EXECUTIVE SUMMARY

Based on existing and evolving evidence, Greenpeace and environmentally conscious citizens and citizen groups worldwide are pursuing the elimination of one class of chemical compounds - called Persistent Organic Pollutants (POPs). POP chemicals, for reasons explained below, are among the most dangerous of life-threatening substances created by humans. Therefore, all human- induced generation of these chemicals must be rapidly phased out.

All the well-known and established POPs are chlorinated compounds. These include: pesticides such as DDT, Hexa Chloro Cyclohexanes (HCH)[1], Aldrin, Dieldrin, Endrin, Chlordane, Heptachlor, Mirex and Toxaphene; industrial chemicals such as Poly Chlorinated Biphenyls (PCBs); and unwanted industrial by-products dioxins and furans.

While Western governments have already graduated from the stage of ignorance of the problem, to denial and, now, acknowledgement and action, policy makers and citizens in the developing world remains unaware of what these chemicals are and what they can do. Unfortunately, the producers of these chemicals have done little to warn their consumers. The fear of losing the last remaining markets for their products has significantly delayed the implementation of rapid phaseouts of POP chemicals and their sources.

This report is the result of a three-month investigation by Greenpeace of the status of POPs in seven countries in Asia. Currently, very little information exists in a compiled form regarding the most pressing POP problems in Asian countries. This conveys a false sense of security to policy makers in Asia.

Through this report, Greenpeace wishes to make the case that POPs present a particularly significant problem in Asia, which is perhaps the world's largest producer and consumer of many POPs chemicals.

POPs are known to have the potential to cause irreversible and debilitating damage on entire ecosystems and species populations, including humans. The threat is made even more significant by the fact that once released into the environment, these chemicals resist degradation by natural elements and persist in ecosystems and life forms for long durations of time.

The POPs generated by human activities have managed to contaminate even the remotest environments. Evidence of injury to some wildlife and human populations due to POPs leaves us with little doubt that unless immediate action is taken to eliminate all human-made POPs and their sources, the health of the human species and other life forms as a whole may be threatened.

"Both people and wildlife, everywhere in the world, carry body burdens of POPs at or near levels that can - and in some cases, clearly do - cause injury to human health and to entire ecosystems."[2] This means that the solution to global contamination lies in concerted international action to eliminate POPs from the planet. More than three decades of dedicated campaigning by scores of environmental and community activists and groups has finally resulted in the setting up of an international process under the United Nations Environment Program. With the right guidance, this process can pave the way for elimination of identified POPs chemicals and others that may be classified as POPs in the future.

We hope the right guidance will be provided by forward-thinking experts in the government and private sector and by the broad spectrum of citizens' groups and environmental organisations that continue to gather under the International POPs Elimination Network (IPEN).

IPEN argues that, "The goal of a global POPs convention must not be defined as the "better management of risks associated with POPs. " POPs represent more than just a "risk. " Indeed, they are a current source of significant injury to the biosphere -to humans, to wildlife and to entire ecosystems around the world. Because POPs by their very nature are unmanageable substances, the better management of POPs and POPs releases is not an appropriate goal for a global POPs convention.Rather the goals of a global convention should be to eliminate all POPs and POPs sources.

Business As Usual...in Asia

Chemicals now categorised as Persistent Organic Pollutants were black-listed in all western nations at least a decade ago. In Asia, a combination of factors has resulted 10 the continued production, trade, use and release into the environment of most of these chemicals.

A series of investigations by Greenpeace International in Pakistan, Nepal, India, Bangladesh, Thailand, Vietnam and the Philippines in 1998 revealed that:

- Manufacturing, trade and usage of many POPs chemicals continues unabated.
- Obsolete POP pesticides are stored in more than 1000 stockpiles in Nepal and Pakistan under highly hazardous conditions.
- Lack of awareness about handling PCBs in electrical equipment may create a dangerous situation during disposal. Even Thailand which understands the dangers of PCBs continues to store PCB containing equipment in unsound conditions.
- Hazardous activities of the past have left behind a legacy of poisons such as in South Vietnam where war-time spraying of Agent Orange by the US armed forces has contaminated entire districts. In the Philippines, several sites in former US military bases were found to be severely contaminated with toxic chemicals including PCBs, aldrin and other persistent organic pollutants.
- Asia is poised for a disturbing expansion of POPs-producing technologies such as incinerators, cement kilns retrofitted for hazardous waste burning, PVC manufactories, and pulp and paper mills.

The common thread in the hazardous POP situation in the eight Asian countries visited by Greenpeace is that in each country, citizens bear the environmental cost of POPs usage, manufacture or storage; citizens are likely to also bear the cost of its eventual disposal. Corporate accountability, extended producer responsibility and the principle of polluter pays are unheard of concepts in this region.

Some examples that demonstrate this -

- The obsolete pesticide stockpiles in Pakistan and Nepal contain chemicals from well-known chemical corporations such as Hoechst, Bayer, Shell, ICI, Velsicol, Dow, Rhone Poulenc and DuPont. Barring one instance in Pakistan where Bayer has agreed to reclaim and destroy stocks of Gusathion, none of the multinationals have come forward to accept their share of the responsibility. Meanwhile, the official position of most of the multinational companies as articulated by the Global Crop Protection Federation is that "Obsolete stocks are principally a government issue. It is clear that the principal responsibility lies with the last owner/purchaser."[3]

- Intensive promotion of DDT as the *pesticide of choice* for mosquito and other vector control led to large "donations" of this chemical to South Asian countries. Nepal, in particular, received DDT for its malaria program from the 1950s from the USAID. The USAID program was discontinued in the 1980s, nearly a decade after the chemical was banned in the US. Currently, one storage site in Southern Nepal houses 16 drums of date-expired DDT dust. Its origins are unknown but shouldn't be too difficult to find provided past records of bulk imports of DDT exist.

- Recent environmental studies commissioned by the Philippine Government confirm that the former US military bases in the Philippines are severely contaminated with persistent organic pollutants including PCBs, dieldrin, aldrin, chlordane, BHC and heptachlor. Newspaper articles in the local press report birth abnormalities and impaired intelligence among some children living near Clark. The US Government has categorically refused to be held liable for the damage to human health and environment near its former bases in the Philippines.

