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Final Report

ASSESSMENT OF THE POLICY, REGULATORY AND LEGISLATIVE FRAMEWORK

GEF PCB Waste Management and Disposal Demonstration Project (P099460)
TF058119

November 14, 2007

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List of Acronyms

DOI - Department of Industry (Provincial)
DONRE – Department of Natural Resources and Environment (Provincial)
EIA – Environmental Impact Assessment
EVN – Electricity of Vietnam
GEF – Global Environment Facility
GOV – Government of Vietnam
HW – Hazardous wastes
LEP – Law on Environmental Protection
LPC – Local Peoples Committee
MARD – Ministry of Agriculture and Rural Development
MOC – Ministry of Construction
MOCI – Ministry of Culture and Information
MOET – Ministry of Education and Training
MOF – Ministry of Finance
MoFisheries – Ministry of Fisheries
MOH – Ministry of Health
MOI - Ministry of Industry
MOJ – Ministry of Justice
MOLISA – Ministry of Labour, Invalids and Social Affairs
MONRE – Ministry of Natural Resources and Environment
MOST – Ministry of Science and Technology
MOSTE – Former Ministry of Science, Technology and the Environment
MOT – Ministry of Transportation
MoTrade – Ministry of Trade
MPI – Ministry of Planning and Investment
MTI – Ministry of Industry and Trade
NIP – National Implementation Plan
PCBs – Poly Chlorinated Biphenyls
POPs – Persistent Organic Pollutants
PPC – Provincial Peoples Committee
UNEP – United Nations Environment Program
VCEP – Vietnam Canada Environment Program
VEPA – Vietnam Environmental Protection Agency

1. Introduction

On July 22, 2002, Vietnam ratified the Stockholm Convention to become the 14th Party to the Convention. As a Party, Vietnam committed to target 12 Persistent Organic Pollutants (POPs) for reduction and eventual elimination. One of the chemicals targeted by the Convention is Polychlorinated Biphenyls (PCBs). The Convention requires Parties to take action to phase out the use of equipment containing PCBs by 2025 and to treat and eliminate the recovered PCBs by 2028. Vietnam's National Implementation Plan (NIP) commits the country to these international targets.

To assist in meeting its commitments for PCBs under the Convention, Vietnam has been working with the World Bank to prepare a PCB Management and Disposal Project to be financed under the Global Environment Facility (GEF). Three projects funded by the Canadian POP fund are now underway to help the World Bank and Vietnam in preparing the GEF project. They are:

- Assessment of policy, regulatory and legislative framework for PCB management;
- Sampling, testing and mapping of PCB inventory and contamination; and
- Analysis of PCB treatment and disposal options

This Final Report was prepared as part of the policy, regulatory and legislative framework assessment project.

The first deliverable prepared under this project was a Desk Top Review. The Desk Top Review was an assessment of Vietnam's policy framework against selected international jurisdictions and the requirements of the Stockholm Convention. This assessment identified gaps, overlaps and inadequacies in Vietnam's existing policies. In addition, it documented the current roles and responsibilities of Ministries and Agencies and identified inconsistencies. A summary of the findings of the Desk Top Report can be found in the next section of this report.

The Draft Final Report was the second deliverable of the policy project. That report summarized the findings of the Desk Top Report, identified and assessed policy options based on the experiences of best practice jurisdictions and made recommendations for Vietnam to address its policy needs. That report also presented a proposed policy framework and outlines for key technical guidelines and protocols.

The purpose of the Draft Final Report was to promote discussion at the August 8 workshop among the Ministries and Agencies that currently have responsibility for PCB management. At the conclusion of the workshop, copies of the Draft Final Report were circulated for comment. These comments have been taken into consideration in this Final Report. This Final report was submitted to the World Bank and the Vietnam Environmental Protection Agency (VEPA) in September, 2007 in accordance with the terms and conditions of the contract.

This report has been prepared by Breeze and Associates Inc., Toronto, Canada. The review team consisted of Robert Breeze, Principle, Breeze and Associates Inc, Toronto, Le Thi Bich Thuy, Director, Venetco Consulting, Hanoi and Tran Ngoc Quang, Hanoi University of Civil Engineering, Faculty of Environmental Engineering.

2. Desk Top Report Findings

The Desk Top Report was submitted on May 1, 2007 and formed the basis of a workshop held on May 4 to begin building understanding and consensus among the Ministries and Agencies that have current responsibilities for PCB management. The Desk Top Report included the following:

- A policy inventory of Vietnam, the Stockholm Convention and four best practice jurisdictions (Australia, the Philippines, Canada and the European Union)
- A description of Vietnam's current PCB management system
- An assessment of Vietnam's current policy framework
- An assessment of the roles and responsibilities of Ministries and Agencies
- Findings (gaps, overlaps and inconsistencies)

After the workshop, the Desk Top report was circulated to key Ministries and their comments solicited. These comments have been received and integrated into the findings of the Desk Top Report. The following section summarizes these findings.

Life Cycle Regulations

Best practice jurisdictions have developed PCB regulations that cover the complete "life cycle" of PCBs from production to in-service use and disposal. These regulations have clear definitions for PCBs, PCB equipment (such a transformers and capacitors) and PCB materials (such as fluids and contaminated soils).

Currently, there are 27 policies that deal with aspects of PCB management and disposal in Vietnam. Many of these policies overlap or are inconsistent creating confusion that will make compliance difficult. There are no definitions for PCB equipment or PCB materials.

Bans

Best practice jurisdictions have implemented bans for PCB production, import, export, recycling, reuse, mixing, disposal in municipal landfills and environmental discharges. These bans are intended to stop the ubiquitous distribution of PCBs throughout the environment and to promote sound management practices.

Vietnam has import and export restrictions in place however, licenses can be granted by provincial authorities for PCB imports with a letter of agreement from MOI. This loophole presents a substantial risk that PCBs will be imported and discharged into the environment. There are no bans in place for recycling, reuse, mixing or environmental discharges.

In-Service equipment

Best practice jurisdictions have developed comprehensive management policies for PCB equipment and PCB materials that are in-service. These jurisdictions require annual registration of all in-service PCB equipment and set standards for repairs, retrofilling, labeling, storage, occupational health and safety, record keeping, contingency planning and emergency response.

In Vietnam, the Ministries of Health and Industry have developed regulations that would require the registration and safe management of all hazardous chemicals. To date, these requirements have not been implemented. It is unclear if these will apply to PCBs or when implementation will begin.

Phase-out Triggers and Disposal Deadlines

Best practice jurisdictions have developed phase out and disposal timelines for PCBs based on the risk to human health and the environment. These timelines start with high risk concentrated PCBs located near sensitive sites and end with small quantities located near less sensitive sites. Under the Stockholm Convention, all PCB equipment is to be out of service by 2025 and disposed of by 2028.

Under the National Implementation Plan prepared by Vietnam, the country has committed to the phase out of in-service equipment by 2020 and disposal by 2028. Regulations have not been passed to implement these commitments.

PCB Waste Management

Best practice jurisdictions manage waste PCBs (with concentrations greater than 50 mg/kg) within their hazardous waste policy framework. As such, the policy provisions including registration, manifests, licenses for transportation, storage, treatment and disposal and financial assurance apply to PCBs.

Vietnam has developed and is now beginning to implement new hazardous waste regulations. The regulations that have been passed provide a good foundation but contain inconsistencies that will need to be addressed to ensure that PCBs can be effectively managed from “cradle to grave”.

Contaminated Sites

Best practice jurisdictions have developed hazardous contaminant clean-up programs that include an inventory of potential sites, site investigations to evaluate risk, site monitoring, clean-up standards and technology licensing.

Vietnam has committed to a clean-up program for POPs in its National Implementation Plan. At this point, no formal program is in place.

Compliance

Best practice jurisdictions have recognized that the level of compliance is a direct function of outreach efforts by government to the regulated community, capacity building at the national and provincial levels, the visibility of abatement and enforcement efforts and the sanctions that are in place.

Vietnam is only beginning to consider what it will take to implement the PCB and hazardous waste requirements. At this point, limited efforts have been made to reach out to the regulated community, to adequately resource the government agencies and to build the capacity of PCB owners and facility operators. In addition, current sanctions range from US$40 to US$ 5,000 and as such are not a significant disincentive for non-compliance.

Environmental Monitoring

Best practice jurisdictions have set up or are in the process of setting up environmental monitoring programs to better understand how PCBs are distributed in the environment and whether international efforts at phasing out and destroying PCBs have been effective.

Vietnam, with the assistance of international donors, has undertaken a number of monitoring initiatives described in the National Implementation Plan. To date, there has been no coordinated national effort to set up a valid monitoring program.

National Inventories

Best practice jurisdictions have established local, regional and national data collection systems integrated with statistical analysis and tabulation to create inventories of PCB equipment, PCB materials and PCB wastes. These inventories serve as rolling snap shots of progress towards the 2025 and 2028 goals.

Vietnam, through the hazardous waste regulations, is beginning to collect part of the data required for the inventory. No programs are yet in place to begin to collect the remaining data.

Public Awareness and Involvement

Best practice jurisdictions have developed public awareness and involvement as a key component of their PCB programs. These jurisdictions recognize that public involvement in planning and decision making is essential to minimize impacts on the environment.

In Vietnam, the LEP gives rights to individuals and groups that might be affected by government policy. The Law lists a broad range of information that must be made available in a form that is readily understandable, accurate, truthful and objective. No implementing policy for PCBs has yet been formulated.

Capacity Building

Best practice jurisdictions understand that building the capacity of government engineers and inspectors as well as PCB owners and operators of PCB facilities is essential for compliance. These jurisdictions have invested significant resources to develop training programs and provide technical support to the regulated community.

Vietnam has been involved in the development and implementation of the hazardous waste management program since 1999. At the time of implementation, some training was provided to government officials at the national level. No capacity assessment or building initiatives have been undertaken for PCBs.

“Polluter Pays” Principle

Some best practice jurisdictions have adopted a “polluter pays” policy and require that PCB owners and facility operators pay the full cost for administering government licensing and inspections for PCBs.

The LEP states that those responsible for environmental degradation are responsible for remedies, compensation and potentially other liabilities as specified by law. Vietnam has yet to formally articulate its position on the polluter pays principle with respect to PCBs.

Roles and Responsibilities

Best practice jurisdictions have usually established one agency responsible for overseeing and coordinating the PCB regulations. Typically, these agencies would be responsible for policy and standard development, licensing, technical guidance and support, abatement and enforcement.

There are currently nine agencies with some responsibility for PCB in Vietnam. Five of these (MONRE, MOI, MOH, MOST and MOC) have significant, overlapping responsibilities.

3. Policy Options

The Terms of Reference for this project require that the full spectrum of macro level policy options targeting owners of PCB equipment, PCB materials and PCB wastes be considered along with measures to engage the public through information disclosure and participation. The policy options to be considered include regulations, economic instruments, voluntary measures and technical support.

This section of the report describes and assesses each macro policy option to determine its ability to achieve or support the long term goal of the Stockholm Convention; the "virtual elimination" of PCBs by 2028. It also assesses the consistency of each policy option with international best practices and the conditions where each can best contribute to Vietnam's PCB policy framework. Finally, this section identifies the roles that the public can play in the environmentally sound management of PCBs.

3.1. "Command and Control"

"Command and Control" refers to legislation and regulations that prescribe government requirements and force compliance through sanctions. Implementation of these requirements has two components; abatement and enforcement.

- Abatement refers to activities used by government such as licensing, permitting, inspections, monitoring, negotiations and directions aimed at achieving compliance with the regulatory provisions without reference to a Court.
- Enforcement, on the other hand, refers to investigations, prosecutions and sanctions that force compliance with a regulatory measure usually after submissions to a Court.

Governments typically spend substantial efforts working with the regulated community using the abatement function to achieve results that meet both the intentions set by the legislators as well as the financial and technical restrictions faced by the regulated community. Often the focus is on "win-win" results where government objectives are achieved at the lowest cost to the industry or institution.

Enforcement action forces compliance with regulatory requirements usually through Court ordered sanctions. Enforcement requires detailed investigations, reports, preparation of witness statements, examination of witnesses and legal arguments before a tribunal. Enforcement can also take the form of Stop and Control Orders to force non-compliant operators to meet regulatory provisions within specified time lines or terminate operations. Stop and Control Orders are issued by government inspectors or senior public officials and are appealable to the Courts.

Effective sanctions are a key to compliance but to be effective they must outweigh the cost of not complying. In best practice jurisdictions, effective sanctions can range from the imprisonment of chief executives to fines for significant offences exceeding US$1 million. Without the realistic threat of enforcement and without penalties that outweigh the cost of not complying, abatement efforts will have limited effect on regulated entities.

Command and control mechanisms have been shown to be effective with large point sources of environmental emissions that are well understood and where measurable criteria can be set. For example, command and control mechanisms have been effective in best practice jurisdictions in removing from service large transformers containing concentrated PCBs. Command and control is less effective with small, numerous non-point sources that are less well understood. For example, regulations alone have not been effective in dealing with small capacitors found in household fluorescent fixtures.

