4. Summary of Findings

This study was carried out as part of the National Dioxins Program for DEH. The results of this study provide a measure of the levels of polychlorinated dibenzo-p-dioxins (PCDDs), polychlorinated dibenzofurans (PCDFs) and polychlorinated biphenyls (PCBs) in pooled human breast milk collected throughout Australia in 2002/03. The study relied on the collection of milk from well-defined groups of mothers living in clearly defined areas of Australia. The emphasis of the study was to distinguish between various geographical regions, rural, urban and industrial areas. It was not expected to be able to distinguish between populations that inhabit different parts of a city since such effects may be related to social differences in food consumption.

Note that the selection of cohorts was based on population distribution in Australia, and the inclusion of multiple samples from the key urban centres should allow assessment of overall variation of levels within a given region. Results from individual participant samples were not obtained. Breast milk samples were collected from primipara mothers recruited from a variety of sources. In order to allow direct comparison with previous WHO studies, volunteer mothers were selected using the following criteria:

- A primipara (first-time) mother with a baby aged two to eight weeks (mothers of IVF babies were included)
- Exclusively breastfeeding
- Willing to provide a minimum of 100 ml (preferably 150 ml) of expressed milk. This volume was to be collected over the six week period (two-eight weeks post-partum)
- Healthy pregnancy, mother and child
- A resident of the area for the past five years.

In total, 173 samples were collected from 12 regions of Australia during the period March 2002 and September 2003. Of these, 16 were excluded because they were later found to have violated the inclusion/exclusion criteria. The sampling regions were Brisbane, Sydney (2 pools), Melbourne (4 pools), Adelaide (2 pools), Perth, Hobart, rural inland NSW (Dubbo), rural inland Queensland (Dalby), rural Victoria (Bendigo, Ballarat, Lakes Entrance), Newcastle, Wollongong and Darwin. The remaining 157 samples were analysed as pooled samples and there were 17 pooled samples in total.

In addition to these samples a further 24 “historical” samples that were collected in 1993 were obtained from the Key Centre for Applied and Nutritional Toxicology, Royal Melbourne Institute of Technology, Melbourne, Australia. They were analysed as three pools of eight samples.

In total, analysis was carried out on 20 pools of breast milk, 17 pools obtained in 2002/03 from the current study and three pools obtained in 1993 and supplied to EnTox by Key Centre for Applied and Nutritional Toxicology, Royal Melbourne Institute of Technology, Melbourne, Australia.

All pooled samples were sent to the Australian Government Analytical Laboratories, Sydney, Australia and two duplicate samples were sent to the State Laboratory of NRW, Münster, Germany. Both are laboratories accredited for analytical dioxin analysis.

Dioxin-like chemicals were detected in all pooled samples. For samples collected during 2002/03, the mean and median levels, expressed as TEQ, were 9.0 and 8.9 pg TEQ g^{-1} lipid, respectively. Lipid content was measured in all pooled samples and gave an average lipid concentration of 3.7±0.5%. No systematic differences were observed in the levels of dioxin-like chemicals in breast milk samples collected from different regions of Australia during 2002/03. A higher level of dioxin-like chemicals was detected in the Brisbane pool (15.2 pg TEQ g^{-1} lipid) and this may have been due to the lower (2.8%) lipid content found in this sample.

For samples collected in 1993, the mean and median levels, expressed as TEQ were 16 pg TEQ g^{-1} lipid and 16.4 pg TEQ g^{-1} lipid, respectively. Lipid content was measured in all pooled samples and gave an average lipid concentration of 3.9±0.7%.

A comparison of the samples collected from Melbourne women in 1993 with those collected for the present study shows clearly that the levels of these chemicals have decreased over the ten year time period. It should, however, be noted that comparison of the two sample populations is complicated because details of maternal parity and infant age at date of collection was not made available for the older samples. Despite these limitations, a clear decrease in the levels of these compounds over time was observed. The concentration decreased by almost a factor of two from 1993 to 2002/03, from 16±1.4 to 9.1±1.3 pg g^{-1} lipid. Consistently, PCDD/PCDFs as well as PCBs decreased in this period. This reflects the worldwide trend over recent decades of declining levels of dioxin-like compounds in the environment and humans. This was seen in the third round WHO exposure studies, where on average the decline between the second round in 1993 and the third round in 2003 was about 40% (Malisch and van Leeuwen 2003).

In summary, the levels of dioxin-like chemicals in the breast milk of Australian women are both similar across all regions of Australia and low by international standards. Consistent with worldwide trends, the levels of dioxin-like compounds have decreased over a ten-year period from 1993 to 2003 by approximately 60%. It should be noted that it is the advice of the WHO and the National Health and Medical Research Council (NHMRC) in Australia that breast milk is the best food for babies. Breast milk may contain low levels of dioxins because of its fat content, but all babies are exposed to dioxins even if they are not breastfed. Alternative foods for babies, such as infant formula, may also contain dioxins because they may also contain fat. Several studies around the world in areas where dioxin levels are known to be high have still shown that breastfed babies are healthier than those fed infant formula.

5. References

Bates MN, Thomson B & Garrett N (2001), 'Investigations of organochlorine contaminants in the milk of New Zealand women', A report from the Institute of Environmental Science and Research to the Ministry of Health, Wellington, New Zealand.

Beck H, Eckart K, Mathar W & Wittkowski R (1989) 'Dependence of PCDD and PCDF levels in human milk on various parameters in the Federal Republic of Germany', *Chemosphere, vol. 18, pp. 1063-1066.*

Buckland SJ, Bates MN, Garrett N, Ellis H & Kvan Maanen, T (2001), 'Concentrations of selected organochlorines in the serum of the non-occupationally exposed New Zealand population.' in Ministry for the Environment, Wellington. www.mfe.govt.nz/publications/hazardous/serum-study-may01.pdf

Deml E, Mangelsdorf I & Greim, H (1996), 'Chlorinated dibenzodioxins and dibenzofurans (PCDD/F) in blood and human milk of non occupationally exposed persons living in the vicinity of a municipal waste incinerator', *Chemosphere, vol. 33(10), pp. 1941-1950.*

Fürst P, Fürst C & Wilmers K (1992), 'PCDDs and PCDFs in human milk - statistical evaluation of a 6-years survey', *Chemosphere, vol. 25, pp. 1029-1038.*

Fürst P, Beck H and Theelen, RMC (1992a), 'Assessment of human intake of PCDDs and PCDFs from different environmental sources', *Toxic Substances Journal vol. 12, pp. 133-150.*

Fürst P, Krüger C, Meemken H & Groebel WCN (1989), 'PCDD and PCDF levels in human milk - dependence on period of lactation', *Chemosphere, vol. 18, pp. 439-444.*

Gaus, C, Papke, O, Dennison, N, Haynes, D, Shaw, G, Connell, D & Müller, J (2001), 'Evidence for the presence of a widespread PCDD source in coastal sediments and soils from Queensland, Australia', *Chemosphere, vol.43, pp. 549-558.*

Greizerstein, HB, Stinson, C, Mendola, P, Buck, GM, Kostyniak PJ, & Vena JE (1999), 'Comparison of PCB congeners and pesticide levels between serum and milk from lactating women', *Environmental Research Section A, vol 80, pp. 280-286.*

Harden F, Müller J, Toms L, Gaus C, Moore M, Päpke O, Ryan J, Hobson P, Symons R, Horsley K, Sim M, Van den Berg M & Fürst P (2004), *Dioxins in the Australian Population: Levels in Blood*, National Dioxins Program Technical Report No. 9, Department of the Environment and Heritage, Canberra.

Langhorst ML & Shadoff LA (1980), 'Determination of parts-per-trillion concentratrations of tetra-, hexa-, hepta-, and octachlorodibenzo-p-dioxins in human milk samples', *Analytical Chemistry, vol. 52, pp. 2037-2044.*

Liem DAK, Fürst, P & Rappe, C (2000), 'Exposure of populations to dioxins and related compounds', *Food Additives and Contaminants, vol. 17, pp. 241-259.*

Malisch R & van Leeuwen FXR (2003), 'Results of the WHO-coordinated exposure study on the levels of PCBs, PCDDs and PCDFs in human milk', *Organohalogen Compounds, vol. 64, pp. 140-143.*

Päpke O (1998), 'PCDD/PCDF: human background data for Germany, a 10-year experience', *Environmental Health Perspectives, vol. 106 Suppl. 2, pp. 723-731.*

Schecter A, Päpke O, Ball M & Ryan JJ (1991), 'Partitioning of dioxins and dibenzofurans: whole blood, blood plasma and adipose tissue', *Chemosphere, vol. 23 (11-12), pp. 1913-1919.*

Schecter A, Kassis I & Päpke O (1998), 'Partitioning of dioxins, dibenzofurans, and coplanar PCBs in blood, milk, adipose tissue, placenta and cord blood from five American women', *Chemosphere, vol. 37(9-12), pp. 1817-1823.*

U.S. EPA NCEA. (2000). 'Exposure and human health reassessment of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) and related compounds - Part 3: Integrated summary and risk characterization for 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) and related compounds.' External Review Draft, June 2000. *www.epa.gov/ncea.*

Van den Berg M., Birnbaum L., Bosveld A.T.C., Brunstroem B., Cook P., Feeley M., Giesy J.P., Hanberg A., Hasegawa R., Kennedy S.W., Kubiak T., Larsen J.C., Van Leeuwen R.F.X., Liem D.A.K., Nolt C., Peterson R.E., Peollinger L., Safe S., Schrenk D., Tillitt D., Tysklind M., Younes M., Waern F., Zacharewski T.et al. (1998), 'Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, PCDFs for humans and wildlife', *Environmental Health Perspectives, vol. 106(12), pp. 775-792.*

Van den Berg M, Peterson RE & Schrenk D (2000), 'Human risk assessment and TEFs', *Food Additives and Contaminants, vol. 17 (4), pp. 347-358.*

6. Appendices

Appendix A Ethics approval letter

OFFICE OF RESEARCH AND POSTGRADUATE STUDIES

DIRECTOR
JAN MARBEY

Tel: (07) 3365 3924
Fax: (07) 3365 4455
Email: humanethics@research.uq.edu.au

THE UNIVERSITY OF QUEENSLAND

Cumbrae-Stewart Building
Research Road
Brisbane Qld 4072 Australia
Telephone (07) 3365 3580, (07) 3365 4584
International +61 7 3365 3580, +61 7 3365 4584
Facsimile (07) 3365 4455

Friday, 6 December 2002

Dr Jochen Mueller
National Research Centre for Environmental Toxicology

Dear Dr Mueller

Concerning:Ethical clearance for project:- ***Dioxinlike Compounds In Human Milk - 25/11/02 - AMENDMENT***

Clearance No: H/308/NRCET/00

The Medical Research Ethics Committee has approved your project.

Please note that:-

(i) The Clearance number should be quoted on the protocol coversheet when applying to a granting agency and in any correspondence relating to ethical clearance.

(ii) Clearance will normally be for the duration of the project unless otherwise stated in the institutional clearance.

(iii) Adverse reaction to treatment by subjects, injury or any other incident affecting the welfare and/or health of subjects attributable to the research should be promptly reported to the Head of Department and the Behavioural and Social Sciences Ethical Review Committee.

(iv) Amendments to any part of the approved protocol, documents or questionnaires attached to this clearance are to be submitted to the Behavioural and Social Sciences Ethical Review Committee for approval.

H/308/NRCET/00

(v) Advisers on 'Integrity in Research'
As part of the University's commitment to the institutional statement, *Code of conduct for the Ethical Practice of Research (1999)*, and the NH&MRC's *National Statement on Ethical Conduct in Research Involving Humans (1999)*, designated positions have been appointed as advisers on integrity in research. The Chairperson of each ethics committee acts in an advisory capacity to provide confidential advice on such matters as misconduct in research, the rights and duties of postgraduate supervisors, and procedures for dealing with allegations on research misconduct within the University. The contact number for the Chairperson of each ethics committee can be obtained from the Ethics Officer.

(vi) The Committee reserves the right to visit the research site and materials at any time during the project.

(vii) It is the Committees expectation whenever possible, this work should result in publication and the Committee would require details to be submitted for our records.

Staff and students are also encouraged to contact either the Ethics Officer (3365 3924), or Chairperson on other issues concerning the conduct of experimentation/research (e.g. involvement of children, informed consent) prior to commencement of the project and throughout the course of the study.

