NATIONAL ADVISORY BODY ON SCHEDULED WASTES
SCHEDULED WASTES MANAGEMENT GROUP

REVIEW OF THE PCB MANAGEMENT PLAN

DISCUSSION PAPER

Prepared by PCB Review Panel
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DISCLAIMER

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1. INTRODUCTION TO THE REVIEW

1.1 Requirements of the Plan

The PCB Management Plan was agreed by the Australia and New Zealand Environment and Conservation Council (ANZECC) in November 1995 and the national starting date for its implementation was 1 January 1996. The PCB Management Plan is available on the Environment Australia web-site (www.ea.gov.au/industry/chemicals/swm/index.html). Section 16 of the Plan provides the following direction on review of the Plan:

> 16.1 The review period for this management plan shall not be greater than five years.
>
> 16.2 The review shall consider information made available through State of the Environment and other reporting mechanisms, including:
> - progress in destroying scheduled PCB material and scheduled PCB waste;
> - PCB treatment technologies and their adequacy for treating the different types of scheduled PCB material and scheduled PCB waste;
> - appropriateness of the various values (for example, threshold concentration and quantity) and phase-out dates stipulated in the plan;
> - changes in environmental PCB concentrations over time;
> - concentrations of PCBs in groundwater and landfill leachate;
> - human health and environmental toxicology of PCBs, including coplanar PCBs;
> - cost/benefit analyses including intangible costs and benefits; and
> - effectiveness of education programs.

According to the requirements of the management plan, the review should cover the period January 1996 to December 2000. Present plans for the review are that it should be completed in the second half of 2001 for submission to the Environment Protection and Heritage Council (EPHC, formerly ANZECC) at the end of the year.

Rather than being limited to 'information made available through State of the Environment and other reporting mechanisms' this review will seek to avail itself of relevant data and information from any source. Readily available information bearing on PCB matters, for example the provisions of the Stockholm Convention on Persistent Organic Pollutants (2001), should also be taken into account.

1.2 Review Panel

On behalf of EPHC, the Review is being conducted jointly by the National Advisory Body on Scheduled Waste (NAB) and Scheduled Wastes Management Group (SWMG). The NAB comprises representatives from industry, conservation organisations, local government, unions and farmers while the SWMG consists of senior officers from the State, Territory and Commonwealth environment departments. Both groups were closely involved in the development of the PCB Management Plan and provide advice to EPHC on scheduled waste issues, including implementation of the scheduled waste plans.

A Review Panel has been established. Its members are Professor Ian Rae (NAB Chair), Dr Peter Brotherton (Australian Conservation Foundation), Mr Trevor Bridle (Environment Business Australia), Dr Harry Schaap (Electricity Supply Association of Australia), and Dr Helen Tope (EPA Victoria). Environment Australia provided secretariat services for the review.

The NAB will conduct public/stakeholder meetings, which will include a discussion about progress towards the

goals of the PCB Management Plan and other issues arising from the PCB Discussion Paper. A joint NAB/SWMG report is intended to be produced and submitted to EPHC.

1.3 The Review Process

This discussion paper, containing information relevant to the terms of reference of the review, has been prepared by the review panel in consultation with the NAB and SWMG. It is to be used to seek input to the review from all interested parties. A notice regarding the review is to be sent to the NAB's PCB mailing list, and will also be publicised through the email distribution lists of NAB and SWMG members. Public meetings will be held in Melbourne, Sydney, Brisbane and Perth. Following analysis of any submissions and other available information, a report to EPHC on the findings of the review, including a response to the submissions received, and any recommendations will then be prepared. A summary of the Review outcomes will be provided to all contributors to the review (those who attended public meetings and/or provided written submissions), preferably via electronic mail. The review report will also be available on the Environment Australia website (www.ea.gov.au/industry/chemicals/swm/index.html), or upon request (email request to ocp@ea.gov.au or telephone 1800 657 945).

1.4 Earlier Submissions

In response to an early request for input to the review discussion paper that was mailed to conservation organisations, government representatives and industry, five submissions were received from industry and government. The substantive points raised by these submissions have been included in the relevant section of this discussion paper, and they are also summarised at Appendix A[1].

1.5 Changes to the plan

In 1999 ANZECC approved a revision of the standard for surface contamination by PCBs, in section 9.17 of the plan, and subsequent printings incorporated these changes and mentioned them on page 1.

2. PROGRESS IN DESTROYING PCBs

2.1 Registers

The PCB management plan (Section 4.3) requires each jurisdiction to "maintain a publicly accessible register of scheduled PCB material and scheduled PCB waste", that "holders of notifiable quantities are obliged to register their holdings; and other holders are encouraged to do so". Although South Australia EPA developed a proposed standard format for registers, each jurisdiction decided to utilise its own register format. These range from paper files to software versions.

Some jurisdictions did not introduce specific regulations for PCBs for some time but indicated that existing regulations were to be regarded as applying to PCBs, although these lacked much of the specificity of elements of the Management Plan. Victorian regulations shown in the table below is a case in point. In some cases, known holders of PCB materials or wastes have declined invitations to register voluntarily, preferring to wait until they were obliged to register under specific regulations.

The current status of State legislation/regulations and PCB registers is summarised in Table 1.

[1] It should be noted that while effort has been made to ensure the accuracy of these summaries of submissions provided here, they may nevertheless not accurately present the intentions of the credited submission authors.

Table 1. Summary of PCB Management Plan Regulation in Australia

JURISDICTION	SUMMARY OF REGULATORY INSTRUMENTS
Commonwealth	Under the Intergovernmental Agreement on the Environment the Commonwealth has agreed to comply with State legislation or to manage PCB to at least an equivalent standard.
New South Wales	Polychlorinated Biphenyl (PCB) Chemical Control Order 1997 – commenced 21 July 1997. A paper register of PCB holdings in NSW is kept.
Queensland	Legislation on PCBs took effect on 1 July 2000. Part 6 of the *Environmental Protection (Waste Management) Regulation 2000* prescribes provisions for handling PCBs. PCB holders submit information in written/paper format. An electronic register of PCB holdings records information provided by industry under the legislation.
Victoria	The *Environment Protection Act 1970* places controls on PCBs through instruments such as a Notifiable Chemicals Order (varied in 2000) for PCBs, the *Environment Protection (Scheduled Premises and Exemptions) Regulations (1996),* and *the Environment Protection (Prescribed Waste) Regulations (1998)*. The 2000 variation to the *Notifiable Chemicals Order* provides the statutory basis for the implementation of the PCB Management Plan in Victoria and requires the provision of data through a register of scheduled PCB holdings under development by EPA Victoria.
South Australia	Proposal to incorporate provisions of the PCB Management Plan into Environment Protection Policy. A discussion paper relating to this EPP has been produced. An electronic register of PCB holdings established.
Western Australia	Controlled Waste Regulations came into operation on 1 April 2001. These regulations allow the EPA to enforce the PCB Management Plan. Establishment of a register is under consideration.
Northern Territory	The Northern Territory does not consider that legislation is necessary to enable the NT to implement the PCB Management Plan. A register of PCB holdings has been established.
Tasmania	The *Environmental Management and Pollution Control Act* (1994) allows for the Director of Environmental Management to request information and seek action(s) to be undertaken through an Environment Protection Notice. New regulations for waste management, including relevant requirements in relation to the PCB Management, came into force January 1, 2001. Tasmania has a paper based PCB register.
Australian Capital Territory	Environment Protection Act 1997 and Environment Protection Regulation 1997 apply. A Hazardous Materials Environment Protection Policy contains five modules covering a range of hazardous materials, and calls on the PCB

	Management Plan for operational direction. A register of movements of PCB material out of the ACT is kept.

