National Pollutant Release Inventory Submittal Form
- Proposal for a Modification to the NPRI -

Please complete this form to propose a modification to the National Pollutant Release Inventory (NPRI) and forward to :

Attention: Co-ordinator for Proposals for Modifications (NPRI)
Consultations and program Development
The National Pollutant Release Inventory
Environment Canada
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- Section 1 -

Name of contact: Environmnet Canada - NPRI			
Company Name:			
Address:			
Please indicate the details of the proposal:			
Modification Requested	**x**	**Substance Name & CAS # (if applicable)**	**Other (e.g. suggested threshold, reporting condition, other)**
Addition of Substance Listing 1 **(Harmonized with US-TRI)**	**x**	**PCBs (CAS # 1336-36-3);**	**- at a 5 kg MPO threshold;** **- no 1 % concentration exemption for by-products.** **- de-minimus concentration of 50 ppm.**
Listing 2 **(Requirement under POPs Protocol)**	**x**	**Co-planar PCBs**[1] 3,4,4',5-TCB (CAS # 70362-50-4) 3,3',4,4'-TCB (CAS # 32598-13-3) 3,3',4,4',5-PeCB (CAS # 57465-28-8) 2,3,3',4,4'-PeCB (CAS # 32598-14-4) 2,3,4,4',5-PeCB (CAS # 74472-37-0) 2,3',4,4',5-PeCB (CAS # 31508-00-6) 2',3,4,4',5-PeCB (CAS # 65510-44-3) 3,3',4,4',5,5'-HxCB (CAS # 32774-16-6) 2,3,3',4,4',5-HxCB (CAS # 38380-08-4) 2,3,3',4,4',5'-HxCB (CAS # 69782-90-7) 2,3',4,4',5,5'-HxCB (CAS # 52663-72-6) 2,3,3',4,4',5,5'-HpCB (CAS # 39635-31-9)	**- 0.1 g** **- no employee threshold**

[1] TCB = Tetrachlorobiphenyl
PeCB = Pentachlorobiphenyl

Proposed timing for the Change (proposed year for implementation): 2003 consultation (i.e. 2004 Gazette Notice).

Industry Sectors affected :

PCBs are a group of 209 halogenated aromatic hydrocarbons that were commercialy used and sold in North America as mixtures of isomers, primarily under the trade names Aroclor and Askarel. Approximately 40 000 tonnes of PCBs were imported into Canada prior to 1977. PCBs were never manufactured in Canada; PCB production in the United States was halted in 1977 under the *Toxic Substances Control Act.* In Canada, PCBs were the first substances to be regulated under the *Environmental Contaminants Act* (1976). Their use as a constituent in new products manufactured in or imported to Canada was prohibited by *Chlorobiphenyl Regulations No. 1* (1977) and subsequent amendments .

PCBs were used in a wide range of applications such as heat transfer agents in electrical transformers and capacitors, hydraulic systems, heat transfer systems, air conditioners, pumps and fans. Other uses included hydraulic fluids and lubricants, plasticizers and investment castings. Uses were due to a specialized combination of properties including high dielectric constant (good insulator), low flammability, high heat capacity, low chemical reactivity, long term resistance to degradation and low acute toxicity. A fair amount of PCB -containing equipment still exists but is rapidly being phased- out and replaced with PCB-free alternatives. Of the PCBs (primarily in electrical equipment) that have been imported into Canada over the years: 40% remain in service, 15% have been destroyed, 15% are in storage, and 30% are unaccounted for. Total phase-out of **use of** PCB-containing electrical equipment in Canada has been set for 2020.

PCB waste generated by the use and the decommissioning of this equipment is either treated for reuse and recovery or incinerated.

Incidentally manufactured PCBs

PCBs are incidentally manufactured and released in effluents of magnesium manufacturing processes and chemical manufacturing processes. These incidentally manufactured PCBs can also become a part of the manufactured product such as in the dye and pigment manufacturing processes.

PCBs and co-planar PCBs are generated in incineration processes for wastes and PCB wastes. Sources for these emissions are expected to be the same as those for dioxins and furans.

All PCB mixtures, other than co-planar PCBs, would be captured by the first listing of 5kg MPO, with no set deminimus concentration. Coplanar PCBs, considered more toxic and capable of long range transport, will require individual congener reporting by the Stockholm Persistent Organic Pollutants (POP) Convention in 2006.

HxCB = Hexachlorobiphenyl
HpCB = Heptachlorobiphenyl

- Section 2 -

* This section must be completed for proposals for the addition or deletion of NPRI substances.