Yours sincerely

Michael Tse
Ethics Officer

Encs
cc: Head of School, National Research Centre for Environmental Toxicology

Institutional Approval Form For Experiments On Humans Including Behavioural Research

Chief Investigator:	Dr Jochen Mueller
Project Title:	Dioxin-like Compounds in Human Milk - 25/11/02 - AMENDMENT
Supervisor:	None
Co-Investigator(s):	Dr Fiona Harden
Department(s):	National Research Centre for Environmental Toxicology
Project Number:	H/308/NRCET/00
Granting Agency/Degree:	Environment Australia
Duration:	March 2002 – March 2003
Comments:	

Name of responsible Committee:-
Medical Research Ethics Committee
This project complies with the provisions contained in the *National Statement on Ethical Conduct in Research Involving Humans* and complies with the regulations governing experimentation on humans.
Name of Ethics Committee representative:-
Dr Bill Vicenzino
Chairperson
Medical Research Ethics Committee

Date 4-Dec-02 Signature

Appendix B List of sites

Region	Site name	Agreed to participate	Approval	Recruited participants	Number of participants recruited
Sydney	Westmead Hospital	Yes	Yes (18/2/03)	No	0
	Hills Parenting Centre - Castle Hill	Yes	UQ - Gatekeeper Letter	Yes	8
	King George Hospital	Yes	Not submitted	No	0
	South East Sydney Area Health Service	Yes	Not submitted	No	0
	Ramsgate	Yes	UQ - Gatekeeper Letter	No	0
	Tresillian Family Care Centres	Yes	Yes (21/4/03)	Yes	20 (10 used for analysis)
	Sydney	Yes	UQ	Yes	2
	Royal North Shore Hospital	Yes	Not submitted	No	0
Melbourne	Banyule	Yes	UQ - Gatekeeper Letter	Yes	3
	Bayside	No	N/A	No	0
	Casey	No	N/A	No	0
	Darebin	No	N/A	No	0
	Glen Eira	Yes	UQ - Gatekeeper Letter	Yes	5
	Latrobe City Maternal and Child Health	No	N/A	No	0
	Monash Maternal and Child Health	Yes	UQ - Gatekeeper Letter	Yes	2
	Royal Women's Hospital Melbourne	Yes	Yes (16/1/03)	Yes	15
	Stonnington Maternal and Child Health	Yes	UQ - Gatekeeper Letter	Yes	1*
	ISIS Primary Care Brimbank	Yes	UQ - Gatekeeper Letter	Yes	10
	Whitehorse	Yes	UQ - Gatekeeper Letter	Yes	4
Brisbane	Inala Community Health Centre	Yes	UQ - Gatekeeper Letter	Yes	10
	Mater Hospital	Yes	Yes (18/12/02)	No	0
	Mater Hospital Redlands	Yes	Mater Hospital approval	Yes	1*
	Mater Private Clinic	Yes	UQ - Gatekeeper Letter	Yes	
Perth	Uni of WA	Yes	Yes (19/6/02)	Yes	11
	Woodside Hospital	Yes	Not submitted	Yes	0
Adelaide	Women's and Children's Hospital	Yes	Yes (18/12/02)	Yes	21
Tasmania	Kingston Community Health Centre	Yes	Not submitted	No	0
	Launceston General Hospital	Yes	Not submitted	No	0
	Launceston Family + Child Health Clinic	Yes	UQ - Gatekeeper Letter	Yes	10
Canberra	ACT Health	Yes	Yes (9/12/02)	No	0
Darwin	Private lactation consultant	Yes	UQ	Yes	4
Wollongong	University of Wollongong	Yes	Yes (6/2/02)	Yes	12
Newcastle	Hunter Health Service	Yes	Yes (30/8/02)	Yes	9
Gladstone	Maternity Unit	Yes	UQ - Gatekeeper Letter	Yes	3*
Coastal QLD	Innisfail Hospital	Yes	UQ	Yes	2*
	Proserpine Hospital	Yes	UQ	No	0
Coastal NSW	Northern Rivers Area Health - Ballina Community Health Centre	Yes	Yes (26/3/03)	Yes	1*
Coastal Vic	Glenelg Shire Community Health Centre	Yes	UQ	No	0

	Lakes Entrance Community Health	Yes	UQ - Gatekeeper Letter	Yes	2
	Bass Coast Shire - Maternal and Child Health Centre	Yes	UQ - Gatekeeper Letter	No	0
	Wonthaggi	Yes	UQ - Gatekeeper Letter	No	0
Inland QLD	Dalby Hospital (QLD Health)	Yes	UQ - Gatekeeper Letter	Yes	8
	Roma Hospital	Yes	UQ	No	0
	St. George Hospital	Yes	UQ	No	0
	Mt Isa Health Services	Yes	Not submitted	No	0
	Townsville Health Service	Yes	Not submitted	No	0
Inland NSW	Dubbo (Macquarie and Far-west Area Health Service)	Yes	Yes (1/11/02)	Yes	10
Inland Vic	Ararat	No	N/A	No	0
	Highton	Yes	Not submitted	No	0
	Maroondah	No	N/A	No	0
	Maribrynong	No	N/A	No	0
	Port Phillip	No	N/A	No	0
	Hamilton	No	N/A		
	Wodonga Maternal and Child Health	Yes	UQ	No	0
	Wangaratta Maternity Unit	Yes	UQ	No	0
	Manningham	No	N/A	No	0
	Bendigo	Yes	UQ	Yes	1
	Portland	Yes	UQ	Yes	3*
	Ballarat	N/A	N/A	Newspaper ad	1

*not included in final analysis.

Appendix C Participant Information and Consent Form

PARTICIPANT INFORMATION AND CONSENT FORM

Evaluation Of The Levels Of Dioxin-Like Compounds In Breast-Milk In Australia

THE UNIVERSITY OF QUEENSLAND

General Information

We would like to invite you to take part in a research project to be conducted by Dr Jochen Müller and Dr Fiona Harden as part of a national study on dioxin-like chemicals in the environment. The purpose of this study is to find out the typical levels of dioxin-like chemicals in human breast-milk in Australia.

Breast-milk provides perfectly optimized nutrition to infants and there are no equivalent alternatives to breastfeeding. Dioxin-like compounds include some of the most toxic chemicals and they are very long-lived in the environment. Also, since they are far more fat soluble than water soluble they accumulate in fatty tissue. Persistent chemicals such as dioxin-like chemicals enter the human food chain and can be found in breast-milk, infant formulas as well as many other food items including meat and dairy products at low concentrations.

It should be noted that despite the occurrence of elevated levels of dioxins in samples from highly industrialized countries in Europe and North America, The World Health Organization recommends that breastfeeding should continue to be encouraged as the benefits to the overall health and development of infants far outweigh any negative effects of chemical exposure.

The dioxin concentrations in breast-milk are a good indication of the levels of dioxins in our body. By analyzing breast-milk we aim to obtain the first information of the levels of these chemicals in Australian mothers as well as exposure of infants via this route. The results from this study will allow us to assess the exposure of mothers and children in Australia and to compare the levels in Australia with international levels. The results of this study also should help us to identify sources of these compounds in specific areas and therefore allow us to undertake effective steps to reduce exposure of the population.

Approximately 250 breast-feeding mothers around Australia will be taking part in this study.

If you take part

If you agree to take part in this study we will require you to collect 100-150 millitres of breast-milk collected between week 2 and 8 after the birth of your baby. We will supply you with a container to store the sample and will arrange for it to be returned to us. You do not have to collect the sample in a single sitting and so you may collect several small samples to obtain the 100-150 mls. We would suggest that you feed your baby first and then express a small amount of milk into the collection bottle. This can then be placed in the freezer until you are ready to collect another sample. Simply collect subsequent samples in the same jar and refreeze. The sample may be collected by either hand expressing or by using an electric or manual pump. If you require assistance, instructions will be given to you about the sampling. Please feel free to contact Fiona Harden on the number given below. If you collect the sample at home, please ensure that you have understood and followed the instructions on the pump. We request that you store the sample in the freezer until we have arranged for it to be picked up.

The study will also involve the completion of a questionnaire (31 either short answer or multiple choice questions) that will remain strictly confidential. These questions are mainly concerned with your diet and lifestyle. The study will not include any use of medication.

Possible risks

Many mothers routinely perform extraction of breast-milk, and we believe the risk to do so, is minimal. However, please ensure that the sampling equipment (pump) has been sterilized before use according to the procedures outlined with the equipment. Only take the sample if you have excess milk. Please cease collection of milk if you experience any difficulty expressing milk or feel that either you or your child are being compromised by your participation in the study. If you experience any pain or notice any hot or flushed areas around your breast, please consult your usual medical practitioner or clinic sister immediately.

How do you and your child benefit from this study?

The study will mix individual milk samples from participating women in a given area to obtain a pooled sample. These pooled samples will be analysed for levels of dioxin-like compounds and other pesticides. You will be able to obtain the study results for the pooled samples once the study is completed and the results are interpreted. However, since no individual samples will be analysed there will be no immediate benefits to you and your child from this study since the levels of dioxins in breast-milk are the result of a life time accumulation in the mother. The benefits will be long term by identifying current exposure of the population in specific areas of Australia and provide the means to identify and work towards reducing the sources. In countries where similar studies have been carried out, significant reductions (up to 70%) have been achieved in dioxin levels.

Do you need to take part in this study?

You do not need to take part in the study unless you want to do so. However, since we will pool the milk samples (mix milk samples from many women who live in a given area) you cannot discontinue your participation once we have received your sample and it has been added to the pool. However, if you do wish to withdraw your consent we are able to destroy your questionnaire and any milk not pooled. You have the option on the consent form to agree to part of the sample you donate being stored for future research on pollutants. This future research WILL NOT include genetic research. If you do not sign this second consent your remaining sample will be destroyed. You are able to withdraw your consent from this future research and request that your sample be destroyed.

Will the information you give be confidential?

Coded information collected during the study will be stored in a computer. You will not be personally identified in the study. Only the participating organization or your doctor and study staff will know that the information is related to you. The results of the study may be published in the scientific literature but your identity will not be revealed.

All personal information from the consent form will be kept secure and separate from other material including your completed Questionnaire

Please do not write your name on the Questionnaires.

Contacts

This study has been cleared by the Medical Research Ethics Committee at the University of Queensland and will be conducted in accordance with the National Health and Medical Research Council's guidelines. You are free to discuss your participation in this study and any queries you may have with the Project Coordinator: Dr Fiona Harden (Telephone No: 07-3274 9016) or the Secretary at the NRCET: 07-32749003). If you would like to speak to an officer of the University not involved in the study, you may contact the Ethics Officer on 3365 3924.

PARTICIPANTS CONSENT FORM

Dioxins and dioxin-like compounds in breast-milk

THE UNIVERSITY OF QUEENSLAND

Investigator: Dr Jochen Müller

I, the undersigned hereby agree to participate in the above research project.

I have been given clear information, both verbal and written, about this study and understand what has been stated.

I have been informed of any risks to my health or well-being.

I have been given the opportunity to have a member of my family or a friend present while the study was explained to me.

I have been assured that no personal identifiers regarding my questionnaire will be divulged and that the results of any tests will not be published so as to reveal my identity.

I am aware that this study has been approved by one of the Human Ethics Committees of the University of Queensland.

I am aware that I may request further information about the project as it proceeds.

I am aware that I may withdraw my consent at any time but that any milk sample that has been pooled with other samples is unable to be destroyed.

Signed:…… Date:……

I agree that a part of the sample I donated for the **Dioxins and dioxin-like compounds in breast-milk** study can be stored and used for future research on pollutants.

Signed: …… Date:……

Participant Identification: (please print)

Full Name: _____

Address: _____

_____

Telephone: _____

Appendix D Questionnaire for participants

Questionnaire for Participants

Please complete the following questionnaire providing as much detail as possible.

The information provided by your answers will be kept strictly confidential. The questionnaire will be stored in a de-identified state that is it will be coded and your name will be detached from the answers. Only the researchers will have access to your code.

Please print all answers.

Where boxes are provided for alternative answers, please tick those that apply.

Name:……
……..

Residential Address:……..…
……
……
……
……
……
……

Telephone Contact:……
……

1. What is your country of birth? ……..

2. What is your date of birth? …….....

3. Where have you lived (town or closest town and state e.g. Newcastle, NSW) for:

    a. The last 5 years…….....

    b. The previous 5-10 years……...……

    c. The previous 10-20 years……...……

    d. The previous 20+ years……...…….……

4. What date did you start sample collection? (DD/MM/YY)……...

5. When date did you finish sample collection? (DD/MM/YY)……....

6. What is your height (cm)?: ……

7. What was your weight before you became pregnant? (kg) ……

8. What was your weight just prior to delivery of your baby? (kg) ……..

9. What is your baby's date of birth?…….

10. What is your baby's sex? ☐ Female ☐ Male

11. What was your baby's birth weight (grams)?……

12. Are you a smoker? Yes ☐ No ☐

13. If yes, how many per day?…….

14. How long have you smoked for?……...

15. Have you ever smoked? Yes ☐ No ☐

16. If yes when (approximately) did you have your last cigarette?……

17. Which diet best describes your dietary habits?

    a. Mixed Diet ☐

    b. Vegetarian but with dairy products and Eggs ☐

    c. Strictly Vegetarian ☐

18. Did your dietary habits change markedly after you became pregnant? If yes please provide details.

……
……
……
……

19. On average, how often do you eat fish or other seafood?

a. Never ☐
b. Less than once a week ☐
c. Once a week ☐
d. Twice a week ☐
e. More than twice a week ☐

20. If eaten, describe the seafood most often consumed.

……
……

21. On average how often do you consume milk and milk products, including cheese?

a. Never ☐
b. Less than once a week ☐
c. Once a week ☐
d. Twice a week ☐
e. More than twice a week ☐

22. On average, how often do you consume meat?

a. Never ☐
b. Less than once a week ☐
c. Once a week ☐
d. Twice a week ☐
e. More than twice a week ☐

23. Have you ever worked in any of the following areas?

    a. Pesticide Industry
       including insecticides, herbicides, fungicides and biocides ☐
    b. Forestry Industry ☐
    c. Manufacturing of Electrical Transformers ☐

24. If yes, what was your job?……..……

25. How long did you work in this industry for?…….

26. Were you an office worker? Yes ☐ No ☐

27. Have you ever had contact with any of the following chemicals?

    a. Pesticides:
       including insecticides, herbicides, fungicides and biocides ☐
    b. Wood treatment chemicals ☐

28. If so how often

    a. Yearly ☐
    b. Monthly ☐
    c. Weekly ☐
    d. Daily ☐

THANK YOU FOR TAKING THE TIME TO COMPLETE THIS QUESTIONNAIRE.