2.2 Reports

Please refer to Appendix B – Summary Data on PCB Holdings and Destruction.

3. PCB TREATMENT TECHNOLOGIES

3.1 Base catalysed dechlorination

This process has been used by two companies - the major operator BCD Technologies near Brisbane, and the smaller HazWaste Services near Melbourne. The process is mainly used for dilute solutions of organochlorines, including PCBs, in mineral oil (paraffin), with the oil providing the means of reducing the chlorinated substance. Blending has been permitted at the facilities and so small quantities of concentrated PCBs are handled by adding them to dilute solutions before treatment.

3.2 Plascon

The plasma arc (Plascon) technology is best suited economically to concentrated liquid PCBs. BCD Technologies operate such a facility at the same site as their base catalysed dechlorination, thus enabling them to handle there a wide range of PCB and PCB-containing materials.

3.3 Eco Logic hydrogenation

This plant, at Kwinana, WA, has ceased operation after operating satisfactorily for some years. It has been purchased by Toxfree and is expected to resume operations. The process was especially suited for destruction of concentrated organochlorine material such as PCB, since with dilute solutions much of the Eco Logic effort was wasted on conversion of paraffin to methane.

For a time in the late 1990s the Eco Logic plant forwarded to the Victorian company HazWaste Services any dilute PCB-in-paraffin materials that it received, since these were more appropriately handled by the base catalysed dechlorination process. However, permission for these transfers was more recently not allowed by EPA Victoria due to concerns about the capacity of the Victorian company to handle the volumes involved without exceeding the inventory cap imposed by its licence.

3.4 Fluidex

ESI (Energy Services International Pty Ltd), a Queensland-based company, has operated this process that is licensed by a South African principal and derives from the S D Myers technology augmented by a clean-up step to remove PCB-degradation products. The process consists of a chemical reduction that is ideally suited for removal of PCB from dilute paraffin solutions that are circulated through the facility and returned to the electrical equipment from which they originate. The facility is relocatable, and has operated in New Zealand.

3.5 CSIRO Process

A catalytic hydrogenation process for treatment of dilute PCB solutions in paraffin has been employed on one occasion to treat contaminated transformer oil (less than 3000 L, PCB level less than 1000 mg/kg) in New South Wales.

3.6 ADOX

The ADOX process developed by ADI and now possessed by Enterra Ltd (comprising Avigroup and IT Environmental) was used in conjunction with indirect thermal desorption (ITD) to remediate the concentrated chlorinated organic fraction separated from contaminated soil by the ITD plant at Homebush Bay, the Sydney Olympics site. Plans have also been announced to seek approval for a soil treatment plant at Kooragang Island, Newcastle. The ADOX process is a faster version of the original base catalysed dechlorination, in which acceleration of the dechlorination reactions is brought about by use of a proprietary catalyst. Trials in New Zealand showed that organochlorines were, to a large extent, destroyed during the thermal desorption process, and so only small proportions of the original contaminants need to be further treated by ADOX proposed PCB treatments.

3.7 Castrol Process

Castrol, in association with Tredi (NZ) and Safety-Kleen PPM (Canada), have submitted licence applications to a number of state environment protection agencies for a process that uses a dispersion of metallic sodium in mineral oil to destroy PCBs in paraffin solutions. Such a process is used in North America for destruction of PCBs but has not been employed in Australia.

3.8 Bioremediation

Attempts at bioremediation of PCB-containing material have generally been unsuccessful but a licence has recently been granted by NSW EPA for a trial involving a small quantity of PCB- contaminated oil.

4. APPROPRIATENESS OF VALUES

4.1 Notifiable quantity

Section 4.1 of the management plan sets a notifiable quantity of 10 kg of PCB in scheduled PCB waste or material. Holders of greater quantities must notify the relevant authority. It is the quantity of PCB in the material or waste and not the total quantity of material or waste that constitutes the threshold. Also, where a number of small equipment items exist at the one premises, the sum of the PCB contained in scheduled PCB material or waste shall be the basis for determining whether the threshold is exceeded. Some agencies have reported that not all holders have complied with this provision in the plan.

4.2 Threshold concentration

Section 2 of the management plan depicts the three classes into which PCB materials and PCB wastes have been divided. At concentrations at or below 2 mg/kg PCB, the material or waste is classified as 'PCB free' and this is the condition that must be achieved by any treatment of PCB material or waste. From 2 to below 50 mg/kg PCB the material or waste is classified as 'non-scheduled PCB' and does not require treatment (but the plan provides guidance for disposal). At or above 50 mg/kg, but only for quantities of at least 50 g PCB, the material or waste is classified as 'scheduled PCB', and subject to other stipulations in the management plan apply. The level of 50g was set to exclude small single items.

There has been some confusion between the 10 kg notifiable quantity and the 50 g threshold for declaring material or waste 'scheduled PCB'. Holders of more than 10kg of scheduled PCB (regardless of its form) must report that fact to the relevant state or territory agency for inclusion in their PCB register. Above the dual 50g and 50mg thresholds' all PCB waste must be treated as scheduled PCB waste. However it is only when the quantity of PCBs exceeds 10kg that it is compulsory to notify the regulatory agency.

There has also been some confusion about the threshold values for non-scheduled and scheduled PCBs and their practical implementation. One practical outcome is that people may be including all PCBs with a concentration at or above 50mg/kg among those managed as scheduled PCBs, rather than taking into consideration the threshold quantity of 50g. The effect of this would be to manage some PCBs as scheduled PCBs that would be strictly defined as non-scheduled under the Plan. Alternatively, people may be dis-aggregating their scheduled PCB holdings into smaller parcels of non-scheduled PCBs by taking advantage of the threshold quantity of 50g even though this is prohibited under the Plan. However, as the Plan states that all PCBs with a concentration at or above 50mg/kg must be disposed of as scheduled PCBs at the end of its useful life (section 10), these interpretations should have no impact on end of life disposal practices.

One problem is that holders and treaters of PCB material and wastes sometimes overlook the need to conduct treatment of scheduled PCB so far as to lower the PCB content to 2 mg/kg, and not merely to below 50 mg/kg. There is, of course a caveat in section 9.12, invoking 'technological practicability' of following such a stipulation. It has also been pointed out that it is sometimes misleading to use the term ‘PCB free’ as it includes material that contains PCB up to a level of 2mg/kg.

Section 7.2 of the Plan states that non-scheduled PCB should be stored, transported and handled as the diluent and in accordance with any other legislative requirements. This has been, perhaps conveniently, interpreted by some industry to imply that non-scheduled PCB is to be stored, transported and handled like a waste oil. In practice this interpretation has the potential to lead to
non-scheduled PCB ending up in the waste oil stream regardless of the guidance for disposal of non-scheduled PCBs in Appendix B. Also in some jurisdictions, requirements for transport, storage and handling for waste oil and non-scheduled PCBs are quite different, requiring higher standards of practice with PCBs.

