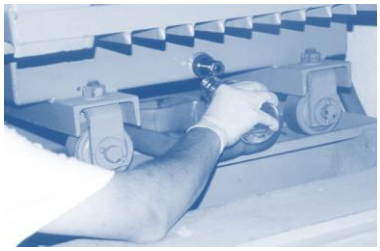
- Always use new or clean(ed) sampling materials
- Collect waste in appropriate/protected place
- Waste disposal in environmental sound manner

Step-by-Step Sampling of a Transformer

Prepare sampling material and label the glass vial before sampling

Place drip tray under drain tap, wearing gloves and goggles

Open drain tap/valve (usually by local electrical technician)



Sample the oil (30-50ml for PCB screening, 1(if also oil quality is tested)

Affix sampling label on transformer (after cleaning the surface)

Record sample in sampling report, affix sampling label to report

Screen the oil sample by Clor-N-Oil or L2000 DX Analyzer(on site or off site)

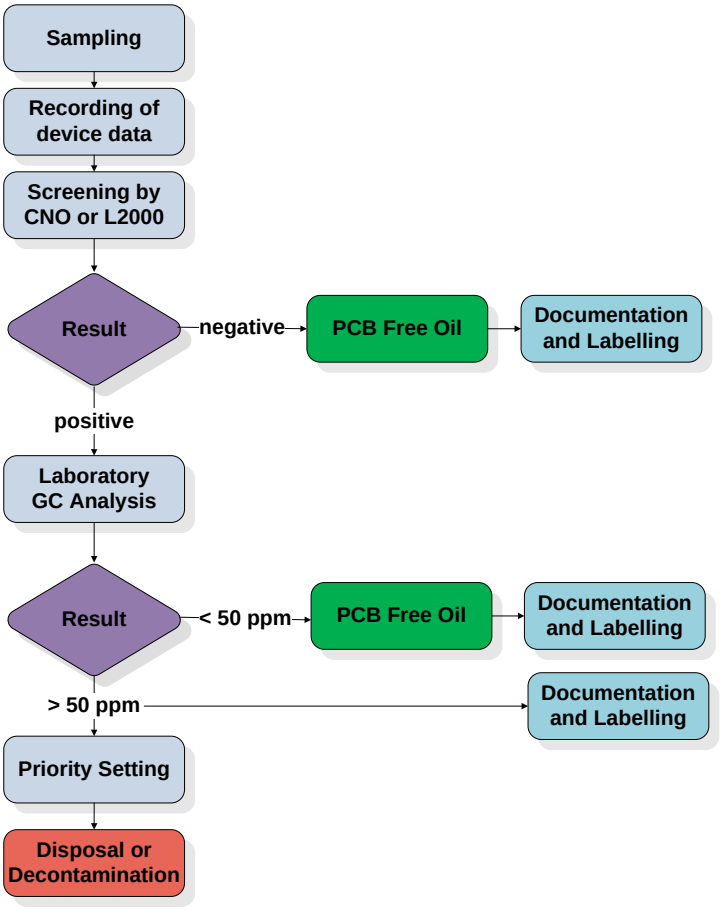
Collect and dispose of screening materials as hazardous wastes

When test results are available, re-label the tested transformer

Strategic Partnership for the Mediterranean Sea Large Marine Ecosystem
MedPartnership
Together for the Mediterranean Sea

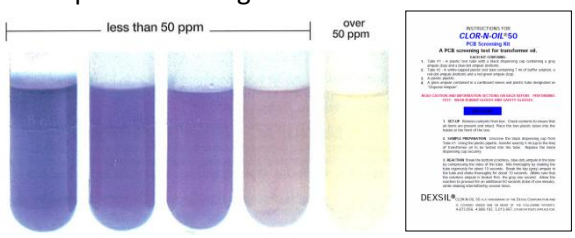
Factsheet II

IDENTIFICATION OF PCB TRANSFORMERS



Screening by Clor-N-Oil

This field test kit has become the worldwide standard in testing for PCB in insulating fluid.
Dexsil Clor-N-Oil is fast, accurate, inexpensive and easy-to-use.
The total chlorine concentration is determined and indicated by a colorimetric reaction. The kit is a «GO / NO GO» type of test where the result is either positive or negative.



Also non-technical staff may just follow the instructions to test transformer oils within minutes.

The test kits are ideal for emergency and on site testing. In the case of extensive inventories, however, the L2000 Analyzer should be used.

