

Reporting on persistent organochlorines in New Zealand

A report, "Reporting on Persistent Organochlorines in New Zealand", was released by the Minister for the Environment on 22 September 1998.

The report presents a summary of the findings of surveys into the levels of organochlorine contaminant levels in the New Zealand environment, and in food products purchased from retail outlets in New Zealand.

"This ground-breaking research shows that the level of these contaminants in air, soil and water are 'generally low' and that New Zealanders have one of the lowest dietary intakes of these chemicals in the western world", Mr Upton said.

"While providing some comfort, this leaves no room for complacency. We will not use these findings to pat ourselves on the back. Rather, this research will assist the Government in preparing national environmental standards and guidelines for these contaminants to safeguard the health of New Zealanders and the quality of our environment".

The summary report, and the full and highly detailed scientific reports (available in October, see order form this bulletin), will be placed on the Ministry's website: <http://www.mfe.govt.nz/issues/waste/organo.htm>

A copy of the summary report "Reporting on Persistent Organochlorines in New Zealand", is also available (free) from the Ministry for the Environment and can be ordered from Publications, Ministry for the Environment, by phone 04 917 7400, fax 04 917 7523, or email <publications@mfe.govt.nz>, or by writing to

In Bulletin 7:

- Reporting on persistent organochlorines in New Zealand
- Organochlorines Programme public consultation
- Organochlorine body burdens
- Dioxins, PCBs and pesticide contaminants in breast milk
- WHO re-evaluation of the tolerable daily intake for dioxins
- Inventory of dioxin emissions
- UNEP POPs negotiations

Publications, Ministry for the Environment, PO Box 10-362, Wellington.

Public meetings are being held to present the findings of the research (see notice in this Bulletin) as part of the public consultation process previously outlined in Bulletin 6.

Environmental Survey of Organochlorines

The survey to measure environmental levels of dioxins, polychlorinated biphenyls (PCBs), organochlorine pesticides and chlorophenols, was a major 3-year study and the most comprehensive undertaken in New Zealand. After rigorous international scientific peer review, the following scientific reports are to be published October - November 1998.

- *Ambient concentrations of selected organochlorines in soils*
- *Ambient concentrations of selected organochlorines in rivers*
- *Ambient concentrations of selected organochlorines in estuaries*
- *Ambient concentrations of selected organochlorines in air*

These reports will provide, for the first time, definitive data on organochlorine contaminant levels throughout the New Zealand environment. The



purpose of the investigations was to determine background levels around the country. These data provide a baseline against which to compare levels found in contaminated areas.

Each report will include detailed information on where and how samples were collected, and the methods used to measure the organochlorine contaminants. The concentration results for all samples will be fully tabulated, along with supporting quality assurance data. In addition, the reports summarise available overseas standards and guidelines for dioxins and PCBs in environmental media, and provide a comparison of organochlorine concentrations measured in New Zealand with values measured in other countries.

The studies show that the levels of organochlorines in the air, soil, rivers and estuaries studied are generally low when compared to other countries that have comparable data.

Dietary study of dioxins and PCBs

This study surveyed the levels of dioxins and PCBs in food produce available at retail outlets in New Zealand (see Bulletin 4 for a description of the study design). The purpose of the study was to estimate the level of dietary uptake of dioxins and PCBs by the New Zealand population. The findings of this work are reported in *Concentrations of PCDDs, PCDFs and PCBs in retail foods and an assessment of dietary exposure for New Zealanders*.

Included in this publication is a summary of international food standards for dioxins and PCBs, and a review of estimated dietary exposures to dioxins for populations in other countries.

The study shows that New Zealanders dietary exposure to dioxins and PCBs is lower than that reported for all other countries that have undertaken a comparable survey.

Organochlorines Programme Public Consultation

The Ministry for the Environment is undertaking a “road-show” on the Organochlorines Programme from 30 September to 14 October 1998.

The aim of the tour is to begin the process of public consultation on the development of national environmental standards (NES) for dioxins and PCBs. The standards will be the first NES developed under the Resource Management Act (RMA).

The Ministry will present the scientific findings of the results of the environmental surveys of background levels of organochlorines. As well, **Professor John Giesy**, a foremost authority on **organochlorine ecotoxicology**, will be talking about **environmental impacts** of organochlorines. We hope that the meetings can be run informally to maximise discussion and to hear any concerns that people may have. The meetings will be supported by a public summary of the scientific findings. Details of the public meetings are:

Speakers:

- **Professor John Giesy, Distinguished Scientist (ecotoxicology), Michigan State University;**
- **Organochlorines Programme Team of the Ministry for the Environment.**

The schedule of the public meetings are listed below.