4.3 Emissions

Section 9 provides emissions specifications for treatment and disposal of scheduled PCB material and scheduled PCB waste. Specifications include that:

- any liquid residue from the treatment of scheduled waste shall be PCB free;
- liquid discharge to sewers will meet the requirements of ANZECC/ARMCANZ Guidelines for Sewerage Systems: Acceptance of Trade Waste (Industrial Waste);
- there will be no discharge of liquid PCB effluent from treatment facilities to any wetlands;
- liquid effluent from the treatment of scheduled PCB waste and from sewage treatment facilities which is discharged to fresh or marine waters other than wetlands shall contain less than 0.1 and 0.4 microgram of PCBs per litre respectively.
- Emissions of PCBs, dioxins and furans to atmosphere are to reflect USA, Canadian and European standards. Where the Plan does not provide for numerical specifications, emissions standards are as determined by the relevant state environment agency.

Comprehensive data is not available. Monitoring of emissions and management of any exceedences are the responsibility of the States and Territories.

4.4 Surfaces

As mentioned earlier, the specifications for surface contamination were revised in 1999 and now (section 9.17 of the management plan), to allow for 1 mg/m^2 as the maximum allowable level.

PCB contamination of porous material from transformers, such as paperboard, has also been considered. The Canadian guideline assumes 25% of the mass of contaminated material arises from retention of the transformer

fluid. The Queensland EPA has produced a draft Guideline for Waste Management on this matter, titled "Determining the surface concentration of PCBs".

A draft guideline on transformer management, concentrating on the recycling of PCB-free metal, has been prepared by Queensland EPA: "Identifying equipment containing PCBs" and "Managing PCBs".

4.5 Timelines

The times for the achievement of various stages in the notification, removal from service and eventual destruction of PCBs are set out in Table 2 of the management plan, with shorter timelines applying to PCBs in sensitive areas. Complete destruction of known scheduled PCBs in Australia is to be achieved by 1 January 2009 (13 years from the start date). However, an exception applies to some small equipment and equipment containing non-scheduled PCB material which is expected to be still in service at that time, to which the stipulation applies that as such equipment comes out of service, the PCB is expected to be consigned for destruction within one year.

The Plan requires that more concentrated PCBs, and those PCBs in more sensitive locations (eg in schools, or near wetlands) be treated with a greater priority than other PCBs. It is not clear whether all jurisdictions have systematically ensured that this aspect of the plan has been enforced. In the A.C.T, for example, a program for PCB removal was conducted in public schools in the late 1980s and early 1990s, and the A.C.T's universities have in place programs for the identification and removal of PCB capacitors during servicing and refurbishment activities. The Canberra Hospital has undergone major refurbishment since 1990 with 95% of light fixtures being removed. The hospital plans to remove the remaining light fittings through ongoing minor works and subsequent refurbishment efforts.

5. ENVIRONMENTAL CONCENTRATIONS

A study of monitoring of PCB levels in Australia, published by the NAB as *Monitoring of Polychlorinated Biphenyls in Australia* in September 1988, while conceding that "data are not comprehensive and for some media they are very patchy" concluded that the they do "not indicate a need for further extensive monitoring other than that which is undertaken on a routine basis". However, "some additional monitoring would assist in determining whether the implementation of the PCB management plan is meeting the desired result of reducing levels of PCBs in the environment". The areas singled out for comment were:

- PCB levels in foodstuffs were well below national and international standards;
- breast milk levels, although derived from limited sampling, were close to levels of concern and further monitoring would be in order;
- levels in sewage did not appear to be of concern but further analytical data would be needed before this conclusion could be confirmed;
- landfill data suggested that PCBs interred in the past were not leaching into the environment;
- further monitoring of sediments and fish near east-coast capital cities was recommended, and it was noted that concern had been expressed about levels of PCBs and other organochlorines in marine mammals;
- PCBs levels in fish and other wildlife imply the need for continued monitoring, particularly in the case of marine mammals that have been a focus of particular concern in the Northern Hemisphere.

No national screening program for PCBs in breast milk has been conducted.

A recently published article (Kalantzi, et al., Environmental Science and Technology, 2001, vol. 35, pp. 1013-1018) on PCBs and organochlorine pesticides in butter samples from a number of countries reported five samples from Australia (locations not disclosed), and alluded to earlier work on soil samples. In both media, southern hemisphere samples showed the lowest concentrations of organochlorines. Australian butters had mean PCB-in-

lipid content of 740 pg/g. The range of PCB levels in the 63 samples from 23 countries ranged from 230 to 14 090 pg/g, with New Zealand and Australia having the lowest PCB levels and Czechoslovakia the highest.

A report on levels of persistent organochlorine pesticides (OCPs) in Australia was prepared for Environment Australia by consultant group Envirotest in November 1999. Some PCB data for a variety of marine mammal species from the Southern Ocean were also included in the report. The levels of PCB in these animals showed variation between species, but tended to be lower than those found in similar tests in the 1970s and 1980s.

Another report *Persistent Lipophilic Contaminants and Other Chemical Residues in the Southern Hemisphere* includes some PCB information (http://www.environment.gov.au/epg/chemicals/pubs/connell.pdf), but all data are prior to the advent of the PCB management plan.

The South Australian Environment Protection Agency has undertaken analyses of PCBs in blubber tissue collected from 15 dolphins found dead in different parts of South Australia over the last 10 years. Mainly male dolphins were used as PCB levels in female dolphins can be reduced by calving. PCB levels in dolphins from the Port River area were substantially higher than from dolphins found elsewhere around the State but well below most levels reported in the scientific literature. The results of the survey have been published and are available from the EPA web site
http://www.environment.sa.gov.au/epa/pdfs/dolphin.pdf.

While the above direct and indirect environmental indicators paint a situation of declining presence of PCB in the environment, it is not possible to attribute those changes to the implementation of the PCB plan.

A small number of incidents involving PCB contamination have been reported by the jurisdictions and some have resulted in court prosecutions. Inappropriate storage has been identified as a contributory cause of incidents in Queensland and Western Australia.

6. GROUNDWATER AND LANDFILL LEACHATES

No data have become available for groundwater, and as noted in the previous section of this discussion paper, PCBs are not detected in landfill leachates where analyses have been performed. Landfill leachate/bore monitoring has been undertaken in a number of jurisdictions - WA, Vic, ACT and Qld - generally with no detected PCBs. (The exception being in WA during 1991 - well prior to the Plan being implemented - where leachate was detected at up to 1.2 micrograms/litre). NT, SA and Tas do not monitor landfill leachate for PCBs, in most cases because non-scheduled PCB disposal at their landfills is not allowed.

7. TOXICOLOGY

In 1993 the International Programme on Chemical Safety, a joint venture of the United Nations Environment Programme (UNEP), The International Labour Organisation (ILO) and the World Health Organization (WHO) released report number 140 *Polychlorinated Biphenyls and Terphenyls* (Second Edition) in its series on Environmental Health Criteria. This included exposure data and health outcomes for exposed humans and other species. The US Department of Health and Human Services, through its Agency for Toxic Substances and Disease Registry, in 1997 produced a Toxicological Profile for Polychlorinated Biphenyls that concentrated on human health. An updated report was published in November 2000 and it noted that occupational exposure to PCBs occurs mainly through inhalation and skin contact, while the general population is most likely to be exposed to PCBs by inhalation and orally. Occupational studies are inconclusive regarding cancer but impairment of liver function is well established. Animal studies of the effects on ingestion show adverse liver, kidney, skin, immunological, body weight and other effects, but impairment of human health is not evident, possibly because exposures (by way of food) are too small for such effects to be discerned.