Screening by L2000

The L2000DX Analyzer relies on the same basic chemistry as the Clor-N-Oil test kits, however, instead of a colorimetric reaction; the L2000DX uses an ion-specific electrode to quantify the contamination in the sample and provides the result in ppm (mg/kg respectively).
The L2000DX Analyzer is pre-programmed with conversion factors for all major Aroclors. The usable measurement range for oils is 2 to 2'000 ppm. A specific Manual will help quantify PCBs in transformer oils - step by step.

UNEP

Strategic Partnership for the Mediterranean Sea Large Marine Ecosystem
MedPartnership
Together for the Mediterranean Sea
GEF UNEP

Factsheet II

IDENTIFICATION OF PCB TRANSFORMERS

Site Visit

Sites with possibly PCB containing equipment shall be inspected by inventory teams that should be assisted by a local electrical engineer.
During the inspection relevant transformer data shall be collected and recorded, for example *manufacturer, KVA rating, brand name of cooling fluid, type of fluid, serial number, year of manufacture, weight, and location.*
The site shall also be visually checked for spills, pollution and environmental risks.
In order to facilitate the inspection, national standard inventory forms shall be used for the inventory purposes.

Risk Assessment

An inventory is always an opportunity for preventive measures. Thus, a basic risk assessment of the site and the surrounding land shall be integrated in the PCB inventory.
Details and particulars, such as *the technical condition of the equipment, maintenance status, leakage, oil spills, safety of the site, location of the site (e.g. proximity to watercourses or food-processing companies), etc.,* will allow assessing the specific situation.
The opportunity should also be taken to consider partially open and open applications of PCBs.

Identification

Only sampling and screening will prove whether or not a transformer contains PCBs. Experience has shown that numerous transformers that were manufactured as PCB free equipment today actually **do** contain PCBs. In the 70s transformer manufacturers and oil suppliers were often not aware of the potential of cross-contamination of PCBs by using identical cisterns, transport containers, pipe systems and fittings for mineral oils and PCBs. Therefore many new transformers were unintentionally contaminated by PCBs. Such contamination can still occur today during maintenance and service works.
Consequently, each not hermetically sealed electrical device needs to be sampled even if it is of recent date of manufacture, because a later unintended contamination could have occurred.
Not only the PCB content of transformers in use has to be checked, but also the oil of phased out and spare transformers. Rigorous examinations must include spare oils in drums/containers and other equipment that could contain PCBs, *e.g. capacitors, regulators, circuit breakers, heat exchangers, oil cisterns, pipe systems, etc.*

Sampling

Oil samples can be taken by using the drain tap, which usually is at the bottom of the transformer. If a transformer has been disconnected from power for over 72 hours the sample should generally be taken from the bottom, as PCB may sink to a lower level because of its higher density. Alternatively transformers can be sampled via the oil filling cap by using a hand pump (a new pump must be used for each transformer). Oil samples from the expansion receptacle cannot always be regarded as representative, because the oil does not circulate and thus it is not really mixed.
Usually, transformers are sampled when they are in use and thus when they are live. Corresponding precautions must be taken and safety regulations must be known and considered at any time! Samples must only be taken under the supervision of skilled staff.

Important: Labelling of Tested Equipment

Once the PCB content has been determined the PCB equipment must be labelled appropriately. Correct labelling guarantees an easy and immediate recognition whether or not a device contains PCBs. In the event of an incident, the label will allow an immediate assessment of the situation and the associated potential hazards.

Factsheet II

IDENTIFICATION OF PCB TRANSFORMERS

Country Profile

Text to be provided by the countries based on their specific national management system and related project (s).

To write the overview we suggest to use **the 5W &H method**. The content should be specific to the country highlighting the aim of the activity and more importantly showcasing its impact.
The examples given here are only indicative. Writers of this section are free to add whatever detail they deem appropriate

Overview of the activity implemented in the country:

Country and specific location

Brief introduction about the country Reason for undertaking this activity (EX: country electricity companies still using PCB contaminated equipment in producing XX% of their power etc…)

Information about projects' timeframe and procedures, and phases of the activities undertaken

Impact: end result of the activity and its impact on the country

The conclusion could be about future needs or challenges.

Factsheet II

IDENTIFICATION OF PCB TRANSFORMERS

UNEP/MAP- MedPartnership

The Strategic Partnership for the Mediterranean Sea Large Marine Ecosystem (MedPartnership) is a collective effort of leading environmental institutions and organizations together with countries sharing the Mediterranean Sea to address the main environmental challenges that Mediterranean marine and coastal ecosystems face. The project is led by UNEP/MAP and is financially supported by the Global Environment Facility (GEF) and other donors, including the European Commission and all participating countries.