The Ministry expects to arrange a second round of consultative meetings in February 1999 to focus on human health and policy aspects of the Programme as these are not being addressed in the first round of meetings.

Schedule of public meetings on the Organochlorines Programme

Whangarei	Wednesday 30 September 5.30 - 7.30pm	Quality Hotel Whangarei, 9 Riverside Drive, Whangarei
Auckland	Thursday 1 October 7.00 - 9.30pm	Auckland University - Library Basement, Room MLT2, Cnr Alfred & Princes Streets (entrance off Alfred St)
Hamilton	Friday 2 October 7.00- 9.30pm	Hamilton Gardens, Chartwell Square Room, Cobham Drive, Hamilton East
Whakatane	Monday 5 October 5.30 - 8.00pm	Environment Bay of Plenty Council Chambers, Quay Street, Whakatane
Palmerston North	Wednesday 7 October 5.30 - 7.30pm	Manawatu-Wanganui Regional Council Board Room, Regional House, Victoria Ave, Palmerston North
Wellington	Thursday 8 October 7.30 - 10.00pm	BP Theatre, Ground floor, 20 Customhouse Quay, (entrance off Johnstone Street)
Nelson - Tasman	Friday 9 October 5.30 - 8.00pm	Tasman District Council Chambers, 189 Queen Street, Richmond
Invercargill	Monday 12 October 5.30 - 8.00pm	Southland Regional Council Chambers, Cnr Price Street and North Road, Invercargill
Dunedin	Tuesday 13 October 5.30 - 8.00pm	Otago Regional Council Chambers 70 Stafford Street, Dunedin
Christchurch	Wednesday 14 October 7.00 - 9.00pm	3 rd Floor, Rooms 2 & 3 Christchurch Regional Resource Centre, Open Polytechnic, 50-56 Kilmore Street.

Hui on organochlorines

Nau mai Haere mai

A hui will also be held for Maori and Iwi representatives on the issue of organochlorines. The hui is at Apumoana Kokiri, Tarawera Road, 12.00 pm - 5.00 pm, Tuesday 6 October 1998.

An open invitation is extended to Maori to participate in this hui by the Maori Focus Group on Organochlorines and the Ministry for the Environment

Involving Maori in setting standards

The Organochlorines Programme of the Ministry for the Environment is studying whether certain organochlorine contaminants pose a risk to the environment or to people at the levels found in New Zealand. National environmental standards (under the Resource Management Act) will be set to regulate any future discharges of these contaminants.

The Ministry for the Environment wishes to involve Maori in the setting of standards so that issues important to iwi, such as traditional food gathering, are taken into account. In reinforcing kaitiakitanga, the Ministry for the Environment is working in partnership with a Maori Focus Group to access both Maori and European baskets of knowledge so that the new environmental standards can be developed and supported by both cultures.

At the hui the Ministry hopes to share knowledge about toxic and persistent chemical contaminants, such as dioxins and PCBs, which are now internationally regarded as a possible threat to human health and the environment.

The hui will cover

- Maori involvement in the setting of standards.
- International expert Professor John Giesy will speak about the ecological impact of organochlorines.
- The Ministry for the Environment will present research on organochlorines in our air, water, soil, rivers, estuaries, and in food.

The hui signals a public beginning to a consultation process that will continue over the coming year.

Iwi representatives wishing to participate in this hui please RSVP to John Hohapata-Oke, phone 021 779930, fax 07 3070 762; or Ngati Awa Trust Board, PO Box 76, WHAKATANE.

Organochlorine body burdens

Research is being carried out into the "body burden" of organochlorines in New Zealanders. A body burden is the amount of contaminant stored in a person's body. It can be estimated from contaminant levels in blood serum.

The objectives of this study are:

1. To obtain estimates of baseline levels of dioxins, PCBs and organochlorine pesticides in serum sampled from the New Zealand population.

2. To determine the relationships of organochlorine contaminant body burdens to geographic region, ethnicity, age and sex.
3. To obtain data relevant to Resource Management Act standards on human health and the environment concerning organochlorine contaminants.