The challenge with PCBs is that there is a combination of large sources that are well understood such as large transformers and capacitors and small, less well understood

sources such as capacitors found in fluorescent light bulbs and open uses such as waste from paint manufacturing. As we will see later in this section of the report, other tools will need to be considered for these smaller and less well understood sources of PCBs.

Command and control mechanisms are essential however when the intention of the policy is to protect human health and the environment from foreseeable risks or to meet binding international commitments. The Stockholm Convention on Persistent Organic Pollutants is aimed at the virtual elimination of a group of chemicals that have defined risks for both human health and the environment. It also legally obligates Vietnam to meet the provisions of the agreement for PCBs by 2028.

International best practice jurisdictions have found that the virtual elimination of PCBs within the prescribed timelines can only be achieved by putting legislation and regulations in place and taking strong abatement and enforcement action. These jurisdictions have also found that a sole focus on command and control regulations will not lead to compliance. Leading jurisdictions are now using a broader range of tools; they recognize that a mix of economic instruments, technical support and voluntary measures are essential.

3.2. Economic Instruments

Economic instruments are an important part of every leading jurisdictions policy framework. Leading jurisdictions have found that market forces can be a powerful way of achieving government policies. They are also an effective way of ensuring that polluters pay for the full cost of PCB management and disposal.

There are many types of economic instruments that have been used internationally. Some of the more common instruments are:

- *Market creation instruments* such as tradable emission permits for CO_2 and other greenhouse gases
- *Liability instruments* such as regulatory provisions that make those responsible for contaminating sites fully responsible for the clean-up costs
- *Fiscal instruments* such tax incentives to promote cleaner production technologies
- *Charge systems* such as user fees to cover part or all of the costs for hazardous waste disposal
- *Bonds and other securities* such as environmental performance bonds that guarantee that funds will be available for future costs of disposal site closure, monitoring and clean-up
- *Financial instruments* such as subsidies for the purchase of new pollution abatement equipment

Four of these instruments have been used extensively by leading jurisdictions in their PCB policy frameworks; liability measures, charge systems, securities and financial instruments. Market creation and fiscal instruments were not found to be used extensively by the best practice jurisdictions reviewed and have not been included in this analysis.

3.2.1. Liability measures

Liability measures have been used by best practice jurisdictions to assign the responsibility for cleaning up contaminated sites or environmental spills to those who have created the problem. The United States has established the US Superfund to identify and clean-up sites that have been contaminated and have the potential to impact human health and the environment. The Superfund, as the name implies, is a fund administered by the US EPA to initially cover the costs of site investigation, planning and remediation. The important liability measure is that Superfund will pursue the responsible party and require payment for all clean-up costs incurred.

As a result of Superfund and similar action by other leading jurisdictions, owners of PCB equipment that could contaminate the environment now routinely inspect, repair and replace leaking or damaged transformers and capacitors before they can leak and contaminate sites. Owners recognize that the costs of inspection and replacement of faulty electrical equipment is less expensive than funding the cost of future clean-up.

3.2.2. Charge systems

Charge systems are widely used to shift the costs from the general tax base to system users. In best practice jurisdictions, user fees are charged by the private sector and, in some cases, the public sector for PCB transportation, storage and disposal. In many jurisdictions, the full cost including long term care and monitoring is charged.

In some cases, charge systems have extended to the cost to government of managing the compliance program. In the United Kingdom, for example, charges are made for issuing the annual register for PCB owners. In addition, charges are made for each site inspection. As of 2002, the fees charged are £155 for the annual PCB registration and £240 for each inspection. At these rates, the UK Environment Agency can collect the equivalent of 4,836 million Dong annually for every 1,000 licenses and 7,738 million Dong annually for every 1,000 inspections. It is recognized that Vietnam cannot charge fees of this magnitude, but this is an indication that significant revenue can be derived from a polluter pays system to cover the costs of system administration.

3.2.3. Bonds and other financial securities

Securities are required by many best practice jurisdictions as a form of insurance to cover costs if the facility was abandoned or to cover the costs of eventual facility closure and clean-up. These requirements recognize that private sector operators can go bankrupt leaving the government responsible for site closure and clean-up. The provision of financial securities is a powerful incentive for operators to carefully manage their sites and to meet all regulatory requirements. The securities are returned to the facility owner once it is closed and the owner can demonstrate that there will be no long term impacts.

In the Province of Ontario, Canada, all operators of hazardous waste storage, treatment and disposal facilities must provide financial securities to ensure that funds are available for future clean-up, remediation, monitoring and perpetual care of sites. Financial assurance can take the form of cash, irrevocable letters of credit, surety bonds and other negotiable securities available to the provincial government. Certificates of Approval (licenses) are not issued until the financial securities are available to the Ministry of the Environment. A guideline with cost formulas has been established based on the province's experience with similar sites.

3.2.4. Financial Instruments

In some best practice jurisdictions, hidden or apparent subsidies are provided to cover (all or in part) the cost of administering the PCB regulations. These are regressive economic instruments as they shift costs back to governments. However, some jurisdictions are charging license and related fees that do not cover program costs. These subsidies are seen by some as an incentive for owners and operators to manage their PCBs appropriately as costs are somewhat controlled. Jurisdictions providing subsidies often prefer to charge the full cost of the service and to eliminate subsidies but find subsidy removal politically difficult to implement.

3.3. Voluntary Measures and Technical Support

Leading jurisdictions have found that regulatory and economic measures need to be supplemented with public outreach programs, voluntary measures and technical support for both operators and government inspectors. These measures are needed to:

- Describe in non-legal language what is required of the regulated community to comply with the PCB regulations
- Describe for government inspectors and staff involved in facility licensing what must be inspected, assessed and criteria to be used
- Describe what can be done to reduce environmental impacts from small, less understood PCB sources that cannot be reached through regulations

Best practice jurisdictions have developed the following innovative and effective approaches to supporting regulations and economic measures in achieving Stockholm Convention commitments. Copies of each are included in the CD attached as Appendix 4 to this report.

3.3.1. Technical Guidelines for the Regulated Community

Technical guidelines are needed to provide simple, step-by-step procedures for the regulated community to achieve compliance with the regulations. These guidelines acknowledge that the publishing of a regulation in a government gazette does not guarantee compliance. The regulated community will need help to understand the legal language and also to answer the many questions that arise during implementation. The following are examples of best practice regulatory guidance:

PCB Transformer Decontamination – CCME

The Canadian Council of Ministers of the Environment (CCME) has published a guideline to provide standards and protocols for those involved in the decontamination of transformers. CCME represents the views of all Canadian provinces and the Federal government and works to develop coordinated national approaches to environmental problems. The guideline reviews methods for the decontamination of PCB transformers and recommends residual PCB concentrations for their re-use, recycling and disposal. The goal of the guideline is to encourage resource recovery and technological developments in this area.

PCB Transformers and Capacitors: from Management to Reclassification and Disposal – UNEP

The United Nations Environment Program has developed an excellent guideline to assist electrical utilities and other institutions in meeting their obligations for the safe management of transformers and capacitors. The guidelines describe preferred management practices for PCB equipment and PCB materials, worker health and safety considerations, reclassification, retrofilling, alternative fluids and the replacement of equipment.

Guidance Notes for the Annual Registration of PCB Holders – United Kingdom

The UK has developed a guide describing how to complete annual registration forms that need to be submitted by each owner of PCB equipment. It provides an easy to understand description of each line on the application form. Best practice jurisdictions have found that good quality instruction improves the rate of compliance and eases the workload of abatement staff.

PCB Site Revitalization Guidance - USEPA

The US EPA has a detailed document describing the clean-up and disposal requirements for PCB contamination under the Toxic Substances Control Act. It gives an overview of the requirements, appropriate clean-up levels, disposal, review and notification requirements and potential clean-up scenarios.

3.3.2. Procedural Guidelines and Protocols for Government Staff

Procedural guidelines and protocols are essential if government abatement and enforcement officers are to consistently interpret the regulations and technical guidance documents and to promote compliance in the most cost effective manner. They also limit the discretion available to environmental inspectors and contribute to fairness and equitable treatment under the law.

Compliance Guideline – Ontario Ministry of the Environment

The Ontario MOE has a guideline that documents the ministry's approach to achieve and maintain province-wide compliance with the PCB and other regulations. The guideline describes how government staff are to use both abatement and enforcement to achieve compliance and what is the expected action by staff if compliance is not achieved.

3.3.3. Voluntary Measures for Small Sources

Voluntary measures are needed to reach PCB owners that cannot effectively be reached by regulations. Best practice jurisdictions have used fact sheets to encourage those involved in managing small sources of PCBs to take appropriate action. The following are examples of best practice voluntary measures:

PCBs in Fluorescent Light Fixtures – Michigan Department of Environmental Quality

The State of Michigan, USA has prepared a guidance note for homeowners and others dealing with fluorescent light fixtures. The guidance note describes what PCBs are, where they are found in fluorescent lights, how to determine if ballasts contain PCBs, what to do with ballasts if they are leaking and how to dispose of the light fixtures. Michigan recognizes that they need to reach out to homeowners and electricians if they are to achieve virtual elimination. They also recognize that it is not reasonable to regulate compliance of homeowners and electricians.

Identification of PCB Capacitors - ANZECC

The Australian and New Zealand Environment and Conservation Council (ANZECC) has developed an information booklet for electricians and electrical contractors to assist Australia and New Zealand in implementing the Polychlorinated Biphenyl Management Plan. The booklet describes PCBs, the identification of PCB containing equipment, safe handling and disposal in terms that can be readily understood by electricians and contractors.

3.4. Public Awareness and Involvement

Three pillars are recognized by leading jurisdictions as essential for meaningful public participation. These are:

- Access to information
- Access to decision making
- Access to justice

3.4.1. Access to Information

The first pillar of meaningful public participation is open, transparent and readily availability information to both build public awareness and to inform the public about issues or proposals that could have an impact on the environment.

Best practice jurisdictions build public awareness through public communication programs and by supporting the establishment of independent NGOs. Many best practice jurisdictions reach out to the public through full communications strategies that include Fact Sheets, education programs and public speakers at local events. They describe what POPs and PCBs are, what is being done by governments to manage risks and what stakeholders can do to contribute to the goal of virtual elimination. Best practice jurisdictions also use partners such as NGOs to play important roles in disseminating information and as independent "watch-dogs".

Best practice jurisdictions give the public access to all data and information collected, tabulated and evaluated as part of monitoring programs, inspection activities as well as all PCB registration notices, annual reports and applications for licenses. They do this through web sites and by requiring that proponents inform the public of their plans.

The following are examples of best practice Fact Sheets, NGOs and government information sources aimed at building awareness and informing the general public and industry:

The POPs Issue and Effects on Human Health – The Philippines

The Environmental Management Bureau of the Department of the Environment and Natural Resources of the Philippines has developed a Fact Sheet to build awareness of the POPs issue, the health effects of POPs, the Stockholm Convention and what the government is doing about it. The Philippines recognizes that awareness is a key to effective public participation.

North American Regional Action Plan for PCBs – North America

The Commission for Environmental Cooperation of North America (CEC) is an "international organization formed by Mexico, the United States and Canada to address regional environmental concerns, help prevent future trade and environmental conflicts and to promote the effective enforcement of environmental law." The CEC has developed a Fact Sheet aimed at describing what are PCBs and the strategies being used to meet international commitments. The Fact Sheet is a good example of one of the types of outreach material that build public and private sector understanding and commitment to participate.

Environmental Defense Fund – USA

The Environmental Defense Fund was established in 1967 and has become one of the most influential, independent environmental advocacy groups in the United States. Among other activities, the EDF publishes email newsletters, fact sheets and educational material to help change the way individuals and companies do business, save money and protect the planet. The establishment of effective NGOs is essential to informing the public and also the independent assessment of government and private sector generated reports.

Clean City Program – Indonesia

Indonesia has been a leader in promoting improved environmental management through public awareness and pressure. In 1990, Indonesia introduced the Clean City program that had the major cities in the country compete for the honour of being the cleanest city. Each year, staff from KLH (the Indonesian Ministry of State for Population and the Environment) would inspect the major cities using predetermined criteria, evaluate the findings and then publish the results. The published list ranked the cities from the cleanest to the dirtiest. Within two years of implementation, there was a marked improvement in general sanitation in Indonesia's major cities.

Information Web Site – Great Britain

The Department of Environment, Food and Rural Affairs (DEFRA) in Great Britain has set up a website www.defra.gov.uk to give the public "a wide range of information on what

the Government is doing to protect the environment in a range of areas such as chemicals, air quality, soil and contamination and water quality, including news on national, EU and international chemicals policy, Government position statements, advisory committee papers and reports, and developments in research." These types of web sites are common to all best practice jurisdictions.

3.4.2. Access to Decision Making

The second pillar of meaningful public participation is public access to decision making. Best practice jurisdictions have established legislation that requires that proposals for all environmentally significant government decisions be posted on a public web site and opportunities be given to the public to make comments. Governments must later demonstrate how they took these comments into consideration as final decisions are made. These best practice jurisdictions recognize that the transparent involvement of the public can result in greater levels of trust and possibly support for treatment and disposal facilities.