The MedPartnership's overarching goal is to enable a coordinated and strategic approach to catalyze the policy, legal and institutional reforms, and the investments necessary to reverse the degradation trends affecting the Mediterranean, including its coastal habitats, pollution and biodiversity.

Within the framework of the project, UNEP/MAP, through its MEDPOL programme, aims to support countries in the implementation of the SAP-MED (Strategic Action Programme to address pollution from land-based activities in the Mediterranean Region) and associated National Action Plans adopted in accordance with Land Based Sources and Activities Protocol of the Barcelona Convention. The project is supporting the ESM disposal of up to 870 tons PCB as well as undertaking important capacity building activities in four Mediterranean countries, including the preparation of ESM Guidelines for PCB.

The SAP-Med provides for the disposal of all hazardous wastes in a safe and environmentally sound manner and in conformity with the provisions of the Land Based Sources and Activities Protocol of the Barcelona Convention and other international agreed provisions by 2025.

Links

Country links:

Text to be provided by the countries:

Links to country institutions/projects dealing with PCBs management

Other links:

www.unepmap.org
www.themedpartnership.org
www.basel.int
www.chm.pops.int
www.pic.int

Please insert the PCB network website
Watch the PCB documentary

Contact

For further information please contact:
(key persons in the country/ministry

Country:

National MED POL Focal Point,
Other contacts and focal points

Strategic Partnership for the Mediterranean Sea Large Marine Ecosystem
MedPartnership
Together for the Mediterranean Sea
GEF UNEP

Factsheet III

IDENTIFICATION OF PCB CAPACITORS

Sampling Material

- Absorbent pads / rugs
- Drip trays (metal or PE)
- Glass vials, 30-50 ml (robust, wide opening)
- Flexible plastic hoses, 5mm
- Syringes, 10-100 mm
- Hand pumps
- Funnels
- Carrying box (incl. racks for vials/bottles)
- Sampling labels (for vials, transformer, report)
- Waterproof pens
- Sampling/Inventory reports

Personal Protective Equipment and Tools

- One-way protective gloves (Nitrile, PVC, Neoprene or rubber)
- Safety goggles
- Toolbox with set of maintenance tools (screwdrivers, pincers, locking pliers, hammer)

Caution!

- Always use new or clean(ed) sampling materials
- Collect waste in appropriate/protected place
- Waste disposal in environmentally sound manner

Identification of PCB Capacitors

Step 1 - Year of Manufacture:	Check nameplate for year of manufacture. If capacitor was manufactured in or after 19** → **"PCB free"** There is no global regulatory policy on a deadline. The decision is based from where electrical devices were imported and experience data. Therefore, it may vary from country to country. In many Countries the deadline is set on 1993. *** Final Year and/or additional text to be provided by the countries.*	
Step 2 - Declaration:	Check nameplate for declaration "PCB" or "PCB trade name", e.g. *Aroclor, Askarel, Clophen, Delor, Elaol, Fenclor, No FlamolPhenoclor, Pyralene, Pyranol, Sovol, etc.* →**"PCB containing"**	
Step 3 - Capacitor Lists:	Compare nameplate/serial number with capacitor lists. Many devices can be identified or categorised according to information in capacitor lists. →**"PCB free or PCB suspect"**	
Step 4 - Sampling/Analysis:	If capacitor cannot be identified according to Steps 1-3 above, it must be sampled and analysed according to the procedure with transformers. Alternatively, the capacitor can be regarded as PCB containing. Please see the appropriate Factsheets.	

Factsheet III

IDENTIFICATION OF PCB CAPACITORS

Site Visit

Sites with possibly PCB containing equipment shall be inspected by inventory teams that should be assisted by a local electrical engineer.
During the inspection relevant capacitor data shall be collected and recorded, for example *manufacturer, brand name, type, kVAr, type of fluid, serial number, year of manufacture, weight, and location.*
The site shall also be visually checked for spills, pollution and environmental risks.
In order to facilitate the inspection, national standard inventory forms shall be used for the inventory purposes.

Risk Assessment

An inventory is always an opportunity for preventive measures. Thus, a basic risk assessment of the site and the surrounding land shall be integrated in the PCB inventory.
Details and particulars, such as *the technical condition of the equipment, maintenance status, leakage, oil spills, safety of the site, location of the site (e.g. proximity to watercourses or food-processing companies), etc.,* will allow assessing the specific situation.
The opportunity should also be taken to consider partially open and open applications of PCBs.