Dioxin-like activity of those PCBs for which the molecule is likely to be coplanar has been observed in clinical studies, and since the early 1990s a number of schemes have been advanced for assigning dioxin Toxic Equivalence Factors (TEQ) to PCB congeners. The most toxic of the PCB congeners (3,3',4,4',5-pentachlorobiphenyl) has TEQ 0.1 relative to 2,3,7,8,-tetrachlorodibenzo-p-dioxin taken as 1. The degree to which the toxicities of the PCB congeners may be regarded as additive is not established, but a recent New Zealand publication uses a TEQ approach to explore toxicity of the PCDD/PCDF/PCB group (A.H. Smith & P. Lopipero, *Evaluation of the toxicity of dioxins and dioxin-like PCBs: A health risk appraisal for the New Zealand population* February 2001, NZ Ministry for the Environment). A survey of the occurrence of these substances in NZ foods in 1998 showed that, on a TEQ basis, PCBs contributed to the same extent as dioxins/furans, but that both figures were low in comparison to those for other developed countries.

In June 2000 the Department of Health and Aged Care (DHAC) proposed the establishment of a provisional national health standard TDI of 1-4pg TEQ/kg body weight for dioxins, as recommended by the World Health Organisation (WHO). This TEQ includes dioxins, furans and dioxin-like PCBs. The DHAC report *Dioxins: Proposal for Setting an Australian Provisional Tolerable Daily Intake* noted that future considerations of the potential adverse human impacts of exposure to dioxins would also need to consider other possible dioxin-like compounds which may occur in the environment. A copy of this report can be found on the DHAC web site (www.health.gov.au/tga/docs/html/dioxins/htm).

PCBs were discussed at the March 2000 meeting of the Society of Toxicology held in Philadelphia, USA, when it was noted that despite declining use of PCBs in developed countries it was still possible to detect (usually minute) concentrations of PCBs in the body fat of most residents of those countries. PCBs were still being produced as by-products of incineration and industrial bleaching. Dutch reports indicated that PCBs passed to infants during pregnancy and in breast milk, appeared to weaken the babies' immune systems. The study, which began in 1988, is continuing.

8. COST/BENEFIT ANALYSIS

The cost/benefit analysis required by ANZECC before the PCB management plan was accepted concluded that the incremental cost (expressed as net present value) of implementing the plan was approximately $70 million, although it was noted that no reliable inventory of PCB holdings was publicly available. Approximately $33 million of this cost would accrue to the electricity supply industry, for which a more reliable inventory was available. The benefits of implementing the plan were not readily quantifiable and therefore could not be expressed in monetary terms. The benefits were, however, held to be considerable. Reduction of risk to the general population and the environment, as well as potentially-exposed workers, were among the intangibles. More tangible benefits would flow to consultants and to the destruction technology holders. There would also be benefits to trade from reducing the risk of contamination of produce.

No further work of this kind has been attempted.

9. EDUCATION PROGRAMS

The management plan (Section 15.3) requires agencies to ensure that education programs are formulated for people likely to come into contact with PCBs, including electricians, building owners and operators, landfill operators, and emergency workers. A major educational activity was the commissioning by the NAB and SWMG of a publication for electricians identifying PCB-containing capacitors. Some 12,000 copies of this publication have been distributed in the trade. Some agencies have produced general material of this type, usually (see submissions by Victoria and Queensland environment protection agencies, Appendix A) in conjunction with the implementation of new regulations. NSW has had guidance material available to industry since 1991, which has been largely superseded by the above national document.

10. THE STOCKHOLM (POPs) CONVENTION

The Stockholm Convention on Persistent Organic Pollutants (POPs) was agreed in December 2000 by 120 countries. The treaty establishes legally binding obligations. Australia signed the agreement 23 May 2001. Overall, the PCB Management Plan should meet all of Australia's obligations with respect to the phase out and management of PCBs under the Convention, except for import/export obligations which are currently not dealt with in the Plan. A summary of the relevant aspects of the Convention is in Appendix C.

11. IMPORTATION OF PCBs

Under Regulation 4AB of the *Customs (Prohibited Imports) Regulations* 1956, import of PCBs and goods containing PCBs is prohibited without the written consent of the Minister for Justice and Customs. In practice, the Australian Customs Service seeks advice from Environment Australia and National Industrial Chemicals Notification and Assessment Scheme (NICNAS) in formulating advice for the Customs Minister on receipt of an application. Environment Australia's advice to Customs is provided with due regard to the intent of the PCB Management Plan. Where the PCB material is *waste*, the Hazardous Waste (Regulation of Export and Imports Act) 1989, which implements Australia's obligations under the *Basel Convention on the Transboundary Movement of Hazardous Waste* also applies.

Although questions of import and export of PCBs are not strictly part of the NAB's terms of reference, it has on two occasions been asked to consider whether it supports, *in principle*, the importation of PCBs into Australia for the purpose of destruction. In the first, NAB discussed a suggestion that material from PNG might be brought to Queensland for treatment. NAB members indicated support for importation of PCBs from nations of the South Pacific Forum (with the exception of New Zealand). The feeling of NAB members was that such importation should be given sympathetic consideration, for three reasons:

- such equipment could have originated in Australia;
- Australia had special 'good neighbour' responsibilities towards small Pacific nations; and
- because these nations could not reasonably be expected to have the technical capacity to handle such wastes themselves.

In the second instance, a destruction technology holder wished to have NAB's opinion about whether importation of PCBs from USA military establishments in Japan would be acceptable. To do so would provide work for an Australian facility and remove the threat of release to the environment material that USA law prevented being imported to that country. A majority of NAB members were strongly opposed to such importation and this advice was passed on to the technology holder. (The USA now proposes to revise its legislation to permit import of such material into the USA for destruction).

There may be some merit in this review addressing the issue of importation of PCBs into Australia, and making some recommendations regarding the conditions under which importation of PCBs into Australia would be acceptable. There is anecdotal evidence to suggest that the relevant Customs importation procedures fail to mention that PCB and PCB containing/contaminated equipment is banned.

12. CONCLUSIONS

Progress in destroying PCBs has been slower than many people expected at the time of preparation of the PCB management plan[2] . The rate of progress has been affected by:

- the cost of destruction, which was typically $2000- $3000 / tonne in the mid-1990s but has increased to

[2] A feature of PCB management in the European Union has been lack of consistency in applying regulations. An article in *Chemistry in Britain* (March 2001, page 13) headed 'PCB rules breached by 13 States' reveals that of the 15 EU States, only Finland and The Netherlands have been in full compliance with the EU rules relating to PCBs. In 1999 the UK was taken to the European Court of Justice for missing a deadline for announcing how it would implement the 1996 PCB Directive. Germany and Belgium have reported holdings of 23,000 and 10,000 tonnes respectively; Austria, Finland and Ireland report 'small' holdings, but other EU states have not reported. A 1996 resolution adopted by the EU requires members to quantify their holdings by late 1999 in preparation for PCB destruction programs and decontamination or safe disposal of contaminated equipment by 2010. The high cost of PCB incineration - approximately $US 1000/tonne - has prompted the European Parliament to urge states to offer collection schemes and financial incentives, in order to circumvent accidental or inappropriate disposal.

several times this rate at the close of the review period;

- some difficulties with the availability of suitable technologies due to the limited capacity of Australian facilities, but this may be adequate now that the initial surge of business has passed; and PCB holders delaying consigning their wastes for destruction because the requirements of the PCB management plan were not made mandatory immediately in all jurisdictions

13. QUESTIONS

A number of questions are provided below as a guide to areas where the review team would welcome comments. Comments on other matters relating to the review are, of course, also welcome. It would be most helpful to the review if comments could include suggestions for changes or additions to the PCB Management Plan. Copies are available from the Environment Australia web-site (www.ea.gov.au/industry/chemicals/swm/index.html), or by contacting ocp@ea.gov.au or 1800 657 945.