The POP problem in Asia -between the historic problem of stockpiles of obsolete pesticides and the continued production of POP chemicals or proposed expansion of POPs-producing technologies - is too large, complicated and expensive for individual Asian nations to handle.

The international process initiated by the United Nations Environment Program presents a suitable forum for Asian countries to air their concerns and recommend solutions.

Greenpeace urges Asian governments to participate actively in the UNEP process and to press for the adoption of the following principles -- explained in more detail in subsequent chapters -- during the ongoing POPs negotiations:

- **Polluter Pays and Corporate Responsibility:** This principle must be implemented beginning with the problem of historic contamination - stockpiles and hotspot areas. Application of this principle would, for instance, require the US Government to pay for the clean-up of the contaminated military bases in the Philippines.

- **Precautionary Principle**

- **Technological and other resource assistance** must be extended to developing country governments to phase out the remaining usage and generation of POPs, and in the identification and implementation of suitable non-chemical alternatives and systems.

- **Action Plan:** Any action on POPs must take into account the difficulty faced by developing country governments in implementing legislation. As a rule of thumb, a ban is more easily implementable than a restriction. Zero emission is easier to ensure than "regulated" emission.

- **Elimination of all POP sources:** If a substance is listed as a POP, all production and human-made sources of the substance should be eliminated in a rapid and systematic manner taking into account the specific requirements of developing countries.

In dealing with Persistent Organic Pollutants, Greenpeace advocates that:

- **For intentionally produced POP chemicals:** All production, usage and trade of intentionally produced POP chemicals be phased out in a rapid and orderly manner.

- **For POP chemicals such as dioxins and furans that are unintentionally produced during certain industrial activities or as a result of waste incineration:** The significant human-made sources of POP emissions should be identified and phased out.

- **For stockpiles of obsolete POP chemicals:** Immediate action should be taken to identify, inventory and contain obsolete POP chemicals. A system to similarly contain POP stocks that will, become obsolete over the coming years should also be set up. Finally, the stocks should be 1 disposed in a manner that do not give rise to other POP chemicals or pose a hazard to the environment or life in any manner.

Greenpeace has concluded that to afford adequate protection of both local and distant populations of humans and wildlife, the technologies, used for destroying stockpiles of persistent organic pollutants must meet the following fundamental performance criteria:[4]

1. **Destruction efficiencies of effectively 100 percent for the chemicals of concern:** The detennination of 100 percent destruction efficiency requires the absence of any detectable concentrations of the chemicals of concern in any and all residues, using the most sensitive analytical techniques available worldwide. Analyses of the residues must be carried out sufficiently frequently to ensure compliance with this criterion during startups, shutdowns and routine operations.

2. **Complete containment of all residues** for screening and, if necessary, reprocessing to ensure that no residues contain detectable levels of chemicals of concern or other harmful constituents, such as newly formed persistent organic pollutants or other hazardous substances.

3. **No uncontrolled releases.**

ENDNOTES

[1] Hexachlorocyclohexanes (HCH) are also referred to as BHC in South Asian countries. Technical grade HCH is an insecticide, which is comprised of a mixture of different isomeric forms of HCH. The approximate isomer content is alpha-HCH (53-70%); beta-HCH (3-14%); gamma-HCH (ll-18%); delta-HCH (6-10%); others (3-10%). The insecticide Lindane is the common name for the gamma isomer. Another compound that is often confused with BHC is Hexa Chlor Benzene (HCB). HCB has a variety of sources including its previous use as a fungicide for seed grain. It is produced as an unwanted by-product or impurity in the manufacture of chlorinated solvents, other chlorinated compounds such as vinyl chloride, and several pesticides. It is also produced as a by-product in waste streams of chloralkali plants and wood preserving plants, and in fly ash and flue gas effluents from municipal waste incinerators. Its main source in the environment today is from the manufacture of pesticides.

SOURCES: Allsopp M., Stringer R. and Johnston P. (June 1998). Unseen Poisons: Levels of Organochlorine Chemicals in Human Tissues. (GREENPEACE)

Foster W.G. (1995). The reproductive toxicology of Great Lakes Contaminants. Environmental Health Perspectives 103 (Suppl. 9): 63-69.

ASTDR (Agency for Toxic Substances and Disease Registry, US Public Health Service), (1997). Toxicological Profiles. CRC Press Inc.

[2] "Provisional Background Statement and POPs Elimination Platform, " International POPs Elimination Network, May 20, 1998.

[3] Global Crop Protection Forum (1997). Crop Protection Industry Position on Persistant (sic) Organic Pollutants. Internet: http://www.gcpf.org/pops.html

[4] Costner P. with Luscombe D. and Simpson M. (October 1998). Technical Criteria for the Destruction of Stockpiled Persistent Organic Pollutants. Greenpeace.

COUNTRY REPORT - THE PHILIPPINES

The Philippines faces a difficult problem in the storage and safe disposal of PCBs used in old transformers, many of which are still in use by the country's power generating units. The Philippines has no adequate treatment and disposal facility for hazardous wastes, and the standard practice by companies consists of illegal dumping, burning and in a few exceptional cases exporting the hazardous wastes abroad for incineration.

Pesticides

Almost all the POPs pesticides shortlisted by the UNEP have already been banned in the Philippines, with the exception of chlordane whose use is restricted to termite control purposes. Unfortunately, instead of having the desired effect of minimizing its use by the public, chlordane has become more accessible and can be purchased in any hardware store in the Philippines with very little trouble.

From time to time, reports surface about the continued sale and use in the countryside of some of the already banned pesticides. Authorities claim that illegal pesticides are available because of the smuggling of such substances into the country via the Southern backdoor from Indonesia or Malaysia.
The Philippine government has consistently brought to the attention of the UNEP, in the context of the POPs negotiations, the inclusion of endosulfan, also an organochlorine, in the list of POPs being targeted for international action.