Identification

Capacitors are sealed entities. A contamination after manufacture can be excluded. Considering the fact that after 1993-1996 (deadline set by the countries), no PCB was produced anymore, it can be assumed that capacitors manufactured after this date are PCB free.
In many cases, the manufacturer provided information about the type of dielectric liquid, either with identification on the nameplate or with a separate tag confirming that the contents are harmful for the environment.
Such capacitors do not need any further investigation. They definitely do contain PCBs and must be treated accordingly.
After the PCB ban most of the power capacitors were declared as *PCB free/Non PCB* either on the nameplate or with a separate tag, and they can be disposed of as normal oil containing waste.
In some cases, capacitor lists providing information about the PCB content of capacitors can be used to determine whether or not a capacitor contains PCBs.
If a designation is missing and no other information is available, the capacitor must be sampled.
Capacitors still in service and manufactured before 1993-1996 (deadline set by the countries), with missing information about the dielectric liquid have to be labelled as PCB suspected equipment.

Sampling

The only way to test the dielectric liquid of a capacitor is to drill a hole in the casing on the top or cut the isolator and retrieve an oil sample. This can be done by e.g. using a one-way pipette.
Only phased out capacitors can undergo this procedure. If there is a series of the same capacitors, it is usually sufficient to sample only two devices out of the series. Preferably a mixed sample originating from the two capacitors with the lowest serial numbers should be analyzed.

Important: Labelling of Tested Equipment

Once the PCB content has been determined the PCB equipment must be labelled appropriately. Correct labelling guarantees an easy and immediate recognition whether or not a device contains PCBs. In the event of an incident, the label will allow an immediate assessment of the situation and the associated potential hazards.

Factsheet III

IDENTIFICATION OF PCB CAPACITORS

Country Profile

Text to be provided by the countries based on their specific national management system and related project (s).

To write the overview we suggest to use **the 5W &H method**. the content should be specific to the country highlighting the aim of the activity and more importantly showcasing its impact.
The examples given here are only indicative. Writers of this section are free to add whatever detail they deem appropriate

Overview of the activity implemented in the country:

Country and specific location

Brief introduction about the country Reason for undertaking this activity (EX: country electricity companies still using PCB contaminated equipment in producing XX% of their power etc…)

Information about projects' timeframe and procedures, and phases of the activities undertaken

Impact: end result of the activity and its impact on the country

The conclusion could be about future needs or challenges.

Factsheet III

IDENTIFICATION OF PCB CAPACITORS

UNEP/MAP- MedPartnership

The Strategic Partnership for the Mediterranean Sea Large Marine Ecosystem (MedPartnership) is a collective effort of leading environmental institutions and organizations together with countries sharing the Mediterranean Sea to address the main environmental challenges that Mediterranean marine and coastal ecosystems face. The project is led by UNEP/MAP and is financially supported by the Global Environment Facility (GEF) and other donors, including the European Commission and all participating countries.

The MedPartnership's overarching goal is to enable a coordinated and strategic approach to catalyze the policy, legal and institutional reforms, and the investments necessary to reverse the degradation trends affecting the Mediterranean, including its coastal habitats, pollution and biodiversity.

Within the framework of the project, UNEP/MAP, through its MEDPOL programme, aims to support countries in the implementation of the SAP-MED (Strategic Action Programme to address pollution from land-based activities in the Mediterranean Region) and associated National Action Plans adopted in accordance with Land Based Sources and Activities Protocol of the Barcelona Convention. The project is supporting the ESM disposal of up to 870 tons PCB as well as undertaking important capacity building activities in four Mediterranean countries, including the preparation of ESM Guidelines for PCB.

The SAP-Med provides for the disposal of all hazardous wastes in a safe and environmentally sound manner and in conformity with the provisions of the Land Based Sources and Activities Protocol of the Barcelona Convention and other international agreed provisions by 2025.

Links

Country links:

Text to be provided by the countries:

Links to country institutions/projects dealing with PCBs management

Other links:

www.unepmap.org
www.themedpartnership.org
www.basel.int
www.chm.pops.int
www.pic.int

Please insert the PCB network website
Watch the PCB documentary

Contact

For further information please contact:

(key persons in the country/ministry

Country:

National MED POL Focal Point,
Other contacts and focal points

Strategic Partnership for the Mediterranean Sea Large Marine Ecosystem
MedPartnership
Together for the Mediterranean Sea

Factsheet IV

PCB OPEN APPLICATIONS

Background

Annex A, Part II (f) of the Stockholm Convention requires that efforts should be made to identify other articles containing more than 0.005 % (50 ppm) PCBs including uses in open applications and to manage them in an environmentally sound manner.