1. Is there a need to alter the timelines set out in the PCB management plan?

2. Should the wording in the PCB Management Plan be amended (eg include additional cross-referencing) to clarify/reiterate management obligations for 'scheduled PCB', 'non-scheduled PCB' and 'PCB –free' wastes and materials?

3. Should a minimum quantity be specified for non-scheduled PCBs? A figure of 5kg (of contaminated material), for example, would provide a parallel with the Stockholm Convention.

4. Are any amendments to the Plan required to assist Australia to meet its obligations under the Stockholm Convention?

5. Are the values for threshold concentration, threshold quantity and notifiable quantity still appropriate?

6. Are performance thresholds for treatment, disposal and emissions still appropriate?

7. Is the requirement to treat scheduled PCB waste down to 2 mg/kg (rather than 50 mg/kg)PCB appropriate for soil waste that may be co-contaminated with a metal that would preclude use of the soil and require landfill disposal anyway.

8. Should issues of importation be considered within the Plan, for example with guidelines developed for importation of PCBs from South Pacific Forum Countries?

9. Are current treatment facilities in Australia adequate to treat all types of scheduled PCB material and scheduled PCB wastes by 2009?

10. Is there any new evidence regarding PCB concentrations in the environment, or in the human health and toxicology of PCBs (including coplanar PCBs) that suggests a need to amend the Plan?

11. Have PCB education programs been adequate?

14. References

ANZECC (1996) *Polychlorinated Biphenyls Management Plan*, Australian and New Zealand Environment and Conservation Council.

Envirotest, (1999) *Report on Organochlorine Pesticide (OCP) Levels in Australia*", Report prepared for Environment Australia.

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Appendix A

Summary of Key Points Made in Earlier Submissions and Comments Provided to the Review

A.1 EPA Victoria

The submission made the following points:

- PCB activities are subject to a number of statutory controls under the *Environment Protection Act 1970*, of both broad scope and specific nature.
- An incident in late 1999 indicated that some of those using or handling PCBs may not have been adequately managing PCBs within the existing framework and may have been working outside the PCB Management Plan. As a result a Notifiable Chemical Order was varied to formally incorporate the PCB Management Plan within the statutory framework.
- Guidelines for PCB management were introduced in 1996 following adoption of the PCB management plan by ANZECC, and then replaced in 2000 by new *Guidelines for the Management of PCBs* (Publication No. 693, 2000).
- The Victorian Department of Infrastructure published material on PCBs in buildings (July 1998), and EPA Victoria and Victoria's Department of Human Services have jointly prepared special bulletins from time to time to inform communities of local incidents involving PCBs.
- Potential mismanagement of PCB waste and material are the subject of on-going EPA investigations. In particular non-scheduled PCBs appear to be a problem area. It appears that a perception may have arisen that this category of materials is no more than waste oil and can be dealt with as such. For example, some industry interpret section 7.2 to mean that all storage and destruction requirements for non-scheduled PCB are the same as those for the diluent (oil). The review should consider whether greater clarity is needed in the PCB Management Plan to correct such misconceptions.
- EPA Victoria therefore proposes that the following sentences be added to section 2.5 - Scope of this Management Plan: *Compliance with all statutory requirements of the Commonwealth, States and Territories which apply to the management of scheduled and non-scheduled PCBs must be observed. Those involved in PCB management must look to the relevant statutory requirements, including those that give effect to this plan, as their primary responsibilities.*
- One option that could be considered is to remove the distinction between scheduled and non scheduled to ensure cradle to grave management for all PCB waste greater than 2 mg/kg.
- The review should give consideration to whether Ecologic's closure [see section 3.3 of this discussion paper] jeopardises Australia's capacity to destroy its remaining stocks of PCB wastes.
- Another issue for consideration is PCB waste transport over long distances (noting that a National Environment Protection Measure provides for nationally consistent regulation and tracking of waste).
- Further data have been requested from industries dealing with PCBs
- EPA expects to provide further monitoring and toxicological data.

A.2 ELI Eco Logic Australia

Mr Andre Duplessis, the facility manager, made the following points in his submission:

- The facility had destroyed 60-70 tonne/month through 1998 and 1999, reducing to 40 tonne/month in 2000 before closing early in 2001.
- The total PCB waste destroyed was 1333 tonne, and OCPs 678 tonne.
- Jurisdictions were slow to implement the PCB Management Plan and this resulted in PCB waste holders

being slow to forward material for destruction.

- It was useful to classify PCB material and waste as falling in Tier 1 (PCB oil or PCB -contaminated equipment held in large quantities by relatively few parties), Tier 2 (multiple small quantities of equipment such as capacitors and ballasts, widely distributed), and Tier 3 (little recognised materials such as contaminated soils).
- Holders of Tier 1 materials were generally aware of their responsibilities but Tier 2 holders were not, and also had more limited resources.
- Tier 1 material, especially concentrated or neat PCB, has largely been destroyed and this lack of its specialised feedstock has brought about the closure of the Eco Logic facility.
- Tier 2 material is not being brought forward for destruction because jurisdictions have not paid sufficient attention to it, even where it exists in priority areas (as defined in the PCB management plan).
- Government incentives or subsidies might be needed to offset the high cost of PCB destruction which has deterred holders from consigning their wastes.
- The provision in Section 9.12 of the PCB management plan, which recognises that 'PCB free' status may not always be obtainable by some treatments of some materials, constitutes a loophole which is exploited by unscrupulous people.
- The opposition of NAB in 1999 to the suggestion that PCBs might be selectively imported into Australia (for the purposes of destruction) to sustain local business activity suggests a lack of understanding of the situation being faced.
- A number of breaches, near-breaches or suspected breaches of regulations relating to PCBs are known.
- The provision for energy recovery from non-scheduled PCBs (section 10.3 of the PCB management plan) has caused holders to arrange their affairs so as to take this cost-effective destruction route.
- The plan itself is 'largely a workable document' and stakeholders should be obliged to comply with it promptly.

A.3 Electricity Supply Association of Australia (ESAA)

In October 2000 the Association distributed a questionnaire to 49 member businesses. 32 responses were received, although the number of businesses represented is higher as there were some combined responses. The questions and summaries of the responses are shown below.

1. Have you had difficulties in disposing of PCB waste due to the inability of the waste industry to dispose of PCB wastes promptly and at a reasonable cost? There were 11 'yes' responses, citing cost and lack of price control through competition, the need for interstate transport, difficulties disposing of contaminated soil and other solids, and the desirability of consigning non-scheduled PCB materials for energy recovery.