This study will obtain, for the first time, comprehensive data on organochlorine body burdens representative of the New Zealand population.

Research design

Blood samples for the Organochlorines Programme Serum Study were collected as a component of the National Nutrition Survey (NNS). The NNS is providing information on food and nutrient intakes, dietary habits and body measurements of a representative sample of New Zealanders aged 15 years and over. This study is being conducted by the Life in New Zealand Group based at the University of Otago, on behalf of the Ministry of Health.

In linking the two studies, the organochlorines study has been able to take advantage of the large number of individuals involved in the NNS. The sample frame for the NNS was developed in consultation with Statistics New Zealand.

During the period December 1996 to November 1997, NNS participants were interviewed and samples of blood were taken from approximately 2,500 people for the Organochlorines Serum Study. Each sample was couriered to the Department of Human Nutrition, University of Otago, where the blood was processed, and the separated serum (typically 3-5 ml) was stored at -80°C, pending chemical analysis. This volume of serum is insufficient for individual dioxin analysis. Therefore it was necessary to pool individual samples to obtain a sufficient volume of serum for the full suite of organochlorine analyses to be undertaken.

Pooling of serum

A working group was convened to develop a scientifically robust strategy and protocol for the pooling of samples to enable the most information to be derived from the study. Cultural advice was received from Dr Paparangi Reid, Eru Pomare Maori Health School of Medicine. Epidemiological and statistical advice from New Zealand and USA experts has also been followed. A total of eighty different groupings were devised as follows:

Regional	Sex	Age	Ethnicity
Auckland/Northland	Male	15-24	Maori
Bay of Plenty/ Waikato	Female	25-34	Non-Maori
Rest of North Island		35-49	
South Island		50-64	
		65+	

Results for a few of these groupings are not available as, even when pooled, an insufficient volume of blood was collected for analysis.

Chemical analysis

Serum samples have been shipped to the Centres for Disease Control and Prevention, Atlanta, Georgia, where they are being analysed for dioxins, PCBs and organochlorine pesticides.

The contaminant concentrations measured will be assessed in the light of overseas research on human exposure and human health effects of dioxins and other organochlorines. This will support the development of national environmental standards and guidelines for these substances.

Other studies of organochlorines in New Zealanders

Literature on the levels of organochlorine body burdens in other countries is expanding, but to date, little work has been done on New Zealanders. A survey of organochlorine levels in breast milk was carried out by the Department of Health in 1987/88 as part of a World Health Organisation co-ordinated study. The study was restricted to 38 women aged between twenty and thirty who had given birth to their first child. This study is being repeated (see next section in this Bulletin).

In a second study, levels of dioxins and organochlorine pesticides in blood were determined in a small number of New Zealanders from the Wellington region. Both this study and the breast milk study concluded that the dioxin body burdens found in the low to medium range, and typically two to three times lower than levels found in comparable studies from Europe and North America. However, due to actions taken by overseas Governments to reduce dioxin emissions and exposures, body burdens in populations from a number of northern hemisphere countries have fallen over the last decade.

Dioxins, PCBs and pesticide contaminants in breast milk

A study is presently underway to investigate organochlorine levels in breast milk. This study, which is part of an international research programme co-ordinated by the World Health Organisation (WHO), is being carried out by scientists at the Institute of Environmental Science and Research (ESR), on behalf of the Ministry of Health. This study is complementary to the serum study being undertaken for the Organochlorines Programme.

The main purpose of the study is to obtain information on the levels of dioxins, PCBs and organochlorine pesticides in the bodies of New Zealanders. These substances are believed to be present, at least at very low levels, in all people. The results of this study will be compared with the results of a very similar New Zealand study carried out 10

years ago to see whether levels of organochlorines in New Zealanders have decreased over the last decade. Also, comparisons will be made with the results of similar studies carried out in other countries participating in the WHO programme.

Approximately 80 first-time mothers will be invited to participate. To obtain consistency with the previous New Zealand study, mothers will be recruited from Northland, Auckland, Canterbury and Christchurch. Mothers who meet the required selection criteria are being identified by lead maternity carers in the study areas. Participating mothers will be visited by a trained midwife in the research team.

The collection of breast milk samples is currently underway, with samples being sent to the Wellington Science Centre of ESR for chemical analyses. The results of this study are expected by June 1999.