The remediation and management of PCBs in open applications is important because of the relatively high levels of human exposure and environmental releases compared to closed systems and their associated health effects.

Although open application uses accounted for only approximately 21% of the total world production it is estimated that approximately 50% of the total PCB emissions have come from these uses.

What are Open Applications?

Due to their chemical characteristics and stability PCBs mixtures were widely used in open and partially open applications, for example in caulks (sealants), paints, anti-corrosion coatings, small capacitors, and flame retardants.

It is generally believed that PCBs were used in open applications between the 1950s and the early 1980s. However, the time of usage of PCBs in the different applications can vary from country to country.

Open applications are not usually defined as hazardous waste at the time of disposal; so PCBs often find their way into the environment.

PCBs from open applications can be released into the environment also by weathering and inappropriate removal of PCBs containing material

It is important to know that PCBs applications can

be found throughout all industries and public buildings and do not only focus on the electricity utilities, specifically in the Mediterrean Region the Shipbuilding Industry can be an important source of unintentional cross-contamination.

Current national PCB inventory activities mainly focus on closed applications, such as cooling fluids in electrical equipment, e.g. transformers, capacitors, and switches.

Examples of Open Applications

Open applications of PCBs for example include; caulks/sealants, paints, anti-corrosion coatings, surface coatings, cables and cable sheaths, and many more. The largest open application of PCBs has been caulks/sealants as well as anti-corrosion coatings and paints in buildings and other constructions such as metal pipes or machinery.

Extract of open PCB applications:

Caulks (sealants)	Lubricating fluid in oils and grease; cutting oils
Paints and plaster	Flame retardants and impregnating agents
Anti-corrosion coatings (indoors and outdoors)	Adhesives
Surface coatings	Carbonless copy paper
Sealed double glazing windows	Pesticide extenders
Cables and cable sheaths	Inks

Priority Buildings to Check

Many buildings worldwide constructed or renovated specifically between the 1950s and the early 1980s often contain PCBs in a great variety of applications, which emit PCBs into the environment. In buildings PCBs can contribute directly to human exposure via indoor air evaporation and dust.

PCBs in open applications were used in all kind of industrial, public and private buildings as well as in hydro power, nuclear power and water treatment plants, military installations, the car and shipbuilding as well as the mining industry.

UNEP

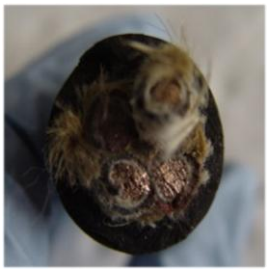
Strategic Partnership for the Mediterranean Sea Large Marine Ecosystem
MedPartnership
Together for the Mediterranean Sea
GEF UNEP

Factsheet IV

PCB OPEN APPLICATIONS

Examples of PCB Open Applications


PCBs in Anti-Corrosion Coating - Power Plants; Pipelines




PCBs in Cable Impregnation and Cable Sheaths


PCBs in small Capacitors (Ballasts)

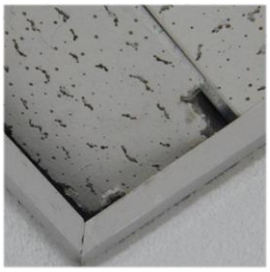
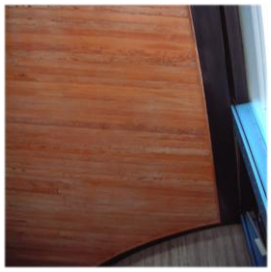

PCBs as Lubricating Fluid in Oils and Grease


PCBs in Caulks (Sealants)


PCBs in Surface Coatings - Floors


PCBs in Paints – Indoor Applications


PCBs in Anti-Corrosion Coatings – Indoor Applications

PCBs as Flame Retardant and Impregnating Agent


PCBs in Adhesives

Strategic Partnership for the Mediterranean Sea Large Marine Ecosystem

Together for the Mediterranean Sea

MedPartnership

GEF UNEP

UNEP

Factsheet IV

PCB OPEN APPLICATIONS

Country Profile

Text to be provided by the countries based on their specific national management system and related project (s).