2. Has the responsible authority (e.g. EPA) in your jurisdiction imposed conditions on PCB management and disposal that are more onerous than required by the National PCB Management Plan? There were 24 'no' responses, but the remainder cited examples of this nature in Victoria and, to a lesser extent, in Western Australia.

3. Could you advise how much PCB has been destroyed by your business between the start of the Management Plan in January 1996 and December 2000? The returns totalled 1.0 ML scheduled PCB, 3.3 ML non-scheduled, 974 tonne capacitor cans, 68 tonne contaminated soil, and thousands of lighting capacitors.

4. Could you advise how much PCB is still held by your business as at December 2000 in these categories? The total response, same order as above, was 0.9 ML, 23 ML, 89 tonne, 350 tonne, and (again) thousands.

5. Do you foresee problems in meeting the requirements of the National Management Plan? There were 25 'no' responses. The main issues raised by those responding in the positive were cost of disposal and the need to survey the large amount of equipment.

6. Are there any other issues related to PCB management that you would care to raise? There were 24 'no' responses. The 'yes' responses included some relating to ESAA itself, but others mentioned the high cost (and non-competitive nature) of the destruction business, variation of standards between States (especially the NSW 3-docket system as opposed to the national 5-docket system), and the need for reassessment of the timelines in the PCB management plan due to the closure of the Eco Logic plant for some time.

A.4 BCD Technologies P/L (BCDT)

- The company has seen the flow of concentrated PCB material "diminish to a trickle" and notes that ELI EcoLogic ceased operations due to such material being unavailable in commercial quantities.
- The flow of more dilute material decreased up to early 2001 but then increased sharply, probably as a result of increased vigilance by Victoria's EPA.
- Victorian waste on which BCDT had quoted, subsequently disappeared from the market. Prior to the EPA action there were rumours of illegal burning, blending to reduce grade, and use of PCB-contaminated oil as diesel extender.
- Certificates of destruction should be required for any PCB collected by the OCP collection programme (ChemCollect).
- BCDT offer base catalysed dechlorination, Plascon destruction, and the Fluidex process at their Brisbane site, thus enabling them to operate economically with a wide range of wastes.
- BCDT has recently purchased SRL Plasma from ITW and will complete the destruction of CFCs and Halons at the Melbourne location.
- BCDT will market an integrated package including Plascon overseas for scheduled wastes and ozone-depleting substances.

A.5 Queensland Environment Protection Agency

- Queensland has implemented the major provisions of the PCB management plan through the *Environmental Protection (Waste Management) Regulation 2000*, which commenced on 1 July 2000.
- Queensland EPA has noted a significant reduction in the quantities of PCB material being offered for treatment over the last twelve months, and industry advises that 80% of Queensland holdings have been destroyed, with the remainder containing less than 50 mg/kg PCB.
- Treatment facilities available in Queensland are adequate, since the BCDT facility includes base catalysed dechlorination, thermal desorption, plasma arc, and Fluidex (until recently located at Powerlink).
- Threshold values of the plan are incorporated in the Queensland regulation.
- Only limited data are available for PCBs in the Queensland waters, sediments and biota. Traces of PCBs were detected in sediments associated with Brisbane sewage outfalls - 33.3-66.7 µg/kg in the Brisbane at Graceville, 7.1-27.1 µg/kg in Oxley Creek at Donaldson Road (both figures normalised to 1% total organic carbon) - and some sewage sludge containing more than 50 mg/kg has been securely stored pending treatment. The sources of the contamination remain unidentified. PCB content of sediments in the Brisbane River ranged from 2.7 µg/kg at the river mouth to 10.4 µg/kg in city reaches. No PCBs were detected in biota taken from a number of coastal locations.
- No leachate and groundwater data are available, PCB investigations of creek sediments near the Gurrulmundi Secure Landfill did not reveal any contamination (100 µg/kg wet weight basis).
- EPA is aware of the concerns of waste holders with costs of PCB destruction but believes that there are benefits from destroying PCBs, although no cost-benefit analysis has been conducted.
- At the time of release of the 2000 regulations, EPA contacted all likely stakeholders, conducted public consultation meetings, and issued three guidelines on PCB management.

A.6 Comment from NSW Environment Protection Agency

- There is inconsistency in the plan's requirements for contaminated soil, in that scheduled waste must be treated to 'PCB free' levels whereas non-scheduled material can go straight to landfill. Under the Contaminated Sites NEPM, the investigation for commercial or industrial sites is 50 mg/kg.
- The values and phaseout dates in the PCB management plan were accepted as appropriate by NSW when they were incorporated into the NSW 1997 Chemical Control Order.

Appendix B

SUMMARY DATA ON PCB HOLDINGS AND DESTRUCTION

Estimates of the volume of PCBs in Australia at the time of the Plan's inception

PCBs were never commercially manufactured in Australia. At the time of devising the Management Plan, in 1994, the Electricity Supply Association of Australia estimated that some 10,000 to 20,000 tonnes of PCB had been imported for use in Australia but estimates of the quantities remaining were very imprecise. In particular, no estimate was available of the quantities likely to have been consigned to landfill or otherwise released to the environment.

Significant stocks of PCBs continued to come to notice, however, so those figures are now considered an underestimate. In mid-1997, the PCB Implementation Sub-Group of the National Advisory Body drew up the following balance sheet, based mainly on estimates:

	Tonne
Destroyed before Management Plan	700
Destroyed since Management Plan	5000
In storage awaiting destruction	1700
Probably lost to environment	3500-7000
Amount remaining	5000-9000

The exact proportions of PCB and mineral oil represented by these figures are unknown.

The Electricity Supply industry has been the single largest user of PCBs. Much PCB material was used for the primary purpose of generation and distribution of electricity, but PCBs were also used in capacitors in motors and other appliances, in fluorescent lighting, and in electromagnets. While some information is available about likely quantities in these categories, much less information is available about the use of PCBs in a wide range of other functions. These included caulking compounds, hydraulic and cooling fluids, plasticisers in various products, pesticides and in casting boxes. The range of industries, businesses and institutions required by the plan to implement the PCB Management Plan has therefore been extensive, but most reports have concerned electrical uses.

The wide distribution of the use of PCBs throughout Australia, and the fact that many of the uses have involved very small quantities at each site, has meant that it is only from the largest PCB-using facilities and industries that notifiable quantities of PCBs are generally reported. In contrast, a significant proportion of the 2,200 tonnes of PCBs that were estimated to have been distributed throughout Australia in approximately 18 million lighting capacitors are unlikely to have been managed in accordance with the PCB Management Plan. These were often removed during refurbishment of buildings, and discarded to landfill.

Data on PCBs since the inception of the Plan

State and territory representatives on the Scheduled Waste Management Group have provided reports to the National Advisory Body – and thence to the ministerial council ANZECC - regarding the amounts of

PCB notified to EPA registers, and the amounts of PCB material destroyed. After several years of operation of the Plan, the NAB requested these reports quarterly, but most jurisdictions were unable to comply with this request and so longer reporting periods have been adopted. Nevertheless, accurate data on volumes/mass and concentrations of PCBs disposed of in Australia are not readily available.

A number of factors contribute to this situation. Firstly, the data held by environment protection agencies are gathered in association with the enforcement of regulations in their respective jurisdictions. Interest was expressed in having all jurisdictions adopt for their PCB registers an electronic format developed by South Australia, but so far this has not eventuated. This might have assisted in achieving comparability in national reporting. Most jurisdictions have not regularly updated their registers, and have not always provided timely information to the Scheduled wastes secretariat.