This study does not imply that breast feeding is less than optimal or desirable. Breast milk is universally acknowledged as the best nutrition that infants can receive, and is protective against a wide range of diseases, including sudden infant death syndrome. This study is not expected to produce findings that would in any way alter that view.

The study team is grateful to participating mothers who will make a valuable contribution to an international study, with a long-term view of protecting the New Zealand and global environments.

Further information on this study is available from Barbara Thomson, ESR, PO Box 29 181, Christchurch. Phone (03) 351 6019; Fax (03) 351 9923.

WHO re-evaluation of the tolerable daily intake for dioxins

The World Health Organisation (WHO) has lowered by more than half the amount of dioxin it considers humans can tolerate. In 1990, health experts fixed a tolerable daily intake (TDI) of 10 picograms per kilogram of body weight for 2,3,7,8-tetrachlorodibenzo-p-dioxin, the most toxic of the dioxins. Since then, new epidemiological data have emerged, notably the effects of dioxin on neurological development and the endocrine system. WHO therefore convened an experts meeting to re-evaluate the TDI. This consultation recommended that the daily threshold be reduced to between 1 and 4 picograms toxic equivalents per kilogram of body weight (pg TEQ/kg bw).

The consultation was held from 25-29 May 1998 at the WHO headquarters, Geneva, Switzerland, and was attended by 40 experts from many parts of the world. Europe and North America were heavily represented, but participants also came from Japan, Australia and New Zealand. Jim Waters of the Ministry of Health attended from New Zealand. The consultation was jointly organised by the WHO European Centre for Environmental Health and the International Programme on Chemical Safety.

UNEP POPs Negotiations

At the meeting, working parties reviewed available information on dioxins in a range of areas. This included human exposures, the mechanisms of action and toxicokinetics for these chemicals, and their effects (both carcinogenic and non-carcinogenic) on humans and animals. After four days of discussions, the experts reached agreement on a new TDI value. The TDI recommended is expressed as a range of 1-4 pg TEQ/kg bw, where the TEQ refers to the combined toxic equivalent concentration based on the WHO-derived factors for dioxins and certain PCBs that were recommended in 1997.

The consultation recognised that certain subtle effects may be occurring in parts of the general populations of industrialised countries at current intake levels (2-6 pg TEQ/kg bw/day) but found it tolerable on a provisional basis. The consultation stressed that “the upper range of the TDI of 4 pg TEQ/kg bw should be considered a maximal tolerable intake on a provisional basis and that the ultimate goal is to reduce human intake levels below 1 pg TEQ/kg bw/day”.

The consultation therefore recommended that “every effort should be made to limit environmental releases of dioxin and related compounds to the extent feasible in order to reduce their presence in the food chains resulting in continued reductions in human body burdens”.

Further information on this meeting is available from Jim Waters, Ministry of Health, PO Box 5013, Wellington. Phone (04) 496 2000; Fax (03) 496 2340.

Inventory of dioxin emissions

The compilation of a New Zealand inventory of dioxin emissions is now nearing completion. The inventory assesses current emissions of dioxins to air and water and identifies hazards on land. The project is being carried out for the Ministry for the Environment by Woodward Clyde NZ Ltd.

The three phases of this work are:

Phase 1 Desktop study.

This assumes that dioxins are being emitted to the New Zealand environment from the same types of industrial and non-industrial activities already identified in studies in other countries. Potential sources include: incinerators (eg hospital and quarantine wastes; crematoria); industrial and domestic wood burners; smelters, foundries and metal recyclers; contaminated soils and sludges; motor vehicle exhausts; landfills; accidental fires; sewage and waste waters.

Phase 2 Emissions testing.

Following a review of the desk-top study by industry and independent experts, a dioxin emissions testing programme was undertaken on sources where specific New Zealand data were needed to refine the initial estimates.

Phase 3 Final review.

The study is now being made ready for its final review and is expected to be completed in December 1998.

As previously reported in Bulletin 6, the United Nations Environment Programme (UNEP) is to develop an internationally legally binding convention on persistent organic pollutants (POPs) (UNEP Governing Council decision 19/13 C, 7 February 1997). The first meeting of the Intergovernmental Negotiating Committee (INC-1) was held in Montreal, 29 June - 3 July 1998, and was attended by delegates from 94 UN member countries. UN bodies, intergovernmental organisations and NGOs were well represented. The New Zealand delegation comprised Matthew Gubb (Ministry of Foreign Affairs, Permanent Mission to the UN, Geneva) and Howard Ellis (Ministry for the Environment).