Appendix E Advertisement and website

THE UNIVERSITY OF QUEENSLAND

Call for breast milk study volunteers

Pregnant women and new mothers who are breastfeeding are invited to take part in a national breast milk study being conducted throughout Australia by the University of Queensland.

Volunteers are needed to complete the study. To participate you must be:

- A first-time mother with a baby aged two to eight weeks (IVF babies are fine)
- Exclusively breastfeeding
- Willing to provide 100-150mls of expressed milk
- Healthy, and
- A resident of your area for the past five years.

If you would like more information please call 1800 550030 or visit http://www.uq.edu.au/nrcet/BreastMilkStudy.html.

If you are having your First Baby, are Healthy, intend to Breastfeed and are willing to participate in a national research project, then

WE NEED YOU !

Your Breast Milk is Vital.

Breast milk is perfect for your baby. It provides your baby with all of his or her nutritional needs. And for now, it also provides you with the chance to participate in an important study which may help improve the long-term health of all Australians.

Dr Jochen Muller and Dr Fiona Harden, in conjunction with The University of Queensland, is conducting a national research project which will identify typical levels of certain chemicals in breast milk. The results of the research will enable us to compare levels in Australia with other countries, but most importantly, it will help us reduce our exposure to certain chemicals in Australia.

It's Easy

You can collect your sample over a six week period by expressing a small amount of breast milk after feeding your baby. This can be frozen and stored. Once you have expressed 100 – 150mLs of milk, we will arrange for it to be collected.

Would you like to be involved?

To participate you must be:

- A first time Mum.
- Exclusively breastfeeding.
- Willing to provide 100 –150ml of expressed milk.
- Healthy (IVF babies are fine)
- Living in your area for the past 5 years.

150mls of your breast milk could help make a world of difference!!!

If you would like to participate, or would like more information, please telephone the Projector Coordinator, Dr Fiona Harden on 1800 550030 24Hours / 7 Days a Week or e-mail f.harden@uq.edu.au

Appendix F Analytical Methodology

The MID Windows for PCDD/PCDF.

MID Window	Accurate Mass	*Ion Id	Ion Type	Analyte (I= internal standard)
1	303.9016	M	R	TCDF
	305.8987	M+2	T	TCDF
	315.9419	M	R	TCDF (I)
	317.9389	M+2	T	TCDF (I)
	319.8965	M	R	TCDD
	321.8936	M+2	T	TCDD
	331.9368	M	R	TCDD (I)
	333.9338	M+2	T	TCDD (I)
2	339.8597	M+2	T	PeCDF
	341.8567	M+4	R	PeCDF
	351.9000	M+2	T	PeCDF (I)
	353.8970	M+4	R	PeCDF (I)
	355.8546	M+2	T	PeCDD
	357.8516	M+4	R	PeCDD
	367.8949	M+2	T	PeCDD (I)
	369.8919	M+4	R	PeCDD (I)
3	373.8208	M+2	T	HxCDF
	375.8178	M+4	R	HxCDF
	383.8639	M	R	HxCDF (I)
	385.8610	M+2	T	HxCDF (I)
	389.8156	M+2	T	HxCDD
	391.8127	M+4	R	HxCDD
	401.8559	M+2	T	HxCDD (I)
	403.8529	M+4	R	HxCDD (I)
4	407.7818	M+2	T	HpCDF
	409.7788	M+4	R	HpCDF
	417.8250	M	R	HpCDF (I)
	419.8220	M+2	T	HpCDF (I)
	423.7767	M+2	T	HpCDD
	425.7737	M+4	R	HpCDD
	435.8169	M+2	T	HpCDD (I)
	437.8140	M+4	R	HpCDD (I)
5	441.7428	M+2	T	OCDF
	443.7399	M+4	R	OCDF
	457.7377	M+2	T	OCDD
	459.7348	M+4	R	OCDD
	469.7780	M+2	T	OCDD (I)
	471.7750	M+4	R	OCDD (I)

❖T=Target Ion=Quantitation Ion; R=Ratio Ion=Qualifier Ion.

TCDD - tetrachlorodibenzo-*p*-dioxin
PeCDD - pentachlorodibenzo-*p*-dioxin
HxCDD - hexachlorodibenzo-*p*-dioxin
HpCDD - heptachlorodibenzo-*p*-dioxin
OCDD - octachlorodibenzo-*p*-dioxin

TCDF - tetrachlorodibenzofuran
PeCDF - pentachlorodibenzofuran
HxCDF - hexachlorodibenzofuran
HpCDF - heptachlorodibenzofuran
OCDF - octachlorodibenzofuran

Theoretical Ion Abundance Ratios and QC Limits.

No. of Cl Atoms	m/z's forming the ratio[1]	Theoretical Ratio	QC limits[2]	
			Lower	Upper
4[3]	M/(M+2)	0.77	0.65	0.89
5	(M+4)/(M+2)	0.65	0.56	0.76
6	(M+4)/(M+2)	0.81	0.70	0.95
6[3]	M/(M+2)	0.51	0.43	0.59
7	(M+4)/(M+2)	0.95	0.83	1.14
7[5]	M/(M+2)	0.44	0.37	0.51
8	(M+2)/(M+4)	0.89	0.76	1.02

[1] The ratio is defined as the Qualifier ion area (R) divided by the Quantitation ion area (T).
[2] QC limits represent ±15% windows around the theoretical ion abundance ratios.
[3] Does not apply to $^{37}Cl_4$-2,3,7,8-TCDD (clean-up standard).
[4] Used for $^{13}C_{12}$-HxCDF only.
[5] Used for $^{13}C_{12}$-HpCDF only.

The MID windows for non-ortho and mono-ortho PCBs

MID Window	Accurate Mass	*Ion Id	Analyte (I= internal standard)
1	289.9224	M	TeCB
	291.9194	M+2	TeCB
	293.9165	M+4	TeCB
	301.9626	M	TeCB (I)
	303.9597	M+2	TeCB (I)
	323.8834	M	PeCB
	325.8804	M+2	PeCB
	327.8775	M+4	PeCB
	337.9207	M+2	PeCB (I)
	339.9178	M+4	PeCB (I)
2	359.8415	M+2	HxCB
	361.8365	M+4	HxCB
	363.8356	M+6	HxCB
	371.8817	M+2	HxCB (I)
	373.8788	M+4	HxCB (I)
	393.8025	M+2	HpCB
	395.7995	M+4	HpCB
	397.7966	M+6	HpCB
	405.8428	M+2	HpCB (I)
	407.8398	M+4	HpCB (I)

TeCB - tetrachlorobiphenyl
PeCB - pentachlorobiphenyl
HxCB - hexachlorobiphenyl
HpCB - heptachlorobiphenyl

Theoretical Ion Abundance Ratios and QC Limits

No. of Chlorine Atoms	m/z's forming the ratio[1]	Theoretical Ratio	QC limits[2]	
			Lower	Upper
4	M/(M+2)	0.77	0.65	0.89
5	(M+4)/(M+2)	0.66	0.56	0.76
6	(M+4)/(M+2)	0.82	0.70	0.94
7	(M+4)/(M+2)	0.98	0.83	1.13

[1] The ratio is defined as the Qualifier ion area (R) divided by the Quantitation ion area (T).
[2] QC limits represent ±15% windows around the theoretical ion abundance ratios.

Appendix G Results of WHO study

3rd WHO-COORDINATED EXPOSURE STUDY

PCDDS, PCDFS AND DIOXIN-LIKE PCBs IN HUMAN MILK SAMPLES FROM AUSTRALIA

Jochen F Müller[1], Fiona Harden[2], Michael R Moore[2], Yoko Berry[1], Rainer Malisch[3]

[1]National Research Centre for Environmental Toxicology, University of Queensland, 39 Kessels Rd, Coopers Plains, Q4108, Australia
[2]Department of Chemistry, University of Wollongong, NSW 2522, Australia
[3]State Laboratory for Chemical and Veterinary Analysis of Food, Bissierstr. 5, D 79114 Freiburg, Germany

Introduction

Dioxin-like compounds are ubiquitously distributed and humans throughout the world are exposed to these compounds primarily through food. Dioxin-like compounds are lipophilic and persistent, thus accumulate in human adipose tissue. Since it has been demonstrated that PCDDs occur in breast milk[1], studies from all over the world have demonstrated that human milk is contaminated with dioxin-like compounds. As a consequence, the WHO organised two international studies on dioxin-like compounds in breast milk in 1987/88 and 1992/93 respectively. In summary, these studies demonstrated that levels of dioxins in breast milk are relatively high in industrialised countries when compared to non-industrialised countries[2] that PCDD/Fs were higher in human milk from mothers with their first child[3] and that the levels decrease over a given lactation period[4]. Furthermore since PCDD/F concentration in blood and human milk of the respective samples are very similar when concentrations are expressed on a lipid basis, hence human milk provides a good monitoring tool of exposure for a given population in a given area[5]. To date no data have been published on PCDD/Fs and dioxin-like PCBs in human milk samples from Australia. The main aims of this study were to produce the first set of data on levels of dioxin-like compounds in breast milk from urban and industrial Australia, assess the exposure of infants and to gain initial information on the levels of exposure of Australia's population to dioxin-like chemicals.

Methods

Sampling

The study was carried out as part of the WHO study on human milk samples following the respective protocols, using the WHO Questionnaire and carrying out the analysis in the laboratory that has been selected by WHO as reference laboratory to carry out the analysis of dioxin-like chemicals and lipid content in the human milk samples in the third round of exposure study. In brief ten suitable volunteering mothers (i.e. primiparae, child and mother being apparently healthy following a "normal" pregnancy, donor) must not have resided outside the area for more than 6 months in the last 5 years) were identified in the urban area of south-east Queensland and an industrial town in New South Wales in 2001. About 100 mL of milk was collected by each of the participating women in the period between week 3 and 5 of the lactation. Samples were collected either using a pump or by directly expressing the milk into the glass container provided to the volunteering mother via the study team. Samples were stored and shipped frozen to the laboratory at NRCET/QHSS, thawed, and subsamples of 50 mL from each sample were pooled according to the sampling region. The leftover pooled samples were transported on ice to Freiburg, Germany.

Analysis

According to the study design, all samples were analysed for 17 PCDDs and PCDFs, 12 dioxin-like PCBs (non-ortho IUPAC 77, 81, 126 and 169, mono-ortho IUPAC 105, 114, 118, 123, 156, 157, 167 and 189) and 6 marker PCBs (di-ortho IUPAC 28, 52, 101, 138, 153, and 180).

Extraction, clean up and GC/MS determination followed the same procedure as applied during the fourth round of WHO interlaboratory quality control studies. Freeze-drying of the whole sample, hot extraction of fat and contaminants of interest with ethanol / toluene (70/30, gives crude fat after evaporation), solving in butyl methyl ether (gives pure fat after evaporation), gel permeation chromatography on Bio Beads S-X3 for removal of fat, silica column impregnated with sulfuric acid for removal of remaining oxidizable substances, florisil column for separation PCDD/F from PCBs, different charcoal columns for further clean up of PCDD/F fraction and for separation of PCBs into three fractions of non-ortho, mono-ortho and di-ortho PCBs. The compounds of interest are determined by HRGC/HRMS (resolution 10,000) in four separate runs (for PCDD/Fs, non-ortho PCBs, mono-ortho PCBs and di-ortho PCBs).

Generally for all samples to be analyzed for the third round of exposure study, a rigid quality control programme includes blank samples, spiked vegetable oil samples on different levels, and five different kinds of quality control samples (two butter samples and two egg samples of different levels of contamination and WHO pooled breast milk samples which remained from the WHO interlaboratory quality control study). Samples are analysed in a way which can be described as „overlapping sandwich method": A great deal of the samples was analysed as duplicate analyses, with the duplicate analyses being performed in sequences with samples from other countries and different quality control samples. This guarantees that the results of all samples from different countries have the same reliability, even if the collection period of the samples stretches over a period of two years. As the samples from Australia were sent to the laboratory early 2002, this rigid quality control programme could not be finished including duplicate analysis of the samples using the "overlapping sandwich method". Therefore, the results are being considered preliminary.

Results and Discussion

PCDD/Fs and dioxin-like PCBs were detectable in both pooled samples. In both pooled samples concentrations of individual 2,3,7,8 chlorine substituted PCDD/F congeners ranged from below the limit of detection for selected higher chlorinated dibenzofurans to between 60 and 70 pg g^{-1} lipid for OCDD. The concentrations of PCDD/Fs and dioxin-like PCBs expressed on a TE basis using the WHO-TEFs[2] were between 9 and 9 pg g^{-1} lipid and almost identical in the two sample pools despite the geographical and industrial/urban differences of the locations where the participants lived (Table 1). Dioxin-like PCBs contributed about 30-40 % of the total TE value which is relatively low compared with European samples but similar to a recent study undertaken in New Zealand[3]. Although it should be noted that the questionnaires have not yet been analysed and thus an age difference is not considered in this comparison, the similarities of concentrations between the 2 samples were striking even for the individual congeners with a mean normalized difference ($|(xA - xB)/(xA + xB)/2|$) for all detectable PCDD/F congeners of about 15 % and for PCBs of 25 %. Like for many human samples from elsewhere in the world, when the WHO-TEFs are used 1,2,3,7,8-PeCDD is the single most relevant congener contributing 20 - 30 % to the total contribution of the TE values.