Leading jurisdictions have also required through legislation that public hearings be held before any licenses are issued for environmentally significant undertakings. These public hearings can be broad and address the need for the undertaking, alternatives to the undertaking, alternative methods and measures to mitigate impacts. Hearings are held before independent tribunals that are given the authority for making decisions.

Environmental Bill of Rights Registry – Province of Ontario, Canada

The Environmental Bill of Rights legislation and registry were established in the early 1990s and give the public access to information and government decision making. Under the legislation, the Province must post on the registry web site (www.ebr.gov.on.ca) public notices about environmental matters proposed by provincial Ministries. These could include proposals for new government policies or applications for Certificates of Approval (licenses) for PCB disposal facilities. The public is given a reasonable opportunity to comment on these proposals. Ministries must show how these public comments have been taken into consideration as decisions are made.

Ontario has also promulgated legislation that requires full public hearings for major facilities such as PCB disposal sites. The public has the right to appear as parties to the Hearings, to give evidence and to cross examine witnesses for the proponent. This right is, of course, limited by the ability of the public to be able to raise sufficient funds to hire Counsel and experts for the Hearings. In the past, Ontario provided funding to the public to hire Counsel and experts. This funding for interveners has been cut as a result of government austerity measures.

Some countries in SE Asia are beginning to consider EBR legislation. It is unclear whether this can be transferred in the short term to Vietnam.

3.4.3. Access to Justice

In some leading jurisdictions, the public has been given the right to initiate prosecutions before the courts. One of the first jurisdictions to introduce "right to sue" legislation was the State of Michigan, USA. The Michigan Environmental Protection Act, 1970 confers the right to any person, partnership, corporation, association, organization of other legal entity to start an action before the circuit court where the alleged infraction occurred. This legislation has been used as a model by many jurisdictions as they provided citizens with the right to protect the environment.

It is also essential that justice is seen to be done. Some leading jurisdictions publish the names of corporations and their officials that have been found guilty of environmental

infractions. The press releases describe the infraction as well as the sanctions that were levied by the courts. These press releases use public embarrassment of owners and members of Boards of Directors as an effective method of promoting compliance. This approach has also been used effectively against public corporations such public utilities.

4. Needs Assessment

This section of the report identifies and assesses policy needs and options based on international best practices and makes recommendations for a policy, regulatory and legislative framework for Vietnam.

4.1. A PCB Policy Framework for Vietnam

The Desk Top Report identified 27 Laws, Decrees, Decisions and Circulars addressing PCB management in Vietnam. These policies include MOI Circular 01/2006 on import restrictions, MOH Circular 05/1999 on hazardous chemicals and GOV Decree 155/1999 and MONRE Circular 12/2006 on hazardous waste management. None of these requirements take an integrated, "life cycle" approach to the management of PCBs or other chemical substances.

The Desk Top Report found there was considerable overlap and inconsistency among these policies and in many cases the requirements were vague and difficult for the regulated community to understand. This will inevitably lead to confusion and a lack of compliance. Government inspectors and the courts will experience the same confusion undermining both abatement and enforcement efforts.

The Desk Top Report also found there are no definitions in place for PCBs, PCB equipment or PCB materials in Vietnam.

Policy Needs Assessment

- Best practice jurisdictions have developed integrated policy frameworks that manage the complete "life cycle" of PCBs from bans on production to requirements for in-service equipment through to secure disposal. The Stockholm Convention supports the "life cycle" approach.
- In addition, international best practice jurisdictions have promulgated single, integrating regulations (or set of regulations) for PCBs to give a clear picture of the government's intentions and directions.
- These jurisdictions have also found that while command and control regulations are essential, they cannot meet government compliance goals and objectives alone. PCB regulations must be supported by economic instruments, voluntary programs and technical assistance.
- The Desk Top Report found that leading jurisdictions have definitions for key terms such as PCBs, PCB equipment (such as transformers) and PCB materials (such as dielectric fluids). These definitions are essential to define the scope and provide a clear foundation for the policy framework. In essence, they determine what is "in" and what is "out" of the policy requirements.
    - The Stockholm Convention and best practice jurisdictions use a range of definitions to identify what comes under the PCB Regulations. For example, the Stockholm Convention has defined PCBs as *"aromatic compounds formed in such a manner that the hydrogen atoms on the biphenyl molecule (two benzene rings bonded together by a single carbon-carbon bond) may be replaced by up to ten chlorine atoms"* Canada and Australia, on the other hand, have more simply defined PCBs as *chlorobiphenyls that have the molecular formula of* $C_{12}H_{(12-n)}Cl_{(n)}$. Both approaches have been effective.
    - The Desk Top Report has also shown that best practice jurisdictions have taken a number of approaches to defining equipment. Some have listed all possible equipment that could contain or have been contaminated with PCBs.

Others have relied on dictionary definitions for equipment. Both approaches have been shown to be effective.

Recommendations

1. Develop a policy framework that addresses the full "life cycle" of PCBs from bans on production to in-service equipment management and final destruction
2. Develop a single integrating PCB regulation supported with economic instruments, technical assistance, voluntary measures and public outreach programs
3. Provide clear definitions for PCBs, PCB equipment and PCB materials. The following definitions integrate the approaches used by leading jurisdictions and are provided as a starting point for discussion:
   - *PCBs are defined as chemical compounds with two benzene rings bonded together by a single carbon-carbon bond where the hydrogen atoms on the two rings have been replaced by up to 10 chlorine atoms and having the molecular formula of* $C_{12}H_{(12-n)}Cl_{(n)}$.
   - *Equipment refers to mechanical, electrical or other equipment such as electrical capacitors, electrical transformers, auxiliary electrical equipment, electromagnets, heat transfer equipment, hydraulic equipment, vapour diffusion pumps, bridge bearings, light ballasts, circuit breakers, reclosers and bushings.*
   - *Material refers to any solid or liquid such as dielectric fluids, heat transfer fluids, contaminated soil and the like.*

4.2. Thresholds and Timelines

Policy Needs Assessment

All best practice jurisdictions have had to respond to four key questions:

1. What is covered by the PCB regulations?
2. How quickly does PCB equipment have to be phased out?
3. When does PCB equipment have to come out of storage for disposal?
4. What restrictions or bans are needed?

<u>What is covered by the PCB Regulations?</u>

Best practice jurisdictions define what is "in" and what is "outside" the scope of their PCB regulations using definitions, threshold concentrations and threshold quantities. Best practice jurisdictions also use the thresholds to establish priorities for phasing out equipment and for end of storage deadlines. Table 1 compares the priority thresholds for three best practice jurisdictions, UNEP and the Stockholm Convention text.

From Table 1, it can be seen that all best practice jurisdictions have identified what they consider to be concentrated and therefore high priority PCB equipment and PCB materials. The Stockholm Convention and Australia have established 100,000 mg/kg as the threshold for concentrated PCBs. Canada, the Philippines and UNEP have more conservatively set 500 mg/kg as the limit for high priority PCBs. It would be reasonable for Vietnam to await the results of the inventory project being undertaken by EVN before setting a limit. Based on preliminary results from Experco International, showing that most transformers in Vietnam contain low concentrations of PCBs, a limit of 500 mg/kg may be a reasonable starting point for discussion.

All jurisdictions reviewed exercise full regulatory control (i.e. PCB registers, handling requirements, phase out timelines and end of storage deadlines) over PCB equipment and PCB materials where the concentration of PCBs is greater than 50 mg/kg. This is the lower limit set by the Stockholm Convention and suggested by UNEP.

Many best practice jurisdictions exercise some control over those PCBs between the "PCB free" and 50 mg/kg levels. Australia allows PCB solids (<50 mg/kg) to be landfilled. Liquids, on the other hand, can only be treated or disposed of at facilities approved for low concentration PCBs. Most provinces in Canada have set similar thresholds for what can be landfilled or otherwise managed. UNEP suggests that materials with concentrations between 5 and 50 mg/kg should be potentially regulated.

Both Australia and Canada recognize that solids contaminated with < 50 mg/kg PCBs can be disposed of in a well designed and managed landfill. The mobility of PCBs is substantially reduced in this environment. Liquids, on the other hand, are generally not acceptable at landfills given the added hydraulic load and operational problems they introduce. Most best practice jurisdictions reviewed require that liquids contaminated with between 5 mg/kg and 50 mg/kg be treated or disposed of at specifically licensed facilities. Generally, this would include decontamination methodologies for transformer carcasses and disposal of fluids and contaminated paper / wood in a cement kiln or hazardous waste incinerator. These jurisdictions are concerned that open burning or reuse of the waste oils would result in unacceptable emissions of PCBs to the environment. On the basis of the foregoing, it is reasonable to exercise a level of control over selected materials between the PCB free and regulated levels in Vietnam.

Two jurisdictions have set "PCB free" levels. Canada has set levels at < 2 mg/kg for liquids and < 50 mg/kg for solids. Australia has set < 2 mg/kg as the level that the PCB regulation no longer applies. UNEP has suggested a "non PCB" level of < 5 mg/kg. Given the capacity constraints of Vietnam Ministries and EVN, a reasonable starting point for discussion may be to set a "PCB free" level of < 5 mg/kg.

<u>How Quickly Does PCB Equipment Have to be Phased Out?</u>

Best practice jurisdictions set threshold limits to define priorities for PCB equipment and PCB materials and to set phase out timing triggers for in-service equipment based on these priorities.

Phase-out triggers are an essential part of all PCB regulations by prescribing in advance when equipment must come out of service. These triggers allow owners and operators to develop plans, budgets and facilities to manage PCB equipment and PCB materials before they are to be taken out of service for eventual disposal. These triggers also allow governments to plan and build the capacity of licensing, abatement and enforcement staff.

Table 2 compares the phase out triggers for three best practice jurisdictions with the phase out priorities for the Stockholm Convention. Table 3 compares how each of these jurisdictions have then defined "sensitive" sites – those sites where phase out should be undertaken as a priority. The health or environmental impacts of leaking PCBs can be substantially higher at these sensitive sites.

Most jurisdictions have included schools, hospitals and food / feed production in their definitions for sensitive land uses. Australia and Canada have extended the definition to include senior citizens retirement homes, endangered species, aquatic spawning areas and drinking water sources and treatment plants. Definitions for sensitive land uses need to be developed by each jurisdiction at the national level to reflect human health and environmental considerations.

Australia has developed one of the most comprehensive risk based equipment phase out and elimination plans. Starting in 1996, they have progressed through five priority levels. The goal has been to phase out all equipment with concentrations greater than 50 mg/kg over the thirteen year period leading to 2009. PCB equipment with concentrations greater than 100,000 mg/kg had to be removed from service within the first 5 years.

Canada is establishing a new regulation that will phase out its remaining PCBs over 8 years with a special exemption for gas and oil pipelines until 2025. The Philippines intends to phase out PCB equipment and PCB contaminated equipment over 10 years after the Chemical Control Order comes into force.

The Stockholm Convention has also recognized the importance of a thoughtful phase out strategy by proposing the following priorities for removing equipment from service:

I. *"Make determined efforts to identify, label and remove from use equipment containing greater than 10 per cent (100,000 mg/kg) polychlorinated biphenyls and volumes greater than 5 litres;"*

II. *"Make determined efforts to identify, label and remove from use equipment containing greater than 0.05 per cent (500 mg/kg) polychlorinated biphenyls and volumes greater than 5 litres;"*

III. *"Endeavour to identify and remove from use equipment containing greater than 0.005 percent (50 mg/kg) polychlorinated biphenyls and volumes greater than 0.05 litres;"*

There is one overriding point to be made in reference to Tables 2 and 3. All three of the jurisdictions reviewed comply with the full requirements of the Stockholm Convention; but each has set threshold concentrations and quantities to meet their country's needs and capacity. Each has considered the health and environmental impacts of PCBs, institutional capacity and the availability of storage, treatment and disposal capacity when they established their priorities.

As an initial starting point for discussion, it may be reasonable to consider triggers that distribute phase out evenly over the 16 years from 2009 (assuming a 2008 promulgation date and one year for building capacity and preparing supporting technical guidelines and communications materials) and the 2025 deadline. This will need to be adjusted when the inventory being developed by EVN has been completed to better reflect the distribution of equipment (by PCB concentration) and the projected capacity of treatment and disposal facilities.

When Does PCB Equipment Have to be Taken from Storage for Disposal?

Table 2 shows that all jurisdictions allow time for materials to be consolidated in storage and for appropriate arrangements to be made for disposal.

Australia and Canada allow one year after equipment has come out of service. The Philippines allows two years between equipment coming out of service and disposal. The Stockholm Convention allows three years storage between 2025 and the 2028 deadline. These jurisdictions recognize that the risk of leakage and environmental discharges increase with time and have accordingly limited the time PCB equipment and materials can be left in storage. These jurisdictions also recognize that it takes time to review disposal options, negotiate contracts and finalize budgeting.