This was after the Philippine government banned endosulfan, following recommendations from local technical experts which cite the pesticide as the country's leading cause of poisoning among agricultural workers. Such action was taken by the government in recognition of its own weakness and lack of infrastructure to monitor the purchase and application of the pesticide at the field level. Banning the pesticide and stopping its distribution in the market was therefore seen by the government as the only effective means of preventing the pesticide's adverse environmental and health effects.[1]

Implementation of this decision, though, was delayed by the multinational chemical company Hoechst which manufactured the Endosulfan formulation in question. Rather than act responsibly and in the interests of human and environmental health, chemical corporations have repeatedly sought to protect their profits at all costs. Such actions could negate and derail any positive POPs elimination programs in developing countries.

The same dynamic could also be seen in the case of the toxic legacy left behind by the United States in its former military bases in the Philippines. Several studies suggest that aside from serious contaminants like heavy metals and radioactive materials, these bases are also severely contaminated with several POP chemicals.

PCBs

The National Power Corporation (NAPOCOR), the largest power generating entity in the country, together with the National Electrification Authority (NEA), and provincial and city power generating utilities, have been pinpointed as the remaining and main repositories of PCBs in the country .A United Nations Development Programme (UNDP) funded study in 1996 estimates a total of 2,000 to 3,000 tonnes of PCB oil in the country still in use or in storage pending final disposal.[2]

The UNDP study also says that some PCB wastes have in the past been exported for high temperature incineration overseas, particularly in the Rechem hazardous waste facility in the United Kingdom. In 1996, for example, the Manila Electric Company (MERALCO) exported PCB oil from its abandoned Rockwell Power Plant in Makati, Metro Manila. The 15.5-hectare site of the Rockwell plant was being considered for re-development into a mixed residential and commercial zone, but environmental authorities refused to give clearance to the project unless the PCB contamination issue is addressed by the plant owners.

The site has since undergone initial clean-up operations costing about 15 million pesos (@$350,000 as per October 1998 exchange rates).

The company hired environmental consultants which found very high levels of PCBs in several places inside the facility. For example, high PCB concentrations in the soil ranging from 30,000 ppm to 45,000 ppm were found in certain localized areas inside the plant. Experts estimate that an additional 50 million pesos may be required to dispose of at least 2,000 cubic meters of PCB- contaminated soil now stockpiled in a temporary soil storage facility inside the plant.

The contamination at Rockwell is indicative of the poor and haphazard practices prevalent in many other old power plants in the country .The problem is further compounded by lack of awareness about the dangers of PCBs, despite the fact that their importation and use has been banned in the country since the 1980s. The Philippine Center for Investigative Journalism reports in a 1997 article that some local power cooperatives still burn their PCB waste, and that workers routinely dip their naked hands in PCB oil when repairing old and busted transformers.[3]

According to the same report, during the 1970s, some workers even used PCB oil as an insecticide in their homes. In some instances, leaking PCB containing transformers owned by NAPOCOR were given to private contractors who offered to dispose of the waste. While the exact fate of the PCB in these transformers remain unknown, they presumably ended up being dumped, burned, or re- used in recycled transformers.

Without question, the considerable amounts of PCB waste anticipated from the decommissioning of old transformers presents a huge problem for the state-owned NAPOCOR and other users of PCB oiled transformers and capacitors. However, instead of taking the responsible approach to this problem which is to inventory all PCB stocks in their facilities and provide for temporary safe storage for leaking transformers, the NAPOCOR has decided to adopt a reticent approach, by consistently evading all questions about its PCB stockpiles. It has even successfully managed to escape compliance from a Philippine law on toxic wastes and hazardous substances that requires firms to disclose information to the government on their inventory of toxic wastes and substances.

When Greenpeace approached NAPOCOR to inquire about its PCB inventory, company officials claimed they were doing something about the problem, but refused to divulge details. This is not reassuring especially in light of present plans by NAPOCOR to retire 14 old thermal power plants in the main island of Luzon and 20 similar plants nationwide. Moreover, current government plans to privatize NAPOCOR could motivate NAPOCOR to sweep the PCB problem under the rug, considering that the matter represents a tremendous liability that could chill investor interest in the company.

In regard to the eventual destruction of PCB oils and contaminated equipment and material, recommendations of international agencies also present cause for worry .A 1992 World Bank funded study on pollution control and industrial efficiency[4] and a 1995 European Commission supported study on hazardous waste management[5] both recommend the installation of an integrated, treatment, storage and disposal facility, including an incinerator, for hazardous wastes. A hazardous waste incinerator installed, even if not dedicated to destroying PCB wastes, will be seen by the local authorities as an easy way to "dispose" or treat PCB wastes.

A 1996 UNDP-funded study on PCBs recommended high temperature incineration including cement kiln incineration for the disposal of PCB waste.[6] This is particularly worrisome for the Philippines given the evolving evidence of contamination around similar facilities even in countries with stricter regulation such as the UK, France, Germany and Japan.

MAIN FINDINGS

The US Military's Toxic War Against the Philippines

After almost a century of military presence in its former colony, the United States was forced to withdraw from its military bases in the Philippines (Clark Air Base and Subic Naval Base) in 1991 after the Philippine Senate rejected an extension of the RP- US bases treaty in 1991. When the Americans left Clark and Subic, it soon became apparent that they also left behind a lethal legacy of toxic wastes brought about by their use, storage and disposal of hazardous materials including POPs such as PCBs and organochlorine pesticides.

A report made by the US General Accounting Office (GAO) in January 1992[7] revealed that the US military has failed to comply with its own environmental standards in its bases in the Philippines and that as a consequence, cleaning-up the damage left behind in both bases could reach Superfund proportions.

Other subsequent studies outline a preponderance of evidence suggesting serious environmental contamination in both bases which pose serious health risks to workers and communities.