To write the overview we suggest to use **the 5W &H method**. The content should be specific to the country highlighting the aim of the activity and more importantly showcasing its impact.
The examples given here are only indicative. Writers of this section are free to add whatever detail they deem appropriate

Overview of the activity implemented in the country:

Country and specific location

Brief introduction about the country Reason for undertaking this activity (EX: country electricity companies still using PCB contaminated equipment in producing XX% of their power etc…)

Information about projects' timeframe and procedures, and phases of the activities undertaken

Impact: end result of the activity and its impact on the country

The conclusion could be about future needs or challenges.

Factsheet IV

PCB OPEN APPLICATIONS

UNEP/MAP- MedPartnership

The Strategic Partnership for the Mediterranean Sea Large Marine Ecosystem (MedPartnership) is a collective effort of leading environmental institutions and organizations together with countries sharing the Mediterranean Sea to address the main environmental challenges that Mediterranean marine and coastal ecosystems face. The project is led by UNEP/MAP and is financially supported by the Global Environment Facility (GEF) and other donors, including the European Commission and all participating countries.

The MedPartnership's overarching goal is to enable a coordinated and strategic approach to catalyze the policy, legal and institutional reforms, and the investments necessary to reverse the degradation trends affecting the Mediterranean, including its coastal habitats, pollution and biodiversity.

Within the framework of the project, UNEP/MAP, through its MEDPOL programme, aims to support countries in the implementation of the SAP-MED (Strategic Action Programme to address pollution from land-based activities in the Mediterranean Region) and associated National Action Plans adopted in accordance with Land Based Sources and Activities Protocol of the Barcelona Convention. The project is supporting the ESM disposal of up to 870 tons PCB as well as undertaking important capacity building activities in four Mediterranean countries, including the preparation of ESM Guidelines for PCB.

The SAP-Med provides for the disposal of all hazardous wastes in a safe and environmentally sound manner and in conformity with the provisions of the Land Based Sources and Activities Protocol of the Barcelona Convention and other international agreed provisions by 2025.

Links

Country links:

Text to be provided by the countries:

Links to country institutions/projects dealing with PCBs management

Other links:

www.unepmap.org
www.themedpartnership.org
www.basel.int
www.chm.pops.int
www.pic.int

Please insert the PCB network website
Watch the PCB documentary

Contact

For further information please contact:
(key persons in the country/ministry

Country:

National MED POL Focal Point,
Other contacts and focal points

Strategic Partnership for the Mediterranean Sea Large Marine Ecosystem
MedPartnership
Together for the Mediterranean Sea

Factsheet V

PCB HANDLING, PACKING, TRANSPORT

Maintenance and Repair

When performing light repair or maintenance work on PCB containing electrical devices, safety precautions for the protection of the employees and the environment (leakage) have to be taken.

See Best Working Practices.

Dismantling andPhase-out

Before the phase out or dismantling of PCB containing electrical devices, it has to be checked if there are any damages or leaks. In case of leaks, they have to be sealed for example with a sealing paste prior to any further work, or alternatively a transformer could be drained on site before removal.

During the dismantling of capacitors, the bushings have to be regarded as their «weakest» parts. Especially for high, medium and low voltage capacitors, it is not allowed to hold on to the bushings while carrying them, as they might loosen or break off and cause a spill of PCB containing fluid.

Leaking devices must immediately be placed in a drip tray, an appropriate drum or container to prevent cross-contamination. The surface must be cleaned and if necessary a leakage stop device can be applied. All arising associated waste has to be collected and disposed of as hazardous waste.

Interim Storage

PCB equipment and wastes should generally not be stored inareaswhichare not specifically designed for interim storage of hazardous wastes.

Uncontrolled and inexpert interim storages endanger human health and the environment.

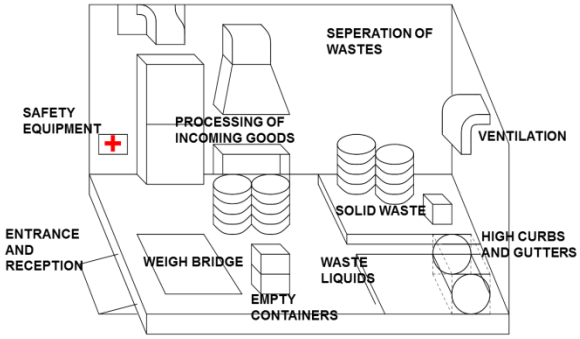
PCB containing devices shall be packed safely and in compliance with the applicable laws as soon as they have been phased out, even if their disposal takes place at a later stage.