Final decisions in Vietnam to set an end of storage deadline will need to take into consideration these best practices as well as the availability of disposal facilities in the country. Given the limited capacity in Vietnam and the experience of best practice jurisdictions, an initial timeline of 2 years for PCBs in storage when facilities become available would be a reasonable starting point for discussion reducing to 1 year once the initial backlog of PCBs has been disposed of.

What Bans and Restrictions are Needed?

All best practice jurisdictions have banned or restricted activities that could allow new PCBs to enter the economy, to become more broadly distributed in the environment or to be laundered so as to evade the regulations.

Vietnam has established some bans and restrictions for PCBs. They are as follows:

- Imports and exports are restricted except where a license has been issued by a provincial department and where a letter of agreement has been issued by MOI. No lower concentration limits have been set for PCBs to be imported or exported.
- PCB waste exports are restricted except where there has been prior informed consent from the receiving country and all other requirements of the Basel Convention have been met.
- Municipal landfilling of HW and therefore PCBs is banned where the concentration of PCBs in the equipment or materials is greater than 50 mg/kg.
- Direct releases into the environment are banned where the concentration is greater than 50 mg/kg.
- Mixing and diluting of HW and therefore PCB liquids are banned where the concentration of either material is greater than 50 mg/kg.

All best practice jurisdictions have implemented bans or restrictions on production, manufacture, sale, distribution, import, export, recycling / reuse, mixing / dilution and processing. Most of the best practice jurisdictions that have been reviewed apply these bans to PCB equipment and PCB materials; that is materials and equipment with PCB concentrations greater than 50 mg/kg.

Canada will be taking a more cautious approach and has proposed a 2 mg/kg limit on the list of banned and restricted materials except for PCBs that are being sold or processed. Canada will allow however the processing of materials with concentrations up to 50 mg/kg if the processing is part of the decontamination or destruction of PCB equipment or waste.

As a starting point for discussion, it is reasonable to consider restrictions below 50 mg/kg to minimize the potential of PCBs being laundered or imported. The limit suggested as a starting point for PCB free materials (< 5 mg/kg) may be reasonable for imports, exports, the landfilling of liquids, direct release, and for mixing / diluting.

Leading jurisdictions have also raised concerns about the use of waste transformer oil as a dust suppressant or as fuel. They have found that measurable concentrations of PCBs can be discharged into the environment as a result of these activities. Given that there are good alternatives, leading jurisdictions have banned the use of all oil from transformers and capacitors from use as dust suppressants or as fuel.

Leading jurisdictions have also developed policies that support the recycling of scrap transformer hulks that have been decontaminated. These jurisdictions recognize that recycling decontaminated scrap steel is preferable to landfilling or to using a cement kiln. To promote recycling of scrap steel transformers, these jurisdictions allow the recovery of waste solvents used to decontaminate the transformers. These solvents are then reclaimed using distillation or other technologies and reused to decontaminate other transformers. These solvent reclamation facilities require licenses under the HW regulations.

Leading jurisdictions have also developed a “swipe test” to determine if transformers to be recycled have been effectively decontaminated. With this test, transformers are swiped to determine surface contamination and compared to guidelines that range from 10 to 25 $\mu g/cm^2$. Transformers with surface contamination less than the guideline are acceptable for metal recycling.

Recommendations

The best practice jurisdictions reviewed have taken a phased, practical approach to eliminating PCBs and achieving the long term goal of the Stockholm Convention. They have established risk based phase-out strategies starting with the highest risk PCB equipment located at the most sensitive sites. They have then worked through their PCB

inventories in stages based on the availability of disposal infrastructure, the capacity of government departments and the ability of industry to implement the provisions.

Vietnam has begun the process of gathering the necessary information for the development of a phased practical plan. The following studies are currently underway or have recently been completed as a first step:

- The PCB sampling and inventory projects under EVN and Experco International
- The Capacity Assessment and Technical Assessment PDF-B Projects
- The Technology Evaluation project under SNC Lavalin
- The pilot project work being undertaken by SDC through Carbotech in several provinces

The analysis of these reports in conjunction with this best practice review will need to be undertaken to develop options and a preferred approach for proceeding. The challenge for Vietnam will be to focus on critical priorities in the early stages while the policy framework, institutional capacity and infrastructure are being established and then to set a balanced pace over the next 20 years to the 2028 deadline.

It is recommended that:

4. A practical staged plan for the phase out and elimination of PCBs be developed based on the above capacity assessment. This plan will establish threshold concentrations and quantities, phase-out timelines for in-service equipment, storage deadlines and restrictions on the critical management activities.

5. This plan should:

- Develop concentration thresholds for high risk and lower risk PCB equipment
- Identify those sensitive sites that need to be protected
- Establish phase out timelines starting with high risk equipment located at sensitive sites and moving through lower risk equipment in other locations
- Set a balanced pace that stages phase out and disposal over the 16 years after the regulations are promulgated
- Be reviewed within 5 years of implementation and adjustments made to reflect progress towards the elimination goal and available capacity of government, the private sector and equipment owners.

6. Based on our best practice review, the following thresholds would be a reasonable starting point for discussion. **Discussion points are shown in bold.**

- Concentrated PCBs refers to equipment or materials with concentrations > **500 mg/kg**
- PCB equipment refers to equipment with PCB concentrations > **50 mg/kg**
- PCB materials refers to materials with PCB concentrations > **50 mg/kg**
- PCB wastes are defined in Decision 15/1999 and Circular 12/2006 as listed waste equipment and materials with PCB concentrations > **50 mg/kg**
- PCB free refers to equipment and materials with PCB concentrations < **5 mg/kg**

7. Based on our best practice review, the following phase out timelines would be a reasonable starting point for discussion. **Discussion points are shown in bold**.

- All concentrated PCB equipment that is currently located within 100 meters of sensitive sites **(hospitals, schools, food and feed production, potable water**

supplies, aquatic spawning areas and endangered species) must be taken out of service, labeled and stored within **5 years** of this regulation coming into service
- All remaining concentrated PCB equipment must be taken out of service, labeled and stored within **9 years** of this regulation coming into service
- All PCB equipment that is currently located within 100 meters of sensitive sites **(hospitals, schools, food and feed production, potable water supplies, aquatic spawning areas and endangered species)** must be taken out of service, labeled and stored within **13 years** of this regulation coming into force
- All remaining PCB equipment must be taken out of service, labeled and stored within **17 years (2025)** of this regulation coming into force

8. Based on our best practice review, the following deadlines for the removal of PCB wastes from storage would be a reasonable starting point for discussion. **Discussion points are shown in bold**.
- All PCBs that are in storage when facilities capable of their destruction become available must be removed from storage for destruction **within 2 years**
- All PCBs that are placed in storage after facilities capable of their destruction are available must be removed from storage for disposal **within 1 year**
- All PCB equipment and PCB materials that are in storage on or after 2020 must be disposed **by 2028**

9. It is recommended that regulated bans be established for the following activities. **Discussion points are shown in bold**.
- The manufacture, production, sale, offering for sale, transfer or distribution of equipment and materials with **PCB concentrations >5 mg/kg**
- The import of any equipment or material that could contain PCBs except for the import of laboratory samples and reagents for instrument calibration with **PCB concentrations >5 mg/kg**
- The export of **PCB equipment, PCB material or PCB wastes** except for shipments to facilities in other countries where hazardous waste regulations have been fully implemented, where there is prior informed consent and where all other requirements of the Basel Convention have been met
- Mixing or diluting of any material with any other material or waste with **PCB concentrations >5 mg/kg** except for solvents used to decontaminate transformers
- Reuse or recycling of equipment or materials with **PCB concentrations >5 mg/kg** except for transformers that have been decontaminated and that have surface contamination less than **allowable limits**.
- Municipal landfilling of:
  - **PCB Equipment**
  - **PCB Materials that are solid**
  - **Liquid material with PCB concentrations > 5 mg/kg**
- Liquid material **with PCB concentrations > 5 mg/kg** can only be treated, decontaminated or disposed of at facilities that have been granted a license under the hazardous waste regulations for these materials
- The use of **any dielectric fluid** from transformers and capacitors as fuel or dust suppressants for roads, parking lots or the like.
- Discharges to the environment of any equipment or material where the **concentration of PCBs is greater than 5 mg/kg** except as otherwise limited by other regulations.

4.3. In-Service PCB Equipment and Materials

It has been estimated that there are approximately 12,000 pieces of electrical equipment and 7,000 tonnes of PCB contaminated fluid currently in use in the country. These quantities consist mainly of transformers and capacitors that are installed in the electrical generation and distribution system across the country. The actual quantities could be higher as this estimate excluded contaminated sites and other sources of PCBs.

The Desk Top Report found that regulations covering in-service PCB equipment and materials are insufficient. Government authority over PCBs is through the hazardous chemical provisions of two regulations. MOH Circular 05/1999/TT-BYT requires that all listed hazardous chemicals be declared and that a license be issued. MOI Circular 12/2006/TT-BCN provides guidance for chemical safety including occupational safety, risk assessment, materials safety data sheets, labeling, annual reporting, and emergency planning. No concrete steps had been taken to develop detailed programs or to implement either of these regulations.

Vietnam has established limited general requirements in TSVN 5507-2002 for facilities storing hazardous chemicals. These standards do not meet international best practices as the definitions and labels for PCBs are incorrect. EVN has developed a sound and comprehensive PCB Management Plan for the Power Sector. The EVN plan would be a best practice except that it does not include any requirements for the repair and retrofilling of transformers.

The Desk Top Report found that Vietnam currently has a comprehensive set of laws and regulations in place governing all aspects of occupational health and safety under the Ministry of Labour, Invalids and Social Affairs (MOLISA). These policies address accident prevention, training of workers, personal protective equipment, medical treatment and compensation for hazardous work. They do not specifically apply to PCBs or provide explicit guidance for workers managing PCB equipment or PCB materials.

Policy Needs Assessment

Our best practice analysis of both international jurisdictions and the Stockholm Convention found integrated programs aimed at promoting the environmentally sound management of all in-service PCB equipment and PCB materials. The following components were common to best practice jurisdictions.

<u>Registration of all PCB equipment and PCB materials</u>

- An inventory of all PCB equipment and PCB materials that are in-service and in storage is a key element of an environmentally sound management system. Registration or a declaration by each owner of in-service PCB equipment and PCB materials provides information to jurisdictions that can be used to design a practical, risk based phase-in program and for subsequent inspection and enforcement activities.
- All best practice jurisdictions have set an aggregate minimum quantity of PCBs per site before requiring registration. Australia has set 10 kg per site and parts of Canada have set 5 kg. This exemption recognizes that it is not practical to register very small quantities. It also recognizes that the environmental risks of small quantities are lower.

<u>Routine reporting for all registered PCB equipment and PCB materials</u>

- Annual or bi-annual reporting helps best practice jurisdictions track progress to achieve phase-out and in-storage deadlines and to prepare the biannual inventory of PCBs. Regular reports also help to develop inspection programs that target higher risk owners and sites.

<u>PCB equipment repairs and retrofilling</u>

- Equipment repairs and retrofilling can be a source of cross contamination of equipment and materials that are PCB free. Best practice jurisdictions require that strict technical procedures be followed as repairs are undertaken to eliminate the potential for cross contamination. There are numerous guidelines prepared by best practice jurisdictions including the UNEP guideline entitled PCB Transformers and Capacitors: From Management to Reclassification and Disposal, UNEP, 2002. These guidelines provide the following:
  - Descriptions of equipment that can contain PCBs
  - Preferred management practices for PCB equipment and PCB materials
  - Health and safety practices for workers
  - Environmental monitoring and contingency response requirements
  - Requirements for the reclassification and retrofilling of transformers
  - Decontamination procedures
  - Alternative fluids for transformers
  - Requirements for the phase out and disposal of transformers and other materials

Storage facility design and operating requirements

- Best practice jurisdictions have established design and operating requirements for facilities involved in temporarily storing PCBs at maintenance facilities operated by electrical utilities. The following basic requirements for these storage facilities are common to best practice jurisdictions:
  - Location standards including zoning restrictions and minimum distances to sensitive uses such as hospitals or schools
  - Design standards including requirements for fencing, buildings, access, pads, curbs and ventilation
  - Signage and labeling requirements for storage facilities
  - Labeling requirements for equipment, drums and other containers with PCB materials
  - Record keeping requirements
  - Annual reports of operations at the storage site and quantities of materials in storage
  - Plans must be prepared, regularly updated and followed for:
    - Facility management and operations
    - Spill prevention and clean-up
    - Emergency / fire prevention
    - Occupational health and safety
    - Staff training
    - Facility closure and monitoring
- Many jurisdictions differentiate between on-site and off-site storage. On-site storage refers to the temporary storage of PCBs at the point of generation such as electrical utility maintenance yards. Off-site refers to those sites that manage PCBs that have been transported from another location. Under the Hazardous Waste Regulations, off-site storage requires a license and all transactions must be accompanied by a manifest. In addition, on site storage must be registered and reported to DONRE every six months.

