Background Notes on the Stockholm Convention on Persistent Organic Pollutants (POPs)

What does the Stockholm Convention aim to achieve?
The overall objective of the convention is to protect human health and the environment from POPs.

What are persistent organic pollutants?
Persistent Organic Pollutants (POPs) are chemical substances that persist in the environment, bioaccumulate through the food web, and pose a risk of causing adverse effects to human health and the environment. There is clear evidence of long-range transport of these substances to regions where they have never been used or produced, posing threats to the environment of the whole globe.

What chemicals does the Stockholm Convention cover?
The organochlorine (chlorine-containing) chemicals listed as POPs under the convention are:

- 9 pesticides: aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, mirex, hexachlorobenzene, and toxaphene.
- PCBs (polychlorinated biphenyls);
- dioxins and furans (polychlorinated dibenzo-p-dioxins or PCDDs, and polychlorinated dibenzofurans or PCDFs).

Why are these chemicals considered dangerous?
Organochlorines are stored in body fat and accumulate through the food chain. Even a low concentration of emissions to the environment can build up over time into a significant risk to the health of people and animals, including birds and marine mammals. POP chemicals include some of the most toxic chemicals known to human kind. [See UNEP press release dated 14 May 2004].

What was New Zealand’s use of these POP chemicals?

**Organochlorine pesticides**
From the mid 1940s until the 1970s some persistent organochlorine pesticides (including DDT, dieldrin) were used widely in New Zealand. The main areas of use were agriculture, horticulture, timber treatment and public health (Table 1). Smaller amounts were also used for amenity purposes and in households.

The use of pesticides in New Zealand was not subject to compulsory regulatory control until the Agricultural Chemicals Act 1959 established the Agricultural Chemicals Board. The use of persistent organochlorine pesticides was then progressively restricted by a succession of legislative measures, so that, by the mid 1970s their use had effectively ceased in agriculture and horticulture. All persistent organochlorine pesticides except PCP were formally deregistered by the Pesticides Board in 1989, and PCP was deregistered in 1991.
Table 1  Summary of the historical usage of persistent organochlorine pesticides in New Zealand

<table>
<thead>
<tr>
<th>Pesticide</th>
<th>Application</th>
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<tbody>
<tr>
<td>DDT</td>
<td>Used as a pasture insecticide to control grass grub (Costelytra zealandia) and porina (Wiseana sp.) caterpillars. Frequently mixed with fertiliser or lime and applied particularly to agriculture pastures, as well as lawns, market gardens and parks.</td>
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<tr>
<td>Aldrin and dieldrin</td>
<td>Introduced in 1954 for use as stock remedies in sheep sprays or dips for controlling sheep ectoparasites. Aldrin was used to control horticultural pests such as wireworm, soldier fly and blackvine weevil, and in limited quantities to control household spiders. Dieldrin was used for controlling carrot rust fly, crickets and armyworm and was also used for timber preservation (mostly in plywood glues) and to mothproof carpets.</td>
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<tr>
<td>Chlordane</td>
<td>Broad spectrum agricultural insecticide, also used in the timber industry as a treatment against termites and borer, and as an insecticide in glues used for the manufacture of plywood, finger jointed and laminated timber.</td>
</tr>
<tr>
<td>Hexachlorobenzene (HCB)</td>
<td>Used experimentally between 1970 and 1972 as a seed-dressing fungicide for cereal grain.</td>
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<tr>
<td>Heptachlor, endrin and toxaphene</td>
<td>Only small amounts of these pesticides were ever used in New Zealand. (Endrin and toxaphene were not included in the New Zealand survey).</td>
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<tr>
<td>Other organochlorines</td>
<td></td>
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<tr>
<td>Lindane (γ-HCH)</td>
<td>Used as an insecticide in agriculture for the control of lice on cattle, ectoparasites (lice, keds and blowflies) in sheep and grass grub in pasture. Also used for insect control on vegetables and in orchards. Household use: flyspray, flea control, and carpet moth.</td>
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<tr>
<td>PCP</td>
<td>In the order of 5,500 tonnes of PCP is estimated to have been used in the New Zealand timber industry over a 35 to 40-year period as an antisapstain (fungicidal) treatment for freshly cut timber (mainly Pinus radiata). Its use in the timber industry ceased in 1988. PCP was also used to a relatively minor extent by the pulp and paper industry and the tanning industry, in mushroom culture in home gardens and on roofs to control moss and algae.</td>
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**Polychlorinated biphenyls**

PCBs were used widely in industry as electrical transformer fluids, heat transfer fluids, hydraulic fluids, solvent extenders, flame retardants, plasticisers, dielectric fluids, some paints and printing inks, immersion oils and sealants. The unusual industrial versatility of PCBs is directly related to their chemical and physical properties, which include resistance to acids and bases, compatibility with organic materials, resistance to
oxidation and reduction, excellent electrical insulating properties, thermal stability, and non-flammability.