Results and Discussion

PCDD/Fs and dioxin-like PCBs were detectable in both pooled samples. In both pooled samples concentrations of individual 2,3,7,8 chlorine substituted PCDD/F congeners ranged from below the

Table 1. Concentrations of PCDD/Fs and dioxin-like PCBs in human milk samples from Australia

PCDD/Fs (in pg g^{-1} lipid)	WHO-TEF	Urban Qld	Industrial NSW
2,3,7,8-TetraCDD	1	1.00	0.92
1,2,3,7,8-PentaCDD	1	2.38	1.85
1,2,3,4,7,8-HexaCDD	0.1	1.82	1.42
1,2,3,6,7,8-HexaCDD	0.1	8.13	7.74
1,2,3,7,8,9-HexaCDD	0.1	2.75	2.59
1,2,3,4,6,7,8-HeptaCDD	0.01	14.3	13.8
OctaCDD	0.0001	66.6	62.7
2,3,7,8-TetraCDF	0.1	0.35	0.33
1,2,3,7,8-PentaCDF	0.05	0.13	0.19
2,3,4,7,8-PentaCDF	0.5	1.84	2.30
1,2,3,4,7,8-HexaCDF	0.1	0.89	0.90
1,2,3,6,7,8-HexaCDF	0.1	0.92	0.85
1,2,3,7,8,9-HexaCDF	0.1	0.07	0.04
2,3,4,6,7,8-HexaCDF	0.1	0.34	0.34
1,2,3,4,6,7,8-HeptaCDF	0.01	1.45	0.69
1,2,3,4,7,8,9-HeptaCDF	0.01	<0.09	<0.04
OctaCDF	0.0001	<0.90	0.38
PCBs (in pg g^{-1} lipid)			
Non-ortho PCBs			
3,3',4,4' – tetraCB (PCB#77)	0.0001	3.06	2.61
3,4,4',5 – tetraCB (PCB#81)	0.0003	1.52	1.57
3,3',4,4',5 – pentaCB (PCB#126)	0.1	11.5	16.1
3,3',4,4',5,5' – hexaCB (PCB#169)	0.01	n.a	n.a.
Mono-ortho PCBs			
2,3,3',4,4' – pentaCB (PCB#105)	0.0001	696	915
2,3,4,4',5 – pentaCB (PCB#114)	0.0005	202	222
2,3',4,4',5 – pentaCB (PCB#118)	0.0001	2590	3700
2',3,4,4',5 – pentaCB (PCB#123)	0.0001	<4	<4
2,3,3',4,4',5 – hexaCB (PCB#156)	0.0005	1370	1630
2,3,3',4,4',5' – hexaCB (PCB#157)	0.0005	306	347
2,3',4,4',5,5' – hexaCB (PCB#167)	0.00001	367	575
2,3,3',4,4',5,5' – heptaCB (PCB#189)	0.0001	85	133
TEQs - WHO		8.3	8.7

limit of detection for selected higher chlorinated dibenzofurans is between 60 and 70 pg g^{-1} lipid for OCDD. The concentrations of PCDD/Fs and dioxin-like PCBs expressed on a TE basis using the WHO TEFs were between 8 and 9 pg g^{-1} lipid and almost identical in the two sample pools despite the geographical and urban/rural/urban differences of the locations where the pools lived (Table 1). Dioxin-like PCBs contributed about 30-40 % of the total TE value which is relatively low compared with European samples but similar to a recent study undertaken in New Zealand[7]. Although it should

be noted that the questionnaires have not yet been analysed and thus an age difference is not considered in this comparison, the similarities of concentrations between the 2 samples were striking even for the individual congeners with a mean normalised difference ((|%A – B%|/(A + B)/2)) for all detectable PCDD/F congeners of about 15 % and for PCBs of 28 %. Like for many human samples from elsewhere in the world, when the WHO-TEFs are used 1,2,3,7,8 PeCDD is the single most relevant congeners contributing 20 - 30 % to the total contribution of the TE values.

Another interesting finding of this study is that, while the concentrations of all PCDF and lower chlorinated PCDD congeners were relatively low in the Australian samples compared with samples from elsewhere, the levels of HxCDDs, HpCDDs and OCDD were high or at least comparable in the Australian samples with samples from elsewhere. To date little is known about the levels of dioxin-like chemicals in food in Australia. However elevated levels of higher chlorinated PCDDs in environmental samples have been the subject of a series of investigations but to date the source remains unknown. The results from this study suggest that despite their low bioavailability the elevated levels observed in the environment translate in a slightly unusual congener profile in humans and thus even at low level exposure a source can be associated with a specific profile.

Acknowledgment

The authors would like to thank 20 new mothers who collected milk samples for this study and participated in the Questionnaire. Thank-you also to Martin van den Berg and Rolat van Leeuwen who initiated our effort provided key support with ethical issues. The study received financial support from a GU/NRCET Research Grant. NRCET is co-funded by Queensland Health.

References

1. Langhorst, M.; Shadoff, C. N. *Anal. Chem.* 1980, *52*, 2037-2044.
2. Liem, D. A. K.; Fürst, P., Rappe, C. *Food Additives and Contaminants* 2000, *17*, 241-259.
3. Fürst, P.; Krüger, C.; Meemken, H.; Groebel, W.C.N. *Chemosphere* 1989, *18*, 439-444.
4. Fürst, P.; Fürst, C., Nuamber, W. K. C. *Chemosphere* 1992, *25*, 1029-1038.
5. Päpke, O. Humanproben. In: *Handbuch Dioxine*; Oehme, M., Ed.; Spektrum Akademischer Verlag: Heidelberg, 1998; pp 333.
6. Van den Berg, M., Birnbaum, L., Bosveld, A.T.C.; Brunstroem, B.; Cook, P.; Feeley, M.; Giesy, J.P., Hanberg, A.; Hasegawa, R.; Kennedy, S.W., Kubiak, T., Larsen, J.C.; Van Leeuwen, R.F.X.; Liem, D.A.K., Nolt, C.; Peterson, R.E.; Poellinger, L.; Safe, S.; Schrenk, D., Tillitt, D., Tysklind, M., Younes, M., Waern, F.; Zacharewski, T. *Environmental Health Perspectives* 1998, *106*, 775-792.
7. World Health Organisation *Levels of PCBs, PCDDs and PCDFs in human milk*. Environmental Health in Europe No 3, Bilthoven, 1996.
8. Buter, M., Thomson, B.; Garrett, N. "Investigation of organochlorine contaminants in the milk of New Zealand women." Ministry of Health, New Zealand, 2001.

Appendix H AGAL Results

AGAL DIOXIN ANALYSIS UNIT - CERTIFICATE OF ANALYSIS

Client	NRCET	Job No.	NRCE01/030928
	39 Kessels Rd., Coopers Plains		
	Queensland 4108	Sampled by	Client
		Date Sampled	various
Contact	Dr. Fiona Harden	Date Received	28-Aug-2003
		Sample/s analysed as received.	
Method	AUTL_01		

Details

The method is for determination of tetra- through octa-chlorinated dibenzo-p- dioxins (PCDDs) & dibenzofurans (PCDFs), plus "dioxin-like" PCBs in breast milk samples by high resolution gas chromatography/high resolution mass spectrometry (HRGC/ HRMS). This method provides data on all toxic 2,3,7,8-PCDD (seven) and PCDF (ten) isomers as well as the "dioxin-like" PCBs (twelve). PCDD and PCDF totals for each homologue group (tetra to octa) are also reported. All results are corrected for labelled surrogate recoveries. Breast milk samples are spiked with isotopically labelled surrogate standards and extracted into organic solvent. Clean up is effected by partitioning with sulphuric acid then distilled water. Further purification is performed using automated column chromatography on acid and base modified silica gels, neutral alumina and carbon dispersed on celite.

Immediately prior to injection, internal standards are added to each extract, and an aliquot of the extract is injected into the GC. The analytes are separated by the GC and detected by a high-resolution (>10,000) mass spectrometer.

Authorisation

Debbie Burniston,

Lead Scientist

Dioxin Analysis Unit

Sample Details

Laboratory Reg. No.	Client Sample Ref.	Matrix	Description
N03/030645	Melb Hist A	Breast Milk	pooled sample
N03/030646	Melb Hist B	Breast Milk	pooled sample
N03/030647	Melb Hist C	Breast Milk	pooled sample

Project Details

Project Name	*National Dioxin Program*
Project Number	*Not specified*

Analytes

TCDD	Tetrachlorodibenzo-p-dioxin	TCDF	Tetrachlorodibenzofuran
PeCDD	Pentachlorodibenzo-p-dioxin	PeCDF	Pentachlorodibenzofuran
HxCDD	Hexachlorodibenzo-p-dioxin	HxCDF	Hexachlorodibenzofuran
HpCDD	Heptachlorodibenzo-p-dioxin	HpCDF	Heptachlorodibenzofuran
OCDD	Octachlorodibenzo-p-dioxin	OCDF	Octachlorodibenzofuran
PCB 77	3,3',4,4'-Tetrachlorobiphenyl	PCB 126	3,3',4,4',5-Pentachlorobiphenyl
PCB 81	3,4,4',5-Tetrachlorobiphenyl	PCB 156	2,3,3',4,4',5-Hexachlorobiphenyl
PCB 105	2,3,3',4,4'-Pentachlorobiphenyl	PCB 157	2,3,3',4,4',5'-Hexachlorobiphenyl
PCB 114	2,3,4,4',5-Pentachlorobiphenyl	PCB 167	2,3',4,4',5,5'-Hexachlorobiphenyl
PCB 118	2,3',4,4',5-Pentachlorobiphenyl	PCB 169	3,3',4,4',5,5'-Hexachlorobiphenyl
PCB 123	2',3,4,4',5-Pentachlorobiphenyl	PCB 189	2,3,3',4,4',5,5'-Heptachlorobiphenyl

Units & Abbreviations

pg/g lipid	picogram per gram lipid
<	level less than limit of detection (LOD)
I-TEF‡	International toxic equivalency factor
I-TEQDF‡	International toxic equivalents - dioxins & furans
WHO98-TEF†	World Health Organization toxic equivalency factor
WHO98-TEQ†	World Health Organization toxic equivalents

† as defined by Van den Berg et al., Environ. Health Perspect. 106(12) pp. 775-792 (1998).

‡ as defined in USEPA publication EPA/625/3-89/016 (1989)

TEQs are calculated by multiplying the quantified level for each individual congener by corresponding TEF and summing result.

Surrogate Recovery	percentage recovery for 13C12 labelled surrogate standard
⚐	Laboratory surrogate recovery outside normal acceptance criteria (25 - 125%)

Laboratory Reg. No.	N03/030644	**Lipid Content: 3.8%**	Date Extracted	19-Sep-03
Client Sample Ref.	Tas A		DB5 Analysis	29-Oct-03
Matrix	Breast Milk		DB-Dioxin Analysis	14-Oct-03
Description	pooled sample		PCB Analysis	14-Oct-03

PCDD/F Congeners	Level pg/g lipid	WHO98-TEF	WHO98-TEQDF contribution	Labelled Surrogate recovery
2,3,7,8-TCDF	0.19	0.1	0.019	72
2,3,7,8-TCDD	0.49	1	0.49	66
1,2,3,7,8-PeCDF	<0.05	0.05	0.0013	65
2,3,4,7,8-PeCDF	1.5	0.5	0.75	67
1,2,3,7,8-PeCDD	1.9	1	1.9	64
1,2,3,4,7,8-HxCDF	0.49	0.1	0.049	100
1,2,3,6,7,8-HxCDF	0.53	0.1	0.053	101
2,3,4,6,7,8-HxCDF	0.2	0.1	0.02	100
1,2,3,7,8,9-HxCDF	<0.05	0.1	0.0025	84
1,2,3,4,7,8-HxCDD	1.3	0.1	0.13	99
1,2,3,6,7,8-HxCDD	6.6	0.1	0.66	93
1,2,3,7,8,9-HxCDD	1.2	0.1	0.12	
1,2,3,4,6,7,8-HpCDF	<0.6	0.01	0.003	82
1,2,3,4,7,8,9-HpCDF	<0.07	0.01	0.00035	61
1,2,3,4,6,7,8-HpCDD	8.9	0.01	0.089	69
OCDF	0.17	0.0001	0.000017	
OCDD	48	0.0001	0.0048	43

PCB Congeners	Level pg/g lipid	WHO98-TEF	WHO98-TEQP contribution	Labelled Surrogate recovery
Non-Ortho PCBs				
PCB 77	15	0.0001	0.0015	58
PCB 81	3	0.0001	0.0003	59
PCB 126	14	0.1	1.4	77
PCB 169	3.9	0.01	0.039	76
Mono-Ortho PCBs				
PCB 105	770	0.0001	0.077	67
PCB 114	160	0.0005	0.08	70
PCB 118	2360	0.0001	0.24	70
PCB 123	48	0.0001	0.0048	76
PCB 156	670	0.0005	0.34	62
PCB 157	170	0.0005	0.085	58
PCB 167	210	0.00001	0.0021	73
PCB 189	46	0.0001	0.0046	71

Summary Results

Sum of PCDD and PCDF congeners			
	Excluding LOD values	71	pg/g lipid
WHO_{98} -TEQ_{DFP}			
	Lower Bound [excluding LOD values]	**6.6**	pg/g lipid
	Middle Bound [including half LOD values]	**6.6**	pg/g lipid
	Upper Bound [including LOD values]	**6.6**	pg/g lipid