Occupational health and safety

- Best practice jurisdictions address occupational health and safety both through their labour legislation and through technical environmental guidelines. Leading jurisdictions recognize the preeminence of labour law and independent labour

compliance activities. However, most have included technical guidance for workers in their environmental guidelines. At a minimum, these technical guidelines require the following:

- Adequate ventilation must be provided for all workplaces managing PCBs
- Approved personal protective equipment must be available and used by workers including:
  - One piece chemical resistant suits
  - Chemical resistant boots
  - Chemical resistant gloves
  - Full face masks
- Training must be provided on proper procedures for workers
- Some jurisdictions offer regular health examinations for workers
- Material Safety Data Sheets (MSDS) describing the risks associated with PCBs, management practices and emergency response must be prepared and posted

Monitoring and inspection requirements

- Best practice jurisdictions generally require that facilities with in-service PCB equipment and PCB materials undertake routine monitoring of operations. Indeed, the draft PCB regulation prepared by UNEP requires that an annual inspection by an independent authorized company be undertaken of all PCB equipment and PCB materials to ensure that there are no leaks or discharges into the environment.
- At a minimum, best practice jurisdictions require site owners to conduct routine inspections of all facilities to ensure that there are no leaks or other hazardous conditions. The results of these inspections are to be described in the annual report submitted to the regulatory agency. Any discharges to the environment in best practice jurisdictions must be reported immediately to the authorities and clean-up action undertaken.

Recommendations

10. Require registration of all PCB equipment and PCB materials that are in-service or in-storage with provincial departments through DONRE within one year of this regulation coming into force. The regulation must specify the form to be used and supporting information to be included with the registration. A small quantity exemption should also be set for the aggregate quantities at each site. This exemption should be set based on the results of the analysis coming out of Recommendation 4.

11. Require annual updates with provincial departments through DONRE of all registered in-service PCB equipment and PCB materials indicating any changes to equipment and materials used, stored or transported off-site.

12. Establish regulated design and operating standards for the management of in-service PCB equipment and materials including repairs and retrofilling. At a minimum, these standards must address the need for routine inspection and monitoring of all PCB equipment and materials that are in-service and emergency action required should leaks be detected. These minimum requirements must be supplemented with the guidelines described under Recommendation 15 below.

13. Require that the occupational health and safety legislation and regulations under the Ministry of Labour, Invalid and Social Affairs be formally extended to apply to the in-service management and storage of PCB equipment, PCB materials and PCB wastes as requested in the official letter from VEPA to MOLISA. Essential

occupational health and safety practices should be included in technical guidelines for workers handling PCBs described in Recommendation 15.

14. Establish a standards system and obligated standards in the PCB regulation for all on-site storage facilities including for all on-site existing stockpiles of PCB equipment, PCB materials and PCB wastes. The regulated standards should address:

- Site location restrictions
- General design requirements including the need for fencing, covered storage, cement pads and curbs
- Signage and labeling requirements for facilities, equipment and containers
- Inspection and monitoring requirements
- Record keeping and reporting requirements
- The need to develop, update and follow plans for:
  - Operations and site management
  - Spill containment and emergency response
  - Fire protection and response
  - Facility closure and monitoring

15. Develop the following guidelines to support the regulated requirements.

- Guidelines for the identification, management, repair and retrofilling of PCB equipment. This guideline should be based on the EVN Management Plan but with changes to better address repairs, maintenance, retrofilling and cross contamination issues.
- Guidelines for the on-site storage of PCB equipment and PCB materials.

4.4. PCB Waste Management

The Desk Top Report found that GOV Decision 155/1999, Decision 23/2006QD-BTNMT and Circular 12/2006/TT-BTNMT provide a sound policy foundation for managing hazardous wastes, including waste PCBs, consistent with international best practices. They provide a "cradle to grave" control system that can ensure these wastes are carefully managed from the time the wastes are generated until ultimate disposal. The Decisions and the Circular include the following best practice requirements for PCBs and other hazardous wastes:

- Registration by owners / generators
- Routine reporting by owners / generators
- Licensing of all transporters and storage, treatment and disposal facilities
- Standards for transporters and storage, treatment and disposal facilities
- Tracking of all waste movements using a manifest form
- Development of a national inventory
- Monitoring of emissions from storage, treatment and disposal facilities
- Capacity building and training requirements

Policy Needs Assessment

Consistency

- There is considerable inconsistency between the two sets of regulations (Decision 155/1999/QD-TTg versus Decision 23/2006/QD-BTNMT and Circular 12/2006/TT-BTNMT). Decision 155 was passed in 1999 and reflected the knowledge of hazardous wastes and the capacity of government departments at that time. Decision 23 and Circular 12 were passed in 2006, provide more detailed, up to date requirements and describe a more appropriate role for VEPA and the provincial

DONREs. An analysis of the two sets of requirements shows that there are a number of important differences.

- Circular 12/2006 requires the use of a 6 part manifest. Decision 155/1999 requires a 5 part manifest. The 6 part manifest recognizes that both VEPA and DONRE have important roles to play and require information on all transfers.
- The roles of the provincial DONREs and VEPA have been more clearly delineated in Circular 12 and are more consistent with their capacities.
- The definition for Hazardous Waste is more understandable in Decision 23/2006
- The definition for PCBs is more understandable in Decision 23/2006
- Re-registration for HW generators is required under Circular 12/2006 if quantities of waste change by more than 15%. It is not clear when re-registration is required in Decision 155/1999.
- The timelines given to the DONREs and VEPA for the issuing generator registers and other licenses has been reduced in Decision 23/2006. In the case of generator registers, it has been reduced from 45 days to 37 days.
- Decision 23/2006 and Circular 12/2006 provide substantially more detail than Decision 155/1999. This added level of detail is a prerequisite of compliance.

- These inconsistencies need to be resolved or the resulting confusion will undermine all efforts towards full compliance. Based on an interpretation from MOJ, Decision 155/1999 will need to be amended to reflect the improvements in Decision 23/2006 and Circular 12/2006.

<u>Supporting Guidelines and Protocols</u>

- Best practice jurisdictions have developed guidelines to describe in plain language the requirements prescribed in the regulations. The following guidelines have been put in place by best practice jurisdictions.
  - Generator registration guidelines that describe in more detail the definitions for HW, PCBs and the generator registration process
  - Technical guidelines for transporters of HW and PCBs
  - Technical guidelines for treatment, storage and disposal of HW and PCBs
- Both Decision 155/1999 and Decision 23/2006 require plain language guidelines to describe requirements for the regulated community and for government inspectors. MONRE, MOST and MOC have already developed three guidelines:
  - Technical Guidelines for the Landfilling of Hazardous Wastes, MOST, Decision 60/2002,
  - Design Standards for Hazardous Waste Landfills, TCXDVN 320-2004, MOC
  - The disposal of hazardous wastes in cement kilns
- The Desk Top Report found that although these are sound documents there will need to be updated as part of the final policy framework. For example, the MOSTE guideline allows PCB wastes to be landfilled. The recommendations of this report suggest that the municipal landfilling of solid wastes with PCB concentrations less than 50mg/kg and liquid wastes less than 2 mg/kg may be acceptable.

<u>Placarding and Labeling Standards</u>

- Best practice jurisdictions have developed detailed standards for the placarding of vehicles carrying hazardous wastes including PCBs. These standards are based on international standards.
- The Desk Top Report found that Vietnam standards TCVN 6706-2000 and 6707-2000 will need to be reviewed to ensure that placarding and labeling requirements for

PCB wastes meet international standards. In addition, Vietnam standard TCVN 5507-2002 will need to be amended to correct the listing used for PCBs.

Financial guarantees

- The Policy Options Section of this report found that best practice jurisdictions have used an economic instrument to require that private sector owners of facilities that manage hazardous wastes and PCBs provide financial guarantees to cover the costs if the facility was abandoned and for the costs of eventual facility closure and clean-up.
- The provision of financial securities is a powerful incentive for operators to carefully manage their sites and to meet all regulatory requirements as securities are returned to the owner once the site is properly closed.

Recommendations

16. Amend Decision 155/1999 to better reflect the improvements made in Decision 23/2006 and Circular 12/2006 (This recommendation is based on an interpretation from MOJ).

17. Define all PCB equipment and PCB materials that are out of service or in storage as hazardous wastes to clarify that all provisions of these HW regulations apply

18. Develop the following technical guidelines to support the implementation of the hazardous waste regulations:
- Guidelines to describe the process for applying for generator registers including an easy to understand hazardous waste definition
- Guidelines for the transfer, transportation and storage of HW and PCBs
- Guidelines for the decontamination of PCB transformers.

19. Review and amend the following obligated standards and technical guidelines to bring them in line with the final PCB regulations:
- Technical Guidelines for the Landfilling of Hazardous Wastes, Decision 60, 2002, MOSTE
- Design Standards for Hazardous Waste Landfills, TCXDVN 320-2004
- Guidelines for the use of cement kilns for the disposal of hazardous wastes.

20. Require that financial guarantees be provided by site owners to the local DONREs for all private storage, treatment and disposal facilities to cover the costs of the environmentally sound clean-up, monitoring and management of sites in the event of abandonment. Guarantees are to be returned to private sector owners after the site has been closed to the satisfaction of the MONRE or VEPA.

4.5. Contaminated Sites

The Desk Top Report found that there are broad commitments and provisions under the Law on Environmental Protection (LEP) and the National Implementation Plan (NIP) for the effective management of contaminated sites. The LEP prescribes requirements for identifying contaminated areas, measures to stop the source of the contamination, rehabilitation of sites and compensation for damages. The NIP commits to identifying and comprehensively treating PCB and POP contaminated hotspots to reduce their impacts on human health and the environment. Apart from these high level commitments, there are few formal programs in place for the assessment of potential locations for POP or other hazardous contaminant “hot spots” in the country and a national clean-up plan for PCBs managed. Those that are in place have limitations by not applying directly to PCBs.

Policy Needs Assessment

- Best practice jurisdictions have developed contaminated site clean-up programs to address not just POPs and PCBs but all hazardous contaminants identified under toxic substance legislation. These programs proactively assess the potential for contaminated

sites in the jurisdiction, undertake desk top and on site investigations, set priorities, procure funding and undertake the necessary clean-up actions.

- As part of contaminated site clean-up programs, best practice jurisdiction have developed standards and detailed protocols on how clean-ups are to be effected and approved by the regulatory authorities.
- An important provision in a contaminated site clean-up program is making polluters responsible for notifying authorities of spills or other discharges, for the clean-up of sites and for compensation to be paid to damaged parties.
- Best practice jurisdictions have also included provisions in their environmental legislation that promotes a rapid response for leaking PCB equipment by making the owner liable for all clean-up costs. As a result, owners of equipment check for leaks and remove leaking equipment from service to avoid the cost of clean-up including undertaking studies and monitoring the results.

Recommendations

21. Establish an economic instrument and other provisions in the PCB regulation that makes the owners of PCB equipment, PCB materials and PCB wastes responsible for:
- Notifying the provincial DONRE of the location of any sites where PCBs may have leaked or otherwise found their way into the local environment
- Undertaking the necessary studies to determine the potential and extent of contamination that may be occurring
- Undertaking the necessary steps to remove from service, equipment that is leaking and may be creating or contributing to environmental contamination
- Undertaking the necessary work to stop the flow of contaminants and to clean-up the site and covering the costs of this clean-up
- Compensation for any costs incurred by government or third parties for site clean-up

22. The development of a contaminated site program is a monumental task and is beyond the terms of reference of this project. Efforts should be made to coordinate the development of PCB contaminated site clean-up initiatives with the NIP Priority Project for POPs clean-up.

4.6. Policy Compliance

Vietnam has limited capacity to ensure compliance with the provisions of current regulations and legislation. In addition, communication of the hazardous waste program to the regulated community has been limited to date. Finally, the sanctions reviewed in the Desk Top Report do not provide much of a disincentive for non-compliant behavior.

Policy Needs Assessment

- Best practice jurisdictions have found that compliance with regulatory provisions and the achievement of virtual elimination of PCBs will be limited if concrete efforts are not made in four areas:
  - First, the regulations must be clear and understandable and communicated directly with the regulated community.
  - Second, the regulations must be supported with technical guidelines to assist owners to understand the legal requirements and to provide safe practices for handling PCB equipment and PCB materials.
  - Third, inspections and enforcement must be visible and effective. Leading jurisdictions have found that removing the plausible threat of inspections and enforcement will result in limited compliance. To achieve this level of compliance

activity, best practice jurisdictions have found that significant resources need to be spent. In addition, fines for infractions of up to $1,000,000 and imprisonment have been found necessary given the high costs of managing PCBs.

- Fourth, inspection and enforcement staff must be supported with guidelines and protocols that describe what must be inspected, criteria to be used to measure compliance and actions to be taken for non-compliance. These protocols ensure a consistency of compliance action and a rapid of enforcement response if there are infractions.