Interim Storage of PCB wastes shall never exceed twelve months. Generally, electrical equipment should only be phased out and stored, once an appropriate method of disposal has been chosen(unless the devices are in bad condition).

General Criteria for Interim Storage:

- No nature reserves nearby
- Distance to rivers and groundwater
- Distance to residential or farming areas
- Distance to other industries (e.g. food-processing companies)
- Possible effects of incidents

Possible General Layout of Interim Storage



Packing

Packagingand labelling of PCB wastes must conform to the construction and testing instructions stipulated in the ADR regulations.

Due to safety and handling reasons PCB wastes should ideally be packed into UN approved steel drums: Open head steel drums for solid PCBs, and tight head steel drums for liquids.

In case of liquid PCB, drums must never be completely filled. Approx. 50 mm or 10 % of the volume should be left empty for a possible extension of PCB in case of higher temperatures.

When capacitors are packed into drums, they must always be stored standing upright.

Factsheet V

PCB HANDLING, PACKING, TRANSPORT

Any movement of the waste inside the drum has to be prevented. If the height of the capacitors exceeds the drum, it might be necessary to carefully break off the bushings. Such activities shall only be allowed after the capacitors have been placed into drums. As an additional safety measure, a layer of sawdust should be added to each drum, in order to absorb any liquids if necessary.

Due to their size, transformers can normally not be packed in boxes. Therefore, they have to be prepared and loaded on trucks in such a way, that no contamination of the surrounding materials is possible. Precautions have to be taken to prevent leakage (for example steel drip trays) and secure the devices. The best option, however, remains the draining of cooling fluids into UN approved steel drums before transport.

UN approved drums with PCB wastes are ideally loaded and transported in box containers for national or international transport.

Transport

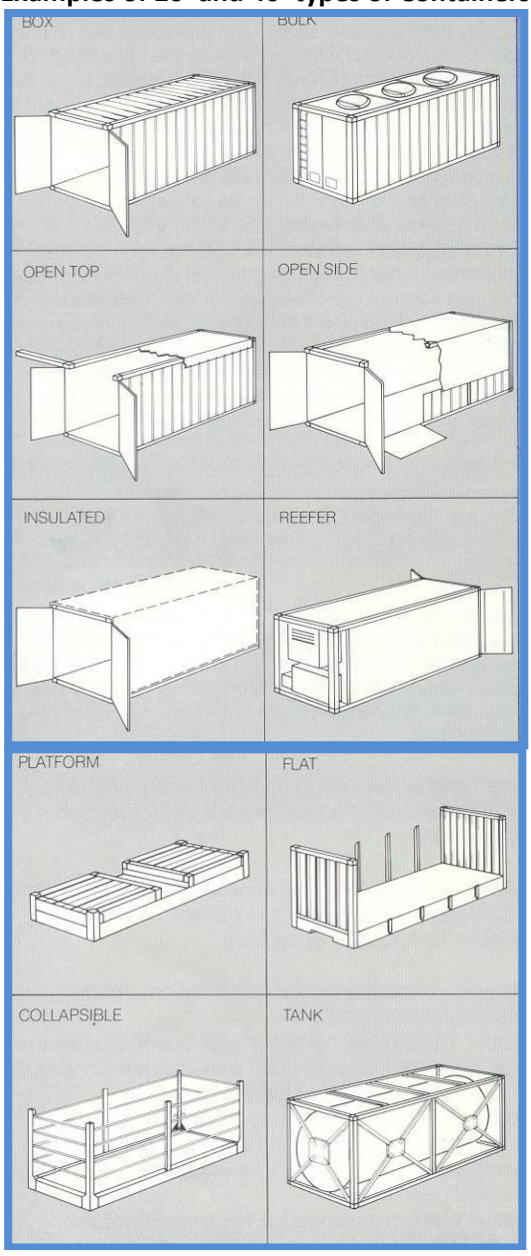
Transport and packing of dangerous goods are regulated by various international regulations, for example the ADR.

In case of international transports also Basel Convention procedures must be considered. In 1989, the Basel Convention on the *"Control of Transboundary Movements of Hazardous Wastes and their Disposal"* was adopted to protect people and the environment from the negative effects of the inappropriate management of hazardous wastes worldwide.

There are different types of sea containers which can be used for the (international) transport of hazardous wastes, and therefore PCB containing wastes. If 20' containers are used, there is space for 72 UN approved drums.