Laboratory Reg. No.	N03/030643	**Lipid Content: 3.5%**	Date Extracted	19-Sep-03
Client Sample Ref.	Rural QLD		DB5 Analysis	29-Oct-03
Matrix	Breast Milk		DB-Dioxin Analysis	14-Oct-03
Description	pooled sample		PCB Analysis	14-Oct-03

PCDD/F Congeners	Level pg/g lipid	WHO_{98}-TEF	WHO_{98}-TEQ_{DF} contribution	Labelled Surrogate recovery
2,3,7,8-TCDF	<0.2	0.1	0.01	66
2,3,7,8-TCDD	0.51	1	0.51	60
1,2,3,7,8-PeCDF	<0.1	0.05	0.0025	53
2,3,4,7,8-PeCDF	0.86	0.5	0.43	59
1,2,3,7,8-PeCDD	1.8	1	1.8	53
1,2,3,4,7,8-HxCDF	0.55	0.1	0.055	94
1,2,3,6,7,8-HxCDF	0.47	0.1	0.047	74
2,3,4,6,7,8-HxCDF	0.24	0.1	0.024	94
1,2,3,7,8,9-HxCDF	<0.09	0.1	0.0045	74
1,2,3,4,7,8-HxCDD	0.86	0.1	0.086	94
1,2,3,6,7,8-HxCDD	4.8	0.1	0.48	65
1,2,3,7,8,9-HxCDD	1.5	0.1	0.15	
1,2,3,4,6,7,8-HpCDF	<1	0.01	0.005	75
1,2,3,4,7,8,9-HpCDF	<0.2	0.01	0.001	59
1,2,3,4,6,7,8-HpCDD	7.8	0.01	0.078	62
OCDF	<0.4	0.0001	0.00002	
OCDD	57	0.0001	0.0057	43

PCB Congeners	Level pg/g lipid	WHO_{98}-TEF	WHO_{98}-TEQ_{P} contribution	Labelled Surrogate recovery
Non-Ortho PCBs				
PCB 77	21	0.0001	0.0021	58
PCB 81	5.2	0.0001	0.00052	59
PCB 126	14	0.1	1.4	74
PCB 169	3.7	0.01	0.037	73
Mono-Ortho PCBs				
PCB 105	890	0.0001	0.089	72
PCB 114	130	0.0005	0.065	73
PCB 118	2270	0.0001	0.23	73
PCB 123	63	0.0001	0.0063	77
PCB 156	740	0.0005	0.37	65
PCB 157	180	0.0005	0.09	59
PCB 167	320	0.00001	0.0032	70
PCB 189	71	0.0001	0.0071	71

Summary Results

Sum of PCDD and PCDF congeners				
	Excluding LOD values		77	pg/g lipid
WHO_{98} -TEQ_{DFP}				
		Lower Bound [excluding LOD values]	**6**	pg/g lipid
		Middle Bound [including half LOD values]	**6**	pg/g lipid
		Upper Bound [including LOD values]	**6**	pg/g lipid

Laboratory Reg. No.	N03/030642	Lipid Content: 4.2%	Date Extracted	19-Sep-03
Client Sample Ref.	Darwin		DB5 Analysis	29-Oct-03
Matrix	Breast Milk		DB-Dioxin Analysis	14-Oct-03
Description	pooled sample		PCB Analysis	14-Oct-03

PCDD/F Congeners	Level pg/g lipid	WHO98-TEF	WHO98-TEQDF contribution	Labelled Surrogate recovery
2,3,7,8-TCDF	<0.9	0.1	0.045	76
2,3,7,8-TCDD	0.98	1	0.98	77
1,2,3,7,8-PeCDF	<0.4	0.05	0.01	75
2,3,4,7,8-PeCDF	1.3	0.5	0.65	73
1,2,3,7,8-PeCDD	2.9	1	2.9	76
1,2,3,4,7,8-HxCDF	2.4	0.1	0.24	97
1,2,3,6,7,8-HxCDF	1.2	0.1	0.12	98
2,3,4,6,7,8-HxCDF	0.44	0.1	0.044	102
1,2,3,7,8,9-HxCDF	<0.5	0.1	0.025	86
1,2,3,4,7,8-HxCDD	2.1	0.1	0.21	106
1,2,3,6,7,8-HxCDD	13	0.1	1.3	98
1,2,3,7,8,9-HxCDD	2.4	0.1	0.24	
1,2,3,4,6,7,8-HpCDF	<1	0.01	0.005	88
1,2,3,4,7,8,9-HpCDF	<0.3	0.01	0.0015	81
1,2,3,4,6,7,8-HpCDD	11	0.01	0.11	94
OCDF	<0.6	0.0001	0.00003	
OCDD	65	0.0001	0.0065	65

PCB Congeners	Level pg/g lipid	WHO98-TEF	WHO98-TEQP contribution	Labelled Surrogate recovery
Non-Ortho PCBs				
PCB 77	6.5	0.0001	0.00065	69
PCB 81	0.92	0.0001	0.000092	72
PCB 126	11	0.1	1.1	84
PCB 169	7.2	0.01	0.072	80
Mono-Ortho PCBs				
PCB 105	750	0.0001	0.075	70
PCB 114	190	0.0005	0.095	79
PCB 118	2540	0.0001	0.25	75
PCB 123	51	0.0001	0.0051	82
PCB 156	1330	0.0005	0.67	67
PCB 157	320	0.0005	0.16	67
PCB 167	430	0.00001	0.0043	81
PCB 189	87	0.0001	0.0087	63

Summary Results

Sum of PCDD and PCDF congeners			
	Excluding LOD values	100	pg/g lipid
WHO_{98}-TEQ_{DFP}			
	Lower Bound [excluding LOD values]	**9.2**	pg/g lipid
	Middle Bound [including half LOD values]	**9.3**	pg/g lipid
	Upper Bound [including LOD values]	**9.4**	pg/g lipid

Laboratory Reg. No.	N03/030641	**Lipid Content:**	**3.1%**	Date Extracted	19-Sep-03
Client Sample Ref.	Melb C			DB5 Analysis	29-Oct-03
Matrix	Breast Milk			DB-Dioxin Analysis	14-Oct-03
Description	pooled sample			PCB Analysis	14-Oct-03

	Level	WHO_{98}-TEF	WHO_{98}-TEQ_{DF}	Labelled Surrogate
PCDD/F Congeners	**pg/g lipid**		**contribution**	**recovery**
2,3,7,8-TCDF	<0.2	0.1	0.01	69
2,3,7,8-TCDD	0.85	1	0.85	64
1,2,3,7,8-PeCDF	<0.1	0.05	0.0025	60
2,3,4,7,8-PeCDF	2.2	0.5	1.1	64
1,2,3,7,8-PeCDD	2.6	1	2.6	63
1,2,3,4,7,8-HxCDF	0.79	0.1	0.079	96
1,2,3,6,7,8-HxCDF	0.87	0.1	0.087	95
2,3,4,6,7,8-HxCDF	0.35	0.1	0.035	93
1,2,3,7,8,9-HxCDF	<0.04	0.1	0.002	79
1,2,3,4,7,8-HxCDD	2.2	0.1	0.22	94
1,2,3,6,7,8-HxCDD	11	0.1	1.1	85
1,2,3,7,8,9-HxCDD	1.8	0.1	0.18	
1,2,3,4,6,7,8-HpCDF	<0.9	0.01	0.0045	78
1,2,3,4,7,8,9-HpCDF	<0.05	0.01	0.00025	63
1,2,3,4,6,7,8-HpCDD	13	0.01	0.13	66
OCDF	<0.2	0.0001	0.00001	
OCDD	64	0.0001	0.0064	44

	Level	WHO_{98}-TEF	WHO_{98}-TEQ_{P}	Labelled Surrogate
PCB Congeners	**pg/g lipid**		**contribution**	**recovery**
Non-Ortho PCBs				
PCB 77	7.1	0.0001	0.00071	54
PCB 81	4.1	0.0001	0.00041	56
PCB 126	14	0.1	1.4	71
PCB 169	7.2	0.01	0.072	78
Mono-Ortho PCBs				
PCB 105	1040	0.0001	0.1	66
PCB 114	250	0.0005	0.13	72
PCB 118	3300	0.0001	0.33	74
PCB 123	66	0.0001	0.0066	79
PCB 156	1170	0.0005	0.59	56
PCB 157	290	0.0005	0.15	51
PCB 167	330	0.00001	0.0033	67
PCB 189	82	0.0001	0.0082	64

Summary Results

Sum of PCDD and PCDF congeners			
	Excluding LOD values	100	pg/g lipid
WHO_{98} -TEQ_{DFP}			
	Lower Bound [excluding LOD values]	**9.2**	pg/g lipid
	Middle Bound [including half LOD values]	**9.2**	pg/g lipid
	Upper Bound [including LOD values]	**9.2**	pg/g lipid

Laboratory Reg. No.	N03/030640	**Lipid Content:**	Date Extracted	19-Sep-03
		4.3%		
Client Sample Ref.	Syd A		DB5 Analysis	29-Oct-03
Matrix	Breast Milk		DB-Dioxin Analysis	14-Oct-03
Description	pooled sample		PCB Analysis	14-Oct-03

PCDD/F Congeners	Level pg/g lipid	WHO_{98}-TEF	WHO_{98}-TEQ_{DF} contribution	Labelled Surrogate recovery
2,3,7,8-TCDF	<0.3	0.1	0.015	70
2,3,7,8-TCDD	1.4	1	1.4	65
1,2,3,7,8-PeCDF	0.28	0.05	0.0	60
2,3,4,7,8-PeCDF	3.2	0.5	1.6	60
1,2,3,7,8-PeCDD	2.7	1	2.7	59
1,2,3,4,7,8-HxCDF	1.1	0.1	0.11	88
1,2,3,6,7,8-HxCDF	1.2	0.1	0.12	86
2,3,4,6,7,8-HxCDF	0.41	0.1	0.041	84
1,2,3,7,8,9-HxCDF	<0.05	0.1	0.0025	72
1,2,3,4,7,8-HxCDD	1.8	0.1	0.18	84
1,2,3,6,7,8-HxCDD	9.9	0.1	0.99	76
1,2,3,7,8,9-HxCDD	2.2	0.1	0.22	
1,2,3,4,6,7,8-HpCDF	1.9	0.01	0.019	68
1,2,3,4,7,8,9-HpCDF	<0.09	0.01	0.00045	56
1,2,3,4,6,7,8-HpCDD	11	0.01	0.11	61
OCDF	0.26	0.0001	0.000026	
OCDD	62	0.0001	0.0062	42

PCB Congeners	Level pg/g lipid	WHO_{98}-TEF	WHO_{98}-TEQ_{P} contribution	Labelled Surrogate recovery
Non-Ortho PCBs				
PCB 77	5	0.0001	0.0005	53
PCB 81	2.4	0.0001	0.00024	53
PCB 126	24	0.1	2.4	71
PCB 169	11	0.01	0.11	72
Mono-Ortho PCBs				
PCB 105	1560	0.0001	0.16	61
PCB 114	320	0.0005	0.16	69
PCB 118	5320	0.0001	0.53	73
PCB 123	85	0.0001	0.0085	78
PCB 156	1740	0.0005	0.87	67
PCB 157	420	0.0005	0.21	67
PCB 167	540	0.00001	0.0054	84
PCB 189	93	0.0001	0.0093	81

Summary Results

Sum of PCDD and PCDF congeners				
	Excluding LOD values		99	pg/g lipid
WHO_{98} -TEQ_{DFP}				
		Lower Bound [excluding LOD values]	**12**	pg/g lipid
		Middle Bound [including half LOD values]	**12**	pg/g lipid
		Upper Bound [including LOD values]	**12**	pg/g lipid

Laboratory Reg. No.	N03/035827	**Lipid Content:**	4.3%	**Date Extracted**	31-Oct-03
Client Sample Ref.	Western Australia			**DB5 Analysis**	12-Nov-03
Matrix	Breast Milk				
Description	pooled sample			**PCB Analysis**	12-Nov-03

	Level	WHO_{98}-TEF	WHO_{98}-TEQ_{DF}	Labelled Surrogate
PCDD/F Congeners	**pg/g lipid**		**contribution**	**recovery**
2,3,7,8-TCDF	0.33	0.1	0.033	41
2,3,7,8-TCDD	0.57	1	0.57	46
1,2,3,7,8-PeCDF	0.22	0.05	0.011	56
2,3,4,7,8-PeCDF	2.4	0.5	1.2	56
1,2,3,7,8-PeCDD	1.9	1	1.9	60
1,2,3,4,7,8-HxCDF	0.75	0.1	0.075	81
1,2,3,6,7,8-HxCDF	0.87	0.1	0.087	80
2,3,4,6,7,8-HxCDF	0.35	0.1	0.035	78
1,2,3,7,8,9-HxCDF	<0.05	0.1	0.0025	69
1,2,3,4,7,8-HxCDD	1	0.1	0.1	91
1,2,3,6,7,8-HxCDD	7.7	0.1	0.77	80
1,2,3,7,8,9-HxCDD	1.7	0.1	0.17	
1,2,3,4,6,7,8-HpCDF	2	0.01	0.02	73
1,2,3,4,7,8,9-HpCDF	<0.04	0.01	0.0002	65
1,2,3,4,6,7,8-HpCDD	9.6	0.01	0.096	76
OCDF	<0.2	0.0001	0.00001	
OCDD	37	0.0001	0.0037	53