Secondly, the data that have been gathered and reported are insufficiently detailed for evaluation of the appropriateness of the PCB Plan or the effectiveness of its implementation. A major deficiency has been the absence of even approximate quantities of PCB being destroyed. For example, where the mass of PCB-containing small equipment (such as capacitors) being treated is given in tonne, there is no indication of the amount of PCB. Similarly, when solutions of PCB in paraffin (mineral oil) have been treated, little information beyond the scheduled/non-scheduled classification is available. This is true also of contaminated soils (where these have become PCB waste), of which major quantities have been identified in NSW and Victoria.

Thirdly, because of adherence to normal reporting practices, quantities of solids were reported by mass (kg or tonne), whereas liquids were often reported by volume (litre). Converting volume to mass requires knowledge of the specific gravity of the liquids, which could range from a little below 1 for dilute solutions of PCB in paraffin oil to 1.8 for the most heavily chlorinated PCBs.

Data from the states and territories have been augmented by reference to data provided by the two major destruction facilities. There may arise questions of ‘double counting’ – although this is believed not to be major problem – and the timeliness of industry data, given possible considerations of commercial confidentiality. A typical data compilation based on information provided by industry relating to the financial year 1996-97 is:

Company	PCB waste treated (tonne)	Future capacity (t/y)
BCD Technologies	**2090**	**3500**
ELI Ecologic	250	2500

At that time, the information available to the NAB indicated that 1500 tonne of PCB waste had been treated in 1994-95, 1300 tonne in 1995-96, and 2600 tonne in 1996-97. However, the quantity of PCB involved could not be deduced from these figures.

With the advent of more detailed reporting, it was possible to provide the following information for PCB waste for the year July 1999 – June 2000. The liquid figures have been converted on the basis of 1000L = 1 tonne, although this almost certainly over-estimates the quantity of PCB involved.

Jurisdiction	**Material**	**Treated (tonne)**
New South Wales	capacitors	320
	PCB oil	17.3
	Soil	53
Northern Territory	equipment	0.3
	PCB oil	15.8
Queensland	data unavailable	
South Australia		nil
Tasmania	equipment	15.7
	PCB oil	29.5
Victoria	equipment	16.7
	PCB oil	45
Western Australia	sched. PCB oil	474
TOTAL	equipment	352.7
	PCB oil	581.6

Because of differences in record-keeping by the jurisdictions, it has not been possible to provide a comprehensive and accurate set of data for notification and treatment of PCB waste and material. However, a few examples are provided here to show the kind of data that are available and the scale of operations.

New South Wales

A particularly detailed data set was obtained from New South Wales, from which the following overview can be provided for the four years Jan 1996 – Dec 2000.

Material	**Treated (tonne)**	**Storage (tonne)**
Equipment	4700	22.9 (+ 5 large transformers)
PCB oil	99	99.7
Soil	53	3000

Queensland

From 1996 to 2000 BCD Technologies have treated approximately 8200 tonnes of PCB contaminated materials, comprising:

- PCB contaminated oil 3600 tonnes
- PCB Capacitors 2000 tonnes
- PCB Transformers 1200 tonnes
- Other 1400 tonnes.

From 1996 to 2000 inclusive Energy Services International in Queensland disposed of 800,520 litres of PCB containing transformer oil. The oil is estimated to have averaged approximately 100mg/kg, with concentrations varying from non-scheduled to scheduled.

The Queensland PCB register contains the following notifications from 1 July 2000:

Mount Isa Mines have	256 tonnes
Powerlink	50 tonnes (processing 3000 litres per day)
Toowoomba Foundry Pty Ltd	6 tonnes
Neumann Steel	22.2 tonnes

Queensland EPA records shows that there were no shipments of PCB leaving the state during 1996-2001 but significant amounts of PCBs have been transported into Queensland during these years.

1996	no data available
1997	no data available
1998	no data available
1999	5560 kg, 139026 litres (total 23 movements into Qld)
2000	17000 kg, 616298 litres (total 36 movements into Qld)
2001	45771 kg, 196653 litres (total 14 movements into Qld)

Victorian treatment and disposal trends

Data were taken from EPA's TRANCERT database that provides information on the transport of waste PCBs from the Victorian generator to the waste receiver. The data include the treatment type (and waste receiver) designated by the generator in transporting their waste off-site. The data does not represent waste generation but rather waste movements. For example, where waste PCBs are transported from a generator to a waste storage facility and then to a treatment facility, all the movements will be counted and the quantity will therefore be counted more than once. The charts below present the total M type – liquids and electrical equipment contaminated with PCBs - and other PCB wastes (mainly soils) for the period 1996-2000. The Vic EPA qualifies that the data may contain errors due to the entry of inaccurate information on certificates by users eg. through inaccurate estimation of waste quantity or incorrect waste type or treatment codes.

Year 2000 Treatment type	M PCBs † (kg)	Other PCBs (kg)	Total waste (kg)
Prescribed waste landfill‡	76880	13490336	13567216
Biological treatment	0	0	0
Immobilisation/solidification	0	0	0
Other physico/chemical treatment	170091	59418	229509
Storage pending treatment or disposal	375107	0	375107
Use as a fuel	0	0	0
Solvent reclamation/regeneration	0	0	0
Reconditioning of drums	11000	20	11020
Accumulation pending further RRR	24180	0	24180
Code not indicated	89890	107810	197700
Total	747148	13657584	14404732

Year 1999 Treatment type	M PCBs (kg)	Other PCBs (kg)	Total waste (kg)
Prescribed waste landfill	49615	5523755	5573370
Biological treatment	0	0	0
Immobilisation/solidification	0	0	0
Other physico/chemical treatment	58207	1170	59377
Storage pending treatment or disposal	320192	0	320192
Use as a fuel	67700	0	67700
Solvent reclamation/regeneration	0	0	0
Reconditioning of drums	0	0	0
Accumulation pending further RRR	2340	0	2340
Code not indicated	81993	33740	115733
Total	580047	5558665	6138712

Year 1998 Treatment type	M PCBs † (kg)	Other PCBs (kg)	Total waste (kg)
Prescribed waste landfill‡	61850	867440	929290
Biological treatment	0	1800	1800
Immobilisation/solidification	0	51300	51300
Other physico/chemical treatment	156533	16205	172738

† M type waste PCBs can be considered to include PCB transformer oil, contaminated solvents and oils, capacitors and other equipment and material contaminated with PCBs. 'Other PCBs' includes contaminated soils and miscellaneous contaminated wastes such as filter cake and dust.

‡ Prescribed waste landfills are only licensed to receive solid PCB wastes and materials in concentrations less than 50 ppm.

† M type waste PCBs can be considered to include PCB transformer oil, contaminated solvents and oils, capacitors and other equipment and material contaminated with PCBs. 'Other PCBs' includes contaminated soils and miscellaneous contaminated wastes such as filter cake and dust.

‡ Prescribed waste landfills are only licensed to receive solid PCB wastes and materials in concentrations less than 50 ppm.