When wastes are transported over long distances, it is particularly important to ensure that the load cannot shift. The load can be ideally secured by ideal utilisation of space and by safety measures like safety straps, antislip wooden boards and air bags. It is also necessary to ensure that the weight of the individual packaging in trucks or containers is evenly distributed. Furthermore, the total gross loading weights, which vary from country to country, must be considered.

Examples of 20' and 40' types of Containers



When transporting (drained) transformers, the devices must be tightened by using sufficiently strong straps fixed to the lifting eyes. The loading is easier if open top containers are used. However, such containers must be covered by a tarpaulin to protect against the rain.

Factsheet V

PCB HANDLING, PACKING, TRANSPORT

There are also special containers for the safe transport of PCB containing transformers that have not been drained. Such units, however, are rather expensive.

Best Working Practices

When performing light repair or maintenance work on PCB containing equipment, the following safety precautions for the protection of the employees and the environment have to be taken:

- Direct contact of the skin with PCB contaminated materials must be avoided by wearing gloves and safety goggles. According to the type of work to be performed, protective clothing and a respiratory mask must also be put at the workers' disposal;
- The working area must be adequately ventilated;
- Spills must be prevented in every case by using drip trays or adequate plastic tarps;
- Every contact of PCBs with a flame or any other heat source over 300 °C and use of a grinder must absolutely be avoided (risk of highly toxic Dioxins and Furans);
- All used tools and other working materials that got in contact with PCBs must be disposed of as PCB contaminated waste in an environmentally sound manner or otherwise have to be decontaminated with an appropriate solvent (technical acetone). The only possible materials to be decontaminated are steel, glass, and ceramics;
- Operations which involve draining, rewinding of coil, etc. may only be performed by companies approved for such task by the appropriate authority.

No person shall handle, offer for transport or transport PCBs unless he is trained to do so, or is performing those activities under the direct supervision of a trained person.

Country Profile

Text to be provided by the countries based on their specific national management system and related project (s).

To write the overview we suggest to use **the 5W &H method**. The content should be specific to the country highlighting the aim of the activity and more importantly showcasing its impact.
The examples given here are only indicative. Writers of this section are free to add whatever detail they deem appropriate

Overview of the activity implemented in the country:

Country and specific location

Brief introduction about the country Reason for undertaking this activity (EX: country electricity companies still using PCB contaminated equipment in producing XX% of their power etc…)

Information about projects' timeframe and procedures, and phases of the activities undertaken

Impact: end result of the activity and its impact on the country

The conclusion could be about future needs or challenges.

Factsheet V

PCB HANDLING, PACKING, TRANSPORT

UNEP/MAP- MedPartnership

The Strategic Partnership for the Mediterranean Sea Large Marine Ecosystem (MedPartnership) is a collective effort of leading environmental institutions and organizations together with countries sharing the Mediterranean Sea to address the main environmental challenges that Mediterranean marine and coastal ecosystems face. The project is led by UNEP/MAP and is financially supported by the Global Environment Facility (GEF) and other donors, including the European Commission and all participating countries.

The MedPartnership's overarching goal is to enable a coordinated and strategic approach to catalyze the policy, legal and institutional reforms, and the investments necessary to reverse the degradation trends affecting the Mediterranean, including its coastal habitats, pollution and biodiversity.

Within the framework of the project, UNEP/MAP, through its MEDPOL programme, aims to support countries in the implementation of the SAP-MED (Strategic Action Programme to address pollution from land-based activities in the Mediterranean Region) and associated National Action Plans adopted in accordance with Land Based Sources and Activities Protocol of the Barcelona Convention. The project is supporting the ESM disposal of up to 870 tons PCB as well as undertaking important capacity building activities in four Mediterranean countries, including the preparation of ESM Guidelines for PCB.

The SAP-Med provides for the disposal of all hazardous wastes in a safe and environmentally sound manner and in conformity with the provisions of the Land Based Sources and Activities Protocol of the Barcelona Convention and other international agreed provisions by 2025.

Links

Country links:

Text to be provided by the countries:

Links to country institutions/projects dealing with PCBs management

Other links:

www.unepmap.org
www.themedpartnership.org
www.basel.int
www.chm.pops.int
www.pic.int

Please insert the PCB network website
Watch the PCB documentary

Contact

For further information please contact:

(key persons in the country/ministry

Country:

National MED POL Focal Point,
Other contacts and focal points