The widespread use of PCBs, coupled with industrial accidents and improper disposal has resulted in significant environmental contamination by these chemicals in many countries, particularly within the more industrialised northern hemisphere. Most NZ stocks of PCBs have already shipped overseas and destroyed in a nationwide recall of PCBs used in the electrical supply industry. New Zealand is committed to complete the PCB replacement programme by 2014.

‘Dioxin’ is a generic term to describe a family of chlorine-containing chemicals called dioxins and furans. These unwanted and highly toxic ‘by-product’ chemicals are formed in very small amounts when chlorine is present in some industrial processes, and during the burning (combustion, incineration) of organic materials.

Historically what were New Zealand’s main industrial sources of dioxin?
Past releases of dioxin into the environment resulted mainly from three industrial activities. The chlorinated chemicals, pentachlorophenol (PCP) and 2,4,5-T, contained dioxin impurities. PCP, widely used as a fungicidal and preservative treatment of timber, was voluntarily phased out by the timber industry in 1988 and is no longer used. The herbicide 2,4,5-T is no longer manufactured or imported. Also, advances in pulp processing mean that elemental chlorine is no longer used in the manufacture of bleached paper – previously a source of dioxin formation.

Have other countries signed the Stockholm Convention?
There are 151 signatories to the convention, as of September 2004; New Zealand is likely to be the 78th ratified party.

What will be New Zealand’s first convention obligation?
The Ministry for the Environment is to prepare a National Implementation Plan by September 2006 that will set out how NZ plans to implement convention obligations. NZ will utilise and update the information gained under the Ministry’s organochlorine research programme that began in 1995, consolidate existing work (e.g. stockpiles and wastes, clean up of contaminated sites, dioxin emissions reduction) and assess the need for new work.

What is New Zealand already doing towards meeting Stockholm Convention obligations?

Stockpiles and wastes
The Ministry for the Environment, working with local government, is undertaking a national collection of agricultural chemicals in rural New Zealand. The program has two stages, firstly to remove as much as possible the historical legacy of agrochemicals stored in rural sheds across the country. A key focus is the removal of POP pesticides. The second stage is to put in place a longer-term industry led extended producer responsibility (EPR) solution to manage and dispose of future unwanted chemicals to ensure that we do not recreate the same problem again in the future.

Clean up of contaminated sites
- The Government has established a Contaminated Sites Remediation Fund to assist local government to assess and clean up contaminated sites, including sites contaminated by POPs chemicals. The first major expenditure from the fund is being used to clean up one of New Zealand’s worst contaminated site at Mapua (contaminated by DDT and dieldrin).

Dioxin emissions reduction:

- New Zealand is obligated under the convention to take measures to reduce, and where feasible ultimately eliminate, releases of dioxin.
- As a first measure, the Ministry for the Environment has developed National Environmental Standards (NES) as regulations under the Resource Management Act 1991. The NES for Certain Air Pollutants, Dioxins and Other Toxics, bans certain activities that produce dioxins and other air toxins. The activities, banned from 8 October 2004 comprise:
  - burning insulated copper wire, oil or tyres in the open
  - burning road seal
  - high-temperature incineration of hazardous waste (except for three facilities that have existing resource consents)
  - low-temperature waste incineration in schools and hospitals (unless the facility has a resource consent)
- The Ministry undertook an evaluation of dioxin releases (NZ Inventory of dioxin emissions to air, land and water, and reservoir sources, Ministry for the Environment, 2000). This work was followed up by an assessment of the NZ metallurgical industry (Dioxin and Furan Emissions to Air from Secondary Metallurgical Processes in New Zealand, Ministry for the Environment, 2004).