More recently, the Philippine government which has undertaken extensive efforts to convert the former bases into flagship economic centers, commissioned environmental baseline studies in both Clark and Subic to determine the actual extent of contamination. The Clark study which was conducted by Weston International[8] reported that:

- high levels of the persistent pesticide dieldrin was found in four operational wells and two back-up wells inside Clark, fueling fears that the underground drinking water supply inside and outside the bases is also contaminated. The dieldrin contamination could be a result of breakdown of the organochlorine pesticide aldrin which may have been used in the golf course. The wells containing dieldrin are all located near or downgradient of the golf course;
- high levels of aldrin, dieldrin, lindane, chlordane, heptachlor and HCB were also found in the soil samples from several sites including a municipal landfill located near a residential area in the town of Mabalacat; an abandoned motor pool now used as a relocation site for evacuees of the Mt. Pinatubo volcanic eruption; in the old fire training area; and in the Civil Engineering Entomology center;
- elevated levels of PCB in soil were detected in the old decommissioned power plant and transformer sites, with one site recording a high of 7,800 parts per million.

The People's Task Force for a Bases Clean-up, a Manila-based NGO, has pushed for US responsibility in the clean-up of its former bases in the Philippines. According to this group, the Weston study, although limited in scope, amply validates fears of extensive contamination in Clark with the findings providing only a "window to a much bigger problem. " Meanwhile, communities living near the base continue to be exposed to highly poisonous pollutants. The findings of the study may also explain the high incidence of children born with abnormalities and impaired intelligence in the communities living near the bases.

In a letter to President Fidel Ramos, Dr. Rosalie Bertell, president of the International Institute of Concern for Public Health, asserted that "the level of kidney diseases and symptoms of kidney problems reported in this area is startlingly high."[9] The Institute is engaged in monitoring the health of over 700 households in the near vicinity of Clark.

The Philippine government has been very laid back in pushing the US to assume responsibility for the toxic wastes its forces left behind. Worse, Philippine base conversion authorities, especially during the term of President Fidel Ramos, have demonstrated a tendency to downplay the contamination problem, probably apprehensive of the possibility that this might scare away investors and locators in the former bases.

This propensity to downplay the problem is very obvious in the case of Subic where the Subic Bay Metropolitan Authority (SBMA) commissioned Woodward Clyde, an environmental consulting firm to do an environmental baseline study (EBS).[10]

The Woodward-Clyde study which was financed by a $650,000 loan from the World Bank did not identify widespread severe contamination in the former naval base. The base conversion authorities used these findings to describe the problem in Subic as "minimal."

However, a subsequent review of the Woodward-Clyde study undertaken by Clearwater Revival Company (CRC), an American based environmental consulting firm with expertise in toxic waste remediation and base conversion issues stated that "the EBS does not accurately characterize contamination at the Subic Bay Freeport Zone, and the potential for adverse impacts to human health and the environment."[11] Describing the report as "terribly designed", Dr. Paul Bloom, a noted soil scientist identified with the United States Working Group for Philippine Bases Clean-up, said that the EBS "was an attempt to spend the most amount of money to produce the least amount of results."

Among other issues, CRC said that the study done by Woodward-Clyde fails in its objective to establish a baseline for environmental quality because it did not assess all areas of the Freeport Zone, especially those that had been previously determined to be contaminated such as housing areas and hazardous materials storage areas where the presence of PCBs, pesticides, lead, unexploded ordnance, and oil had been identified.

The baseline study also failed to measure contaminants in the former naval base's sewer system where hazardous materials such as chlorinated solvents, PCBs, and contaminated solids were reportedly discharged by the US Navy in the past. It also failed to look into the environmental consequences of the bumming of hazardous wastes and their use as fuels in the incinerator and old power stations inside the facility .No testing for dioxins and other bioaccummulative substances has been done in or near these identified areas.

There are many other omissions in the Woodward-Clyde study -most of which are failures to investigate and account for recorded pollutive practices by the US Navy in Subic. Retired Admiral Eugene Carroll, a 37 -year US Navy Veteran who used to command US carriers and battleships into Subic referred to such dirty practices when he admitted how the US Navy was "endlessly producing industrial toxic chemicals and discarding them without due regard for the pollution (in Subic)."

In a 1992 article published by the Philippine Center for Investigative Journalism (PCIJ),[12] Carroll recalls how the US Navy routinely flushed and left behind trails of waste and toxic materials in the process of ship repair. The PCIJ article also revealed the double standard applied by the US, particularly in the use of PCBs in transformers which have been banned in the US since 1976. Filipino base workers said they dealt with PCB-contaminated material without adequate protection, with the knowledge of their American superiors.

To date, the official American response to this issue has been that of denial, stressing at every turn that it is under no legal obligation to pay and provide for the clean-up of its former bases in the Philippines, even though it has paid and conducted full remediation of its other bases in Europe and Japan. As elsewhere, and especially in poor countries, polluters, the US government in this case, should pay.

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[1] Philippine Case Study: A Developing Country's Perspective on Persistent Organic Pollutants, paper presented by the Philippine government during the Intergovernmental Forum on Chemical Safety (IFCS) Experts Meeting on POPs, 17-19 July 1996, Manila, Philippines.

[2] Graham, R., Polychlorinated Biphenyl (PCB) Waste Management and Land Contamination in the Philippines, UNDP, 8 November 1996.

[3] Tielens, C., and Severino, H., "Napocor's Dirty Secret", Philippine Center for investigative Journalism , March 17, 1997.

[4] MEIP/ Industrial Efficiency and Pollution Control (IEPC) programme. Final Report of Metro Manila Study, Metropolitan Environmental Improvement Program., World Bank, 1992.

[5] Entec Europe Ltd., Toxic and Hazardous Waste Management Project: Phase 1 report to the Government of the Philippines, Commission of the European Communities, September 1995.

[6] Graham, R. UNDP (1996).

[7] "Military Base Closures: US Financial Obligations in the Philippines," U.S. General Accounting Office (GAO/NSIAD-92-51, January 1992).

[8] Soil and Baseline Study Report., prepared by Weston International for the Clark Development Corporation, Philippines, August 1997.

[9] Letter written by Dr. Rosalie Bertell to President Fidel Ramos and the People's Task Force for Bases Clean- up dated October 9, 1997.

[10] Environmental Baseline Study, Final Report prepared by Woodward-Clyde for the Subic Bay Metropolitan Authority, Olongapo City, Philippines, August 1996.

[11] Environmental Baseline Survey of Former United States Navy Installation, Subic bay, Philippines; An Arc Ecology Technical Review produced for the People's Task Force for Bases Clean-up, with analysis provided by the Clearwater Revival Company (CRC), 1998.