	Level	WHO_{98}-TEF	WHO_{98}-TEQ_{P}	Labelled Surrogate
PCB Congeners	**pg/g lipid**		**contribution**	**recovery**
Non-Ortho PCBs				
PCB 77	2.1	0.0001	0.00021	30
PCB 81	1.3	0.0001	0.00013	24
PCB 126	15	0.1	1.5	75
PCB 169	6.8	0.01	0.068	70
Mono-Ortho PCBs				
PCB 105	600	0.0001	0.06	57
PCB 114	180	0.0005	0.09	62
PCB 118	2370	0.0001	0.24	61
PCB 123	44	0.0001	0.0044	65
PCB 156	1060	0.0005	0.53	59
PCB 157	250	0.0005	0.13	59
PCB 167	300	0.00001	0.003	70
PCB 189	72	0.0001	0.0072	57

Summary Results

Sum of PCDD and PCDF congeners			
Excluding LOD values		67	pg/g lipid
WHO_{98} -TEQ_{DFP}			
	Lower Bound [excluding LOD values]	**7.7**	pg/g lipid
	Middle Bound [including half LOD values]	**7.7**	pg/g lipid

Laboratory Reg. No.	N03/035826	**Lipid Content:**	4.1%	**Date Extracted**	31-Oct-03
Client Sample Ref.	Rural Victoria			**DB5 Analysis**	12-Nov-03
Matrix	Breast Milk				
Description	pooled sample			**PCB Analysis**	12-Nov-03

PCDD/F Congeners	Level pg/g lipid	WHO_{98}-TEF	WHO_{98}-TEQ_{DF} contribution	Labelled Surrogate recovery
2,3,7,8-TCDF	<0.2	0.1	0.01	63
2,3,7,8-TCDD	0.86	1	0.86	61
1,2,3,7,8-PeCDF	0.11	0.05	0.0055	65
2,3,4,7,8-PeCDF	2.5	0.5	1.3	67
1,2,3,7,8-PeCDD	2.9	1	2.9	72
1,2,3,4,7,8-HxCDF	0.71	0.1	0.071	89
1,2,3,6,7,8-HxCDF	0.72	0.1	0.072	85
2,3,4,6,7,8-HxCDF	0.37	0.1	0.037	93
1,2,3,7,8,9-HxCDF	0.077	0.1	0.0077	79
1,2,3,4,7,8-HxCDD	2.2	0.1	0.22	100
1,2,3,6,7,8-HxCDD	11	0.1	1.1	87
1,2,3,7,8,9-HxCDD	2.4	0.1	0.24	
1,2,3,4,6,7,8-HpCDF	1.5	0.01	0.015	83
1,2,3,4,7,8,9-HpCDF	<0.07	0.01	0.00035	76
1,2,3,4,6,7,8-HpCDD	13	0.01	0.13	85
OCDF	<0.6	0.0001	0.00003	
OCDD	68	0.0001	0.0068	47

PCB Congeners	Level pg/g lipid	WHO_{98}-TEF	WHO_{98}-TEQ_{P} contribution	Labelled Surrogate recovery
Non-Ortho PCBs				
PCB 77	1.7	0.0001	0.00017	60
PCB 81	0.77	0.0001	0.000077	55
PCB 126	12	0.1	1.2	88
PCB 169	6.6	0.01	0.066	79
Mono-Ortho PCBs				
PCB 105	380	0.0001	0.038	72
PCB 114	150	0.0005	0.075	75
PCB 118	1540	0.0001	0.15	76
PCB 123	41	0.0001	0.0041	80
PCB 156	700	0.0005	0.35	63
PCB 157	180	0.0005	0.09	59
PCB 167	170	0.00001	0.0017	78
PCB 189	53	0.0001	0.0053	59

Summary Results

Sum of PCDD and PCDF congeners			
	Excluding LOD values	110	pg/g lipid
WHO_{98} -TEQ_{DFP}			
	Lower Bound [excluding LOD values]	**8.9**	pg/g lipid
	Middle Bound [including half LOD values]	**9**	pg/g lipid

Laboratory Reg. No.	N03/035825	**Lipid Content:**	4.5%	**Date Extracted**	31-Oct-03
Client Sample Ref.	Melbourne-D			**DB5 Analysis**	12-Nov-03
Matrix	Breast Milk				
Description	pooled sample			**PCB Analysis**	12-Nov-03

PCDD/F Congeners	Level pg/g lipid	WHO_{98}-TEF	WHO_{98}-TEQ_{DF} contribution	Labelled Surrogate recovery
2,3,7,8-TCDF	0.37	0.1	0.037	61
2,3,7,8-TCDD	0.72	1	0.72	65
1,2,3,7,8-PeCDF	0.21	0.05	0.011	62
2,3,4,7,8-PeCDF	2.3	0.5	1.2	62
1,2,3,7,8-PeCDD	2.1	1	2.1	65
1,2,3,4,7,8-HxCDF	0.65	0.1	0.065	89
1,2,3,6,7,8-HxCDF	0.74	0.1	0.074	89
2,3,4,6,7,8-HxCDF	0.28	0.1	0.028	84
1,2,3,7,8,9-HxCDF	<0.04	0.1	0.002	72
1,2,3,4,7,8-HxCDD	1.6	0.1	0.16	98
1,2,3,6,7,8-HxCDD	8.7	0.1	0.87	89
1,2,3,7,8,9-HxCDD	1.8	0.1	0.18	
1,2,3,4,6,7,8-HpCDF	<0.7	0.01	0.0035	78
1,2,3,4,7,8,9-HpCDF	<0.07	0.01	0.00035	69
1,2,3,4,6,7,8-HpCDD	7.2	0.01	0.072	79
OCDF	0.14	0.0001	0.000014	
OCDD	50	0.0001	0.005	52

PCB Congeners	Level pg/g lipid	WHO_{98}-TEF	WHO_{98}-TEQ_{P} contribution	Labelled Surrogate recovery
Non-Ortho PCBs				
PCB 77	1.6	0.0001	0.00016	54
PCB 81	1.1	0.0001	0.00011	52
PCB 126	12	0.1	1.2	99
PCB 169	6.7	0.01	0.067	70
Mono-Ortho PCBs				
PCB 105	690	0.0001	0.069	69
PCB 114	190	0.0005	0.095	76
PCB 118	2660	0.0001	0.27	72
PCB 123	44	0.0001	0.0044	79
PCB 156	1110	0.0005	0.56	66
PCB 157	250	0.0005	0.13	64
PCB 167	300	0.00001	0.003	80
PCB 189	79	0.0001	0.0079	60

Summary Results

Sum of PCDD and PCDF congeners			
Excluding LOD values		77	pg/g lipid
WHO_{98} -TEQ_{DFP}			
	Lower Bound [excluding LOD values]	**7.9**	pg/g lipid
	Middle Bound [including half LOD values]	**7.9**	pg/g lipid

Laboratory Reg. No.	N03/035824	**Lipid Content:**	4.2%	**Date Extracted**	31-Oct-03
Client Sample Ref.	Sydney-B			**DB5 Analysis**	12-Nov-03
Matrix	Breast Milk				
Description	pooled sample			**PCB Analysis**	12-Nov-03

PCDD/F Congeners	Level pg/g lipid	WHO_{98}-TEF	WHO_{98}-TEQ_{DF} contribution	Labelled Surrogate recovery
2,3,7,8-TCDF	0.39	0.1	0.039	64
2,3,7,8-TCDD	0.77	1	0.77	66
1,2,3,7,8-PeCDF	0.26	0.05	0.013	73
2,3,4,7,8-PeCDF	3.2	0.5	1.6	71
1,2,3,7,8-PeCDD	2.4	1	2.4	74
1,2,3,4,7,8-HxCDF	1	0.1	0.1	91
1,2,3,6,7,8-HxCDF	1.1	0.1	0.11	89
2,3,4,6,7,8-HxCDF	0.42	0.1	0.042	90
1,2,3,7,8,9-HxCDF	<0.03	0.1	0.0015	81
1,2,3,4,7,8-HxCDD	1.4	0.1	0.14	101
1,2,3,6,7,8-HxCDD	8.5	0.1	0.85	94
1,2,3,7,8,9-HxCDD	1.6	0.1	0.16	
1,2,3,4,6,7,8-HpCDF	2	0.01	0.02	86
1,2,3,4,7,8,9-HpCDF	<0.05	0.01	0.00025	78
1,2,3,4,6,7,8-HpCDD	8.5	0.01	0.085	86
OCDF	0.46	0.0001	0.000046	
OCDD	46	0.0001	0.0046	58

PCB Congeners	Level pg/g lipid	WHO_{98}-TEF	WHO_{98}-TEQ_{P} contribution	Labelled Surrogate recovery
Non-Ortho PCBs				
PCB 77	1.5	0.0001	0.00015	64
PCB 81	1.1	0.0001	0.00011	62
PCB 126	21	0.1	2.1	96
PCB 169	9.1	0.01	0.091	79
Mono-Ortho PCBs				
PCB 105	950	0.0001	0.095	74
PCB 114	290	0.0005	0.15	78
PCB 118	3870	0.0001	0.39	75
PCB 123	84	0.0001	0.0084	79
PCB 156	1580	0.0005	0.79	66
PCB 157	390	0.0005	0.2	65
PCB 167	480	0.00001	0.0048	76
PCB 189	100	0.0001	0.01	60

Summary Results

Sum of PCDD and PCDF congeners			
Excluding LOD values		79	pg/g lipid
WHO_{98} -TEQ_{DFP}			
	Lower Bound [excluding LOD values]	**10**	pg/g lipid
	Middle Bound [including half LOD values]	**10**	pg/g lipid

Laboratory Reg. No.	N03/035823	**Lipid Content:**	3.1%	**Date Extracted**	31-Oct-03
Client Sample Ref.	South Australia-B			**DB5 Analysis**	12-Nov-03
Matrix	Breast Milk				
Description	pooled sample			**PCB Analysis**	12-Nov-03

PCDD/F Congeners	Level pg/g lipid	WHO_{98}-TEF	WHO_{98}-TEQ_{DF} contribution	Labelled Surrogate recovery
2,3,7,8-TCDF	0.13	0.1	0.013	63
2,3,7,8-TCDD	0.5	1	0.5	68
1,2,3,7,8-PeCDF	<0.1	0.05	0.0025	67
2,3,4,7,8-PeCDF	2	0.5	1	67
1,2,3,7,8-PeCDD	1.7	1	1.7	72
1,2,3,4,7,8-HxCDF	0.57	0.1	0.057	89
1,2,3,6,7,8-HxCDF	0.64	0.1	0.064	87
2,3,4,6,7,8-HxCDF	0.26	0.1	0.026	91
1,2,3,7,8,9-HxCDF	<0.05	0.1	0.0025	77
1,2,3,4,7,8-HxCDD	0.95	0.1	0.095	104
1,2,3,6,7,8-HxCDD	6	0.1	0.6	94
1,2,3,7,8,9-HxCDD	1.1	0.1	0.11	
1,2,3,4,6,7,8-HpCDF	<0.8	0.01	0.004	84
1,2,3,4,7,8,9-HpCDF	<0.05	0.01	0.00025	78
1,2,3,4,6,7,8-HpCDD	8.4	0.01	0.084	88
OCDF	0.15	0.0001	0.000015	
OCDD	49	0.0001	0.0049	45

PCB Congeners	Level pg/g lipid	WHO_{98}-TEF	WHO_{98}-TEQ_{P} contribution	Labelled Surrogate recovery
Non-Ortho PCBs				
PCB 77	1.9	0.0001	0.00019	69
PCB 81	1	0.0001	0.0001	68
PCB 126	7.8	0.1	0.78	97
PCB 169	6.7	0.01	0.067	74
Mono-Ortho PCBs				
PCB 105	410	0.0001	0.041	66
PCB 114	150	0.0005	0.075	71
PCB 118	1820	0.0001	0.18	68
PCB 123	29	0.0001	0.0029	73
PCB 156	1070	0.0005	0.54	65
PCB 157	240	0.0005	0.12	61
PCB 167	250	0.00001	0.0025	78
PCB 189	83	0.0001	0.0083	62

Summary Results

Sum of PCDD and PCDF congeners			
	Excluding LOD values	71	pg/g lipid
WHO_{98} -TEQ_{DFP}			
	Lower Bound [excluding LOD values]	**6.1**	pg/g lipid
	Middle Bound [including half LOD values]	**6.1**	pg/g lipid

Laboratory Reg. No.	N03/035822	**Lipid Content:**	3.5%	**Date Extracted**	31-Oct-03
Client Sample Ref.	South Australia-A			**DB5 Analysis**	12-Nov-03
Matrix	Breast Milk				
Description	pooled sample			**PCB Analysis**	12-Nov-03

PCDD/F Congeners	Level pg/g lipid	WHO_{98}-TEF	WHO_{98}-TEQ_{DF} contribution	Labelled Surrogate recovery
2,3,7,8-TCDF	0.69	0.1	0.069	47
2,3,7,8-TCDD	0.64	1	0.64	48
1,2,3,7,8-PeCDF	0.41	0.05	0.0	54
2,3,4,7,8-PeCDF	2.6	0.5	1.3	57
1,2,3,7,8-PeCDD	2.3	1	2.3	58
1,2,3,4,7,8-HxCDF	1.4	0.1	0.14	68
1,2,3,6,7,8-HxCDF	1.1	0.1	0.11	70
2,3,4,6,7,8-HxCDF	0.6	0.1	0.06	71
1,2,3,7,8,9-HxCDF	<0.07	0.1	0.0035	62
1,2,3,4,7,8-HxCDD	1.5	0.1	0.15	77
1,2,3,6,7,8-HxCDD	9.9	0.1	0.99	70
1,2,3,7,8,9-HxCDD	1.8	0.1	0.18	
1,2,3,4,6,7,8-HpCDF	1.6	0.01	0.016	68
1,2,3,4,7,8,9-HpCDF	<0.1	0.01	0.0005	59
1,2,3,4,6,7,8-HpCDD	14	0.01	0.14	70
OCDF	<2	0.0001	0.0001	
OCDD	92	0.0001	0.0092	33