How much do we know about dioxin in New Zealand?
The Ministry for the Environment has researched and reported on the amount of dioxin in our air, water, soil, and food. In addition, the Ministry assessed the levels of dioxins in the bodies of New Zealanders and appraised health risks. See www.mfe.govt.nz/publications/hazardous/index.html#organochlorines.

How do our dioxin levels compare internationally?
Background levels of dioxins in the New Zealand environment are generally low compared with the levels recorded in many other countries. The levels of dioxins in New Zealand foods, including our meats, dairy products and fish, are also low. According to the Ministry for the Environment’s 2001 serum study, the average concentration of dioxins in New Zealanders, aged 15 years and older, was 12.8 ng TEQ per kilogram of body fat. When looking at comparable results from other developed countries, the concentrations of dioxins in the serum of adult New Zealanders tend to be towards the lower end of the range, particularly for the younger age groups.
Stockholm Convention on POPs to become international law, launching a global campaign to eliminate 12 hazardous chemicals

Stockholm, 14 May 2004 – The 2001 Stockholm Convention on Persistent Organic Pollutants (POPs) enters into force on Monday, May 17, marking the start of an ambitious international effort to rid the world of PCBs, dioxins and furans, and nine highly dangerous pesticides.

"The Stockholm Convention will save lives and protect the natural environment – particularly in the poorest communities and countries – by banning the production and use of some of the most toxic chemicals known to humankind," said Executive Klaus Toepfer of the United Nations Environment Programme (UNEP), under whose auspices the Convention was adopted.

"Over the next several years national investments plus donor pledges of hundreds of millions will channel more than five hundred million dollars into an overdue and urgently needed initiative to ensure that future generations do not have to live as we do with measurable quantities of these toxic chemicals stored in their bodies," he said.

Much of this funding will be managed by the Global Environment Facility, which serves as the financial mechanism for the Convention on an interim basis.

Of all the pollutants released into the environment every year by human activity, POPs are amongst the most dangerous. For decades these highly toxic chemicals have killed and sickened people and animals by causing cancer and damaging the nervous, reproductive and immune systems. They have also caused uncounted birth defects.

Governments will seek a rapid start to action against POPs when they meet for the first meeting of the Conference of the Parties to the Convention (COP 1) in Punta del Este, Uruguay in the first week of May, 2005. They will fast-track efforts to:

• reduce or eliminate the carcinogenic chemicals known as dioxins and furans, which are produced unintentionally as by-products of combustion. Many of the required improvements in technologies and processes may prove expensive and technically challenging, particularly for developing countries.
• assist countries in malarial regions to replace DDT with the increasingly safe and effective alternatives. Until such alternatives are in place, the Convention allows governments to continue using DDT to protect their citizens from malaria – a major killer in many tropical regions.

• support efforts by each national government to develop an implementation plan. Already, over 120 developing countries have started to elaborate such plans with funds from the Global Environment Facility. The COP will also focus on channelling new funds into POPs projects.

• measure and evaluate changes in the levels of POPs in the natural environment and in humans and animals in order to confirm whether the Convention is indeed reducing releases of POPs to the environment.

• establish a POPs review committee for evaluating additional chemicals and pesticides to be added to the initial list of 12 POPs.

• finalize guidelines for promoting “best environmental practices” and “best available techniques” that can reduce and eliminate releases of dioxins and furans.

In addition to banning the use of POPs, the treaty focuses on cleaning up the growing accumulation of unwanted and obsolete stockpiles of pesticides and toxic chemicals that contain POPs. Dump sites and toxic drums from the 1950s, ’60s, and ’70s are now decaying and leaching chemicals into the soil and poisoning water resources, wildlife and people. The Convention also requires the disposal of PCBs and PCB-containing wastes.

Every human in the world carries traces of POPs in his or her body. POPs are highly stable compounds that can last for years or decades before breaking down. They circulate globally through a process known as the "grasshopper effect". POPs released in one part of the world can, through a repeated process of evaporation and deposit, be transported through the atmosphere to regions far away from the original source.

Fortunately, there are alternatives to most POPs. The problem has been that high costs, a lack of public awareness, and the absence of appropriate infrastructure and technology have often prevented their adoption. Solutions must be tailored to the specific properties and uses of each chemical, as well as to each country's climatic and socio-economic conditions.

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