[12] Pimentel, B., and Lasola, L., "Toxic Sunset", Philippine Center for Investigative Journalism, November 1992.

COUNTRY REPORT – THAILAND

As of 1996, Thailand had banned all shortlisted POPs pesticides. However, chlordane, which was banned in 1996, was available in the markets in Chiang Mai as recently as August 1998. A government source who wished to remain anonymous indicated that the Thai Armed Forces still has stocks of old DDT, especially in the densely forested border areas. If this is indeed the case, immediate inventorying and containment of the old stocks must be conducted in order to avoid escape into the environment.

According to one source, many of the banned pesticides including DDT and BHC are freely used in the uplands near Chiang Mai in Northern Thailand. According to this source, some of these pesticides come in packaging with Chinese marking via the Thai-Myanmar border.[1]

Moreover, at least 12.5 tonnes of Aldrin and 20 tonnes of hexachlorocyclohexane (HCH) are known to have been exported to Thailand from-India in 1997-98.[2]

Obsolete Pesticides

Approximately one ton of various pesticides including some organochlorine chemicals are stored in a shed in the premises of the Agricultural Toxics Substances Division in Kasetsart University. According to the director of the Division's Pesticides Research Laboratory, Khun Nualsri, the pesticides are leftovers from samples taken from the market for quality verification. Every year, nearly 1 ton of pesticides accumulates with the Division.[3]

The pesticides, stored in a shed, with metal grills in the place of two walls, are located within the University campus near areas frequented by large numbers of students and other visitors. The pesticides and their containers seemed to be in good condition and showed no visible signs of leakage. However, given the sensitivity of the area where they are currently stored, it is advisable to immediately contain them and remove them to a less populated area to await eventual disposal.
Currently, a proposal is in the pipeline to avail of GTZ assistance for a 1 ton/year incinerator. No further details were available regarding this proposal.

The staff at the division were not clear as to the disposal method used for earlier stocks. Nualsri, however, indicated that "two-to-three years ago," a stock of similarly accumulated pesticides were disposed of by burial at an agriculture experimental station in Uttaradit in Sukhothai. Burial, particularly for persistent substances, is an ineffective method of containment. "Constituents in buried wastes can and do escape into the surrounding environment, primarily through leaching into groundwater and volatilising into the air."[4]

According to the United Nations Food and Agricultural Organisation (FAO), "Many countries that buried pesticides in the past are now experiencing severe environmental contamination and facing huge costs to recover the pesticides and to mitigate damage to the environment and public health."[5]

Given the facts, the burial site in Uttaradit could be a potential POPs hotspot, and very likely a source of pesticide contamination in nearby areas.

PCBs

PCBs were banned for use in 1975. However, some government sources say that PCBs may still be imported for industrial use or as part of industrial equipment.[6]

Thailand already recognises the PCB-containing or contaminated electrical equipment in its electric utility to be a "major existing hazardous waste of concern."[7] Thailand's electrification program, driven by the World Bank-funded Electricity Generating Authority of Thailand (EGAT), has relied heavily on imports of equipment from Northern countries. Fortunately, Thai authorities are in a position to identify at least some of the equipment which contain or may have contained PCB oils.

MAIN FINDINGS

PCB Wastes: Where there's a Will, but no Way

In July 1998, Greenpeace identified a site storing old transformers and capacitors in the Bangyai branch of the Metropolitan Electricity Authority, Bangkok. Although it was not possible to verify whether the equipment used to contain PCBs, at least some of the equipment were specially marked with a red dot. The storage was in the open and most of the equipment were fully or partially drained. There were visible signs of leakage around some equipment. If this site does contain PCBs, it could be a very significant point source for PCBs. Volatilisation of PCBs from storage sites is particularly problematic in tropical climates.

This was verified by Watanabe et al[8] at a storage site in Bangkok for PCB-containing transformers and capacitors owned by the Electricity Generating Authority of Thailand. Immediately downwind of the storage site, the average PCB concentration in the air was 280 nanograms per cubic meter (ng/m3). The PCB concentration was 570 ng/m3 some 5 meters upwind. These levels are roughly 1000 times greater than those measured in urban air in the United Kingdom[9] and from 15,000 to 48,000 times greater than those measured in the Arctic air.[10]

This site, we were told, no longer exists. The contents of this site were reportedly removed to an unknown location, and the site, which is likely to be contaminated, was currently being used to stored equipment and material for highways construction. We were unable to investigate these transformers. All the PCB-containing transformers and capacitors -some of which are still in use -are either in the custody of the EGAT, the Provincial Electricity Authority (PEA) or the Metropolitan Electricity Authority (MEA). The latter, which is responsible for electricity distribution in the Bangkok metropolitan region, has reportedly removed all PCB-containing capacitors from service and has stored them in steel containers awaiting disposal.[11] The PEA estimates that a further 30,000 transformers and capacitors could be potentially contaminated.

A 1987 inventory conducted by EGAT and the PEA provides the only available estimate of the quantity of PCBs and PCB-contaminated electrical equipment in Thailand.

PCB Containing Transformers Owned By EGAT

In Operation	Spares	Retired	Total
1165	188	534	1887

Source: EGAT (1987)

PCB Oil in EGAT Transformers (Askarel)

Number of Transformers	Askarel Content (liters)
33	45,060

Source: EGAT (1987)

PCB-contaminated equipment (in tons)

Equipment	EGAT	MEA	PEA	TOTAL
Large transformer	148	-	-	148
Small transformer	-	8	2020	2028
Capacitors	188	6	98	292
Total	336	14	2118	2468

Source: EGAT (1987)

A portion of these wastes have already been disposed in offshore facilities. According to Boon-Long, Thailand exported 153 tons of PCB wastes to EMC Service in France. The EGA T exported 240 tons during 1994-1996; the MEA shipped 166 tons in 1994 to France; and Ekarat Engineering Co. Ltd exported 30 tons in 1996 to a hazardous waste facility in the UK.

[1] Interview with Sirin Virajsirin, Northern Regional Environmental Office, Chiang Mai, 25.7.98.