Recommendations

23. Develop an outreach program aimed at the regulated community to ensure they fully understand the provisions of the PCB regulations. This program should include:
- Preparation of brochures and pamphlets to support the regulation
- Ads in trade journals
- Presentations to trade associations about the requirements

24. Develop technical guidelines for the regulated community to ensure that they understand the legal language and also to provide detailed technical assistance to workers involved in handling PCB equipment and PCB materials. (These guidelines were discussed and specific recommendations made in earlier sections of this report.)

25. Develop obligated standards and technical guidelines for VEPA and DONRE inspection and enforcement staff to describe government expectations and required staff action when infractions are found.

26. Provide resources to VEPA and the provincial DONREs for effective abatement and enforcement to ensure that compliance activities are visible and balanced

27. Conduct an assessment of the cost of compliance with the PCB regulations and the disincentive to non-compliance of the existing sanctions. Increase the existing sanctions based on this assessment to ensure that adequate economic disincentives for non-compliance are in place.

4.7. Environmental Monitoring

Vietnam has undertaken a number of monitoring initiatives including more than a dozen projects described in the National Implementation Plan for the monitoring of various POPs and PCBs. There is no however, no formal, ongoing monitoring program for POPs in the country.

The NIP commits to undertaking several initiatives related to monitoring. Priority Project # 10 proposes to develop the country's technical capacity for POP monitoring and analysis. This will result in the establishment of a network of internationally standardized laboratories for assessing pollution and impacts of POPs on human health and the environment. Korea is working with Vietnam to develop a POPs monitoring database with support from UNEP.

Policy Needs Assessment

- Best practice jurisdictions have set up or are in the process of setting up environmental monitoring programs to better understand how ubiquitous PCBs have become in the nation and whether, in the longer term, national and international efforts are having a positive impact.
- For example, Australia during the 5 year review of the PCB Management Plan found that there was insufficient data on PCBs in the environment. A nationally coordinated and statistically valid PCB sampling and monitoring program is now to be carried out

to determine if PCBs in the environment are decreasing with time. A range of receiving environments is to be monitored, including:
  - breast milk and foodstuffs;
  - sewage treatment plants and outfalls;
  - landfill sites suspected of having received scheduled PCB and
  - appropriate biological indicators, including wildlife."
- The Stockholm Convention requires the establishment of a monitoring program for POPs and PCBs.

Recommendations

28. Establish, in conjunction with Priority Project #10 and the Korean project, a nationally coordinated and statistically valid PCB sampling and monitoring program to determine if PCBs in the environment are decreasing with time as well as their distribution in the environment. In addition, Vietnam should commit to:
- Conduct the first round of sampling within the next two years to develop baseline data
- Coordinate the plan with ASEAN jurisdictions to account for broader sources of PCBs in the national environment

4.8. National Inventories

Vietnam does not have a formalized system for collecting data that can be catalogued in a national inventory. There have been however, several spot inventories conducted to help the country gain a better understanding of the scope of the problem. The most extensive is to be undertaken later this year by EVN. The results will allow the country to develop plans that better reflect the actual inventory of PCBs that will require management and disposal.

Policy Needs Assessment

- Best practice jurisdictions prepare annual inventories of PCBs that are in-service, in storage and that have been destroyed. These inventories are derived from data collected at the local, regional and national levels from the annual reports submitted by PCB in-service equipment and material owners, storage site operators and through the hazardous waste manifest system. These data give a snap shot of the success of the PCB management and elimination program and contain the following information:
  - In-service PCB equipment and materials
  - PCB equipment and PCB materials as they are phased-out and placed in storage
  - On-site and off-site PCB waste storage
  - PCB equipment and materials that have been treated and disposed of
- In addition, best practice jurisdictions evaluate and compile these data to show the distribution by location, size of equipment, concentration of PCBs, age of equipment and electrical capacity of equipment. UNEP has developed a useful guide to the conduct of national inventories.

Recommendations

29. Require that all initial and annual PCB reports submitted by in-service PCB equipment and PCB material owners be tabulated by provincial DONREs and submitted to VEPA twice a year. These reports should be integrated with the hazardous waste manifest reports also tabulated by VEPA to provide a complete inventory of PCBs in the country and progress towards the goal of virtual elimination.

30. Require that VEPA analyze and consolidate the provincial reports into a national report and submit the report to the Minister of Natural Resources and Environment and the Prime Minister annually

4.9. Public Awareness / Involvement

In Vietnam, the existing Law on Environmental Protection provides rights to individuals and groups that may be affected by decisions and actions that could effect the environment. Information that must be made public includes EIA reports and plans, registered environmental commitments, lists of wastes and chemicals that could be hazardous to human health, sites with serious environmental degradation, plans for waste collection and recycling and environmental impact reports. Information reports must be available in forms that are readily understandable and must be accurate, truthful and objective. The LEP provisions are extensive and provide an excellent foundation for building a public information and involvement program.

Policy Needs Assessment

- Best practice jurisdictions have developed sophisticated approaches to inform the public of environmental issues as well as government action and government expectations. The Policy Options section of this report provided a review of some of the more effective examples.
- Best practice jurisdictions have built into their policy frameworks the requirement that all data and information collected, tabulated and evaluated be made available to the public. This is a necessary step to full public involvement. Information that is routinely made available to the public by best practice jurisdictions includes:
  - All local, regional and national inventory reports of PCBs in-service, in storage and that have been destroyed
  - All local, regional and national environmental monitoring reports prepared through the monitoring program
- In addition, best practice jurisdictions have built into their environmental legislation a clear statement that the public has the right to know and receive the following:
  - All initial and annual reports submitted by owners of in-service PCB equipment and materials
  - Reports from all storage sites submitted by owners of facilities storing PCB equipment and materials and PCB waste equipment and materials
  - Application and annual reports for all generators registering hazardous wastes, storage sites, decontamination, treatment and disposal facilities
- In best practice jurisdictions, the public is given the opportunity to review major applications for generator registers and storage, decontamination, treatment and disposal licenses. This opportunity extends to the right to review and comment on public policy that may affect the environment. The Stockholm Convention also recognized that there are special needs for disadvantaged groups such as women.
- The Policy Options Section of this report also identified that public recognition and disclosure are strong incentives for compliance. Posting results of prosecutions and of environmental leaders can have a strong and sustained effect.

Recommendations

31. Develop a public communications program that provides basic information on POPs and PCBs to the population. This program should also describe in easily understandable terms what the government is doing and what is expected of the regulated community and the public in general.

32. Require that all reports and data submitted to the provinces and the national Ministries and Agencies through the PCB regulation be made available to the public. Develop an on-line register where these data and information can be placed for easy public viewing

33. Require that all applications for PCB registers and PCB licenses submitted to the provincial DONREs and VEPA (that are not subject to the EIA) be made available for review and comment by the public before the registers or licenses are issued

34. Develop guidelines for the DONREs and VEPA that promote the use of specific outreach efforts and tools for women and other disadvantaged groups

35. Prepare outreach guidelines aimed at homeowners and electricians to describe electrical equipment that they may come in contact with. The guidelines would also provide advice on handling and disposal.

4.10. Capacity Building and Training

Vietnam has limited outreach and training programs in place for PCBs and hazardous wastes. Initial training was provided for national level staff and several DONREs when the hazardous waste regulations were first implemented. The Vietnam Canada Environment Program (VCEP) has developed the training program for this initial outreach to the provinces. There has been limited follow-up.

Policy Needs Assessment

- As described in the Policy Options section, compliance will only be achieved if there is broad awareness and understanding of the PCB regulatory provisions. The need for awareness and understanding goes beyond the regulated community. All those with responsibilities for aspects of the PCB management and disposal must have a detailed understanding of their responsibilities and how to achieve them. Indeed, government officials involved in conducting engineering assessments for licensing of facilities as well as inspectors and enforcement staff will need to be trained.
- Best practice jurisdictions have assessed the capacity of government officials involved in managing PCBs. These have included the capacity assessment of local, regional and national government institutions, managers and staff.
- Best practice jurisdictions have also designed and delivered tailored training programs for staff and decision makers that include the following courses:
  - The PCB regulation and requirements for compliance
  - Details on each of the technical guidelines and protocols
  - Hands on demonstrations and training for taking, preparing and shipping samples for analysis
- The team working with Breeze and Associates Inc. has extensive experience working at both the national and provincial levels in Vietnam developing hazardous waste strategies, regulations and building capacity. Based on this experience, capacity building and training will need to focus on three areas:
  - Training for decision makers and staff of those Ministries with responsibilities for PCB management.
  - Training of VEPA staff involved in key hazardous waste and PCB regulatory functions. Key functions that will require an initial focus are:
    - Engineering assessment and licensing for transportation, storage, treatment and disposal facilities
    - Inspection and enforcement
  - Training of DONRE staff involved in key hazardous waste and PCB regulatory functions. Key functions that will require an initial focus are:

- Evaluation of generator registers for HW and PCBs
- Engineering assessment of transportation systems and transfer facilities
- Inspection and enforcement
- Environmental monitoring

Recommendations

36. Develop a capacity development and training plan for government decision makers and staff. This plan should address both the national and provincial levels and should be integrated into broader hazardous waste training programs. At a minimum, the plan should address:

- Training for decision makers and staff at all Ministries with responsibilities for PCB management.
- Training for VEPA staff involved in:
  - Engineering assessment and licensing for transportation, storage, treatment and disposal facilities
  - Inspection and enforcement based on the protocol in Recommendation 25.
- Training for DONRE staff involved in:
  - Evaluation of generator registers for HW and PCB s
  - Engineering assessment of transportation systems and transfer facilities
  - Inspection and enforcement based on the protocol in Recommendation 25.
  - Environmental monitoring

4.11. Cost Recovery Mechanisms

The Desk Top Report did not identify any cost recovery mechanisms currently in place in Vietnam. The LEP, on the other hand, states that those responsible for damaging the environment must undertake remediation, provide compensation and be otherwise liable as prescribed by applicable regulations. At this point, no implementing policies are in place apart from the Vietnam Environmental Fund.

The Fund was set up 2002 as a financial instrument under the administration of MONRE and financial management of MOF. It is designed to mobilize domestic and international sources of finance to invest in environmental activities and to provide financial aid for programs and projects to prevent and mitigate environmental pollution.

Policy Needs Assessment

- Many best practice jurisdictions have found that the “polluter pays” principle is a core element of an environmentally sound management system for PCBs. Under this principle, owners are responsible for the full cost of managing and disposing of their PCBs. In this context, the full cost would include:
  - The cost to government to implement the PCB regulations and to oversee compliance
  - The cost to remove from service equipment that is leaking and is to be phased out
  - The cost of the clean-up of sites that have been contaminated with PCBs
  - The cost of storage, decontamination, treatment and disposal of waste PCB
  - The cost of any long term monitoring and care at sites that contained PCBs
- The Policy Options section of this report described three economic instruments that were being used by best practice jurisdictions to shift the costs to the polluter:
  - Liability measures to require that polluters clean-up after spills or other discharges.

- Bonds and other securities to require that potential polluters pay financial securities in advance where the risk of contamination is high and where there is the potential for the operator to abandon the site
- Charges for the full costs of both administration and waste management

- Cost recovery mechanisms and the polluter pays principle are usually part of broader environmental regulations in best practice jurisdictions. The terms of reference for this project however require that recommendations on the establishment of cost recovery mechanisms be made that address funding requirements for PCB management and disposal. The following recommendations are derived from the writers experience in these areas.

Recommendations

37. Establish a process to calculate:
- The full costs of PCB waste storage, treatment and disposal and that user fees be set to recover these costs
- The full costs of delivering government services and to set administrative fees for license to recover these costs

38. Develop a formula and a mechanism for allocating all costs across owners, operators and the general tax base. A decision will need to be made whether a financial subsidy will be provided to all, some or none of the existing PCB owners

39. Put the following economic instruments in place:
- Make all owners of PCB equipment and PCB materials responsible for the surveying, evaluation, taking out of service, retrofilling, decontaminating and storing of PCB equipment
- Make all owners of PCBs or operators of PCB sites liable for the full costs of contaminated site evaluation, clean-up, monitoring and perpetual care.
- Require that all operators of electrical utilities be liable for the site evaluation for all places where PCB equipment was used as well as contaminated site clean-up, monitoring and perpetual care

40. Utilize the Vietnam Environment Fund to assist in seeking national and donor funding to support implementation of key elements of the PCB regulations. A priority area would be clean-up of sites that have been contaminated with PCBs. This work should be coordinated with NIP Priority Project for POPs clean-up.

5. Roles and Responsibilities

The Desk Top Report found that 9 National level Ministries are involved in the implementation and management of the current PCB regulations. International best practices have shown that this overlap of program responsibilities will result in duplication of effort and inconsistency in program delivery. Best practice jurisdictions generally place environmental program responsibilities in the environment and natural resource agencies. They do this for several reasons:

- Delivering programs through several agencies will significantly increase the number of staff that has to be trained as well as the cost and time required to build capacity. In the end, this will divert staff from other priority activities.
- Adding environmental duties to the responsibilities of *sector specialists* will inevitably lead to *sector generalists.* Best practice jurisdictions recognize that staff can't be good at everything.
- Adding environmental abatement to the duties of sector specialists can create conflicts of interest. For example, staff involved in improving the efficiency and cost effectiveness of industry, may view environmental regulations as an unwarranted cost.