Decision Factors[2]

1. Does the substance meet the NPRI criteria, that is:

(i) Is the substance manufactured, processed or otherwise used (M,P,O)[3] *in Canada?*
(ii) Is the substance of health and/or environmental concern?
(iii) Is the substance released to the Canadian environment?
(iv) Is the substance present in the Canadian environment?

The first two criteria are intended to be absolute, in the sense that a substance must be M,P,O in Canada, and of health and/or environmental concern, to be added to the NPRI; and similarly, if these criteria are not satisfied for a substance currently on the NPRI, it should be deleted.

The third and fourth criteria indicate that there should be reasonable expectation that a substance is being or may be released into the Canadian environment in order that it be added to or retained on the NPRI. In general, however, unless there is evidence or analysis to the contrary, it can reasonably be assumed that a substance that is M,P,O in Canada is likely to be released, and therefore present, in the Canadian environment.

(1) Is the Substance MPOed in Canada ?

Yes. It is still in use in electrical equipment and processed for destruction or decontamination. Historically, PCBs entered the air, water, and soil during the course of PCB equipment operation, servicing, maintenance, decommissioning, transportation or storage. Wastes that contained PCBs were also generated during these same activities, and before being regulated these wastes were often placed in landfills.

Today, PCBs may still enter in the environment

- from accidental spills and leaks during the transport of this chemical,
- from leaks, spills or fires in transformers, capacitors, or other products containing PCBs,
- from hazardous waste processing sites, or
- improper disposal of PCB wastes such as used transformer fluids and/or consumer products such as fluorescent light ballasts into municipal or other landfills not designed to handle hazardous waste.

PCBs generated incidentally during manufacturing operations may become part of the manufactured products, be released in effluents or transferred off site for disposal.

PCBs and co-planar PCBs may be released into the environment by the burning of some wastes in municipal, industrial and hazardous wastes incinerators.

(2) Is the substance of health or environmental concern?

[2] These decision factors are applicable to candidate substances at both 10-tonne and alternate thresholds.
[3] For the purposes of the NPRI, the definition of M,P,O includes by-products. A by-product is an NPRI substance that is incidentally manufactured, processed or otherwise used at a facility and is released to the environment and transferred off site for disposal.

Yes - PCBs are CEPA toxic and Track 1 substances slated for virtual elimination. Virtual elimination is the reduction of releases to the point where they can no longer be measured. Time deadlines on the use of PCB equipment and the storage of PCB material are being proposed under the new CEPA PCB Regulations and the amendments to the Storage of PCB Material Regulations.

Summary of Health Effects

PCBs have been demonstrated to cause a variety of adverse health effects, including cancer in animals. Health effects that have been associated with exposure to PCBs in humans and/or animals include liver, thyroid, dermal and ocular changes, immunological alterations, neurodevelopmental changes, reduced head circumference and birth weight, and reproductive toxicity. The different health effects of PCBs may be interrelated, as alterations in one system may have significant implications for the other systems of the body. However, it is generally agreed within the scientific community, that short-term, low-level exposure to PCBs is unlikely to have a significant health impact. Coplanar PCBs however, are known to have dioxin-like toxicity and therefore are toxic at very low levels.

All PCB congeners are not equally toxic. The actual effect depends on the dose and type of PCB. It is unlikely that PCBs initiate cancer, but they act as promoters once growth has begun. The International Agency for Research on Cancer (IARC) has classified PCBs as probably carcinogenic to humans (Group 2A). There is limited evidence for carcinogenicity in humans, but sufficient evidence in animals to link long-term high level exposure to highly chlorinated PCB mixtures and an increased incidence of cancer, particularly liver cancer.

The EPA has determined that PCBs are probable human carcinogens and assigns them the cancer weight-of-evidence classification B2 (IRIS 2000). The Department of Health and Human Services (EPA) concluded that PCBs are reasonably anticipated to be carcinogenic in humans based on sufficient evidence of carcinogenicity in animals.

(3) & (4) Is the substance released or present in the Canadian environment ?

Yes. PCBs are considered to be present everywhere. Once in the environment, PCBs do not readily break down and therefore may remain for very long periods of time.

Since October of 1977, PCBs have not been produced commercially in North America. Current evidence suggests that the major source of PCB release to the environment is an environmental cycling process of PCBs previously introduced into the environment, combined with long-range transport through air. This cycling process involves volatilization from ground surfaces (water, soil) into the atmosphere with subsequent removal from the atmosphere via wet/dry deposition and then revolatilization. As discussed in (1) above, PCBs are also currently released to the environment from landfills containing PCB waste materials and products, incineration of municipal refuse and sewage sludge, and improper disposal of PCB materials. In general, the persistence of PCBs increases with an increase in the degree of chlorination. Mono-, di- and trichlorinated biphenyls (Aroclor 1221 and 1232) biodegrade relatively rapidly, tetrachlorinated biphenyls (Aroclors 1016, 1242 and 1248) biodegrade slowly, and higher chlorinated biphenyls (Aroclors 1254 and 1260) are resistant to biodegradation.