[2] Source: Chemexcil, Mumbai, and Informant database, Mumbai.

[3] Interview with Khun Nualsri, Director, Pesticides Research Laboratory, Kasetsart University, Bangkok, 23.7.98.

[4] Costner P. with inputs from Luscombe D. and Simpson M. (October 1998). Technical Criteria for the Destruction of Stockpiled Persistent Organic Pollutants. Greenpeace.

[5] United Nations Food and Agricultural Organisation. (1996). Disposal of Bulk Quantities of Obsolete Pesticides in Developing Countries.

[6] Interview with Dr. Jarupong Boonlong, Pollution Control Department, Bangkok, July 1998.

[7] Interview with Dr. Monthip Tabucanon, Environmental Quality Promotion Department, Bangkok, 27.7.98.

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COUNTRY REPORT – VIETNAM

All the POPs pesticides shortlisted by the UNEP have already been banned in Vietnam since 1992, although government authorities acknowledge the possibility of illegal entry into the country of some of these banned pesticides through its porous borders shared with China, Cambodia, and Laos. Prior to the enactment of the Regulation on Pesticide Registration which established effective controls for the importation and use of pesticides in Vietnam, the country imported its pesticides from the former USSR, China, and Eastern Europe.

More than pesticides, a key concern among government authorities is the proper management and disposal of PCB stocks, particularly in old transformers decaying in the country's aging power stations. PCB wastes, according to government officials have in the past been routinely discharged into the environment as a consequence of transformer repair, recycling and maintenance operations. It is estimated that total PCBs and contaminated equipment in Vietnam could fall between 27,000 to 30,000 tons.[1]

As a consequence of poor management and disposal practices, PCBs, long banned for importation into Vietnam, have been detected in soils in dumping sites (73.285 ppm) and a former power plant site (18.81 ppm) in Hanoi.[2]

But without doubt the greatest threat from persistent pollutants being faced by Vietnam would still be the legacy of widespread dioxin contamination especially in the South as a direct result of American herbicide spraying operations during the Second Indochina War (between 1961 to 1975). More than two decades after the war, the impacts on the environment and human health of the dioxin-tainted Agent Orange continue to be felt in Vietnam.

MAIN FINDINGS

Toxic Legacies of an Irresponsible Superpower

An estimated 72 million liters of herbicides were sprayed by the United States in wide areas in South Vietnam during the "Vietnam" war under its Operation Ranch Hand, which consisted of defoliation missions and forest destruction operations designed to cut off food supplies to Vietnamese soldiers, expose their lairs, and clear vegetation along river channels to facilitate entry of US supply ships to Ho Chi Minh city.

Of the total amounts of herbicides used by the US, Agent Orange accounted for 60% or around 42 million liters.[3] The dioxin content of Agent Orange, a mixture of the herbicides 2,4,5-T and 2,4-D, averaged 3.83 g/cubic meter, although some batches contained 10 and 20 times this amount.[4] On this basis, it is estimated that a total of 170 kg of dioxin was released into the environment in the South of Vietnam during the war.[5]

The enormous amounts of dioxin-tainted herbicides sprayed in Vietnam has converted extensive forest and agricultural patches in the South into virtual laboratories where consequences of dioxin exposure are apparent to this day. Indeed, more than twenty years after the war, evidence remains of widespread disruption and degradation of productive ecosystems as well as of continuing human health complications. Many of the health effects have begun to manifest themselves in the offspring of Vietnamese who were exposed to Agent Orange.

According to a World Bank report on Vietnam, estimates concerning the extent of land damaged by the war range from 100,000 hectares to 2 million hectares.[6] The loss of forest resources, biodiversity erosion and destruction of agricultural lands are identified as direct consequences of the defoliation operations.

Spraying operations went hand in hand with bombing missions whose direct outcome aside from killing people was the formation of huge craters which eventually became breeding grounds for malaria carrying mosquitoes. Consequently, this led to greater use of DDT in the country .In some instances, the American military dumped entire payloads of pesticides exposing limited areas to high dosages. This practice took place some 50 times during the war, 30 of which involved Agent Orange.[7]

Because dioxins, like other persistent poisons travel through the environment and build up in the food chain, consumption of dioxin-tainted food represented an additional exposure route to residents of South Vietnam. Tests conducted between the period 1985 to 1987 on food and wildlife samples collected in markets in Southern Vietnam confirm elevated high levels of dioxins.[8]

Several epidemiological studies have already been done by Vietnamese and foreign scientists to show human health problems believed to be linked to Agent Orange exposure. The evidence presented by these studies establish among others that higher rates of liver cancer, soft tissue sarcoma, choriocarcinoma is more commonly observed in people living in sprayed areas as well as in North Vietnam war veterans exposed to Agent Orange. Moreover, the rates of abnormalities during pregnancies (e.g. miscarriages, stillbirths, birth defects, and hyditiform mole) were higher in people living in sprayed areas as well as in families of exposed war veterans.[9]

Of serious concern are dioxin levels found in breast milk, and blood. In breast milk samples collected among lactating women in sprayed areas of South Vietnam, the levels of dioxin have decreased from up to 1450 parts per trillion (ppt) in the 1970s to the 19931evel of about 10-20 ppt.

However, these levels of dioxin concentration in breast milk are still much higher than those found in breast milk from the non-sprayed areas of North Vietnam and exceeds values in industrialized countries by 3 to 8 times.[10]

In another study, all blood samples taken in the South had higher levels of dioxin than the ones taken in the North.[11] The study showed a correlation between dioxin levels in the blood taken in adults living for a long time in a given area and the quantity of Agent Orange sprayed.

As evidence worldwide mounts on the real effects of dioxin – which the WHO classifies as a human carcinogen and which is considered by the US Environmental Protection Agency (EPA) in its latest re-assessment of dioxin to be 200,000 times more lethal than DDT – the connection between the spraying of Agent Orange and the impacts on exposed Vietnamese and American war veterans will become much clearer.