GOV has a tradition of delivering government programs through the sector Ministries and Agencies. As a result, there are significant roles for Ministries such as the Ministry of Industry in delivering hazardous substance and other environment programs. For example, MOI has been given the responsibility to take the lead and cooperate with sector Ministries in managing and controlling the use, transport and disposal of PCB equipment and PCB contaminated sites. These responsibilities are inconsistent with MONRE's responsibility for the uniform state management of hazardous wastes including waste PCBs.

There are a number of other significant areas where there is overlap and inconsistency between Ministries:

- The evaluation of technologies during the licensing process for treatment and disposal facilities is shared between MONRE and MOST
- Inspection powers are shared between MONRE, VEPA, MOI and DONRE for industrial facilities
- Standard setting powers for storage, treatment and disposal facilities are shared between MONRE, MOC, MOI and MOST
- The collection and analysis of data on hazardous wastes is shared between MONRE, MOI and MOC
- The listing and management of hazardous substances is shared between MOH and MOI

Table 3 of the Desk Top Report provides a summary of the functional responsibilities for PCBs of all Ministries and the major overlaps, gaps and inconsistencies.

The problem of overlapping responsibility in Vietnam extends well beyond environmental management. Sector Ministries have broad oversight and major responsibilities for the management of their clients. Changes to this arrangement will proceed slowly because of the potential disagreements that may arise between departments and the need to proceed cautiously to make sure there are no gaps in either responsibilities or competencies.

As a first step, it would be prudent to find a balance between Vietnam's tradition of delivering programs through multiple agencies and the need for effective coordination of the PCB program. In this first step, the overall responsibility for coordination of the new PCB policy framework could be given to MONRE and VEPA equivalent to those responsibilities they have for hazardous wastes. In addition, any new responsibilities

arising from the proposed PCB regulation would be granted to MONRE and VEPA. Based on recommendations in this report, these new responsibilities could include:

- Granting initial and annual registers for in-service PCBs and PCBs in storage
- Compiling annual statistics for PCBs that are in-service, in storage and destroyed
- Establishing equipment phase out and end of storage deadlines
- Establishing in-service PCB equipment and PCB material design and operating standards
- Inspecting and enforcing the new provisions

With this approach, none of the existing responsibilities currently with sector and line Ministries would be changed initially. MOI would continue to supervise, inspect and apply effective measures to compel HW generators to comply with the HW requirements. MOC would promulgate the rules and norms guiding the collection, transportation, treatment and disposal of HWs discharged from construction projects.

Taking a step by step approach would also ease implementation of the new PCB provisions. Ease of implementation is an important consideration given the timelines to achieve virtual elimination by 2028.

As a second step, the roles of MONRE and VEPA for the environmental management of PCBs and hazardous wastes would be predominant. In the longer term, MONRE and VEPA could be responsible for the following functions:

- Granting initial and annual registers for in-service PCBs and PCBs in storage
- Compiling annual statistics for PCBs that are in-service, in storage and destroyed
- Establishing equipment phase out and end of storage deadlines
- Establishing in-service PCB equipment and PCB material design and operating standards for all sectors
- Evaluating technologies as part of the licensing process for PCB and HW storage, transportation, treatment and disposal.
- Issuing generator registers and licenses for transportation, treatment and disposal
- Setting standards for the transportation, storage, treatment and disposal of PCBs and hazard wastes in cooperation with MOST
- Abatement and enforcement functions for all PCB and HW operations and facilities
- Establishing a monitoring program and a national inventory
- Setting contaminated site standards and managing site clean-ups

The responsibilities of the sector and line Ministries and Agencies would be accordingly reduced.

Recommendations

1. In the short term, give MONRE responsibility through a Prime Minister's regulation to exercise the uniform State management control over the "life cycle" of PCBs throughout the country and to organize and direct PCB management activities.
2. In the short term, give MONRE and VEPA the responsibility for the new provisions found in the proposed PCB regulation. These would include:
    - Granting initial and annual registers for in-service PCBs and PCBs in storage
    - Compiling annual statistics and preparing an inventory for all PCBs that are in-service, in storage and that have been destroyed
    - Establishing equipment phase out and end of storage deadlines
    - Establishing in-service PCB equipment and PCB material design and operating standards
    - Abatement and enforcement of the new provisions
    - Establishing a monitoring program for PCBs

3. In the longer term, develop and implement a transition plan that would move the remaining environmental responsibilities to MONRE and VEPA from the line and sector Ministries and Agencies.

6. Work Planning

The Project Proposal committed to a work plan for the development of the PCB Policy Framework recommended in the Final Report. The work plan attached to this report as Table 5 assumes that the planning can be completed and the PCB regulation promulgated by November 2008. Training and the preparation of background supporting technical material has been timed to support this date.

Tables

Table 1: Jurisdictional Review – PCB Regulatory Thresholds

	Stockholm Text (1)	UNEP (2)	Australia (3)	Canada (4)	Philippines (5)
Priority 1	Determined efforts for >100,000 mg/kg @ 5 L	>500 mg/kg	>100,000 mg/kg @ 50 grams	>500 mg/kg	>500 mg/kg
Priority 2	Determined Efforts for >500 mg/kg @5 L	>50 mg/kg	>50 mg/kg @ 50 grams	>50 mg/kg	>50 mg/kg
Priority 3	Endeavour for >50 mg/kg @0.05 L	>5 mg/kg	None Specified	None Specified	None Specified
PCB Free	None Specified	< 5 mg/kg	< 2 mg/kg	< 2 mg/kg for liquids < 50 mg/kg for solids	0 mg/kg

Table 2: Jurisdictional Review – Sensitive Site Definitions

	Stockholm Convention	Australia	Canada	The Philippines
Hospitals	Yes	Yes	Yes	Not Specified
Schools	Yes	Yes	Yes	Not Specified
Food and Feed Production	Yes	Yes	Yes	Not Specified
Senior Citizen Homes	No	No	Yes	Not Specified
Drinking Water Treatment	No	No	Yes	Not Specified
Potable Water Sources	No	Yes	No	Not Specified
Aquatic Spawning	No	Yes	No	Not Specified
Endangered Species	No	Yes	No	Not Specified

Table 3: Jurisdictional Review – Equipment Phase out Thresholds and Timing

	Stockholm Text	Australia	Canada	The Philippines
Priority 1	Determined Efforts (2025)	Concentrated PCBs in Sensitive Locations (5 years from promulgation)	> 500 mg/kg (3years after promulgation)	> 500 mg/kg (10 years after promulgation)
Priority 2	Determined Efforts (2025)	Concentrated PCB in Other Locations (8 years)	> 50 to 500 mg/kg in sensitive locations (3 years after promulgation)	> 50 mg/kg (10 years after promulgation)
Priority 3	Endeavour (2025)	Equipment with a 1% probability of > 50 mg/kg (13 years)	> 50 to 500 mg/kg on other locations (8 years after promulgation)	< 50 mg/kg (as they come out service)
Priority 4	None Specified	All other PCBs (15 plus years)	> 50 to 500 mg/kg for special consideration PCBs (2025)	None Specified
Priority 5	None Specified	Small equipment in households, etc. (when taken out of service)	None Specified	None Specified
End of Storage Deadlines	2028	1 year after coming out of service	1 year after coming out of service	2 years after coming out of storage

Table 4: Policy Needs Assessment - Summary Table

Vietnam Current Practice	Best Practice	Gap	Recommendations
Policy Framework			
27 policies	"Life cycle" policy frameworks Integrating regulation(s) Economic instruments / technical support Clear definitions	Life cycle gaps Inconsistent Overlap Limited support Limited compliance	1) Develop a "life cycle" policy framework 2) Develop integrating regulations with • *economic instruments* • *technical support* 3) Provide clear definitions • *PCB equipment* • *PCB materials*
Establishing Priorities			
No formal priorities	*Different priorities established:* *<u>Priority 1</u>* *> 100,000 mg/kg* *> 500 mg/kg* *<u>Priority 2</u>* *> 50 mg/kg* *<u>Priority 3</u>* *> 2 mg/kg* *> 5 mg/kg* *<u>PCB free</u>* *< 2 mg/kg* *< 5 mg/kg*	Priorities not yet established	4) Develop a practical, staged plan based on analysis of capacity 5) Plan should have: • *Thresholds for high risks* • *Definitions for sensitive sites* • *Set a balanced pace - 16 years* • *Be reviewed in 5 years* **6) As a starting point for discussion** • *Priority 1 - > 500mg/kg* • *Priority 2 > 50 mg/kg* • *Priority 3 > 5 mg/kg*

Vietnam Current Practice	Best Practice	Gap	Recommendations
			• *PCB Free < 5 mg/kg*
Priorities – Sensitive Sites			
No definition for sensitive sites for PCBs	Long list of sensitive sites: • *Hospitals* • *Schools* • *Food and feed* • *Senior's* • *Drinking water* • *Potable water* • *Aquatic spawning* • *Endangered species*	Sensitive sites not defined for PCBs	7) Develop a list of sensitive sites to meet Vietnam's needs based on: • *Analysis of capacity* • *National considerations*
Phase Out - Timelines			
No formal timelines	Phase out timelines range from 10 to 20+ years Increments for each priority range from 3 to 10 years	Timelines not yet set	7) Establish timelines starting with high concentrations / sensitive sites 7) Move incrementally from high to low with completion target of 2020 or 2025 **7) As a starting point for discussion**

Vietnam Current Practice	Best Practice	Gap	Recommendations
			• *Priority 1 (S) – 5 yrs* • *Priority 1 (Not S) – 9 yrs* • *Priority 2 (S) – 13 yrs* • *Remaining – 17 yrs (2025)*
Disposal Deadlines			
NIP sets disposal deadline as 2028	End of storage deadlines range from 1 to 2 years	No deadlines	**8) As a starting point for discussion** • *2 years for PCBs in storage when disposal facilities established* • *1 year for PCBs coming out of service after disposal facilities available*
Restrictions and Bans			
Restrictions: • *Import* • *Export* • *Municipal landfilling* • *Direct releases* • *Mixing / diluting*	Bans: • *Manufacture* • *Import* • *Mixing / diluting* • *Reuse / recycling* • *Dust suppression* • *Discharges to environment*	No bans: • *Import* • *Manufacture* • *Dust suppression* No restrictions: • *Reuse /*	**9) As a starting point for discussion** Bans: • *Manufacture* • *Imports (except for labs)* • *Dust suppression* Restrictions:

Vietnam Current Practice	Best Practice	Gap	Recommendations
	Restrictions: • *Export* • *Municipal landfilling (solids > 50 or liquids > 5)*	*recycling* • *Mixing / dilution (5 to 50 mg/kg)* • *Liquids in landfills (5 to 50 mg/kg)*	• *Export (with PIC)* • *Mixing / diluting (>5 mg/kg)* • *Reuse / recycling (>5 mg/kg)* • *Municipal landfilling (> 5 mg/kg for liquids)*
In-Service Equipment			
Several chemical regulations on: • *Chemical identification* • *Registration / declaration* • *Chemical safety* • *Inspection and reporting*	All regulate in-service equipment. • *Registration* • *Routine reporting* • *Repair / retrofilling* • *Storage* • *Worker safety* • *Monitoring / inspection*	Unclear how or when the chemical regulations apply to PCBs	10) Require registration 11) Require annual updates 12) Establish operating standards 13) Establish worker safety practices in technical guidelines 14) Establish standards for on-site storage 15) Develop two guidelines to support in-service regulations
PCB Waste Management			
Dec. 155, Dec. 23 and Cir. 12 in place "Cradle to grave" HW	Integrated HW and waste PCB "cradle to grave" requirements	Inconsistency between Dec. 155 and Dec 23 / Cir.12	16) Amend HW Reg's to ensure consistency 17) Define "out of service" as HW

Vietnam Current Practice	Best Practice	Gap	Recommendations
requirements	Supportive technical guidelines Financial guarantees for HW facilities	Few supporting guidelines Placarding / labeling inconsistent No financial guarantees for private facilities	18) Develop technical guidelines: • *Generator registration* • *Transfer, transportation and storage* • *Decontamination of transformers* 19) Amend technical guidelines: • *Dec. 60/2002, MOSTE* • *TCXDVN 320-2004, MOC* • *HW in Cement Kilns* 20) Require financial guarantees
Contaminated Sites			
LEP commitments • *Site ID* • *Measures to stop at source* • *Rehab* • *Compensation* NIP commitments • *Site ID* • *Clean-up of POP hot spots*	Comprehensive site ID and clean-up policies and programs Requirements for notification and rapid response	Few formal activities in place for site ID and clean-up No implementing provisions for rapid response and clean-up responsibility	21) Assign responsibility to owners: • *Notification* • *Studies* • *Leaking equipment* • *Action to stop discharges and clean-up* • *Compensation for effected parties* 22) Coordinate a PCB clean-up program with NIP POP commitments