PCB Congeners	Level pg/g lipid	WHO_{98}-TEF	WHO_{98}-TEQ_{P} contribution	Labelled Surrogate recovery
Non-Ortho PCBs				
PCB 77	4.1	0.0001	0.00041	41
PCB 81	2.3	0.0001	0.00023	35
PCB 126	14	0.1	1.4	71
PCB 169	6.2	0.01	0.062	69
Mono-Ortho PCBs				
PCB 105	640	0.0001	0.064	60
PCB 114	160	0.0005	0.08	64
PCB 118	2430	0.0001	0.24	60
PCB 123	51	0.0001	0.0051	64
PCB 156	920	0.0005	0.46	69
PCB 157	210	0.0005	0.11	67
PCB 167	290	0.00001	0.0029	68
PCB 189	68	0.0001	0.0068	47

Summary Results

Sum of PCDD and PCDF congeners			
	Excluding LOD values	130	pg/g lipid
WHO_{98} -TEQ_{DFP}			
	Lower Bound [excluding LOD values]	**8.6**	pg/g lipid
	Middle Bound [including half LOD values]	**8.6**	pg/g lipid

Laboratory Reg. No.	N03/022402	Lipid Content	2.8%	**Date Reported**	13 October 2003
Client Sample Ref.	Pool 1				
Matrix	breast milk				
Description	Brisbane A				

PCDD/F Congeners	Level pg/g lipid	WHO_{98}-TEF	WHO_{98}-TEQ_{DF} contribution	Labelled Surrogate recovery
2,3,7,8-TCDF	2	0.1	0.2	66
2,3,7,8-TCDD	1.7	1	1.7	70
1,2,3,7,8-PeCDF	1.2	0.05	0.1	59
2,3,4,7,8-PeCDF	4.1	0.5	2.1	54
1,2,3,7,8-PeCDD	3.6	1	3.6	62
1,2,3,4,7,8-HxCDF	<1	0.1	0.1	87
1,2,3,6,7,8-HxCDF	1.5	0.1	0.15	80
2,3,4,6,7,8-HxCDF	0.73	0.1	0.073	78
1,2,3,7,8,9-HxCDF	<0.3	0.1	0.03	73
1,2,3,4,7,8-HxCDD	1.8	0.1	0.18	95
1,2,3,6,7,8-HxCDD	14	0.1	1.4	76
1,2,3,7,8,9-HxCDD	1.6	0.1	0.16	
1,2,3,4,6,7,8-HpCDF	3.3	0.01	0.033	73
1,2,3,4,7,8,9-HpCDF	<0.2	0.01	0.002	70
1,2,3,4,6,7,8-HpCDD	12	0.01	0.12	76
OCDF	1.8	0.0001	0.00018	
OCDD	78	0.0001	0.0078	66

PCB Congeners	Level pg/g lipid	WHO_{98}-TEF	WHO_{98}-TEQ_{P} contribution	Labelled Surrogate recovery
Non-Ortho PCBs				
PCB 77	52	0.0001	0.0052	73
PCB 81	5.3	0.0001	0.00053	80
PCB 126	25	0.1	2.5	67
PCB 169	13	0.01	0.13	77
Mono-Ortho PCBs				
PCB 105	1460	0.0001	0.146	69
PCB 114	350	0.0005	0.18	74
PCB 118	6390	0.0001	0.639	61
PCB 123	130	0.0001	0.013	74
PCB 156	2870	0.0005	1.44	74
PCB 157	590	0.0005	0.3	74
PCB 167	820	0.00001	0.0082	85
PCB 189	210	0.0001	0.021	70

Summary Results

Sum of PCDD and PCDF congeners			
Excluding LOD values	140	pg/g lipid	

WHO_{98}-TEQ_{DFP}		
Lower Bound [excluding LOD values]	**15**	pg/g lipid
Middle Bound [including half LOD values]	**15**	pg/g lipid
Upper Bound [including LOD values]	**15**	pg/g lipid

Laboratory Reg. No.	N03/022403	Lipid Content	4.3%	**Date Reported**	13 October 2003
Client Sample Ref.	Pool 1				
Matrix	breast milk				
Description	Hunter				

PCDD/F Congeners	Level pg/g lipid	WHO_{98}-TEF	WHO_{98}-TEQ_{DF} contribution	Labelled Surrogate recovery
2,3,7,8-TCDF	<0.3	0.1	0.03	70
2,3,7,8-TCDD	0.82	1	0.82	66
1,2,3,7,8-PeCDF	0.16	0.05	0.008	63
2,3,4,7,8-PeCDF	1.9	0.5	0.95	57
1,2,3,7,8-PeCDD	1.8	1	1.8	57
1,2,3,4,7,8-HxCDF	<0.4	0.1	0.04	90
1,2,3,6,7,8-HxCDF	0.66	0.1	0.066	86
2,3,4,6,7,8-HxCDF	0.37	0.1	0.037	85
1,2,3,7,8,9-HxCDF	<0.6	0.1	0.06	76
1,2,3,4,7,8-HxCDD	1.3	0.1	0.13	97
1,2,3,6,7,8-HxCDD	7.5	0.1	0.75	78
1,2,3,7,8,9-HxCDD	0.72	0.1	0.072	
1,2,3,4,6,7,8-HpCDF	4.6	0.01	0.046	68
1,2,3,4,7,8,9-HpCDF	<0.07	0.01	0.0007	65
1,2,3,4,6,7,8-HpCDD	14	0.01	0.14	69
OCDF	2.1	0.0001	0.00021	
OCDD	77	0.0001	0.0077	56

PCB Congeners	Level pg/g lipid	WHO_{98}-TEF	WHO_{98}-TEQ_{P} contribution	Labelled Surrogate recovery
Non-Ortho PCBs				
PCB 77	36	0.0001	0.0036	61
PCB 81	3.6	0.0001	0.00036	68
PCB 126	30	0.1	3	76
PCB 169	5	0.01	0.05	80
Mono-Ortho PCBs				
PCB 105	1560	0.0001	0.156	97
PCB 114	240	0.0005	0.12	90
PCB 118	4890	0.0001	0.489	85
PCB 123	100	0.0001	0.01	90
PCB 156	980	0.0005	0.49	65
PCB 157	260	0.0005	0.13	63
PCB 167	420	0.00001	0.0042	79
PCB 189	60	0.0001	0.006	63

Summary Results

Sum of PCDD and PCDF congeners			
Excluding LOD values		120	pg/g lipid
WHO_{98} -TEQ_{DFP}			
	Lower Bound [excluding LOD values]	**9.3**	pg/g lipid
	Middle Bound [including half LOD values]	**9.4**	pg/g lipid
	Upper Bound [including LOD values]	**9.4**	pg/g lipid

Laboratory Reg. No.	N03/022404	Lipid Content	3.7%	**Date Reported**	13 October 2003
Client Sample Ref.	Pool 1				
Matrix	breast milk				
Description	Wollongong				

PCDD/F Congeners	Level pg/g lipid	WHO_{98}-TEF	WHO_{98}-TEQ_{DF} contribution	Labelled Surrogate recovery
2,3,7,8-TCDF	0.65	0.1	0.065	61
2,3,7,8-TCDD	<0.6	1	0.6	59
1,2,3,7,8-PeCDF	1.1	0.05	0.055	56
2,3,4,7,8-PeCDF	2.6	0.5	1.3	52
1,2,3,7,8-PeCDD	1.5	1	1.5	58
1,2,3,4,7,8-HxCDF	<0.5	0.1	0.05	81
1,2,3,6,7,8-HxCDF	1.1	0.1	0.11	73
2,3,4,6,7,8-HxCDF	<0.5	0.1	0.05	67
1,2,3,7,8,9-HxCDF	<0.2	0.1	0.02	61
1,2,3,4,7,8-HxCDD	1.1	0.1	0.11	91
1,2,3,6,7,8-HxCDD	6.5	0.1	0.65	72
1,2,3,7,8,9-HxCDD	<1	0.1	0.1	
1,2,3,4,6,7,8-HpCDF	2.9	0.01	0.029	63
1,2,3,4,7,8,9-HpCDF	<0.2	0.01	0.002	60
1,2,3,4,6,7,8-HpCDD	9.5	0.01	0.095	68
OCDF	1.3	0.0001	0.00013	
OCDD	57	0.0001	0.0057	58

PCB Congeners	Level pg/g lipid	WHO_{98}-TEF	WHO_{98}-TEQ_{P} contribution	Labelled Surrogate recovery
Non-Ortho PCBs				
PCB 77	34	0.0001	0.0034	62
PCB 81	4.4	0.0001	0.00044	66
PCB 126	12	0.1	1.2	56
PCB 169	5.3	0.01	0.053	71
Mono-Ortho PCBs				
PCB 105	760	0.0001	0.076	57
PCB 114	160	0.0005	0.08	63
PCB 118	2730	0.0001	0.273	52
PCB 123	60	0.0001	0.006	59
PCB 156	850	0.0005	0.43	63
PCB 157	220	0.0005	0.11	59
PCB 167	340	0.00001	0.0034	68
PCB 189	62	0.0001	0.0062	46

Summary Results

Sum of PCDD and PCDF congeners			
Excluding LOD values		99	pg/g lipid
WHO_{98} -TEQ_{DFP}			
	Lower Bound [excluding LOD values]	**6.2**	pg/g lipid
	Middle Bound [including half LOD values]	**6.6**	pg/g lipid
	Upper Bound [including LOD values]	**7**	pg/g lipid

Laboratory Reg. No.	N03/022405	**Date Reported**	13 October 2003
Client Sample Ref.	Pool 1	Lipid Content	0.032
Matrix	breast milk		
Description	FWR		

PCDD/F Congeners	Level pg/g lipid	WHO_{98}-TEF	WHO_{98}-TEQ_{DF} contribution	Labelled Surrogate recovery
2,3,7,8-TCDF	<0.6	0.1	0.06	64
2,3,7,8-TCDD	0.69	1	0.69	66
1,2,3,7,8-PeCDF	0.7	0.05	0.035	58
2,3,4,7,8-PeCDF	2.2	0.5	1.1	53
1,2,3,7,8-PeCDD	2.4	1	2.4	60
1,2,3,4,7,8-HxCDF	<0.8	0.1	0.08	82
1,2,3,6,7,8-HxCDF	0.92	0.1	0.092	81
2,3,4,6,7,8-HxCDF	0.59	0.1	0.059	74
1,2,3,7,8,9-HxCDF	<0.2	0.1	0.02	70
1,2,3,4,7,8-HxCDD	1.5	0.1	0.15	92
1,2,3,6,7,8-HxCDD	7	0.1	0.7	77
1,2,3,7,8,9-HxCDD	<2	0.1	0.2	
1,2,3,4,6,7,8-HpCDF	1.4	0.01	0.014	68
1,2,3,4,7,8,9-HpCDF	<0.1	0.01	0.001	65
1,2,3,4,6,7,8-HpCDD	13	0.01	0.13	76
OCDF	0.94	0.0001	0.000094	
OCDD	71	0.0001	0.0071	64

PCB Congeners	Level pg/g lipid	WHO_{98}-TEF	WHO_{98}-TEQ_{P} contribution	Labelled Surrogate recovery
Non-Ortho PCBs				
PCB 77	76	0.0001	0.0076	63
PCB 81	11	0.0001	0.0011	69
PCB 126	28	0.1	2.8	58
PCB 169	<4	0.01	0.04	72
Mono-Ortho PCBs				
PCB 105	1450	0.0001	0.145	60
PCB 114	220	0.0005	0.11	74
PCB 118	4190	0.0001	0.419	57
PCB 123	90	0.0001	0.009	68
PCB 156	730	0.0005	0.37	66
PCB 157	220	0.0005	0.11	56
PCB 167	310	0.00001	0.0031	72
PCB 189	41	0.0001	0.0041	50

Summary Results

Sum of PCDD and PCDF congeners			
Excluding LOD values		100	pg/g lipid
WHO_{98} -TEQ_{DFP}			
	Lower Bound [excluding LOD values]	**9.4**	pg/g lipid
	Middle Bound [including half LOD values]	**9.6**	pg/g lipid
	Upper Bound [including LOD values]	**9.8**	pg/g lipid

Laboratory Reg. No.	N03/022406	Lipid Content	**Date Reported**	13 October 2003
		3.6%		
Client Sample Ref.	Pool 1			
Matrix	breast milk			
Description	Melbourne A			