In the final analysis, the burden of compensating people for the damage to the environment and human health brought about by the actions of the US military, should be made to fall on the US government and the manufacturers of Agent Orange including Diamond Shamrock Chemicals Company, Occidental Chemical Corporation, Dow Chemical Company, Monsanto, Uniroyal, Inc., Hercules, Inc. and the Thompson Hayward Chemical Co.

The World Bank, however, maintains that "although there is documented evidence of increased dioxin levels in Vietnamese from many parts of the country, no definitive association has been shown with the wartime application of herbicides." Admitting helplessness about Vietnam's problem, the Bank then states that "other than continuing to support research, there is little that can be done specifically for this problem."[12]

It is hoped that the World Bank disposition on this matter is not indicative of the attitude of the US government. Because if that is the case, the world is likely to witness yet another massive cover-up of one of the biggest crimes against the environment and humanity.

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[1] Do Tham Bai and Pham Hung Viet, "Contamination by Transformer Oil PCBs and Risk Assessment, " paper delivered for Ecological Risk Assessment conference sponsored by UNIDO, South Korea, April 1998.

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[3] Known herbicide expenditures against South Viet Nam from 1961 to 1971 were 70.72 million liters -of which approx. 60% was Agent Orange, according to Westing. The most commonly quoted figure is 72 mil. L which includes Cambodian and Laos missions)

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CONCLUSIONS AND RECOMMENDATIONS

The problem of POPs pollution in Asia – be it the historic problem of obsolete pesticides or of continued production of persistent chemicals, or proposed expansion of POPs producing technologies – is too large, complicated and expensive for individual Asian nations to handle. International action that stresses shared responsibilities among countries is the only effective way to deal with a problem with such transboundary implications.

The ongoing international process under the UNEP umbrella to create a legally-binding instrument to eliminate POPs presents a suitable fora for Asian countries to develop the necessary wherewithal to deal with their existing POPs problems. However, it is important to bear in mind that while governments are responsible for taking action against POPs contamination, the liabilities associated with such action must always fall on the polluter and not on the citizens, who have already endured the consequences of toxics pollution.

Any action on POPs must take into account the difficulties faced by developing country governments, especially in the provision of financial and technical resources to deal with POPs pollution and the availability of non-chemical alternatives for certain remaining uses of POPs. An orderly, equitable and just transition must be ensured as alternatives to POPs are introduced. In some cases, financial and technical assistance will be required to enable technology transfer, or to help build the capacity to employ clean methods for crop protection, vector control, the production of goods and/or the destruction of POP stockpiles.

Moreover, the emerging instrument must include and promote strategies that would encourage the implementation of clean production worldwide, enable developing countries to stop POPs pollution within their borders, and prevent the transfer of the Western POPs producing industrial model to industrializing countries. A schizophrenic situation where POPs sources are being eliminated in one part of the globe and promoted in another is untenable and should not be allowed to continue. In short, a global POPs agreement must facilitate the transition to clean production on a global scale and prevent the migration of dirty technologies from rich to poor countries. Developing countries should be given the opportunity and the wherewithal to by-pass dirty technologies and material, and build an economy reliant on clean and sustainable products and processes.

Agenda 21 explicitly calls for: "the phasing out or banning of toxic chemicals that pose an unreasonable and otherwise unmanageable risk to human health and the environment, including those that are toxic, persistent and bioaccummulative and whose use cannot be adequately controlled. " On this basis, the goal of the emerging POPs Convention must be that of elimination. Concretely this would entail the following:

1. For intentionally produced POPs chemicals such as pesticides, all production, usage and trade must be phased-out in a rapid and orderly manner, taking into account the specific requirements of developing countries;

2. For stockpiles of obsolete POP chemicals, immediate action should be taken to identify, inventory and contain them. Disposal of POPs stockpiles should be done in a manner that does not give rise to other POP chemicals or pose a hazard to the environment and human health. Systems and technologies for the safe de-toxification of chemicals must be designed to be closed-loop and avoid the release of POPs and other toxic chemicals into the environment. Organochlorines must not be allowed, under any circumstances, to be dispersed into the environment through direct dumping or the use of dangerous and inadequate disposal technologies such as incineration.

3. Secure storage of POP stockpiles must be considered the first step in a comprehensive program to identify and develop suitable and safe de-toxification methods. Secure storage would entail the institution of high security measures; a system that would allow monitoring and retrieval of chemicals in storage; zero emissions to water, soil, and atmosphere; rigorous and routine inspections; and an emergency response program.

4. Storage facilities must be designed with a view to facilitate future methods of detoxification. More importantly, original producers of banned chemicals, where they can be traced, must be liable for the storage, collection, and disposal and the full cost of the entire de-toxification program.

5. For identified POP hotspots or contaminated sites, polluters must be made to shoulder the responsibility for their proper clean-up and remediation. The POPs instrument should have a mechanism to ensure that polluters, be they governments of corporations, face-up to their moral obligation to assist victim communities in cleaning-up contaminated sites;

6. For POPs, such as dioxins and furans and HCBs, which are unintentional by-products of certain processes and activities, all significant human-made sources should be identified and phased-out either through process changes, or by product substitution in the case of material like PVC plastic. In this regard, industrial and waste disposal practices that generate dioxin and other persistent pollutants should be changed or replaced with dioxin-free processes. Chlorine-free bleaching should replace chlorine-based bleaching technologies. Waste incineration should be avoided. Chlorine-containing feedstocks in industrial processes should be replaced with cleaner substitutes.

Recommendations

Greenpeace believes that in the long run, the success of the global POPs elimination strategy lies in the embodiment and elaboration of the following principles in emerging international processes and instruments on POPs:

Polluter Pays and Extended Producer Responsibility

This applies particularly to the problem of stockpiled pesticides and PCB-containing electrical equipment. Most of the stockpiled pesticides and PCB-containing equipment were imported into Asia over the last five decades. Producers of the pesticides, PCBs and PCB-containing equipment are morally and financially liable to pay for the clean -up of pollution caused by their operations.

Corporations who have profited from the production and sale of POPs must be made accountable/ liable for the toxic legacies of their commercial practice by -financing and carrying out the proper inventorying, containment and disposal of obsolete pesticides, and the clean-up of contaminated sites.