Vietnam Current Practice	Best Practice	Gap	Recommendations
Policy Compliance			
Some inspection and enforcement efforts for HW Some technical support for: • *Industry* • *DONREs* Some resources New sanctions	Clear PCB regulations Technical guidelines for industry Visible inspection and enforcement Significant sanctions Protocols for inspection staff	Inconsistent regulations Limited technical support Limited resources / inspections Sanctions will not promote compliance	23) Develop outreach program • *Brochures* • *Ad's* • *Presentations* 24) Develop technical guidelines (See Rec. 18) 25) Develop inspection protocols and enforcement mechanisms 26) Provide necessary resources 27) Assess cost of compliance and increase sanctions to provide disincentives

Vietnam Current Practice	Best Practice	Gap	Recommendations
Environmental Monitoring			
More than a dozen monitoring initiatives undertaken NIP (PP #10) commits to building laboratory capacity VN with Korea on POPs database	Environmental monitoring programs for POPs and PCBs National monitoring programs for receiving environments	No formal program in place No formal database Uncertain laboratory capacity	28) Establish national program coordinated with NIP PP #10 and Korean initiative • *First round sampling in two years* • *Coordinate with ASEAN nations*
National Inventories			
HW data beginning to be collected Several one time PCB inventories undertaken Most extensive underway by EVN / Experco	Annual inventories: • *In-service* • *Phased out* • *Storage* • *Disposal* Annual analysis and submission of results	No routine submissions of "life cycle" data (see Rec. 10 and 11) No national "life cycle" inventory Limited analysis	29) Require tabulated reports by DONRE for submission to VEPA biannually 30) Require VEPA to consolidate and analyze for submission to PM, Minister and public
Public Involvement			

Vietnam Current Practice	Best Practice	Gap	Recommendations
LEP confers rights to individuals: • *EIA reports* • *Registered commitments* • *Lists of chemicals* • *Degraded sites* • *Waste plans*	Access to: • *Information* • *Decision making* • *Justice* Data available: • *Inventory reports* • *Monitoring reports* • *Reports from owners* Applications for new facilities / opportunities for involvement	Limited individual access to data collected Limited individual access to the decision making Limited individual access to justice	31) Develop communications program for POPs / PCBs 32) Require all reports available using on-line register 33) Require applications be available for comment 34) Develop guidelines for disadvantaged groups 35) Prepare outreach guidelines aimed at small sources
Capacity Building and Training			
Initial training provided at national and in selected provinces by VEPA through VCEP	Integrated HW and PCB training provided to all government staff involved in implementing the PCB regulations	Limited training provided for HW and no training for PCBs	36) Develop training for national / provincial levels as part of HW training: o Training for all Ministries with PCB responsibility o Training for VEPA in: o Engineering assessment / licensing o Inspection / enforcement o Training for DONRE in: o Generator registers

Vietnam Current Practice	Best Practice	Gap	Recommendations
			o Engineering assessment / licensing o Inspection and enforcement o Monitoring
Cost Recovery Mechanisms			
LEP - Polluters responsible for remediation, compensation VEF mobilizes funding from national and donor	Polluter pays principle is a core element	No implementing regulation for LEP principles	37) Establish a process to set: • *User fees for storage transportation, treatment and disposal* • *Administration fees for government costs* 38) Develop cost allocation formula 39) Put the following economic instruments in place to make: • *Owners responsible for mgt* • *Owners responsible for site clean-up* • *Electrical utilities responsible for system survey / mgt*
Roles and Responsibilities			
Line Ministries responsible for key aspects: • *HW* • *Chemical programs*	Environment agencies responsible	Overlapping responsibilities Inconsistent interpretations and compliance	1) In short term, give MONRE uniform State management for PCBs 2) In short term, give MONRE provisions proposed for new PCB regulation 3) In long term, consider a transition plan towards clear environmental responsibilities

Vietnam Current Practice	Best Practice	Gap	Recommendations

Table 5: Work Planning for the Policy, Regulatory and Legislative Framework

Project Goals	o Prevent new PCB contamination in the country o Closely monitor and eliminate PCBs to meet Stockholm Convention commitments				
Project Objective	o Develop a practical, phased policy framework that reflects available capacity and infrastructure				
Outputs / Activities	**Summary**	**Timing**	**Responsibilities**	**Indicators**	**Assumptions**
1) Develop a PCB inventory	o TOR for inventory o RFP issued o Contract awarded o Draft report o Final report	o Start April 2009 o Interim results October 2009 o Complete May 2010	o EVN lead o VEPA o DONREs	o Contract awarded o Qualified consultants hired o Interim report available for output 2)	o VEPA and EVN commitment o Resources available
2) Prepare an equipment phase out and elimination plan	o TOR established o Establish priorities o Define sensitive sites o Establish thresholds o Establish out of storage deadlines	o Start March 2010 o Consultation July 2010 o Final Plan Sept 2010	o VEPA lead o EVN o Line Ministries o DONREs	o TOR established o Thresholds and timelines set	o VEPA commitment o Line department and EVN time commitment o Resources available
3) Define requirements and standards for in-service equipment	o TOR established o Standards established o Guidelines prepared o Registration process defined	o Start Mar 2009 o Consultation July 2009 o Complete Dec 2009	o VEPA lead o EVN o MTI, MARD o DONREs	o TOR established o In-service component for PCB regulation developed	o VEPA commitment o Line department and EVN time commitment Resources available

Project Goals	o Prevent new PCB contamination in the country o Closely monitor and eliminate PCBs to meet Stockholm Convention commitments				
Project Objective	o Develop a practical, phased policy framework that reflects available capacity and infrastructure				
Outputs / Activities	**Summary**	**Timing**	**Responsibilities**	**Indicators**	**Assumptions**
4) Define changes to the HW regulations to accommodate PCBs	o TOR established o Changes defined o Instructions issued for regulatory change	o Start Mar 2009 o Consultation July 2009 o Complete Dec 2009	o VEPA lead o MONRE, MTI, MOH, o DONREs	o TOR established o Changes submitted to MOJ for drafting	o VEPA commitment o Line ministry and EVN time commitment Resources available
5) Define Ministry and Agency roles and responsibilities for PCBs	o TOR established o Interim roles defined	o Start Mar 2009 o Consultation July 2009 o Complete Dec 2009	o PM lead o VEPA, MONRE, MTI, MOH, MOF, MARD, MOJ o DONREs	o TOR established o Roles and responsibilities defined for PCB regulation	o VEPA commitment o Line Ministry commitment o Resources available
6) Prepare drafting instructions for the PCB and HW regulations	o Drafting instructions prepared o Regulations drafted o Regulation promulgated	o Start March 2010 o Instructions drafted Oct 2010 o Regulations drafted Dec 2010	o MOJ lead o VEPA, MONRE	o Regulation promulgated	o MOJ committed o Ministry support
7) Develop an inspection and enforcement program	o TOR established o Protocols developed o Curriculum developed o Training delivered	o Start March 2010 o Consultation Oct 2010 o Complete March 2011	o VEPA lead o EVN, MTI, MOJ o PPCs, DONREs o LPCs	o TOR established o # of requests for training o Inspectors trained	o VEPA and DONRE time commitment o Resources available o Regulation drafted
8) Develop and	o TOR established	o Start March	o VEPA lead	o TOR	o VEPA and

Project Goals	o Prevent new PCB contamination in the country o Closely monitor and eliminate PCBs to meet Stockholm Convention commitments				
Project Objective	o Develop a practical, phased policy framework that reflects available capacity and infrastructure				
Outputs / Activities	**Summary**	**Timing**	**Responsibilities**	**Indicators**	**Assumptions**
deliver an outreach and communications program	o Communications tools developed o Trainers trained o Outreach delivered	2010 o Consultation Oct 2010 o Complete March 2011	o PPCs, DONREs o LPCs	established o # of requests for information and speakers o # of events o # of mailings	DONRE time commitment o Resources available o Regulation drafted
9) Develop and deliver a government training program	o TOR established o Guidelines and protocols developed o Curriculum set o Trainers trained o Training underway	o Start March 2010 o Consultation Oct 2010 o Complete March 2011	o VEPA lead o DONREs o Government Departments o EVN	o TOR established o # of requests for training o # of staff trained	o VEPA and DONRE time commitment o Resources available o Trainers available o Regulation drafted
10) Establish a national monitoring program for POPs	o Coordination underway with POP PP #10	o Start March 2010 o Program consultation June 2010 o First monitoring Sept 2010	o VEPA lead o DONREs o EVN	o Agreement to work cooperatively reached o Monitoring underway	o VEPA commitment o Resources available
11) Establish a process to recover costs	o TOR established o Process established to set user	o Start March 2009 o Consultation	o MOF/ MPI leads o MONRE,	o TOR established o Fees and	o MOF commitment to “polluter pays”

Project Goals	o Prevent new PCB contamination in the country o Closely monitor and eliminate PCBs to meet Stockholm Convention commitments				
Project Objective	o Develop a practical, phased policy framework that reflects available capacity and infrastructure				
Outputs / Activities	**Summary**	**Timing**	**Responsibilities**	**Indicators**	**Assumptions**
	and admin fees o Cost allocation formula set o Fee collection processes in place o Auditing processes in place	July 2009 o Processes established Dec 2009	VEPA o PPCs, DONREs	allocation set o Fee collection underway o Auditing underway	o MONRE, VEPA commitment
12) Establish a process to evaluate PCB program implementation	o TOR established o Milestones, criteria established o Monitoring system established o Reporting system established o First report available	o Start March 2010 o Consultation Oct 2010 o Data collection underway March 2011 o First report June 2011	o MONRE lead o VEPA o PPCs, DONREs o LPCs	o TOR established o Monitoring system in place o First report available	o VEPA commitment to evaluate system performance o Resources available

Appendices

Appendix 1: Proposed Guidelines for the Classification and Registration of PCB Equipment, PCB Materials and PCB Stockpiles

Description:
The purpose of these guidelines would be to describe for all owners of electrical equipment, dielectric fluids and on-site stockpiles, the process they must follow to determine if they have PCB equipment, PCB materials or PCB stockpiles as defined by the regulations. The guidelines also describe how to complete the application form for the initial registration and for the annual registrations.

Content:
The guidelines would provide a step by step description of the registration form as well as a description of what and when to register, labeling, health, safety and storage requirements and disposal deadlines.
The guideline would also refer to other key resources and publications such as the Guideline for the Management, Repair, Retrofilling, Decontamination and Disposal of Transformers and Capacitors.

Models:

1. PCB inventory form: Instructions for filling-up the PCB inventory form (For Closed Applications), Environmental Management Bureau, Department of Environment and Natural Resources, Philippines, 2004

2. Annual Registration of PCB Holders: Guidance Notes, United Kingdom Environment Agency, 2005

Appendix 2: Proposed Protocol for Compliance Inspection of PCB Facilities

Description:
The purpose of this protocol is to give inspection staff clear guidance on the inspection of facilities that are managing, repairing, retrofilling, decontaminating or storing PCB equipment and PCB materials. The protocol would describe what is to be inspected, the criteria to be considered, abatement action if the criteria is exceeded and enforcement action to be taken.

Content:
The protocol should have the following sections:

- Introduction
- Description of a typical electrical generation and distribution system
    - Evaluation and initial response
    - Documents to be inspected
- Description of a typical transformer and capacitor repair, retrofilling, storage facility
    - Evaluation and initial response
    - Documents to be inspected
- Description of a typical decontamination facility
    - Evaluation and initial response
    - Documents to be inspected
- Prescribed abatement actions based on evaluation and inspection
- Prescribed enforcement actions based on evaluation and inspection

Models:

1. Compliance Guideline (Guideline F-2), Ontario Ministry of the Environment, October, 2001

Appendix 3: Proposed Guidelines for the Management, Repair, Retrofilling, Decontamination and Disposal of Transformers and Capacitors

Description:
This purpose of these guidelines would be to give owners of electrical utilities and owners of PCB equipment and materials direction on the appropriate techniques and procedures for managing PCB equipment and associated materials that are still in service or in an on-site storage facility. It would provide an integrated single reference for the complete management of electrical equipment.

Content:
The guidelines would have the following sections:

- Introduction
- Identification of PCB equipment and materials
- Properties of PCBs
- Description and management of PCB transformers and capacitors
- Equipment Repairs and Retrofilling
- Storage of PCB equipment and materials
- Decontamination procedures
- Decommissioning and disposal
- Occupational health and safety
- Environmental monitoring and contingency planning
- Resources and training

Models:

1. PCB Transformers and Capacitors from Management to Reclassification and Disposal, UNEP, May 2002
2. PCB Transformer Decontamination, Standards and Protocols, PN1205, Canadian Council of Ministers of the Environment, December, 1995
3. EVN Manual

Appendix 4: Research CD

Appendix 4 includes all of the research materials obtained through the web sites of best practice jurisdictions. It has been compiled on a CD and copies given to both the World Bank team and VEPA. Copies can either be obtained from either of these organizations or through Breeze and Associates Inc at bob.breeze@sympatico.ca.