PCDD/F Congeners	Level pg/g lipid	WHO_{98}-TEF	WHO_{98}-TEQ_{DF} contribution	Labelled Surrogate recovery
2,3,7,8-TCDF	<0.2	0.1	0.02	54
2,3,7,8-TCDD	0.65	1	0.65	54
1,2,3,7,8-PeCDF	0.18	0.05	0.009	46
2,3,4,7,8-PeCDF	2.4	0.5	1.2	44
1,2,3,7,8-PeCDD	2.2	1	2.2	46
1,2,3,4,7,8-HxCDF	<0.6	0.1	0.06	79
1,2,3,6,7,8-HxCDF	0.75	0.1	0.075	77
2,3,4,6,7,8-HxCDF	<0.3	0.1	0.03	74
1,2,3,7,8,9-HxCDF	<0.08	0.1	0.008	62
1,2,3,4,7,8-HxCDD	1.5	0.1	0.15	83
1,2,3,6,7,8-HxCDD	8.1	0.1	0.81	71
1,2,3,7,8,9-HxCDD	<0.7	0.1	0.07	
1,2,3,4,6,7,8-HpCDF	0.88	0.01	0.0088	57
1,2,3,4,7,8,9-HpCDF	<0.09	0.01	0.0009	49
1,2,3,4,6,7,8-HpCDD	6.4	0.01	0.064	56
OCDF	<0.4	0.0001	0.00004	
OCDD	46	0.0001	0.0046	43

PCB Congeners	Level pg/g lipid	WHO_{98}-TEF	WHO_{98}-TEQ_{P} contribution	Labelled Surrogate recovery
Non-Ortho PCBs				
PCB 77	26	0.0001	0.0026	51
PCB 81	1.8	0.0001	0.00018	51
PCB 126	14	0.1	1.4	62
PCB 169	9	0.01	0.09	64
Mono-Ortho PCBs				
PCB 105	910	0.0001	0.091	68
PCB 114	210	0.0005	0.11	74
PCB 118	3540	0.0001	0.354	68
PCB 123	63	0.0001	0.0063	80
PCB 156	1370	0.0005	0.685	52
PCB 157	320	0.0005	0.16	54
PCB 167	400	0.00001	0.004	59
PCB 189	83	0.0001	0.0083	81

Summary Results

Sum of PCDD and PCDF congeners			
Excluding LOD values		69	pg/g lipid
WHO_{98} -TEQ_{DFP}			
	Lower Bound [excluding LOD values]	**8.1**	pg/g lipid
	Middle Bound [including half LOD values]	**8.2**	pg/g lipid
	Upper Bound [including LOD values]	**8.3**	pg/g lipid

Laboratory Reg. No.	N03/022407	Lipid Content	3.1%	**Date Reported**	13 October 2003
Client Sample Ref.	Pool 1				
Matrix	breast milk				
Description	Melbourne B				

PCDD/F Congeners	Level pg/g lipid	WHO_{98}-TEF	WHO_{98}-TEQ_{DF} contribution	Labelled Surrogate recovery
2,3,7,8-TCDF	<0.8	0.1	0.08	71
2,3,7,8-TCDD	<0.9	1	0.9	68
1,2,3,7,8-PeCDF	0.57	0.05	0.029	63
2,3,4,7,8-PeCDF	3.8	0.5	1.9	60
1,2,3,7,8-PeCDD	3.1	1	3.1	64
1,2,3,4,7,8-HxCDF	1.2	0.1	0.12	91
1,2,3,6,7,8-HxCDF	1.2	0.1	0.12	89
2,3,4,6,7,8-HxCDF	0.62	0.1	0.062	83
1,2,3,7,8,9-HxCDF	<0.2	0.1	0.02	78
1,2,3,4,7,8-HxCDD	1.7	0.1	0.17	95
1,2,3,6,7,8-HxCDD	10	0.1	1	82
1,2,3,7,8,9-HxCDD	1.8	0.1	0.18	
1,2,3,4,6,7,8-HpCDF	1.9	0.01	0.019	76
1,2,3,4,7,8,9-HpCDF	0.39	0.01	0.0039	76
1,2,3,4,6,7,8-HpCDD	14	0.01	0.14	83
OCDF	1.3	0.0001	0.00013	
OCDD	82	0.0001	0.0082	70

PCB Congeners	Level pg/g lipid	WHO_{98}-TEF	WHO_{98}-TEQ_{P} contribution	Labelled Surrogate recovery
Non-Ortho PCBs				
PCB 77	38	0.0001	0.0038	68
PCB 81	3.6	0.0001	0.00036	74
PCB 126	18	0.1	1.8	64
PCB 169	10	0.01	0.1	77
Mono-Ortho PCBs				
PCB 105	960	0.0001	0.096	62
PCB 114	320	0.0005	0.16	68
PCB 118	4310	0.0001	0.431	60
PCB 123	74	0.0001	0.0074	76
PCB 156	2240	0.0005	1.12	67
PCB 157	490	0.0005	0.25	65
PCB 167	570	0.00001	0.0057	82
PCB 189	160	0.0001	0.016	59

Summary Results

Sum of PCDD and PCDF congeners			
Excluding LOD values		130	pg/g lipid
WHO_{98} -TEQ_{DFP}			
	Lower Bound [excluding LOD values]	**11**	pg/g lipid
	Middle Bound [including half LOD values]	**11**	pg/g lipid
	Upper Bound [including LOD values]	**12**	pg/g lipid

Historic Samples

Laboratory Reg. No.	N03/030645	**Lipid Content:** 4.3%	**Date Extracted**	19-Oct-03
Client Sample Ref.	Melb Hist A		**DB5 Analysis**	13-Oct-03
Matrix	Breast Milk		**DB-Dioxin Analysis**	14-Oct-03
Description	pooled sample		**PCB Analysis**	14-Oct-03

PCDD/F Congeners	Level pg/g lipid	WHO_{98}-TEF	WHO_{98}-TEQ_{DF} contribution	Labelled Surrogate recovery
2,3,7,8-TCDF	<0.2	0.1	0.01	68
2,3,7,8-TCDD	<0.8	1	0.4	66
1,2,3,7,8-PeCDF	<0.3	0.05	0.0	66
2,3,4,7,8-PeCDF	4.2	0.5	2.1	66
1,2,3,7,8-PeCDD	4.1	1	4.1	64
1,2,3,4,7,8-HxCDF	<0.5	0.1	0.025	91
1,2,3,6,7,8-HxCDF	0.99	0.1	0.099	93
2,3,4,6,7,8-HxCDF	0.2	0.1	0.02	93
1,2,3,7,8,9-HxCDF	<0.2	0.1	0.01	81
1,2,3,4,7,8-HxCDD	2.8	0.1	0.28	101
1,2,3,6,7,8-HxCDD	15	0.1	1.5	84
1,2,3,7,8,9-HxCDD	2.8	0.1	0.28	
1,2,3,4,6,7,8-HpCDF	5.7	0.01	0.057	82
1,2,3,4,7,8,9-HpCDF	<0.2	0.01	0.001	78
1,2,3,4,6,7,8-HpCDD	<20	0.01	0.1	85
OCDF	<0.4	0.0001	0.00002	
OCDD	<85	0.0001	0.0043	62

PCB Congeners	Level pg/g lipid	WHO_{98}-TEF	WHO_{98}-TEQ_{P} contribution	Labelled Surrogate recovery
Non-Ortho PCBs				
PCB 77	12	0.0001	0.0012	57
PCB 81	1.8	0.0001	0.00018	54
PCB 126	23	0.1	2.3	79
PCB 169	20	0.01	0.2	70
Mono-Ortho PCBs				
PCB 105	2140	0.0001	0.21	57
PCB 114	710	0.0005	0.36	60
PCB 118	10500	0.0001	1.1	61
PCB 123	100	0.0001	0.01	69
PCB 156	5420	0.0005	2.7	54
PCB 157	1040	0.0005	0.52	49
PCB 167	1550	0.00001	0.016	67
PCB 189	500	0.0001	0.05	52

Summary Results

Sum of PCDD and PCDF congeners	Excluding LOD values		36	pg/g lipid
WHO_{98}-TEQ_{DFP}		Lower Bound [excluding LOD values]	16	pg/g lipid
		Middle Bound [including half LOD values]	16	pg/g lipid
		Upper Bound [including LOD values]	17	pg/g lipid

Laboratory Reg. No.	N03/030646	Lipid Content: **3.1%**	**Date Extracted**	19-Oct-03
Client Sample Ref.	Melb Hist B		**DB5 Analysis**	13-Oct-03
Matrix	Breast Milk		**DB-Dioxin Analysis**	14-Oct-03
Description	pooled sample		**PCB Analysis**	14-Oct-03

PCDD/F Congeners	Level pg/g lipid	WHO_{98}-TEF	WHO_{98}-TEQ_{DF} contribution	Labelled Surrogate recovery
2,3,7,8-TCDF	<0.4	0.1	0.02	71
2,3,7,8-TCDD	1.2	1	1.2	66
1,2,3,7,8-PeCDF	0.86	0.05	0.043	69
2,3,4,7,8-PeCDF	3.9	0.5	2	66
1,2,3,7,8-PeCDD	4.4	1	4.4	68
1,2,3,4,7,8-HxCDF	1.6	0.1	0.16	92
1,2,3,6,7,8-HxCDF	1.6	0.1	0.16	91
2,3,4,6,7,8-HxCDF	0.22	0.1	0.022	94
1,2,3,7,8,9-HxCDF	<0.1	0.1	0.005	84
1,2,3,4,7,8-HxCDD	4.2	0.1	0.42	100
1,2,3,6,7,8-HxCDD	17	0.1	1.7	89
1,2,3,7,8,9-HxCDD	4	0.1	0.4	
1,2,3,4,6,7,8-HpCDF	15	0.01	0.15	85
1,2,3,4,7,8,9-HpCDF	<0.3	0.01	0.0015	76
1,2,3,4,6,7,8-HpCDD	<30	0.01	0.15	89
OCDF	<0.3	0.0001	0.000015	
OCDD	<70	0.0001	0.0035	66

PCB Congeners	Level pg/g lipid	WHO_{98}-TEF	WHO_{98}-TEQ_{P} contribution	Labelled Surrogate recovery
Non-Ortho PCBs				
PCB 77	6.6	0.0001	0.00066	56
PCB 81	1.9	0.0001	0.00019	55
PCB 126	18	0.1	1.8	79
PCB 169	9.5	0.01	0.095	73
Mono-Ortho PCBs				
PCB 105	1230	0.0001	0.12	64
PCB 114	340	0.0005	0.17	73
PCB 118	4220	0.0001	0.42	65
PCB 123	77	0.0001	0.0077	74
PCB 156	1710	0.0005	0.86	63
PCB 157	350	0.0005	0.18	65
PCB 167	520	0.00001	0.0052	79
PCB 189	130	0.0001	0.013	62

Summary Results

Sum of PCDD and PCDF congeners			
	Excluding LOD values	55	pg/g lipid
WHO_{98} -TEQ_{DFP}			
	Lower Bound [excluding LOD values]	**14**	pg/g lipid
	Middle Bound [including half LOD values]	**15**	pg/g lipid
	Upper Bound [including LOD values]	**15**	pg/g lipid

Laboratory Reg. No.	N03/030647	Lipid Content: **4.2%**	**Date Extracted**	19-Oct-03
Client Sample Ref.	Melb Hist C		**DB5 Analysis**	13-Oct-03
Matrix	Breast Milk		**DB-Dioxin Analysis**	15-Oct-03
Description	pooled sample		**PCB Analysis**	14-Oct-03

PCDD/F Congeners	Level pg/g lipid	WHO_{98}-TEF	WHO_{98}-TEQ_{DF} contribution	Labelled Surrogate recovery
2,3,7,8-TCDF	0.34	0.1	0.034	72
2,3,7,8-TCDD	1.5	1	1.5	68
1,2,3,7,8-PeCDF	1.7	0.05	0.085	68
2,3,4,7,8-PeCDF	4.1	0.5	2.1	69
1,2,3,7,8-PeCDD	4.5	1	4.5	68
1,2,3,4,7,8-HxCDF	2.8	0.1	0.28	91
1,2,3,6,7,8-HxCDF	2	0.1	0.2	88
2,3,4,6,7,8-HxCDF	0.3	0.1	0.03	95
1,2,3,7,8,9-HxCDF	<0.1	0.1	0.005	82
1,2,3,4,7,8-HxCDD	3.7	0.1	0.37	100
1,2,3,6,7,8-HxCDD	18	0.1	1.8	90
1,2,3,7,8,9-HxCDD	6.1	0.1	0.61	
1,2,3,4,6,7,8-HpCDF	30	0.01	0.3	85
1,2,3,4,7,8,9-HpCDF	<0.8	0.01	0.004	80
1,2,3,4,6,7,8-HpCDD	<40	0.01	0.2	89
OCDF	<0.3	0.0001	0.000015	
OCDD	<200	0.0001	0.01	64

PCB Congeners	Level pg/g lipid	WHO_{98}-TEF	WHO_{98}-TEQ_{P} contribution	Labelled Surrogate recovery
Non-Ortho PCBs				
PCB 77	13	0.0001	0.0013	65
PCB 81	2.1	0.0001	0.00021	64
PCB 126	20	0.1	2	81
PCB 169	11	0.01	0.11	68
Mono-Ortho PCBs				
PCB 105	1510	0.0001	0.15	70
PCB 114	280	0.0005	0.14	80
PCB 118	5620	0.0001	0.56	72
PCB 123	120	0.0001	0.012	76
PCB 156	1900	0.0005	0.95	60
PCB 157	440	0.0005	0.22	58
PCB 167	900	0.00001	0.009	71
PCB 189	160	0.0001	0.016	59

Summary Results

Sum of PCDD and PCDF congeners			
	Excluding LOD values	75	pg/g lipid
WHO_{98} -TEQ_{DFP}			
	Lower Bound [excluding LOD values]	**16**	pg/g lipid
	Middle Bound [including half LOD values]	**16**	pg/g lipid
	Upper Bound [including LOD values]	**17**	pg/g lipid