Extended producer or corporate responsibility is the application of the polluter pays principle to products. In concrete terms, it means the producers (which may include importers and retailers) must participate directly in the management of their products once the latter reach the end of their useful life. This would have the effect of integrating the full social and environmental costs into production processes. Simply put, the responsibility for waste problems associated with products rests with their producers. Measures to achieve waste reduction should become part of an overall materials policy focusing on the life cycles of products and their constituent materials. EPR goes hand-in hand with the phasing out of hazardous materials that pose unacceptable risks to the environment and human health such as chlorinated pesticides and PVC.

Pollution Prevention and the Preventative Approach

New chemicals released into the market should be screened to ensure that they are not POPs or do not generate a POP during their manufacture, use or disposal. The burden of proof should lie on those who stand to gain from the production and marketing of the chemical or product. Phasing- out a chemical or production process once it is released is economically and politically expensive, particularly in developing countries. Adopting the precautionary principle and reversing the burden of proof would protect developing country governments.

In light of this concern, particular attention must be paid to the proposed expansion of PVC manufacturing, waste incineration, chlorinated pulp and paper bleaching processes, and other products of chlorine chemistry. Armed with the knowledge of the potential effects of such technologies, governments in Asia are now obliged to inform their citizens of the kinds of industries being promoted in the country and to take anticipatory action to prevent the expansion of POPs-producing technologies.

The precautionary principle requires that materials should not be discharged unless it can be established that they will have no negative impact on the environment. This approach also recognises the "limitations of scientific knowledge in determining if the use of a chemical or an industrial activity should proceed. " Rather than ignore science, the precautionary approach suggests that industrial production also has social and health impacts, and that other public decision makers – not just scientists – must be involved.

This approach avoids the problems and limitations of our understanding of toxicology by removing the assumption of a safe level of a particular compound in the environment. Applied to POPS, international action must be based on the understanding that the global ecosystem has in reality, no (zero) capacity to deal with POPs originating out of human activities.

Effective global action on POPs, therefore, must have as its ultimate goal the cessation of production and/or generation of all anthropogenic POPs. Environmental management approaches or end-of- pipe pollution control measures are not applicable to POPs.

Despite the overwhelming evidence, the chemical industry continues to emphasise risk management exercises. "Once a chemical has been determined to be a POP, the procedures of risk management must be proposed to reduce the risk to an acceptable level. These procedures should include all available management options and must be cost-effective. Proposals for substitution, ban or phase-out must be considered as a last resort" according to the Global Crop Protection Federation, an association of multinational companies manufacturing pest and weed-killing chemicals.

However, with what is known about the hazards of POP chemicals, the industry's position amounts to a call for a grand biological experiment with the world's population of humans and other species as guinea pigs.

The preventative approach to pollution maintains that it is cheaper to prevent environmental damage than to attempt to manage or 'cure' it. Prevention requires going upstream in the production process to prevent the source of the problem instead of attempting damage control downstream. Pollution prevention replaces pollution control.

Right To Know

One of the key problems confronting pollution prevention and toxic reductions is the lack of information. In Asia, very little information is available on toxic waste being generated and released by industrial operations. Despite the disastrous gas leak at Union Carbide's pesticide factory in Bhopal in December 1984, Bhopal residents are denied access to even information concerning the quality of groundwater surrounding the Carbide's killer factory.

Communities have no idea what poisons they are being exposed to. Without this information, communities cannot assess the true risks of specific industrial operations to the environment and human health. Armed with information, public participation is a powerful catalyst for the adoption of cleaner production methods. Governments are key in ensuring public access to information by providing the legal framework and the corresponding mechanisms that would support disclosure of information, mandatory reporting of environmental information, and free access to data. The institution of a national toxic use and release inventory, for one, would not only assist governments to identify POPs and other toxic pollution sources -but would also help put pressure on polluting companies to reduce and eventually abandon the use of toxic chemicals in their operations.

Clean Production

In the end, the ultimate goal should be to achieve clean production which is non-toxic, free of hazardous waste, energy efficient, and socially useful. Clean production implements the Precautionary Principle and acknowledges the need for public participation in political and economic decision-making. Clean production assures us of our fundamental right to a safe, healthy and toxics-free future.

Greenpeace Policy on Management and De-toxification of POPs and other Organochlorine Chemicals

No Incineration: Organochlorines must not be allowed under any circumstances, to be dispersed into the environment through direct dumping or the use of dangerous and inadequate disposal technologies such as incineration.

Secure Storage: Secure storage of toxic waste must be considered the first step in a comprehensive program to identify and develop suitable and safe de-toxification for individual waste streams. Secure storage is defined as a place where segregated waste streams are stored in purpose built, above ground facilities which incorporate:

- high security measures
- the ability to monitor and retrieve chemicals in storage
- zero emissions to water, soil, and atmosphere
- rigorous and routine inspections
- emergency response program

Strict Regulation: Strict precautionary measures must be taken to prevent environmental and human health damage which could result from an accident, leak, spill, fire, explosion, or natural disasters. Storage facilities must be designed with a view to facilitate future methods of detoxification;

Closed Loop Destruction: Systems and technologies for the safe de-toxification of chemicals must be designed to be closed-loop and avoid the release of toxic chemicals into the environment;

On-Site Treatment: Mobile detoxification systems which are taken to a contaminated site must be removed upon completion of de-toxification and not remain in-situ where the system could be used to import and dispose of other waste streams;

Responsibility and Accountability: Original producers of banned chemicals, where they can be traced, must be liable for the storage, collection, and disposal and the full cost of the entire de-toxification program;

Comrnunity-Right-to-Know: Full access to information on all aspects of the detoxification program, including the technologies used, alternatives considered, monitoring data at storage and detoxification sites," must be made freely and easily available to the public.

Alternative destruction technologies: A number of alternative POPs destruction technologies are now on offer. Many of these processes, while not perfect, present a better alternative than incineration or cement-kiln burning" A detailed assessment of the various POPs destruction technologies is the subject of an October 1998 Greenpeace report titled "Technical Criteria for the Destruction of Stockpiled Persistent Organic Pollutants. " Copies of the report can be obtained by writing to any of the addresses given in the inside cover "