Also, the lighter the type of PCBs, the further they may be transported from the source of contamination. PCBs are present as solid particles or as a vapour in the atmosphere. They will eventually return to land and water by settling as dust or in rain and snow. In water, PCBs may be transported by currents, attach to bottom sediment or particles in the water, and evaporate into air. Heavy kinds of PCBs are more likely to settle into sediments while lighter PCBs are more likely to evaporate to air. Sediments that contain PCBs can also release the PCBs into the surrounding water. PCBs stick strongly to soil and will not usually be carried deep into the soil with rainwater. They do not readily break down in soil and may stay in the soil for months or years; generally, the more chlorine atoms that the PCBs contain, the more slowly they break down. Evaporation appears to be an important way by which the lighter PCBs leave soil. As a gas, PCBs can accumulate in the leaves and above-ground parts of plants and food crops.

PCBs are taken up into the bodies of small organisms and fish in water. They are also taken up by other animals that eat these aquatic animals as food. PCBs especially accumulate in fish and marine mammals (such as seals and whales) reaching levels that may be many thousands of times higher than in water. PCB levels are highest in animals towards the top of the food chain.

Human exposure to PCBs is primarily through the ingestion of food, mostly from contaminated fish and wildlife. Depending on the age of the fish and the lake of origin, concentrations in the range of 0.85 mg/kg wet weight are observed. Other reported resources are milk, milk products and mother's milk. Based on most recent results form from the Canadian Total Diet Program and other information, the estimated daily intake of PCBs from all sources for the average Canadian is approximately 0.1 microgram per day. Uncontrolled fires are considered to be a much more significant threat to human health than ingestion.

2. *Do facilities contribute significant releases of the substance?*

There are various ways in which 'significant' can be characterized. The concept relates not only to the proportionate quantity of a substance released by NPRI reporting facilities, but also to the potential for health or environmental impacts. In other words, even if facilities do not account for a major proportion of total releases, facility releases may nonetheless be significant depending on such factors as location, timing, concentration, and the hazard associated with the substance.

Yes. 171 reports were generated in the US by the TRI in the year 2000. This was for a single listing of PCBs with a 5 kg or 10 lb threshold.

- On and off-site **releases** of PCBs totalled 1.5 million pounds. On-site releases to land, accounted for 94%of all releases, or 1.37 million lbs, specifically to RCRA subtitle C landfills (including bulk wastes with less than 500 ppm PCBs). Air releases were only 854 pounds (0.4 % of all releases).

  Quantities of PCBs **in waste** totalled 13.7 million pounds in 2000. Most of this (87%) was treated on site.

3. *Does inclusion of the substance support one or more of the objectives of NPRI?*

The following are the NPRI objectives:

- To identify priorities for action
- To encourage voluntary action to reduce releases
- To allow tracking of progress in reducing releases
- To improve public understanding
- To support targeted regulatory initiatives

Yes. Addition of PCBs to the NPRI would support all five targets listed above as well as national reporting of

- **PCB emissions** from the burning of some wastes in municipal and industrial incinerators (i.e. PCB and coplanar PCBs);
- Emissions or releases of incidentally generated PCBs **in manufacturing processes;**
- PCB releases to and from landfills or waste processing sites, that meet the 10 employee a year threshold;
- PCB leaks or releases from the operation, decommissioning, storage or transportation of equipment containing PCBs. Note that provinces usually require spill reporting of PCB liquids containing more than 50 ppm after an event. NPRI on the other hand would require the annual total in grams (or loading) of PCBs released to the environment, regardless of concentration.

4. Is the substance reported elsewhere? Or if it is reported elsewhere, is there nonetheless additional value in reporting to the NPRI?

If a substance is reported elsewhere, the value of adding it to the NPRI, or of deleting it from the NPRI, would be considered in relation to whether:

- The information on the substance is as readily available to the public as it would be through the NPRI;
- The information is available at the facility level;
- The information is comparable in terms of quality and comprehensiveness as that required by the NPRI; and
- The type of data is comparable (e.g., absolute quantities versus concentration).

If a substance that is reported elsewhere is to be included or retained on the NPRI list, to the greatest extent possible, efforts will be made to consolidate reporting under the NPRI (assuming potential compatibility of data requirements)[4].