The commitment of UNEP to develop a POPs convention, and the need for Governments to develop appropriate policies on POPs, is illustrated by the following excerpts from the opening session:

“POPs represent a global threat. The adverse impacts of POPs on wildlife had been well documented, including birth defects, reproductive problems, and immune system dysfunction severe enough to be implicated in large population declines. For humans, evidence indicated that long-term exposure to even low levels of POPs were a cause of birth defects, fertility problems, greater susceptibility to disease, developmental disorders in children and certain cancers, including breast and prostate cancer.... Efforts had to be made to address problems that some developing countries have in reducing and eliminating the release of POPs.” [Mr Klaus Topfer, Executive Director of UNEP.]

“Canada was well aware of the urgent need to eliminate the emissions of POPs, ...not only did they remain in the environment and make their way up the food chain, they also travelled far from the original point of emission and no single country could effectively deal with them. Thus, because they consumed natural foods as part of their traditional way of life, northern and Arctic communities were most at risk ...Those communitieshope that it [INC] would develop a suitable global strategy.” [Ms Christine Stewart, Minister of the Environment, Canada.]

Features of the meeting included:

- a fundamental commitment to prepare an international legally binding instrument ready for signatures “by the year 2000”;
- confirmation of the UNEP mandate to address 12 POPs in the Convention [aldrin, chlordane, dieldrin, DDT, endrin, heptachlor, hexachlorobenzene, mirex, toxaphene, PCBs, dioxins and furans];
- agreed terms of reference for a Criteria Experts Group (i) to develop science-based criteria for POPs, and (ii) a procedure for identifying additional POPs as candidates for international action following the adoption of the convention;
- issues to be investigated include: convention implementation measures, including the need to provide

- technical and financial assistance to developing countries for inventories, destruction of obsolete chemical stocks; finding alternatives to the use of DDT and other POPs so that public health and safety (e.g. malaria) is not compromised; the compilation and exchange of technical information; national and regional experience in and strategies for reducing and/or eliminating POPs.
- recognition of the need for basic information on dioxin emissions from regions where there is no data, in particular from Asia, the Middle East, and southern hemisphere countries in Africa and South America. In this regard, considerable interest was expressed in the New Zealand inventory of dioxin emissions being undertaken for the Organochlorines Programme.
 - Interest was also high in New Zealand and Australian developments in POPs destruction and clean up technologies. The availability of a cost effective alternative to high temperature incineration would be of direct and immediate benefit to the Asian, Pacific, African and South American regions.

New Zealand's participation in the INC-1 forum established a positive profile for this country in which we have contributed expertise and comment arising from our experience in the POPs area. The Ministry for the Environment will continue to maintain its involvement in the POPs negotiations, including participation in the Criteria Experts Group as appropriate.

Further details are available from Howard Ellis, Organochlorines Programme, Ministry for the Environment.



Head Office

Grand Annexe
84 Boulcott Street
PO Box 10-362
Wellington
Phone (04) 917 7400
Fax (04) 917 7523
<http://www.mfe.govt.nz>

Northern Regions Office

8-10 Whitaker Place
PO Box 8270
Auckland
Phone (09) 307 7093
Fax (09) 377 9521

South Island Office

Level 3
West Park Towers
56 Cashel Street
PO Box 1345
Christchurch
Phone (03) 365 4540
Fax (03) 365 1730

Organochlorines Consultative Group

Howard Ellis	Ministry for the Environment (Chair)
Dr Simon Buckland	Ministry for the Environment
Ian Cairns	Ministry of Agriculture and Forestry
Paul Dell	Local Authorities
Dr Donald Hannah	Environmental Risk Management Authority
Jim Waters	Ministry of Health

Technical Specialist

Dr Michael Bates	ESR Communicable Diseases Centre
-------------------------	----------------------------------

Non-Governmental Organisations

Dr Jim Barnett	Agricultural sector
Mark de Bazin	Timber industry
Bill Birch	AGCARM, NZCIC, Waste Disposal industry
Dr Simon Hales	ECO
John Hohapata	Adviser on iwi
Jocelyn Keith	Nominee of Ministry of Women's Affairs
Peter Sligh	Pulp and paper industry
Michael Szabo	ECO
Norm Thom	CAE, IPENZ, NZIC, WMINZ