Storage pending treatment or disposal	269930	182931	452861
Use as a fuel	29400	0	29400
Solvent reclamation/regeneration	120	0	120
Reconditioning of drums	0	0	0
Accumulation pending further RRR	10790	23600	34390
Code not indicated	11202	0	11202
Total	539825	1143276	1683101

Year 1997 Treatment type	M PCBs (kg)	Other PCBs (kg)	Total waste (kg)
Prescribed waste landfill	50000	34000	84000
Biological treatment	0	0	0
Immobilisation/solidification	0	0	0
Other physico/chemical treatment	20131	3000	23131
Storage pending treatment or disposal	137891	3327	141218
Use as a fuel	0	0	0
Solvent reclamation/regeneration	0	0	0
Reconditioning of drums	0	12710	12710
Accumulation pending further RRR	10260	0	10260
Code not indicated	1490	4000	5490
Total	219772	57037	276809

Year 1996 Treatment type	M PCBs (kg)	Other PCB (kg)	Total waste (kg)
Prescribed waste landfill	25000	916000	941000
Biological treatment	0	0	0
Immobilisation/solidification	0	0	0
Other physico/chemical treatment	100000	0	100000
Storage pending treatment or disposal	386102	0	386102
Use as a fuel	0	0	0
Solvent reclamation/regeneration	0	0	0
Reconditioning of drums	760	0	760
Accumulation pending further RRR	3000	0	3000
Code not indicated	0	0	0
Total	514862	916000	1430862

Appendix C

Comparison of the Australian PCB Management Plan with the Stockholm (POPs) Convention

The Convention on Persistent Organic Pollutants (POPs) establishes legally binding measures. Australia signed the agreement on 23 May 2001. The obligations relating to the elimination of PCBs allow for an 'articles in use' exemption, provided a number of conditions are applied.

Part I of Annex A to the convention indicates that production of PCBs will not be allowed, but that articles containing PCBs may continue in use in accordance with provisions set out in Part II of the Annex, which apply to all Parties.

Part II specifies that each Party shall:

(a) With regard to the elimination of the use of polychlorinated biphenyls in equipment (e.g. transformers, capacitors or other receptacles containing liquid stocks) by 2025, subject to review by the Conference of Parties, take action in accordance with the following priorities:

(i) Make determined efforts to identify, label and remove from use equipment containing greater than 10% PCBs and volumes greater than 5 litres;

(ii) Make determined efforts to identify, label and remove from use equipment containing greater than 0.05% PCBs and volumes greater than 5 litres;

(iii) Endeavour to identify and remove from use equipment containing greater than 0.005% PCBs and volumes greater than 0.05 litres.

(b) Consistent with the priorities in subparagraph (a), promote the following measures to reduce exposures and risk to control the use of PCBs:

(i) Use only in intact and non-leaking equipment and only in areas where the risk from environmental release can be minimised and quickly remedied;

(ii) Not use in equipment in areas associated with the production or processing of food or feed;

(iii) When used in populated areas, including schools and hospitals, all reasonable measures to protect from electrical failure which could result in a fire, and regular inspection of equipment for leaks;

(c) Notwithstanding paragraph 2 of Article 3 (which deals with import and export), ensure that equipment containing PCBs, as described in subparagraph (a), shall not be exported or imported except for the purpose of environmentally sound waste management;

(d) Except for maintenance and servicing operations, not allow recovery for the purpose of reuse in other equipment of liquids with PCBs content above 0.005%;

(e) Make determined efforts designed to lead to environmentally sound waste management of liquids containing PCBs and equipment contaminated with PCBs having a PCBs content above 0.005%, in accordance with paragraph 1 of Article 6 (Measures to reduce or eliminate releases from stockpiles and

wastes), as soon as possible but no later than 2028, subject to review by the Conference of the Parties;

(f) In lieu of note (ii) in Part I of this Annex (which says that chemicals incorporated into articles produced before the date of entry into force of the Convention), endeavour to identify other articles containing more than 0.005% PCBs (e.g. cable-sheaths, cured caulk and painted objects) and manage them in accordance with paragraph 1 of Article 6.

(g) provide a report every five years on progress in eliminating PCBs and submit it to the Conference of the Parties pursuant to Article 15 (Reporting).

(h) The reports described in subparagraph (g) shall, as appropriate, be considered by the Conference of the Parties in its reviews relating to PCBs. The Conference of the Parties shall review the progress towards elimination of PCBs at five year intervals or other period, as appropriate, taking into account such reports.

10.2 Comparison of Australia's PCB management plan with the convention

10.2.1 Concentration, quantity and timelines.

(i) The concentration specified in the convention as requiring "determined efforts" to remove equipment from use is 10% PCBs. The end date in the convention, is 2025 but there is an allowance of up to another three years "as soon as possible but no later than 2028" - for management of the wastes. The time allowed in Australia is much shorter. Our requirement is that material containing concentrations of 10% or greater should be surveyed in the first three years (that is, before the end of 1998), removed from service within a further two years (end of 2000) and consigned for treatment within one more year (end of 2001).

(ii) A much lower concentration is specified in the convention as also requiring "determined efforts". This is 0.05% (greater than 5 litres), which roughly equates to 500 mg/kg and greater than 5kg. There is no equivalent specification in the Australian management plan, however, the Plan requires all PCB material at a concentration of 50mg/kg or greater to be disposed of as scheduled PCB waste at the end of its working life.

(iii) The convention requires holders to 'endeavour to identify and remove from use' material having greater than 0.005% PCBs (50 mg/kg) and volumes over 0.05 litres (50 g) and is thus identical with the requirement of the Australian management plan, which is that all material of this concentration or above, and in quantity greater than 50 g, to be removed from service. Again the Australian timeline is shorter - consign for treatment by end of 2009 - whereas the date 2028 is given in the convention.

10.2.2 The Convention covers the priority areas of food production, schools and hospitals that were included in the PCB Management Plan.

10.2.3 The PCB Management Plan specifies effluent and emission concentrations for facilities treating PCB wastes, while the convention requires 'environmentally sound management'. These measures are already likely to be implemented through State and Territory regulation of waste treatment facilities, such as licensing requirements.

10.2.4 The convention does not set a lower bound PCB content that should attract attention, whereas the PCB Management Plan sets a lower bound of 2 mg/kg (approximately 0.0002%). The Convention has a footnote which exempts quantities of a chemical occurring as "unintentional trace contaminants in products and articles".

10.2.5 The PCB Management Plan requires review periods of not less than five years, at which point 'progress in destroying scheduled PCB material and scheduled PCB waste' shall be reported. This accords with the requirements of the convention (every five years or other period as appropriate). The Convention requires parties to report every five years; more frequent reports are provided by jurisdictions in Australia, although the quality and detail of those reports has varied widely.

10.2.6 Under the convention parties should endeavour to identify other articles (that is, not electrical equipment) containing more than 0.005% PCB and manage them when they become wastes. Cables sheaths, cured caulk and painted objects are given as examples of articles which may have PCB levels > 0.005%. These are not specifically mentioned in the Australian management plan but do fall within its scope.

10.2.7 The convention refers to contaminated sites and seeks to 'Endeavour to develop appropriate strategies….'. This is mentioned in the Australian management plan (Section 6) but only to the effect that investigation and clean-up of such land should be in accordance with ANZECC Guidelines for Assessment and Management of Contaminated Sites. It should be noted that the term 'endeavour' is known as a 'soft' obligation, meaning to make every reasonable effort, rather than being a mandatory obligation.