Yes. There are several regulations in place to deal with the use, storage, import and export of PCB wastes, federal treatment and destruction of PCBs (listed below). However none of them as of yet, report nationally on:

- PCB leak or **release** from the operation, decommissioning, storage, or transportation of equipment containing PCBs; and.
- **PCB emissions** from the burning of some wastes in municipal and industrial incinerators (i.e. PCB and coplanar PCBs);
- Emissions or releases of **incidentally** generated PCBs in **manufacturing processes;**
- PCB releases to and from landfills or waste processing sites, that meet the 10 employee a year threshold.

Nationally

(1) The *Chlorobiphenyls Regulations* (PCBs) are governed by the *Canadian Environmental Protection Act* (CEPA). These Regulations address the manufacture, use, storage, import, export, treatment and destruction of PCBs in Canada.
(2) *The Storage of PCB Material Regulations* include provisions for secure access, maintenance and storage practices, fire protection, emergency planning, labeling, record maintenance and reporting waste inventories. Both of these sets of regulations are currently in the process of being amended.
(3) *The Federal Mobile PCB Treatment and Destruction Regulations* apply to mobile systems for the treatment and destruction of chlorobiphenyls that are operated on federal lands or operated by or under contract with federal institutions.
(4) The *PCB Waste Export and proposed Import Regulations* establish strict controls on the export of PCB waste, that are an enhancement of similar controls already in place for hazardous waste under the Export and Import of Hazardous Wastes Regulations. Further, these regulations propose that imports of PCBs to Canada be carefully tracked, and be only for purposes of final destruction in an environmentally sound manner.

Canada is signatory to, or is negotiating to enact, several international agreements on the phase-out of a number of persistent toxic substances including PCBs. Environment Canada has therefore proposed revisions to the existing Chlorobiphenyl Regulations of the Canadian Environmental Protection Act (CEPA) that would set specific dates for the complete destruction of all PCBs in service and in storage.

[4] In sum, the NPRI is recognised as a key national emissions database; and where a substance falls within the NPRI's mandate, efforts will be devoted to ensuring a single window approach through the NPRI.

Internationally

In May 2001, Canada was the first country to ratify the Stockholm Convention on Persistent Organic Pollutants (POPs), which identified co-planar PCBs as one of twelve problematic substances for which comprehensive global action is required. The Convention includes a commitment by Canada and other developed nations to work co-operatively with developing countries, and to provide financial and technical support to help them undertake their obligations and find cost-effective alternatives to the use of POPs such as PCBs.

The North American Agreement for Environmental Cooperation (NAAEC), a side-agreement to the North American Free Trade Agreement (NAFTA), requires Canada, USA and Mexico to report annually to the North American Commission on Environmental Cooperation (NACEC) on their respective environmental enforcement activities. A trilateral agreement has been struck among the parties to achieve virtual elimination of the use of high level PCBs by 2008.

Canada is also one of the original signatories to the Basel Convention; a global convention under the United Nations to control the transboundary movement of hazardous wastes and their disposal.

5. Is the substance already on the NPRI in some form? If it is already on the NPRI in some form, is there nonetheless additional value in including it in another form?

When considering adding a substance in another form (e.g., tetraethyl lead as a separate listing from lead and its compounds), the potential for double-counting will be avoided. For example, a compound will not be both listed as an individual substance, and included as part of an aggregate category. To the extent possible, substances will be listed with their Chemical Abstracts Registry (CAS) numbers.

No. PCBs have never been added to the NPRI.

References

1) Environment Canada's PCB Website: http://www.ec.gc.ca/pcb.
2) Scientific Justification - PCBs- March 1997. Candidate Substance for Management under Track 1 of the Toxic Substances Management Policy. Available from http://www.ec.gc.ca/pcb/pcb24/eng/syn_e.htm.
3) US EPA's PCB Website: http://www.epa.gov/oppt/pcb/index.html.
4) Health Effects of PCBs. Available from http://www.epa.gov/oppt/pcb/index.html
5) Polychlorinated biphenyls. ATSDR Toxicological Profile Information Sheet: http://www.atsdr.cdc.gov/toxpro2.html#-P-
6) PCBs and Human Health. In Health Canada's website, It's Your Health: http://www.hc-sc.gc.ca/ehp/ehd/catalogue/general/iyh/pcb.htm.
7) Chapter 3. 2000 Toxics Release Inventory Data for PBT Chemiclas. Reported PCB releases and transfers data for 2000. Available from http://www.epa.gov/tri/.

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